COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF
TELECOMMUNICATIONS & ENERGY

PIPELINE ENGINEERING AND SAFETY DIVISION

INCIDENT REPORT

225 North Avenue, Weston, Massachusetts
September 12, 2005

PIPELINE ENGINEERING AND SAFETY DIVISION

Location: Weston, Massachusetts

Date of Accident: September 12, 2005

Gas Company: KeySpan Energy Delivery New England

Estimated Property Damage: Over $50,000 *

Injuries: 2

Report Issued - March, 2007

* Estimated by KeySpan Energy Delivery New England

TABLE OF CONTENTS

I. INTRODUCTION ..... Page 1

A. Scope of this Investigation ..... Page 1

B. Overview of Incident ..... Page 2

II. THE DEPARTMENT'S INVESTIGATION ..... Page 4

A. Description of the Site ..... Page 4

B. Description of the Scene ..... Page 4

C. KeySpan Energy Delivery, New England ..... Page 6

1. KeySpan's Locating Services ..... Page 6

2. Dig Safe Request ..... Page 7

3. Operator Qualification and Training Records ..... Page 10

4. History of Locators Performance ..... Page 13

5. Electronic Pipe and Cable Locators Performance ..... Page 13

6. KeySpan Incident Report Determinations and Recommendations .... Page 14

7. Homeowners ..... Page 15

8. W.C. Rowe Corp. ..... Page 16

III. ODORIZATION ..... Page 17

IV. LEAK INVESTIGATIONS AND MAINTENANCE ACTIVITY ..... Page 18

V. LEAKAGE SURVEY ..... Page 18

VI. FINDINGS AND CONCLUSIONS ..... Page 19

A. Findings ..... Page 19

B. Conclusions ..... Page 20

APPENDIX - A
Exhibits

I. INTRODUCTION

A. Scope of this Investigation

The Pipeline Engineering and Safety Division ("Pipeline" or "Division") of the Massachusetts Department of Telecommunications and Energy ("Department"), pursuant to G.L. c. 164, § 105A and G.L. c. 82, §§ 40, 40A through 40E ("Dig Safe"), has investigated a natural gas ("gas") explosion at 225 North Avenue, Weston, which occurred on September 12, 2005 ("Incident").[1] The operator of the pipeline was KeySpan Energy Delivery New England ("KeySpan" or "Operator"). In a report[2] to the United States Department of Transportation ("U.S. DOT") KeySpan reported the damages to be in excess of $50,000 (Exh. 1). There were two injuries as a result of the Incident (Exh. 2).

As part of the Department's annual certification process by the U.S. DOT, the Department must report to the U.S. DOT

> [e]ach accident or incident . . . involving a fatality, personal injury requiring hospitalization, or property damage or loss more than an amount the Secretary establishes, any other accident the [Department] considers significant, and a summary of the investigation by the authority of the cause and circumstances surrounding the accident or incident.

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

2 Form F 7100.1 is an incident report form that operators must tender to the U.S. DOT within 30 days of an incident.

49 U.S.C. § 60105(c)

The purpose of this report is to inform the U.S. DOT of 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 the 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 Department also enforces the U.S. DOT safety standards for gas pipeline systems as set forth in 49 C.F.R. Part 192.

B. Overview of Incident

At approximately 10:45 a.m. on September 12, 2005, the Department received telephonic notice from KeySpan of an explosion at 225 North Avenue, Weston. The caller reported that a contractor, W. C. Rowe Corp. ("Rowe Corp" or "Contractor") hit a gas service line[3] while testing for a septic system. The Department dispatched three investigators to the scene.

The homeowner had contracted Rowe Corp. to install a septic system. While excavating in the front yard of 225 North Avenue, a Rowe excavator struck and pulled a ¾-inch high pressure[4] service line that transitions to one-inch piping, operated by KeySpan

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3 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 meter or at the connection to a customer's piping, whichever is further downstream, or at the connection to customer piping if there is not a meter.

4 A high pressure system is a system in which the pressure in the main is higher than the pressure provided to the customer. 49 C.F.R. § 192.3

(Exh. 3). The contractor caused the line to break at a coupling located upstream of the pulled section of pipe. The failure allowed gas to enter the basement. The area was evacuated by the Weston Fire Department ("Fire Department") prior to the explosion. No one was in the house. A Weston town employee was injured by flying debris. A Weston fireman onsite was also injured. The ignition source is uncertain.

The Division's investigation finds that KeySpan improperly located and marked the location of this underground service line in response to a Dig Safe request by Rowe Corp. The Dig Safe law requires operators of underground facilities to correctly mark the location of their facilities within 72 hours of a request from an excavator. Markings on the ground indicated that the service line extended from the service riser located on the west side of the house straight out to the street (Exh. 4). However, the service actually began on the west side of the house and made a 90 degree turn down the front of the house, towards the center of the house (Exh. 5). When the service reached the center of the house it made another 90 degree turn going towards the street (id.)

II. THE DEPARTMENT'S INVESTIGATION

A. Description of the Site

North Avenue is located in a residential area of Weston. The area is comprised of single-family residences. The structure at 225 North Avenue is a two-story house, with a basement. A two-inch steel gas main, installed in 1930, underlies North Avenue (Exh. 6). The operating pressure of the main was between 48 and 56 p.s.i.g. (id.). A ¾-inch steel service line was installed to 225 North Avenue in 1930 (Exh. 7). In 1992, the service line was relocated to the west side of the house (Exh. 5). At that time, 24-feet of one-inch plastic pipe

was installed and the meter was placed outside (id.). On the outside service riser was a manual shut off valve. The service regulator was mounted downstream of this valve.

B. Description of the Scene

On September 12, 2005 at about 1:30 p.m., three Division investigators arrived at 225 North Avenue to investigate the Incident. Representatives from KeySpan, Rowe Corp., the Fire Department, OSHA, and the State Fire Marshal's Office were already at the scene.

The house had been completely destroyed by the explosion and ensuing fire (Exh. 8). The house had collapsed into the foundation. Debris had been blown across the street into a wooded area (id.). A furnace, washer, dryer, dehumidifier, and water heater were in the basement. In the front of the house, with slight charring of its boom, was a track excavator (Exh. 9). The gas meter was discovered approximately 11 feet from the location of the service riser (Exh. 2). It was discovered under a section of the wall that had been displaced from the foundation during the gas explosion. The meter had been severed from the riser at a point downstream of the meter valve (Exh. 10).

KeySpan attempted to locate the curb valve on the service to shutoff the flow of natural gas, but was unsuccessful. KeySpan then disconnected the service from the main at a coupling located in the street, thus stopping the flow of gas through the service line. The section of main at the service connection was capped (Exh. 2).

The Division's investigators requested that KeySpan conduct a pressure test of the portion of the service line that extended from a kink where the contractor pulled the pipe to the outlet of the service riser. Prior to the test, KeySpan placed a cap at the service valve. The pipe was then cut on the downstream side of the kink and capped. The service was first

pressurized to 10 p.s.i.g; then the pressure was raised to 20 p.s.i.g. (Exh. 2). A coupling approximately 21 inches downstream of the kink began to leak (id.). The leak was not significant enough to have contributed to the explosion. The coupling was cutout and the service line was capped again. The service pipe held at a pressure of 40 p.s.i.g. for 15 minutes (id.). The Division investigators observed no pressure drop, which indicated no leakage (id.).

After completion of the test, investigators attempted to expose the remaining portion of the service just upstream of the kink. As the area was excavated, the portion of the service line that was exposed, the kink, fell onto the ground indicating that the service pipe was no longer intact (id.). When the pipe was completely excavated, it was clear that the service had been pulled apart at a threaded coupling (id.). This appears to have happened when the contractor hit the service line (id.). Measurements by the Division's investigators showed that the kink in the service line was located 119 inches from the foundation wall (Exh. 2). The depth of the service pipe where it pulled out of the coupling was 42 inches (id.). After the section of the pipe with the kink was cut out, it was cut into two sections to help in the transportation of the pipe. The Fire Department took custody of the section of pipe that contained the kink, the two sections of pipe containing the leaking coupling, and the impacted coupling upstream of the kink in the pipe. After the investigation was completed at the scene, the Division's investigators took these sections of pipe into custody.

C. KeySpan Energy Delivery, New England

1. KeySpan's Locating Services

District Inspectors ("Locator" or "Mark-out Person"), employed by KeySpan, locate

and mark KeySpan's facilities in response to excavators' notifications to Dig Safe. This location was marked nine days prior to the Incident. KeySpan locators obtain service information from SPIPE[5] records and Scanned Service Records (Exh. 11). Information pertaining to mains is located on map records which along with the service records are obtained using a field data capture unit ("FDC") (id.). The FDC is located in the vehicles of the mark-out personnel.

The mark-out person for 225 North Avenue did not utilize distribution system map records because the work was "on property" (Exh. 12). During this mark-out, the locator used a MetroTech Model 510 pipe and cable locator (Exh. 14).

The SPIPE record for 225 North Avenue provided measurements for distances from the service line to known locations such as the front of the house and building corners (Exh. 15). According to the file, the service meter is located outside on the left (west) side of the house (id.). The length from the main to the curb shutoff is 11.7 feet; the length from the valve to end is listed as 0 feet and total length of the service is listed as 76 feet (id.). The file also provides the pipe sizes of the service along with a field work note stating that the service was relocated on December 18, 1992 (id.). The Scanned Service record provides a sketch of the service including the service pipe sizes. The service records state that the service was relocated; date of relocation, pipe sizes and a remark indicating that the service was relocated from the front of the house around the left hand corner (Exh. 5).

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5 The name is short for Service PIPE. These files contain information such as size, length, pressure classification, installation date, size of main to which the service is connected, material, location of service entry, and distance from reference points (i.e., building corners). KeySpan Damage Prevention Manual, 2004 ed., pages 27-31.

2. Dig Safe Request

On September 1, 2005, Rowe Corp. called Dig Safe and requested a Dig Safe number for 225 North Avenue, Weston (Exh 16). The Dig Safe ticket indicated that Rowe would be testing for a septic system and the extent of the work would be the entire private property (id.). Dig Safe provided a start date of September 7, 2005 (id.). On September 7, 2005, a KeySpan locator arrived at 225 North Avenue to mark out the location. He attempted to locate SPIPE and Scanned Service record for 225 North Avenue (Exh. 2). Both of these computer inquiries indicated that no information was available for this service. Unable to verify the location of the service, the mark-out person went to the house and located the meter that was on the left side of the house (id.). He used his MetroTech 510 pipe and cable locating equipment to tie onto the service riser and flagged out the service. The locator did not see the tracer wire that is used to locate plastic pipe installations at the riser (Exh. 17). He attempted to locate the service line curb valve but was unable to find it (Exh. 18). The locator also indicated to the Division investigator that he had been having problems with his 510 locating machine (Exh. 3).

When the locator completed marking out the service line to 225 North Avenue, he completed a computer generated dig safe completion ticket for the mark-out (Exh. 16). The completion ticket indicated he visited the site and marked out the service line on September 3, 2005 (id.). The method of locating was direct, meaning that he tied directly onto the service to determine its location. In the comment section of the completion ticket the

locator had the following comments: Flagged Service, No Service Card, Locator Down [6], Talked to Owner, Don't Dig in Gas area (id.).

The incident investigation revealed that the locator did not retrieve the SPIPE and Scanned Service records because he failed to access the computer application system correctly (Exh. 12). The mark-out flags that were placed in the lawn area of 225 North Avenue did not accurately indicate the location of the service line (Exh. 4). The flags indicated that the service went from the riser at the building straight out to the street (id.). The service actually took a 90 degree turn and ran along the front side of the house, made another 90 degree turn and went straight towards the street (Exh. 5). The locator had relied solely on his 510 locating machine and his connection to the riser to mark out the service (Exh. 12).

The service to 225 North Avenue is comprised of the following: bare steel pipe; plastic pipe and a steel riser inserted with plastic. In order to locate a plastic service, a tracer wire is utilized. In this case, the locator never located the tracer wire (Exh. 17). During the investigation, the tracer wire was found near an excavated portion of the service line (id.). The KeySpan locator also relied solely on equipment that he considered problematic, the Metrotech 510 locating machine (Exh. 3). The Company reported that it tested the Metro Tech 510 machine, and concluded that it was working correctly. (Exh. 26).

On September 29, 2005, a KeySpan supervisor tested the locating equipment used by

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6 The locator was referring to his MetroTech 810 pipe and cable locating machine, not the Metro Tech 510 that was used for the markout of 225 North Ave, Weston (Exh. 26).

the locator, making direct connection to the service riser at 225 North Avenue. The locating equipment did not provide signals in the marked location (Exh. 19).

KeySpan's O&M procedure, DAMAGE 5020: Procedure for Locating and Marking Out Sub-Surface Facilities, provides requirements to be followed by locators in the field. The O&M states that a locator should utilize any or all of the following Maps and Records: 1) Maps and Records provided electronically through FDC unit; 2) Scanned records provided electronically through FDC unit; 3) S-Pipe file provided electronically through the FDC unit; 4) New construction notes; and 4) Regulator construction notes available upon request through Pressure Group (Exh. 20).

The procedure also states that "if the markout person notices a discrepancy between the engineering records and the actual location of the gas facility, he/she shall fill out the Misc. AMMS Correction Form within the FDC unit. The markout person shall use their electronic pipe locator and their best judgement to markout the service" (id.).

The locator for 225 North Avenue attempted to use KeySpan's Scanned records and SPIPE records to obtain the location of the service line. He followed company procedures by utilizing the available records; however, he failed to access the information correctly (Exh. 12). As a result of the locator's actions, the FDC unit supplied inaccurate information to the locator. The FDC unit scanned records indicated that there was only one service on North Avenue, 535 North Avenue. The SPIPE record indicated that there wasn't a service at 225 North Avenue (id.). The locator went one more step by attempting to locate the service with a pipe locator (id.). This also produced an incorrect result.

All existing services are listed in the SPIPE system (Exh. 19). During the locator's search for these records, if the SPIPE system says that no service records were found, that should suggest to the locator the existence of either a records problem, or a records retrieval problem, and assistance should have been requested (id.). If assistance had been requested, it would have alerted the company of a records problem (id.). There are occasions in which records are not available, but that was not the case here (id.).

The locator did not notify the Damage Prevention supervisor of any of the problems he had been having with the mark-out (Exh. 19). When a mark-out person notices a discrepancy between the engineering records and the actual location of the gas facility, KeySpan's O&M Procedures require the locator to fill out the Misc. AMMS Correction Form within the FDC unit (Exh. 20). The locator did not complete a Misc. AMMS Correction Form (id.).

3. Operator Qualification and Training Records

KeySpan provided training records for the locator who marked out the gas service at 225 North Avenue. The records date back to 1994 (Exh. 21). Annual training provided by KeySpan's Norwood Training facility included the following: District Inspector Training (1994-1998) and Mark-out Refresher Training (1999-2004). These training sessions are the same. The name of the training was changed to Mark-out Training in the 1990's (id.). The Damage Prevention Manual which is used during training sessions includes: Summary of the Dig Safe Law; Locating and Marking Procedures; Cast Iron replacement Guidelines; Methods for Identifying and Marking Company facilities; Maps and Records (SPIPE, symbols etc). The training also includes a review of maps, records, S-Pipe and also the electronic means to access

records.

The Damage Prevention Manual (August 2004) contained two sets of O&M procedures with a May, 2004 revision date. One of the procedures contained a reference to scanned records in the section pertaining to Maps and Records and the other did not. The damage prevention procedures in the O&M, which has a revision date of July 2004, contained a reference to the use of scanned records as a tool to be utilized by the locator. It is unclear why the Damage Prevention Manual did not contain the July, 2004 revised O&M procedure.

The KeySpan locator also received individual training by Damage Prevention Supervisors. The training included the following:

* August 1, 2005 – A Damage Prevention Supervisor provided one-on-one training in the use of the MetroTech 810 pipe and cable locator (Exh 21).
* June 22, 2005 – A Damage Prevention Supervisor provided a one-on-one training with the locator after a mismark at 33 Juniper Road, Weston. One reason for this mismark was that the locator did not use the scanned service cards to markout the location (Exh. 21).
* May 10, 2005 – Safety and Operations meeting was held. The Damage Prevention Supervisor demonstrated the proper method of accessing services in the Scanned Records application. The supervisor also told the attendees not to put in a street address because they would miss addresses with no street number such as lot numbers, pole numbers (Exh. 21).

* March 1, 2005 – Safety and Operations meeting was held (Exh. 21).

49 C.F.R. Part 192, Subpart N Federal Pipeline Safety Regulations require operators to develop a qualification program for its employees who have particular job functions. The Districts/markout employees have to be qualified to perform their job responsibilities. The locator of 225 North Avenue received Operator Qualification ("OQ") tests on October 28, 2002, December 10, 2004 and August 16, 2005 (Exh. 22). The results of the tests indicated that the locator passed all of the required tests (id.). The OQ testing included the following:

- Inspecting for atmospheric corrosion
- Visually inspecting for internal corrosion
- Line Locating and markout
- Inspecting third party excavations
- Inspecting exposed pipe
- Inspecting pipe at a maintenance job for damage
- Abnormal conditions and properties of natural gas.

4. History of Locator's Performance

In 2005, the locator of 225 North Avenue mismarked three locations which resulted in damages: 1) Whispering Lane, Weston - 6/1/05; 2) 17 Robert Best Road, Sudbury - 6/6/05; 3) 1 Highland Road, Sudbury - 6/29/05 (Exh. 23). There were also two other locations that were mismarked by the same locator in 2005. These mismarks did not result in damages to KeySpan's facilities they were: 1) 33 Juniper Road, Weston – 6/22/05 and 2) 29 Barnett Road, Sudbury - 9/1/05 (Exh. 24). The locator was retrained on three separate occasions between

June, 2005 and August, 2005: June 22, 2005, August 16 and 17, 2005 (Exh. 21).

5. Electronic Pipe and Cable Locators Performance

The KeySpan locator was provided with the following pieces of equipment in his vehicle and available to him: MetroTech 810 pipe and cable locator (one meter on this unit was not working properly); MetroTech 510 pipe and cable locator; Heath Sure-lock All Pro pipe and cable locator; and Pipehorn Model 100 pipe and cable locator (Exh 13). KeySpan locators also have other types of locating equipment including valve box locators (id.). KeySpan was unable to provide a maintenance history for the 510 and 810 pipe and cable locators (Exh. 25). The 510 locating machine, used by the locator who marked out 225 North Avenue was manufactured and calibrated on or about July 16, 2003 (Exh 14). The manufacturer's procedures do not require the machine to be calibrated. The procedures do require that the batteries be checked on a regular basis (id.).

On June 22, 2005, the KeySpan locator requested that the supervisor provide him with a new locating machine after he performed a mismark at 22 Juniper Road. On August 17, 2005, the locator was given a MetroTech 810 (Exh 24). At that time, the Damage Prevention supervisor spent an hour showing the locator how to use the machine (id.).

On September 1, 2005, at 29 Barnett Road, the locator informed the Damage Prevention supervisor that the meter on his Model 810 was pinned and not working (id.). The supervisor told the locator that he could still use the digital readout if it worked (id.). The locator decided to use his MetroTech 510 machine. Even with the new machine the locator was still having problems marking out. The supervisor came out to Barnett Road and

determined that the marks were off at some locations (id.). The supervisor informed the locator that they would get together another day to go over the markout of this location. KeySpan did not provide a date as to when the supervisor and the locator met to discuss the mismark (id.).

6. KeySpan Incident Report Determinations and Recommendations.

KeySpan conducted an investigation into the incident that occurred at 225 North Avenue, Weston. As a result of the investigation, KeySpan made determinations as to the cause of the mismark and recommendations (Exh. 26). A few of the determinations and recommendations are listed below:

Determinations

1) The locator did not properly look up the service records to 225 North Avenue, Weston, that were available in the Host Inquiry and Scanned Records application. Had he entered "North Av" instead of "North Ave" in the Host Inquiry SPIPE application, he would have found accurate service information for 225 North Avenue, Weston.
2) Had the locator entered "North*"instead of "North Ave*" in the "Street Name" box of the Scanned Service application on his FDC unit he would have received 179 scanned records for North Avenue, Weston.
3) The locator received training on the proper method to find service information in the Scanned Records application on May 10, 2005 in the Waltham Yard.
4) When the locator arrived on site at 225 North Avenue, Weston, and found a service riser on the left side of the building, he did not delay his markout and seek assistance to gather any existing records of the service.
5) When the locator met his supervisor on Tuesday September 6, a day before the Dig Safe ticket was legal to be dug, to pick up a MetroTech 810 pipe and cable locator, he did not mention problems with finding records to 225 North Avenue, Weston or request his supervisor's assistance with the mark out at that location.
6) The final determination is that the service to 225 North Avenue was improperly marked due to the locator not following proper KeySpan procedure and due to locator error. The mismarked gas service was struck and pulled by the excavating contractor ultimately causing the incident (id.).

Recommendations

1) Employee Discipline – Action taken
2) Re-train all Damage Prevention employees in record access applications and in the proper operation of electronic locating equipment – Action to be taken
3) Review of all department procedures and the Damage Prevention Manual – Action to be taken
4) Re-training of all others involved in markout activities in records access applications and in proper operation of electronic locating equipment – Action to be taken
5) Train the trainer sessions for yard training representatives in record access applications – Action to be taken
6) Damage Prevention supervisors conduct more frequent periodic field audits of all locating activities – Action to be taken
7) Use QA/QC inspectors to periodically review mark out activities of all Damage Prevention employees – Action to be taken (Exh. 1)

7. Homeowners

The homeowners have lived at this residence since 1992 (id.). After moving into their house, they enclosed a three season porch. The existing septic system for the house is located on the left front area of the house. They never smelled gas in their home (id.). One of the homeowners was home when his natural gas service line was being marked out by a KeySpan locator (Exh. 2). He spoke to the locator and asked what he was doing. The locator proceeded to place flags in the yard to show the location of the gas line.

On the morning of September 12, 2005, one of the homeowners was at home. At approximately 8:30 a.m., the contractor's backhoe arrived onsite with an engineer. At 9:30 a.m., the homeowner left the house to go to the Post Office (id.). When he left, the backhoe operator was digging in the area of the gas service. The homeowner had left one window open on the lower level of the front side of his house. He had a conversation with the backhoe operator who asked him how long he had lived at the house and if the pipes had

been changed. When he returned home from the Post Office, he discovered that there had been a gas explosion (id.).

8. W.C. Rowe Corp.

The W. C. Rowe Corp. was hired to perform excavating work for a new septic system at 225 North Avenue. The day of the explosion was the first day of excavation for the project. Rowe had obtained a valid Dig Safe number (Exh. 16). The Dig Safe ticket became valid on September 7, 2005 at 9:30 a.m. (id.). The excavator was unsure if the area was premarked. Prior to the damage to the service line, Rowe had excavated by hand near the service riser and along the route of the flagged service line in an attempt to locate the service line.

Unable to locate the service, Rowe decided to move to a safe area to begin excavating. After moving approximately 15 feet east of the flagged area, the backhoe operated by a Rowe employee struck the service line feeding 225 North Avenue, placing a kink in the pipe (Exh. 3). The gas smell permeated the area while a plume of dirt surrounded the backhoe at the kinked area. After the service was hit, the employee took photographs of the area.

Rowe notified Dig Safe Inc. and the Fire Department of the hit gas service line. KeySpan's Call Center received a call from Dig Safe at 10:21 a.m., reporting that a contractor working at 225 North Avenue, Weston, hit a gas line (Exh. 27). At 10:25 a.m., KeySpan dispatched a service technician to the site (Exh. 27). The Fire Department arrived at the site and detected a high level of natural gas in the basement. They evacuated civilians and public safety personnel (Exh. 28). The house exploded shortly thereafter. (Exh. 27).

III. ODORIZATION

The state regulation, 220 C.M.R. § 101.06(20), requires operators to odorize gas in their distribution systems. Gas must be "readily perceptible to the normal or average olfactory senses of a person coming from fresh uncontaminated air into a closed room containing [0.15 percent gas in air]." 220 C.M.R. § 101.06(20)(a). Operators are also required to conduct periodic sampling of odorant concentrations throughout their systems. 220 C.M.R. § 101.06(20)(a). KeySpan conducts odorant sampling on a monthly basis.

On September 12, 2005, several odor level tests were conducted in Weston after the explosion (Exh. 29). The results of the test are as follows:

1. 227 North Avenue @ 12:10 p.m. - Odor level @ 0.12 percent gas in air
2. 4 Hastings Road, Weston @ 1:00 p.m. - Odor level @ 0.080 percent gas in air
3. Weston Fire Station, Boston Post Road @ 1:40 p.m. - Odor level @ 0.080 percent gas in air.

The odor detectability levels of gas in air ranged from 0.080 percent to 0.120 percent gas in air, indicating that the odorant levels were within the prescribed state regulation. See 220 C.M.R. § 101.06(20)(a). There were reports of an odor of gas prior to the explosion (Exh. 2).

IV. LEAK INVESTIGATIONS AND MAINTENANCE ACTIVITY

On January 30, 2004, KeySpan responded to a leak at 225 North Avenue, Weston (Exh. 31). A leak at a union, down stream of the riser shutoff, was found and the gas was shutoff so that fitters could repair the line (id.). The leak was repaired that day. Over the last

year, KeySpan is not aware of any maintenance or replacement work performed on the main in the area of the incident (Exh. 6).

V. LEAKAGE SURVEY

In order to determine if other leak sources were contributing factors to the Incident, the Department reviewed the leak history of the mains and service to 225 North Avenue. Leakage surveys of gas mains and services are required by federal and state regulations. See 49 C.F.R. § 192.723(a) and 220 C.M.R. § 101.06(21). The week of August 18, 2003, a walking survey of the main and service was performed (Exh. 32). On November 12, 2004, KeySpan conducted a mobile leakage survey over the gas main underlying North Avenue (id.). The mobile survey did not detect any leaks in the area (id.). After the Incident, KeySpan conducted a leak survey. This survey detected no gas readings on the main or service to 225 North Avenue. There were no gas readings in the adjacent homes to 225 North Avenue (Exh. 33).

VI. FINDINGS AND CONCLUSIONS

A. Findings

1. A two-inch steel main was laid under North Avenue in 1930.
2. A three-quarter inch steel service line to 225 North Avenue was connected to the two-inch main on North Avenue. The service line, which was installed in 1930 was partially relayed with 24 feet of one-inch plastic pipe in 1992. The plastic pipe was installed from the meter to the front center of the house.
3. The meter, regulator and service riser were located on the west side of the house.
4. The service card shows that in 1992, plastic pipe was installed and the meter was relocated to the left side of the house.
5. The SPIPE file for 225 North Avenue indicated that the service was relocated in 1992 and the meter was located outside on the left. The size and measurements of the steel and plastic portions of the service were listed.
6. W.C. Rowe Corporation tendered notification to Dig Safe on September 1, 2005 for septic testing at 225 North Avenue, Weston.
7. A KeySpan locator marked the service line to 225 North Avenue on September 3, 2005.
8. The KeySpan locator failed to access scanned service records and SPIPE file correctly.
9. The locator did not access the tracer wire, at the service riser which is used to locate plastic pipe because it was inaccessible.
10. The locator connected directly to the service riser to mark out the service which resulted in a mismark of the service line.
11. The locator indicated on his Dig Safe completion record that one of his locators was down.
12. KeySpan's procedures call for locators to use scanned records and SPIPE file to be utilized when marking out a service.
13. The locator failed to complete a Misc. AMMS Correction Form after noticing discrepancies with the engineering records and the actual location of the gas facility.
14. An excavator, operated by W.C. Rowe Corporation on the south side of the house, struck the service line to 225 North Avenue on September 12, 2005.
15. The force exerted by the excavator pulled the underground section of the service line, horizontally, in a northerly direction.
16. Post incident investigation showed no service line or other underground metallic structure at the location indicated by the Dig Safe markings placed by the KeySpan locator.

B. Conclusions

On September 1, 2005, W.C.Rowe Corporation tendered notification to Dig Safe Inc. That septic testing work would be conducted on the private property of 225 North Avenue, Weston. KeySpan's locator improperly marked the service line. The locator failed to use the computerized record keeping system correctly. Further, the locator failed to notify the supervisor of problems he was having with the markout.

The damage to the gas line servicing this residence occurred during mechanized excavation activity relating to the testing for a septic system. The only identifying marks on the private property to indicate the location of the gas service line were flags that were placed in a manner showing that the service went directly out to the street with no offsets. These markings did not identify the true location of the gas service. In an apparent "safe" area, away from the markings, the backhoe struck the unidentified gas service line. The horizontal movement by the backhoe caused the pipe to fracture at the inlet connection to a threaded coupling, which was located in close proximity to the contractor excavation. This fracture allowed gas to enter the house, which led to the explosion.

Appendix – A

Exhibits

1. United States Department of Transportation Incident Report – October 12, 2005
2. Five accident Investigation Memos – Angela Motley – September 14, 2005
3. Memo from Bob Hayden, Dig Safe Coordinator – September 12, 2005
4. Photograph of marked service line to 225 North Avenue
5. Service installation card for 225 North Avenue, Weston – 1992
6. First set of Information Request Responses: 1-4
7. Service installation card for 225 North Avenue, Weston – 1930
8. Photographs of the explosion site
9. Photographs of excavator
10. Photographs of Service Riser
11. KeySpan's Damage Prevention Procedures – DAMG-5020
12. First Set of Information Request Responses: 1-17
13. First Set of Information Request Responses: 1-20
14. First Set of Information Request Responses: 1-22
15. First Set of Information Request Responses: 1-22
16. Dig Safe Ticket and Completion Form
17. First Set of Information Request Responses: 1-32
18. First set of Information Request Responses: 1-28
19. First Set of Information Request Responses: 1-16
20. First Set of Information Request Responses: 1-19
21. First Set of Information Request Responses: 1-11

Exhibits - cont.

22. First Set of Information Request Responses: 1-25

23. First Set of Information Request Responses: 1-24

24. First Set of Information Request Responses: 1-23

25. First Set of Information Request Responses: 1-21

26. KeySpan Incident Investigation Report

27. First Set of Information Request Responses: 1-1

28. Statement from the Office of Public Safety Department of Fire Services - September 14, 2005

29. First Set of Information Request Responses: 1-9

30. First Set of Information Request Responses: 1-5

31. First Set of Information Request Responses: 1-6

32. First Set of Information Request Responses: 1-7

33. Premise Condition Report

EXHIBIT 1

United States Department of Transportation Incident Report

KEYSPAN
Energy Delivery

KeySpan Energy Delivery
52 Second Avenue
Waltham, MA 02451
Tel 781 466-5137
Fax 781 290-4965
E-mail tteehan@keyspanenergy.com

Thomas R. Teehan
Senior Counsel

Via Facsimile
Confirmatory Copy by U.S. Mail

October 12, 2005

Mr. Jefferson Tancil
Office of Pipeline Safety
Information Resource Manager
DPS-13
407th Street, S.W.
Washington, DC 20590

Re: 225 North Avenue, Weston, Massachusetts

Dear Mr. Tancil:

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

Very truly yours,

Thomas R. Teehan (dmo)

Thomas R. Teehan

TRT/dmo
Enclosure

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 the violation continues up to a maximum of $1,000,000 for any related series of violations as provided in 49 USC 60122.

Form Approved
OMB No. 2137-0522

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

INCIDENT REPORT - GAS DISTRIBUTION SYSTEM

Report Date _____
No. _____ (DOT Use Only)

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 Office Of Pipeline Safety Web Page at* http://ops.dot.gov.

PART A - GENERAL REPORT INFORMATION

Check: X☐ **Original Report** ☐ **Supplemental Report** ☐ **Final Report**

1. Operator Name and Address

a. Operator's 5-digit Identification Number / 1 / 6 / 4 / 0 / /

b. If Operator does not own the pipeline, enter Owner's 5-digit Identification Number / / / / / /

c. Name of Operator Boston Gas Company d/b/a KeySpan Energy Delivery New England

d. Operator street address 52 Second Avenue

e. Operator address Waltham, Middlesex County, MA 02451
City, County or Parish, State and Zip Code

2. Time and date of the incident

/ 1 / 0 / 5 / 0 / (hr.) / 0 / 9 / (month) / 1 / 2 / (day) / 0 / 5 / (year)

3. Incident Location

a. 225 North Avenue
Street or nearest street or road

b. Weston
City and County or Parish

c. Massachusetts 02493
State and Zip Code

d. Latitude: / / / / / / Longitude: / / / / / /
(if not available, see instructions for how to provide specific location)

e. Class location description
O Class 1 O Class 2 O Class 3 O Class 4

f. Incident on Federal Land O Yes X No

4. Type of leak or rupture

O Leak: O Pinhole O Connection Failure *(complete sec. F5)*

O Puncture, diameter or cross section *(inches)* ____

O Rupture (if applicable):

O Circumferential – Separation

O Longitudinal

- Tear/Crack, length *(inches)* _____

- Propagation Length, total, both sides *(feet)* _____

O N/A

X Other: Contractor excavating hit gas service line

5. Consequences *(check and complete all that apply)*

a. Fatality Total number of people: / / / /

Employees: / / / / *General Public:* / / / 1 /

Non-employee Contractors: / / / /

b. ☐ Injury requiring inpatient hospitalization

Total number of people: / / / /

Employees: / / / / *General Public:* / / / /

Non-employee Contractors: / / / /

c. X☐ Property damage/loss *(estimated)* Total $ over $50,000

Gas loss $_____ Operator damage $_____

Public/private property damage $_____

d. ☐ Gas ignited XO Explosion O No Explosion

e. Gas did not ignite O Explosion O No Explosion

f. ☐ Evacuation *(general public only)* / / / / / people

Evacuation Reason:

O Unknown

O Emergency worker or public official ordered, precautionary

O Threat to the public

O Company policy

6. Elapsed time until area was made safe:

/ 0 / 1 / hr. / 2 / 1 / min.

7. Telephone Report

/ 7 / 7 / 2 / 1 / 8 / 1 / (NRC Report Number) / 0 / 9 / (month) / 1 / 2 / (day) / 0 / 5 / (year)

8. a. Estimated pressure at point and time of incident:

approx. 50 *PSIG*

b. Max. allowable operating pressure *(MAOP):* 60 *PSIG*

c. MAOP established by:

O Test Pressure _____ psig

O 49 CFR § 192. 619 (a)(3)

PART B - PREPARER AND AUTHORIZED SIGNATURE

Thomas R. Teehan, Senior Counsel
(type or print) Preparer's Name and Title

Area Code and Telephone Number

TTeehan@keySpanenergy.com
Preparer's E-mail Address

Area Code and Facsimile Number

Authorized Signature

(type or print) Name and Title

10/12/05
Date

Area Code and Telephone Number

PART C – ORIGIN OF THE INCIDENT

1. Incident occurred on
   - O Main
   - XO Service
   - O Pressure Limiting and Regulating Facility
   - O Meter Set
   - O Other: __
2. Failure occurred on
   - O Body of Pipe
   - O Joint
   - O Other: CONTRACTOR HIT GAS PIPE WHILE EXCAVATING
   - O Pipe Seam
   - O Component
3. Material involved *(pipe, fitting, or other component)*
   - XO Steel
   - O Cast/Wrought Iron
   - O Polyethelene Plastic (complete all items that apply in a-c)
   - O Other Plastic (complete all items that apply in a-c)
     Plastic failure was: ☐ a.ductile ☐ b.brittle ☐ c.joint failure
   - O Other material: _____
4. Year the pipe or component which failed was installed: / 1 / 9 / 3 /0 and relocated in 1992

PART D – MATERIAL SPECIFICATION (if applicable)

1. Nominal pipe size *(NPS)* / / / / / in.
2. Wall thickness / / / / / in.
3. Specification _____ SMYS / / / / / /
4. Seam type _____
5. Valve type _____
6. Pipe or valve manufactured by _____ in year / / / / /

PART E – ENVIRONMENT

1. Area of incident
   - O Under pavement
   - O Under ground
   - X Inside/under building
   - O In open ditch
   - O Above ground
   - O Under water
   - O Other: _____
2. Depth of cover: _____ inches

PART F – APPARENT CAUSE

Important: There are 25 numbered causes in this section. Check the box to the left of the primary cause of the incident. Check one circle in each of the supplemental items to the right of or below the cause you indicate. See the instructions for this form for guidance.

F1 – CORROSION

If either F1 (1) External Corrosion, or F1 (2) Internal Corrosion is checked, complete all subparts a – e.

1. ☐ External Corrosion
2. ☐ Internal Corrosion

a. Pipe Coating
- O Bare
- O Coated
- O Unknown

b. Visual Examination
- O Localized Pitting
- O General Corrosion
- O Other: _____

c. Cause of Corrosion
- O Galvanic
- O Stray Current
- O Improper Cathodic Protection
- O Microbiological
- O Other: _____

d. Was corroded part of pipeline considered to be under cathodic protection prior to discovering incident?
O No O Yes O Unknown Year Protection Started: / / / / /

e. Was pipe previously damaged in the area of corrosion?
O No O Yes O Unknown How long prior to incident: / / / years / / months

F2 – NATURAL FORCES

3. ☐ Earth Movement ⇒ O Earthquake O Subsidence O Landslide O Other: _____
4. ☐ Lightning
5. ☐ Heavy Rains/Floods ⇒ O Washouts O Flotation O Mudslide O Scouring O Other: _____
6. ☐ Temperature ⇒ O Thermal stress O Frost heave O Frozen components O Other: _____
7. ☐ High Winds

F3 - EXCAVATION

8. ☐ Operator Excavation Damage *(including their contractors)* / Not Third Party
9. X☐ Third Party Excavation Damage *(complete a-d)*
   a. Excavator group
      O General Public O Government O Excavator other than Operator/subcontractor
   b. Type: O Road Work O Pipeline O Water O Electric O Sewer O Phone/Cable/Fiber XO Landowner O Railroad
      O Building Construction O Other: septic
   c. Did operator get prior notification of excavation activity?
      O No O Yes: Date received: / 0 / 9 / mo. / 0 / 1 / day / 0 / 5 / yr.
      Notification received from: XO One Call System O Excavator O General Contractor O Landowner
   d. Was pipeline marked?
      O No XO Yes *(If Yes, check applicable items i – iv)*
      i. Temporary markings: XO Flags O Stakes O Paint
      ii. Permanent markings: O Yes XO No
      iii. Marks were *(check one)* O Accurate XO Not Accurate
      iv. Were marks made within required time? XO Yes O No

F4 – OTHER OUTSIDE FORCE DAMAGE

10. ☐ Fire/Explosion as primary cause of failure ⇒ Fire/Explosion cause: O Man made O Natural *Describe in Part G*
11. ☐ Car, truck or other vehicle not relating to excavation activity damaging pipe
12. ☐ Rupture of Previously Damaged Pipe
13. ☐ Vandalism

F5 – MATERIAL OR WELDS

Material

14. ☐ Body of Pipe ⇒ O Dent O Gouge O Wrinkle Bend O Arc Burn O Other: _____
15. ☐ Component ⇒ O Valve O Fitting O Vessel O Extruded Outlet O Other: _____
16. ☐ Joint ⇒ O Gasket O O-Ring O Threads O Fusion O Other: _____

Weld

17. ☐ Butt ⇒ O Pipe O Fabrication O Other: _____
18. ☐ Fillet ⇒ O Branch O Hot Tap O Fitting O Repair Sleeve O Other: _____
19. ☐ Pipe Seam ⇒ O LF ERW O DSAW [redacted] nless O Flash Weld
O HF ERW O SAW O Spiral O Other: _____

*Complete a-f if you indicate **any** cause in part F5.*

a. Type of failure:

☐ Construction Defect ⇒ O Poor Workmanship O Procedure not followed O Poor Construction Procedures

☐ Material Defect

b. Was failure due to pipe damage sustained in transportation to the construction or fabrication site? O Yes O No

c. Was part which leaked pressure tested before incident occurred? O Yes, *complete d-f, **if known*** O No

d. Date of test: / / / mo. / / / day / / / yr.

e. Time held at test pressure: / / / hr.

f. Estimated test pressure at point of incident: _____ *PSIG*

F6 – EQUIPMENT OR OPERATIONS

20. ☐ Malfunction of Control/Relief Equipment ⇒ O Valve O Instrumentation O Pressure Regulator O Other: _____
21. ☐ Threads Stripped, Broken Pipe Coupling ⇒ O Nipples O Valve Threads O Mechanical Couplings O Other: _____
22. ☐ Leaking Seals

23. ☐ Incorrect Operation

a. Type: O Inadequate Procedures O Inadequate Safety Practices O Failure to Follow Procedures O Other: _____

b. Number of employees involved in incident who failed post-incident drug test: / / / / Alcohol test: / / / /

c. Was person involved in incident qualified per OQ rule? O Yes O No d. Hours on duty for person involved: / / /

F7 – OTHER

24. X Miscellaneous, *describe:* Excavator did not use care while digging.

25. Unknown

O Investigation Complete XO Still Under Investigation *(submit a supplemental report when investigation is complete)*

PART G – NARRATIVE DESCRIPTION OF FACTORS CONTRIBUTING TO THE EVENT *(Attach additional sheets as necessary)*

A contractor digging struck a gas service. The contractor had dug a test hole over the area where service pipe had been marked out and found no service line. Nevertheless, the contractor continued to dig with backhoe in the front yard and eventually struck gas service line.

P. 01

TRANSACTION REPORT

OCT-12-2005 WED 03:51 PM

DATE START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
OCT-12 03:49 PM	12023664566	1'37"	5	SEND	OK	924	

TOTAL : 1M 37S PAGES: 5

KEYSPAN ENERGY

KEYSPAN
Legal Department
52 Second Avenue, 4th Fl.
Waltham, MA 02451
Facsimile (781) 290-4965

FAX

FROM: Thomas R. Teehan

DATE: October 12, 2005

Phone: 781-466-5137

NUMBER OF PAGES TRANSMITTED INCLUDING COVER SHEET: 5
If you did not receive the indicated number of pages, or if any pages are illegible, please call (781) 466-5135.

TO: Jefferson Tancil

EXHIBIT 2

Accident Investigation Memo – Angela Motley

MEMO

To: Accident Investigation File

From: Angela Motley, Public Utilities Engineer (PUE)

Date: September 14, 2005

Re: 225 North Avenue, Weston Incident – Day 1: September 12, 2005

DTE Representatives:
Glen LaChance, Investigator, PUE - Arrival Time: 1:24 pm
Angela Motley, Investigator, PUE
Bob Hayden, Dig Safe Investigator

Location: 225 North Avenue, Weston

Homeowners:
They were being interviewed by the State Police. We did not get an opportunity to meet with them.

Fire Chief: Edmund Walker (card)
Paul Nicholas – Weston Fire Dept Investigator

KeySpan markout person: Rob Ravino

Contractor: WC Rowe; Owner, Bill Rowe
Backhoe operator left site unable to speak to him. Contactor working to install a septic system preparing to perform PERK Testing.. The had exposed service at the riser and at the 90 degree turn at the corner of the house. We need to interview the backhoe operator.

KeySpan Representatives: Mike Smith, Waltham Manager, Chuck Cotting, Damage Prevention Manager, Joe O'Connor, Tom Sheehan, MSF Supervisor, Tom Teehan, Tricia Vigente; John Gatherum

State Police – Peter Cummings

OSHA: Frank Vaughn (card)

Location Description: Residential area, two story house, Basement; no garage, shed. Portion of foundation field stone and the other section is concrete (addition). An addition was installed in the area of the service. Wooden shingle house. House is located on a main street. Soil was sandy.

Description of scene: House totally demolished, consumed by fire. The explosion resulted in debris scattered across the street and in neighboring lawns. No visible damage to adjacent homes other than a few broken windows in the garage area of the house to the right of the explosion site.

Main - 2" Steel: Exposed in the street. Depth of 31 inches in the street.
Service: 1" steel transitions at house to ¾" plastic (ALDYL "A") . Outside riser on left side of house. Shutoff indicated on the service card. KeySpan in its response to the explosion never exposed curb valve. The service at the street had been bent back and a coupling was visible at the end. KeySpan had excavated at this location and moved the service while attempting to expose the service connection at the main. Mike Smith said that they had uncovered a pin hole leak in the main, it appears to have been the location of the service connection to the main. The pressure of the service /main 40 psig. At the street there was 7 feet of exposed pipe and the distance from the point the service left the soil to the main was 8 feet. A 1 foot difference. The service was relocated in 1992 (service card). The original service card showed the steel service entering the front of the house (inside meter set). The curb valve shown on the card indicated that it was 11.7 feet from the main. After the incident, KeySpan exposed and painted main line valve near the explosion site in case they needed to shutdown the main.

Injuries:
Two people were taken to the hospital – Beth Koch. She is a Health Agent for the Town of Weston and was onsite during the gas explosion. She was hit by flying debris. She was at the location to inspect the septic system. A fireman, Peter Burke, was also taken to the hospital.

No one was in the house at the time of the incident. The Fire Dept was notified by the contractor. They arrived entered the house and did not get any gas readings in the main section of the house. He entered the basement and smelled gas and his machine indicated high gas readings. He asked everyone to move from by the house because of high gas readings in the basement. He entered the basement through the kitchen. The outside door was locked.

KeySpan shutoff gas service to houses on either side of the explosion site at the meter. The service on the right side of the house was turned back on. The meter at 227 was left shutoff at the meter.

KeySpan crew: Crew said they were in Arlington and got the call around 10:20. They did not get to the location until approximately 11:00. They were the closest crew that was available.

Dig Safe Information: Rob Ravino was the locator for this particular job. He has been taken back to KeySpan's office to be interviewed.

Layout of the House: The State Fire Marshall had a picture of the house taken from Town Hall. It showed a new addition on the left side of the house. In the mid-section of the house there were stairs leading up to the first floor. On the right side of the house was a field stone foundation.

Kink: The distance from the top of the kink to the foundation wall was 119"

Gas Meter: Meter was found under the left side wall debris that was blown to the foundation by the explosion. The meter was found approximately 11' from the riser.

Gas Service: Gas Stove

Service Riser: The exposed service riser has a shutoff and plastic transition fitting was visible. There was a small section of piping that was attached to the end of riser (at the shutoff which was initially connected to the piping going into the regulator/meter. This appears to have been snapped off when the house exploded. The meter/regulator was found next to the riser under siding from the house. There was no tracer wire visible. The meter was taken by the State Police.

Interview with Bill Rowe (owner of construction company): This interview was being conducted by Bob Hayden. When I went over to where the interview was being conducted, Mr. Rowe said the following: After the service line was hit, he received a call from the backhoe operator indicating the damage, 10:16 a.m. At 10:20 a.m. he was at the house. The gas was blowing towards the house. He immediately took pictures.

Pressure Test of Service: The test of the service consisted of the area from the damaged section of pipe (kink) to the outlet of the riser. KeySpan placed a cap on the end of the pipe that extended out from the service cock. The service was cut just after the kink on the downstream side. The test was started at 6:15 pm. The initial pressure was 10 psig and then it was raised to 20 psig. There was a coupling within 21 inches of the kink in the pipe. It began to leak during the pressure test. This coupling was removed from service. We did another pressure test of the remaining section of pipe from the section that was cut, out to the outlet of the riser. The service pipe held a pressure of 40 psig for 15 minutes (6:28 pm. to 6:45 p.m.). We did not test any other sections of the service line.

After the Test: We attempted to expose the remaining portion of the service line, upstream of the kink. As we began to excavate the service pipe fell into the hole, indicating that it was not longer connected to the remaining portion of the service. We continued to excavate the service and was able to determine that the service line was connected to a coupling. The service pipe broke at that connection. We were not able to excavate the complete coupling due to the fact that it was located under debris in the yard. We needed to clear out this area and possibly bring in a small backhoe to excavate the remaining section of pipe.
Site Closed Down For the Night

MEMO

To: Accident Investigation File

From: Angela Motley, PUE

Date: September 14, 2005

Re: 225 North Avenue, Weston Incident – Day 2: September 13, 2005

DTE Representatives: Glenn LaChance, Angela Motley, Bob Hayden

KeySpan Representatives: Tom Sheehan, John Gatherum, Chuck Cotting, Jimmy Duffy – Union Represetative, and Ravino locator,

State Police: Peter Cummings

Insurance Company Representative (homeowners) – Gordon Duquenoy, St. Paul Travelers

Homeowners: Mr.Habib and Mrs. Sandra Rahman

Prior to exposing the section of service pipe that was left in the ground the previous day, several interviews were conducted:

Interviewee: Beth Koch
Interviewer: Paul Nicholas, Weston Fire Department

Ms. Koch arrived at the location at 10:25 a.m. She was coming out to the location because the contractor was going to be performing PERK tests and she was there to witness the test for the Town of Weston. Prior to her arrival an application for soil testing was filed.

The day of the explosion, Ms. Kock parked her car a couple houses down - west of 225 North Avenue near a stone retaining wall. As she approached the house she could smell gas. She said that she did not hear anything. She saw dust blowing up in the yard (plume of dust). Gas was blowing around the dirt. She never saw the break in the pipe. She walked up the driveway and sat on a stone wall on the east side of the house. She did not see anything because the backhoe was blocking her view of the damaged pipe.

She arrived at the scene before the fire department. The police department was already on site. She had spoken to the owner of the construction company, Bill Rowe. He informed her that the service line had been hit. Approximately, 10 minutes after she arrived the fire department

arrived. At this time she was still sitting on a rock wall on the east side of the house.

The fire department entered the house with a meter to detect natural gas. They brought a hose around the back side of the house. When the fireman came out of the house, he asked her, the town engineer, the engineer's assistant, Bill Rowe, Eric (backhoe operator), and laborer to move across the street because he had gotten gas readings in the house.

They crossed the street and sat down on the stone wall. The house exploded and she was hit by flying debris. The left side of her body was hit (leg, arm and neck). Bill Lowe took her away from the house.

Her observations when she arrived:
She said that Bill Lowe was taking pictures of the front of the house when she arrived. She was sitting on the east side of the house. She could not see the front of the office. She said that she believes that the windows on the right side of the 2nd floor were open (crank out windows)
She only recalls one big excavation. She did not remember any other excavations
The backhoe was not running when she arrived.
Standard Procedure – The contractor will call dig safe before Perk tests are performed.
They then determine the best location for the installation of the septic system.
She believes the house exploded around 10:45.
She said that the town may have as-built drawings of the property.

Interview with homeowners: Mr.Habib and Mrs. Sandra Rahman (Office 508 626 4853)
Interviewed by Angela Motley and Glenn LaChance

Mr. Habib was at home prior to the incident. He has an office in his home (front of house).
He recalls the following:
8:30 am Backhoe arrives with Engineer
9:30 am Mr. Habib leaves the house to go to the post office. The backhoe operator was digging in the area of the gas service. The backhoe operator asked him how long he had lived at the house and if the pipes had been changed.
Returns home to find that the house had exploded (no time given). The police and fire departments were on the scene. The fire department was taking hoses around the back side of the house.

Mr. Habib said that he was home when the location was being marked by the gas company. He said that he spoke to the markout person and asked what he was doing. He said that the markout person placed flags in his yard to show the location of the gas line.

They moved into the house in 1992. After moving in they enclosed a three season porch. The existing septic system is on the left front area of the house. They never smelled gas in their home. They have two children 13 and 15 years old.

I asked Mr. And Mrs. Habib if they had left any windows open on the first floor and they indicated that they believe one window was open on the front of the house.

Interview with locator: Rob Ravino, locator for 13 years (Union Representative: Jim Duffy)
Interviewer: Peter Cummings, Bob Hayden and Angela Motley

KeySpan Representative onsite but not part of interview (as the per the request of Peter Cummings): Chris Aronson and Chuck Cotting

The day of the incident the locator was notified at 11:30 am. He was asked by Jeff La Conte to come out to the site. He was at the site at 11:50. He stayed about 40 minutes on the site.

He then went to a meeting with Chuck Cotting and Jeff La Conte at the Newton Street, Waltham MSF office. At the meeting, the locator gave them the picture he had taken of the mark out at 225 North St., Weston. At that time they discussed his markout of the service line.

Mr. Ravino had two machines available for locating: 510 Locator and Gate Box Finder

Mr. Ravino states that he remembers marking out this location. He said that he had looked up the SPIPE and Service Card. He said that the SPIPE record indicated no active gas account. There was one service card record and that was for another house. He knew there was gas on the street because he had marked out another location on the street. He decided to go to the house to see if there was a visible riser. When he arrived to the house he did not see tracer wire. He does not recall whether he attempted to find the tracer wire. He saw the riser and used his 510 locator machine to trace out the line. He does this by clamping onto the service so that a signal can be sent along the line and then trace the signal out from the riser. When he did this he marked the line with flags. He said that the number of flags he uses depends on how much he has to mark. He will place a flag every 7-8 feet.

He did not remember talking to the homeowner. However, he said that he normally tries to make contact with the homeowner when he has to mark on private property.

Mr. Ravino stated that he had brought to the attention of his supervisor the problem he was having with the 510 locating machine.

Mr. Cummings showed Mr. Ravino the Dig Safe Ticket and Completion Information.

Completion ticket comments: Locator indicated problem with locating machine. He stated that he talk to the owner and said not to dig in the gas area. (Don't dig in the gas area means - not to dig where he indicated where the gas line was located). The ticket also had indicated that a

picture was taken (picture frame 177). He said that this was not the number of the picture, it was the contractor number. (I did not understand what he meant by this number).

After the interview, I asked Chuck Cotting if the locator could show me how he accessed the service card and SPIPE record using KeySpan's computer system. A service truck was brought out the site.

Mr. Ravino accessed the records for the service card:

1) He went to the scanned records site
2) He entered the Street Name: (North Ave *); Town Code: A-Weston
3) He hit the find button
4) The computer came back with the following: Query Result 1

535 North Ave Weston

Note: There was no record for 225 North Street

Mr. Ravino accessed the SPIPE record (another service record). He used the mobile pen application:

1) House # - 225; On Street – North Ave; Town – WES; Source – New England Gas (NEGSPI); State – MA
2) Host Inquiry
3) Information Presented: SPIPE Loc: 225 N. Ave Wes; No SPIPE record found with your current Query Criteria

During the interview I asked Mr. Ravino if he could tell the difference between a steel service riser and a plastic service and he said no.

End of Interview

I mentioned to Chuck Cotting that we will have to review the procedures locators are following to mark out service. I also mentioned to him that if a locator cannot find the following: service card, SPIPE record, tracer wire (plastic service locating tool), then the locator, if he cannot verify that the service is plastic, should not mark the service by connecting onto the riser. There should be a procedure in place that will tell the locator at that point to contact Engineering to obtain some information about the service. If that is not done, there is a possibility that they will have another mismark on a plastic service line that does not have visible tracer wire at the riser or any other indicator that the line is plastic.

Investigation of the Service Line

The previous day we were unable to excavate the portion of the service line that was pulled out from a coupling as a result of the damage to the service line. Today, we were able to excavate the remaining portion of the service that was of interest. The service was exposed at 5:05 p.m. The coupling and a portion of the service pipe was cut out (11 1/4 inches long) and taken into

custody by the Weston Fire Department, Ed Walker. The coupling was at a depth of 42 inches below grade.

Transfer of the scene from the State Police to St. Paul Insurance Company

After we completed the excavation of the service line, Mr. Cummings informed us that the accident scene was being turned over to homeowner's insurance company. I spoke to Gordon Duquenoy and he said that the insurance company will be sending out a notice to all interested parties about access to the property to continue any investigative work that is necessary. He said that on Wednesday, September 21st we may enter the property.

Summary of today's events:

Glenn and I met to discuss our plans for today. We still had pipe to expose and other interviews to conduct. When we arrived at the scene, work had not begun to clear out the area so that we may access the remaining portion of the service line. Ms. Koch, Weston's Health Agent who was hit by flying debris was onsite ready to give a statement. Mr. and Mr. Habib were also on site willing to provide a statement. KeySpan was asked by the State Police to have the locator available for questioning. The locators statement was taken as well.

The State Police reopened the site. We began to excavate the area of the service pipe that was of concern. The pipe was exposed, photographed, measured and taken into custody by the Fire Department. The fire department also took custody of the meter and regulator taken from the explosion site.

At the end of the day, the homeowner's insurance company was made aware our responsibility as a regulator and a meeting was set up for Wednesday of next week to continue the investigation if necessary.

MEMO

To: File

From: Angela Motley, PUE

Date: September 21, 2005

Re: Gas Explosion at 225 North Avenue, Weston - Third Day of Investigation

The homeowner's insurance company, St. Paul Insurance, had scheduled a meeting at the site to start removing debris from the house in order to continue its investigation. We asked to be onsite so that we may explore the basement of the home to see if there were any paths through the foundation that the gas may have followed. Also, to see the yard area where the flags were place and the excavations that were dug by Rowe Construction Company. Ron Parsons, St. Paul Insurance Company was spear heading the effort of today.

Upon our arrival, he informed the group (see list in file) that we would have to reschedule the meeting to next Wednesday, Thursday and possibly Friday. He said that the homeowners lawyer did not want to allow anyone to move anything onsite until he could make arrangements to be at the site. The lawyer told Ron Parsons that he had made an attempt to get in touch with the homeowners to see if they could proceed since equipment had been supplied to the site to remove debris. The lawyer, Bill Kennedy said that he was unable to get in touch with the family and therefore, the meeting would have to be postponed.

We went to the Weston Fire Department to retrieve the sections of pipe that they were holding for the DTE. Mr. Wayne Miller, St. Paul Insurance Company was allowed to take pictures of the sections of pipe in their original order. He also took pictures of the meter and regulator. The pipe segments and meter were then transported to the DTE by Glenn LaChance and given to Chris Bourne, Director, DTE.

MEMO

To: File

From: Angela Motley

Date: September 28, 2005 and September 29, 2005

Re: Weston Gas Explosion Investigation

September 28, 2005

The homeowners insurance agency were allowed to start removing debris from the area of the gas explosion. After debris was removed the following things were identified:

1) The markout flags were uncovered and showed that the marks were in a straight line leading to the street.

2) The old service riser was found just inside the old basement wall on the front side of the house as indicated in the drawings for the initial service line.

3) The basement floor of the house was cleaned. The furnace, dehumidifier, washer, dryer and water heater was uncovered.

4) Steve Dombrowski, KeySpan supervisor attempted to use a markout tool (510) to locate the service. There were readings at the riser that fell off and picked up somewhat around what was the front of the house. The machine did not indicate that the service went in the direction of the marks

5) An effort was made to use a box finder to locate the curbvalve. It was not found.

6) The section of piping that was left in the ground going back towards the house was not taken by the DTE. It was excavated and taken by another party.

We also had a KeySpan crew attempt to locate the curbvalve that was identified on the drawings. It appears that the valve may be located in the same area of a rock wall. We were unable to uncover a service curbvalve.

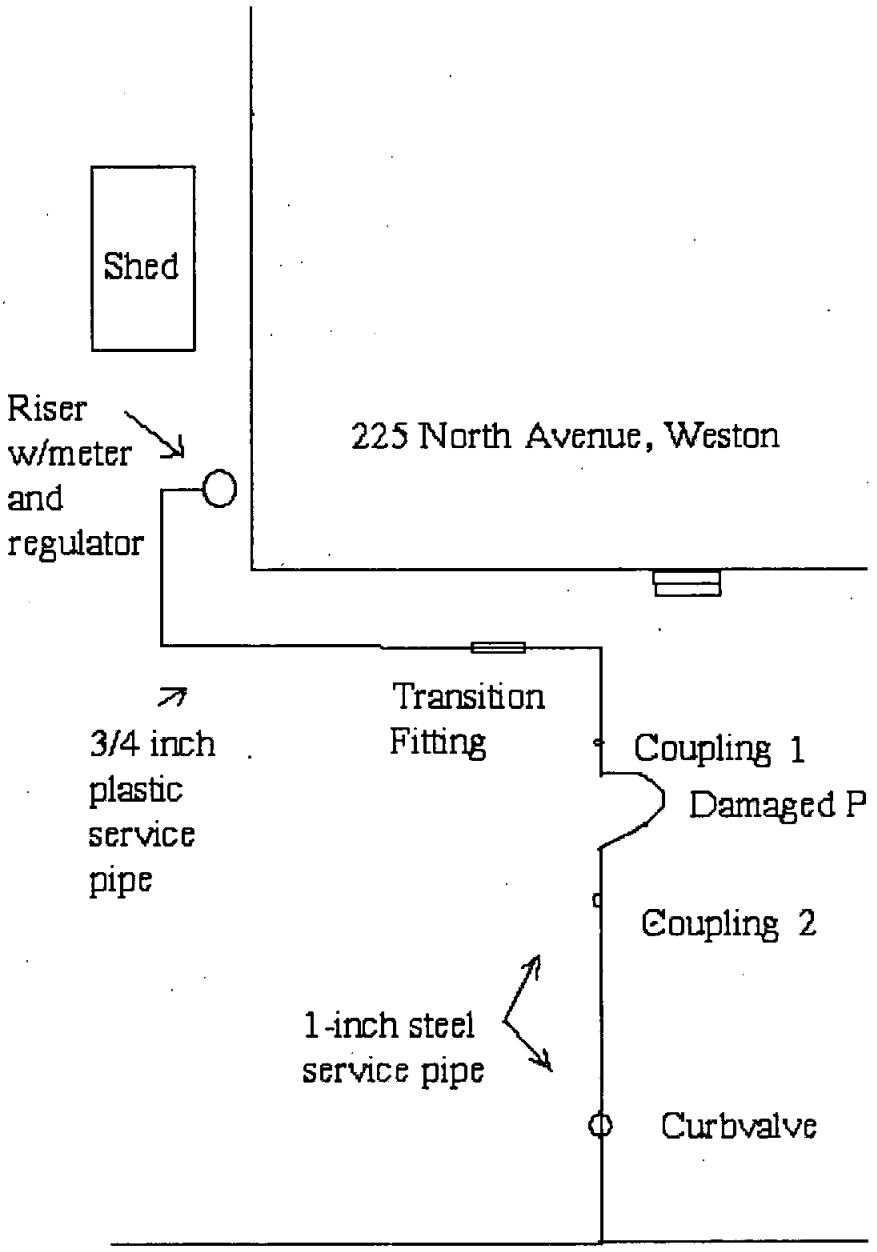

Shed
Riser
w/meter
and
regulator
225 North Avenue, Weston
3/4 inch
plastic
service
pipe
Transition
Fitting
Coupling 1
Damaged P
Coupling 2
1-inch steel
service pipe
Curbvalve

EXHIBIT 3

Memo from Bob Hayden, Dig Safe Coordinator – September 12, 2005

Dig Safe Investigation

225 North Ave, Weston, Mass.

Notes taken from Bob Hayden regarding Dig Safe Investigation

Monday, September 12, 2005:

Interview with William C. Rowe - Contractor:

Arrived at location at approximately 1:45 pm. While at 225 North Ave, I introduced myself to William C. Rowe, the owner of W.C.Rowe Contracting. I explained to Mr. Rowe that I was a Dig Safe Investigator with the DTE and mentioned that I would like to ask him some questions about the incident. Mr. Rowe explained that his attorney advised him not to discuss the incident with anyone. Mr. Rowe then provided me with his attorney's name and phone number and said I could call him. The attorney's name is Peter Sutton, (617) 523-9000.

Later in the day, at approximately 5pm, I saw Mr. Rowe standing next to a man wearing a suit holding a brief case whom I believed to be Attorney Peter Sutton. I approached them and reintroduced myself as a Dig Safe Investigator for the DTE. When Peter Sutton stated that he was Mr. Rowe's attorney, I mentioned that I would like to ask Mr. Rowe some questions about the incident. Attorney Peter Rowe did not object to my request to ask questions and remained present, at Mr. Rowe's side, throughout my conversation with Mr. Rowe.

In response to my questions, Mr. Rowe provided the following information:

He is the owner of the Excavating Company. He was not the operator of the machine when the gas service was damaged, nor was he present when the incident occurred. The operator of the machine was Mark King, an employee of W.C. Rowe. Mark King is no longer present at the site and is unavailable for questions.

Mr. Rowe explained that his company was excavating to test for a septic system. The day of the explosion, Monday, September 12, 2005, was the first day of excavation for the project. A valid Dig Safe number was obtained. Mr. Rowe provided me with his Dig Safe number: 20053607890. The Dig Safe request was called in (to Dig Safe) on September 1, 2005 and became valid on September 7, 2005 at 09:30.

Mr. Rowe was unsure if the area was premarked, but said Mark King (the machine operator) might remember. Mr. Rowe stated the damage occurred at 10:16 am. Mr. Rowe said that Mark King took photographs of the area, to protect himself and W.C. Rowe from liability, just after the damage occurred. These photos, if clear, should indicate the accuracy of Keyspan's flags (dig safe markings).

Mr. Rowe pointed to where the flags were located prior to the damage and pointed to the area where the gas line was pulled up. The distance between these two points was approximately 15 feet. Mr. Rowe estimated that the damage occurred at least 15 feet away from the nearest yellow flag set by Keyspan.

Mr. Rowe was given my DTE business card and said he would email or mail the photos to me when they become available.

Discussion with Sandra Rahman, homeowner:

At approximately 4:30 pm, I observed a woman believed to be the homeowner standing with several people on North Ave. I introduced myself and explained that I was a Dig Safe Investigator for the DTE. She introduced herself as Sandra Rahman and confirmed that she was the homeowner. I asked her if she knew where her gas meter was located on her home prior to the explosion. She said it was an outside gas meter locate on the left side of her house toward the front corner (if standing at the street looking up at the house).

Spoke to Sandra Rahman by telephone on Thursday, September 15, 2005. She remembers seeing yellow and blue flags in the ground in front of her home. When asked if she could describe if the flags were in the middle, to the left, or to the right side of her home, she stated she does not remember exactly where the flags were located, but remembers the yellow flags being to the left of the blue flags (if looking up at the house).

Tuesday, September 13, 2005:

Interview with Rob Ravino - Keyspan underground facility locator:

At approximately 1pm, met with Keyspan Locator, Rob Ravino, along with Angela Motley, Peter Cummings (Fire Marshall), and Jim Duffy (Union Representative for Keyspan Locator). Rob Ravino is the Keyspan locator who responded to 225 North Ave. to locate the underground gas lines for W.C. Rowe.

Questions to Rob Ravino revealed:

He has been a Keyspan locator for 13 years. He is not sure of the exact date and time that he responded to 225 North Ave. to locate the gas facilities. He responds to many different addresses each day and his memory is somewhat foggy to specifics of this locate request.

When he pulled up to the house, he used his Keyspan computer and tried to bring up the service card information for 225 North Ave. No information was available for this particular address. There was no service card available in his computer for this address. It did not come up. [After conducting the interview with Mr. Rowe, he demonstrated for myself and Angela Motley, using a

Keyspan Locators van, the steps he took to access the gas service card for 225 North Ave. After entering the address for 225 North Ave, the computer screen indicated that no service card was available for that address].

He was familiar however, based on his previous experiences, that a gas main ran down the street on the same side the homes were located. He observed the gas meter on the left side of the house (if standing near street looking up at house). He could not find the gate box. He then used his "5-10" locator to try to find the tracer wire. He began looking for the tracer wire on the left side of the house near the meter. He does not recall finding the tracer wire. He hooked onto the riser, but does not recall seeing or finding the tracer wire.

He flagged the area in front of the left side of the house down towards the street area. Prior to leaving the site in his van, he entered into his computer that he had difficulty using the "5-10" locating equipment. He indicated that this piece of locating equipment has been problematic in the past and he has previously notified Keyspan of the problems and his notifications are documented.

Mr. Ravino stated that he took one photograph of his flaggings prior to leaving the site. The photo stays in his camera then gets converted to a disk at Keypsan upon request. On Monday, September 12, 2005, Mr. Ravino gave the camera to Keyspan at the request of Chuck Cotting.

Mr. Ravino believes, to the best of his memory, that the area was not premarked. Although the Dig Safe request ticket indicates the area was premarked (when called in by the Contractor), Mr. Ravino believes it was not. When asked if there was any pre excavation meeting or discussion with the Contractor, Mr. Ravino stated that he has no recollection of any such meeting with the contractor, but may have had a telephone conversation with the homeowner. Mr. Ravino stated that if a conversation with the homeowner did occur, he has no recollection of what was said (if anything). When asked why he may have had a conversation with the homeowner, Mr. Rowe stated he sometimes calls homeowners in advance to let them know he's coming. This is done to diminish curiosity, fear, etc. of homeowners and for safety reasons if a dog is on the property.

Tagging of Evidence:

Evidence consisting of four pipe sections of the bare steel service, and one meter and regulator, was removed from the debris and tagged on Tuesday, September 13, 2005. These items were placed in a green plastic bag and tagged with a Weston Fire Department evidence bag. The bag was given by myself, Angela Motley and Glenn Lachance of the DTE to Weston Fire Chief Edmund Walker for safe keep. I wrote a letter/form describing the evidence and stated possession of the evidence is being passed from the DTE to Weston Fire Department for safe keep. The letter is signed by myself and Fire Chief, Edmund Walker on September 13, 2005.

Correspondence with Parties/Witnesses/Agencies/Investigators:

9.16.05 Received a color photo sent by Attorney Peter Sutton (for W.C. Rowe) via mail. The photo indicates the yellow flags in ground, the backhoe, and the bare steel service. The photo was taken during the time period after the service was pulled and before the explosion.

9.16.05 Left voice mail message with Fire Chief Edmund Walker. I informed him that I was emailing him a Dig Safe Violation Report and he could contact me directly with any questions. I then emailed the D.S. Violation Report to him.

9.21.05 Went back to Weston with Glenn & Angela. Did not remain on scene very long due to limitations from attorneys. Spoke to Chuck Cotting with Angela. Chuck explained that the locator had difficulty producing Keyspan's maps and records the day of the mark out, because the locator was not searching properly. Chuck stated that the records were available but the locator did not access them properly; the locator could have produced them if he performed the query properly. Furthermore, he should have called for a Supervisor's assistance. Chuck will demonstrate this for us whenever we want.

9.21.05 Went to Fire Dept and picked up the evidence obtained from the explosion (four pipe sections of the bare steel service, and one meter and regulator). The evidence bag created on September 13, 2005, was signed by myself and Fire Lt. The evidence was placed in Glenn's car.

9.22.05 Called Attorney Peter Sutton and left voice mail message asking to schedule interview with back hoe operator Mark King.

9.22.05 Sally Vanderwheel (Attorney for Insurance Company 617.772.2822) called and ask some procedural questions about the Dig Safe law and enforcement. She said she may file a public records request regarding Keyspan Dig Safe damages/reports,etc. She also suggested contacting a person named Jefferson Perley, an engineer for the septic project at 225 North Ave. Apparently he was on site the day of the explosion and would be a neutral witness with no axes to grind. His phone number is (978) 369-2689 and (978) 263-6499. He is likely represented by Attorney Frank Jenney (781) 894-0000.

9.23.05 Peter Sutton called and explained that Attorney Thomas Morone of Peerless Insurance is now handling the case and to contact him instead. His phone number is (603) 358-4191. Peter Sutton also mentioned that neighbors were complaining about an odor of gas for weeks prior to the explosion.

9.23.05 Called Attorney Morone (Insurance Company) and left message indicating that I wanted to ask Mark King (back hoe operator) some questions.

9.23.05 Chuck Cotting and Tom Teahan came to DTE and met with myself, Angela and Chris in 4th floor Conference room. Chuck demonstrated, using a locators

computer, how records can be obtained for 225 North Ave, Weston. Chuck showed steps that were taken by locator (incorrectly) and then demonstrated the proper steps that should have been taken to access the records. A color photo was provided (taken by Keyspan locator) indicating the flags after the area was marked by the locator. Chuck also mentioned that an 8-10 locator equipment was used initially by the locator, but he had problems with the 8-10 and switched to a 5-10 locator equipment. According to Chuck, the comment in the locators log "locator down' refers to the 8-10 locator. Chuck also mentioned that a 3rd locator equipment was in the van but the locator was unaware that it was there.

9.27.05 Attorney Bill Kennedy (Attorney for homeowners) (617) 773-711 Ext.16, called to ask some procedural questions about the case. He said he could make homeowner available if we have questions. I explained that I would like to ask if the homeowner remembers seeing white pre marks prior to excavation.

9.27.05 Called Attorney Morone and left message indicating that I wanted to ask Mark King (back hoe operator) some questions. Attorney Morone called back and stated that Mark King and Bill Rowe are being advised by them not to give any statements unless subpoenaed to do so.

9.28.05 Went Back out to Weston with Glenn and Angela. Spoke to neighbor, John Sargent, who resides at 221 North Ave, he said he does not remember seeing any white premarks (paint or flags) he did see yellow and blue, but not white. However, he states white marks could have been there and may have been out of his view because he never got very close. He could see from his driveway that there were yellow and blue flags on the 225 North ave property, but did not see any white paint or flags.

Spoke to the two Engineers Jefferson Perley and his employee, John Lee, who were with their attorney, Francis E. Jenney.(Harnish, Jenney, Mitchell and Resh - 564 Main Street, Waltham, MA 02154 (781)894-0000). I asked them if they were on site the day of the damage prior to the explosion. They said they were there. I asked them if they remember seeing any white flags or paint pre marks. They looked at each other, thought about it for a couple of seconds, and both of them stated that they don't remember seeing any pre marks at all. They both remember seeing gas (yellow) flags and water (blue) flags, but nothing white.

The lead Engineer, Jefferson Perley, explained that the contractor did hand dig to find the service (in the area where the yellow flags were places).

9.29.05 Spoke to Bill Kennedy (Attorney for the homeowners). He said that he could set up an appointment to meet with the homeowners. He suggested touching base next week to discuss. Attorney Kennedy also believes that Rowe may have been working under the direction of the Engineers (Perley) as a subcontractor.

9.30.05 Debris was removed from the front of the foundation of the house exposing the ground surface. Yellow gas flags were found in the same spot as seen in photo taken by Bill Rowe prior to the explosion. No white marks (paint or flags) were found in the area of excavation (or anywhere else).

EXHIBIT 4

Photograph of marked service line to 225 North Avenue

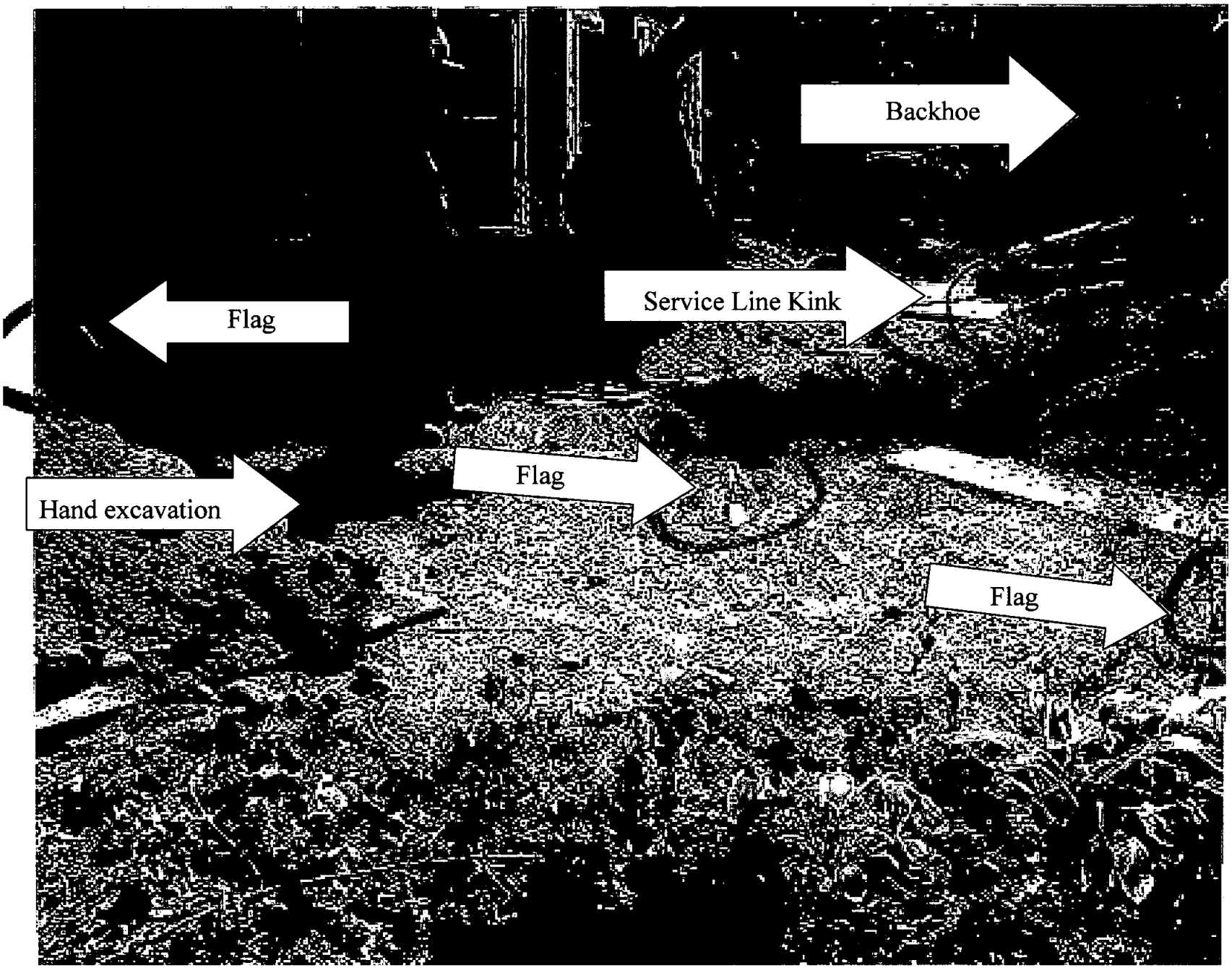

Backhoe
Service Line Kink
Flag
Flag
Hand excavation
Flag

EXHIBIT 5

Service installation card for 225 North Avenue, Weston - 1992

SERVICE CARD

NO. 225 NORTH AVE ST. (CITY) WES

SERVICE FROM 11 11 ST.

SIZE SERVICE	3/4-1"	SIZE GATE	3/4	SALES / NON-SALES	PERMIT NO.
NEW		WORK DATE	12-18-92	MAIN TO L.L.	L.L. TO END
RELAID					
RELOCATE	X				
ABAND.					

MAIN DATA	SIZE	DEPTH	TAP SIZE	PRESSURE	CONDITION OF MAIN
				LOW	
				INT.	
				MED.	
				HIGH X	

ROADWAY SIDEWALK

CREW LEADER W CLARK

NO. 2 ORDER NO.	AIRTEST MIN'S	PRESSURE	AREA	FUNCTION	JOB NUMBER
	1.5T	90	4217	4218D	K21394

INSTALLED PIPE SIZE	TYPE	FOOTAGE	ABANDONED PIPE SIZE	TYPE	FOOTAGE		
1"	PL	34' FT.			FT.	INSERT	
						DIRECT BURIAL	X

REMARKS: RELOCATED SUPPLY FROM FRONT OF HOUSE AROUND LEFT HAND CORNER

M.& S. REC.	EXPEDITER	DRAFTING

FORM NO. 246 REV. 5/83

XEROXED

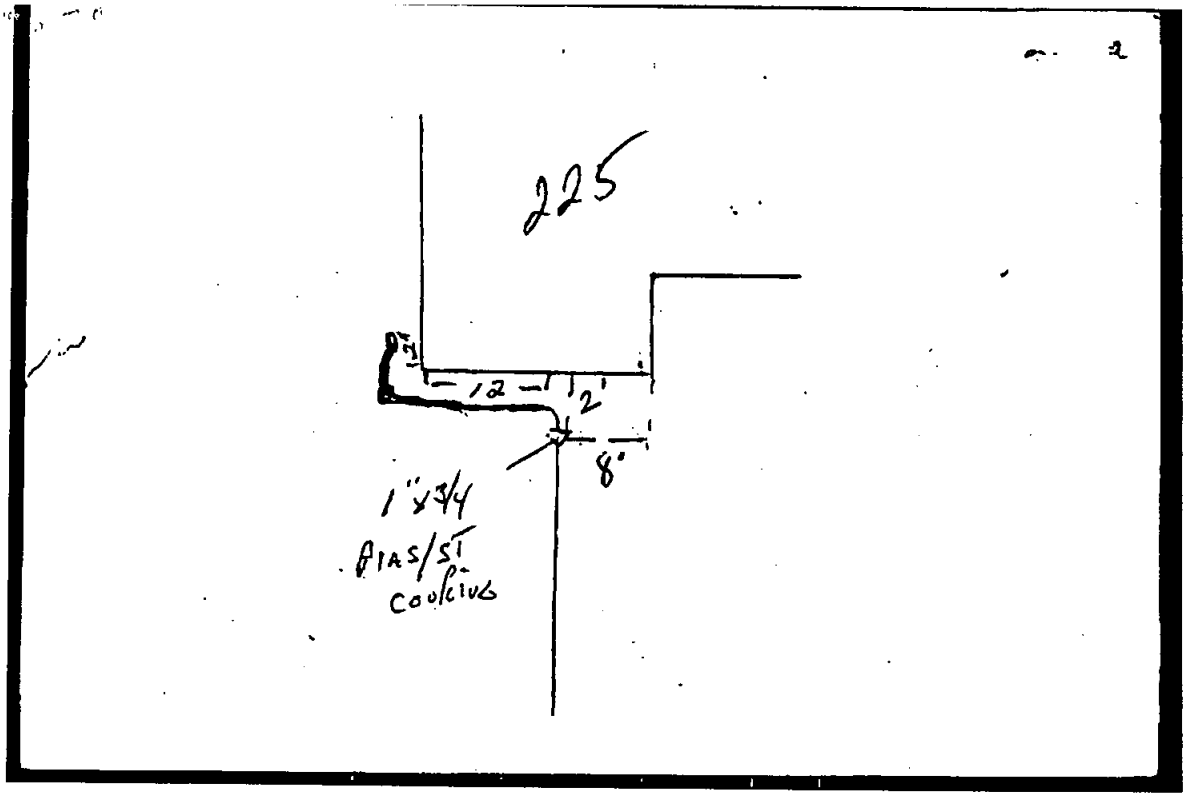

225
12"
12"
8"
1"x3/4
BIAS/SI
COVERING

EXHIBIT 6

First Set of Information Request Responses: 1-4

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-4

Respondent: Warren Gibson, Phil Quan, and Jonathan Hedman

Q. Provide all records for the main on North Avenue, including but not limited to: installation date; MAOP; leak history (over the last year); and operating pressure at the time of the incident. Describe any maintenance or replacement work performed on the main within the last year.

A. The two inch steel main was installed in 1930. The MAOP of the main is 60 PSIG. The operating pressure in the system at the time of the incident was between 48 PSIG and 56 PSIG (one station in the area was 48 PSIG and another nearby station was at 56 PSIG). The closest recorded pressure that day was 48 PSIG. There were no leaks reported on North Avenue over the last year prior to the incident. KeySpan is not aware of any maintenance or replacement work performed in the past year on this main.

EXHIBIT 7

Service installation card for 225 North Avenue, Weston - 1930

Farmers Hastings

M9-99 C

209

SUPPLY RECORD

W. H. Wayne Street

NO. 225 North Avenue ST. (CITY) Weston

SUPPLY FROM North Avenue INSIDE SERVICE 1971 ST.

SIZE	NEW / RENEWED	DATE LAID	M TO L. L.	L. L. TO END
3/4		7/3/30	11.7	40.5

SIZE GATE 3/4 PERMIT NO. NATURAL GAS

MAIN DATA	SIZE	DEPTH	TAP SIZE	CONDITION OF MAIN
	2	2	1/2	New Steel

ROADWAY Penetration SIDEWALK None

FOREMAN

REMARKS: High Pressure

7-26-7

IMPORTANT—SKETCH OF THIS SUPPLY MUST BE DRAWN ON BACK OF THIS CARD. 468 WWS

SCANNED

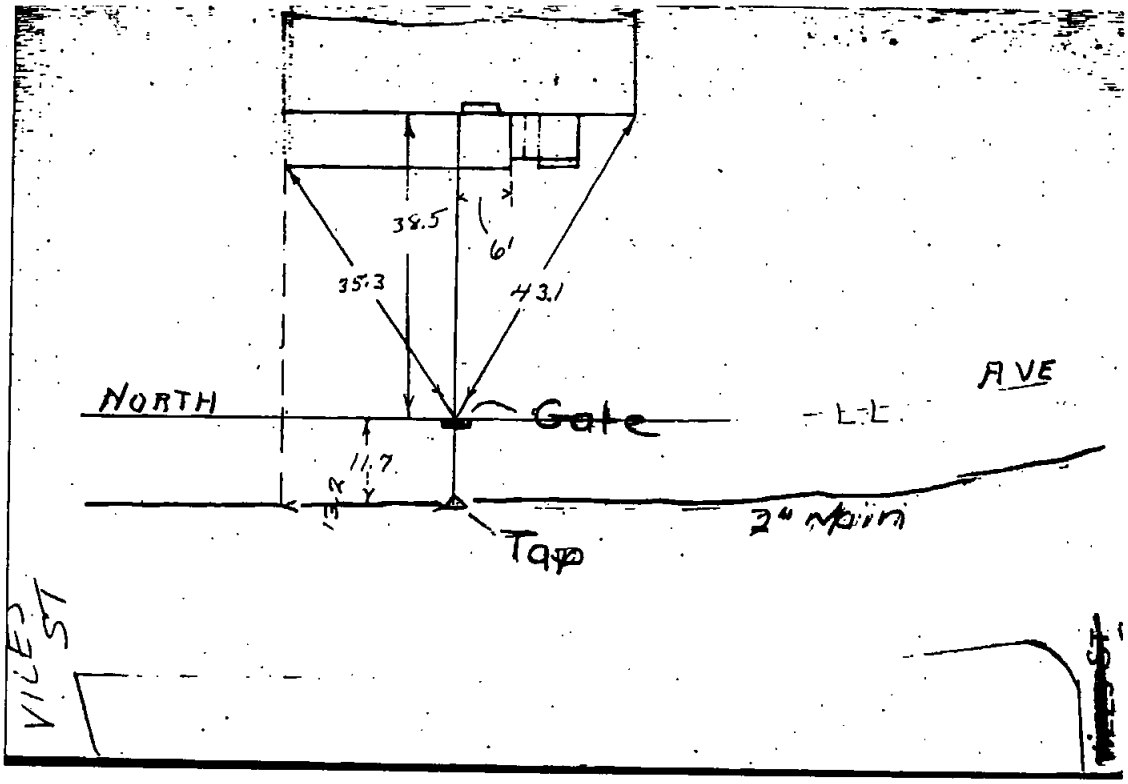
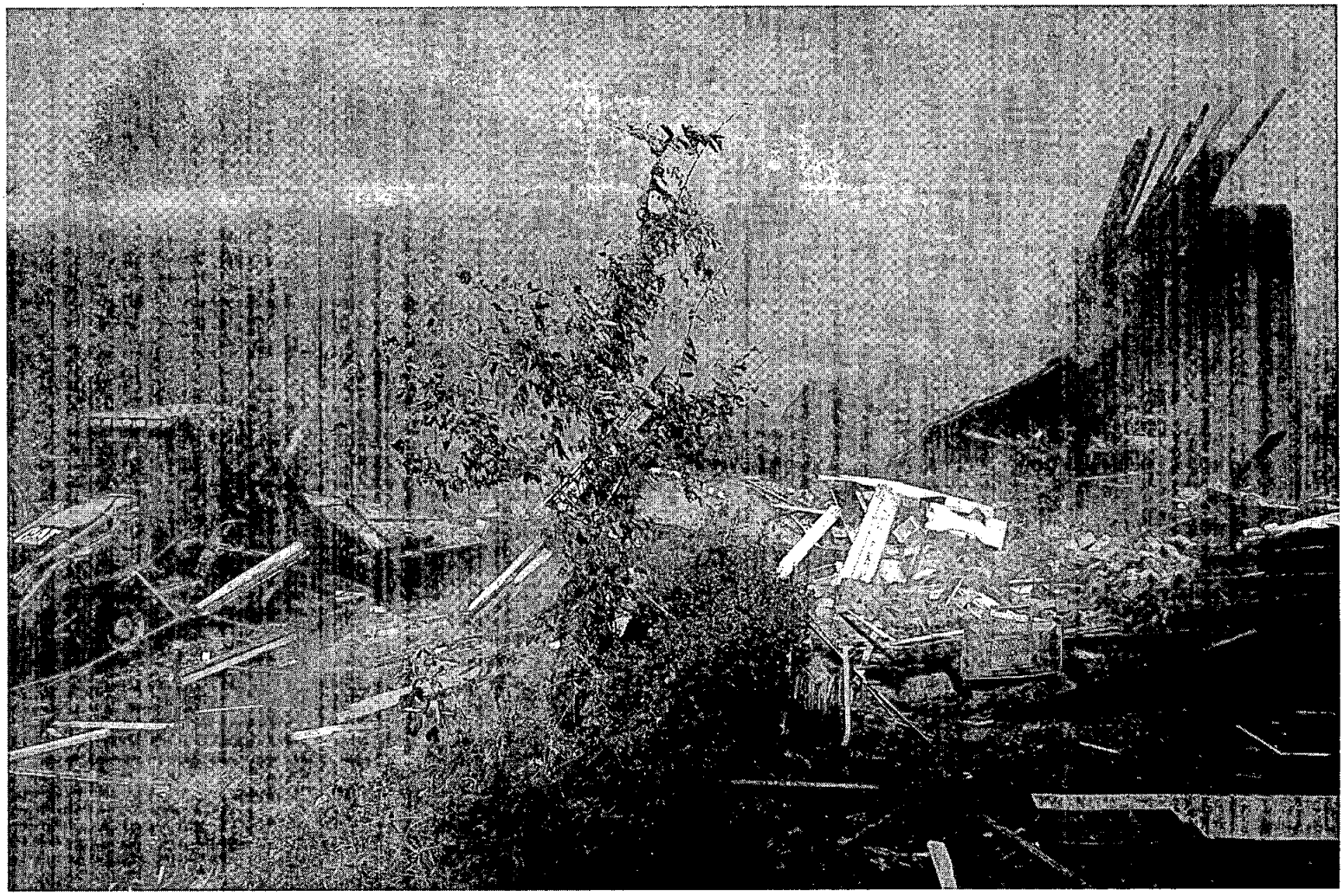
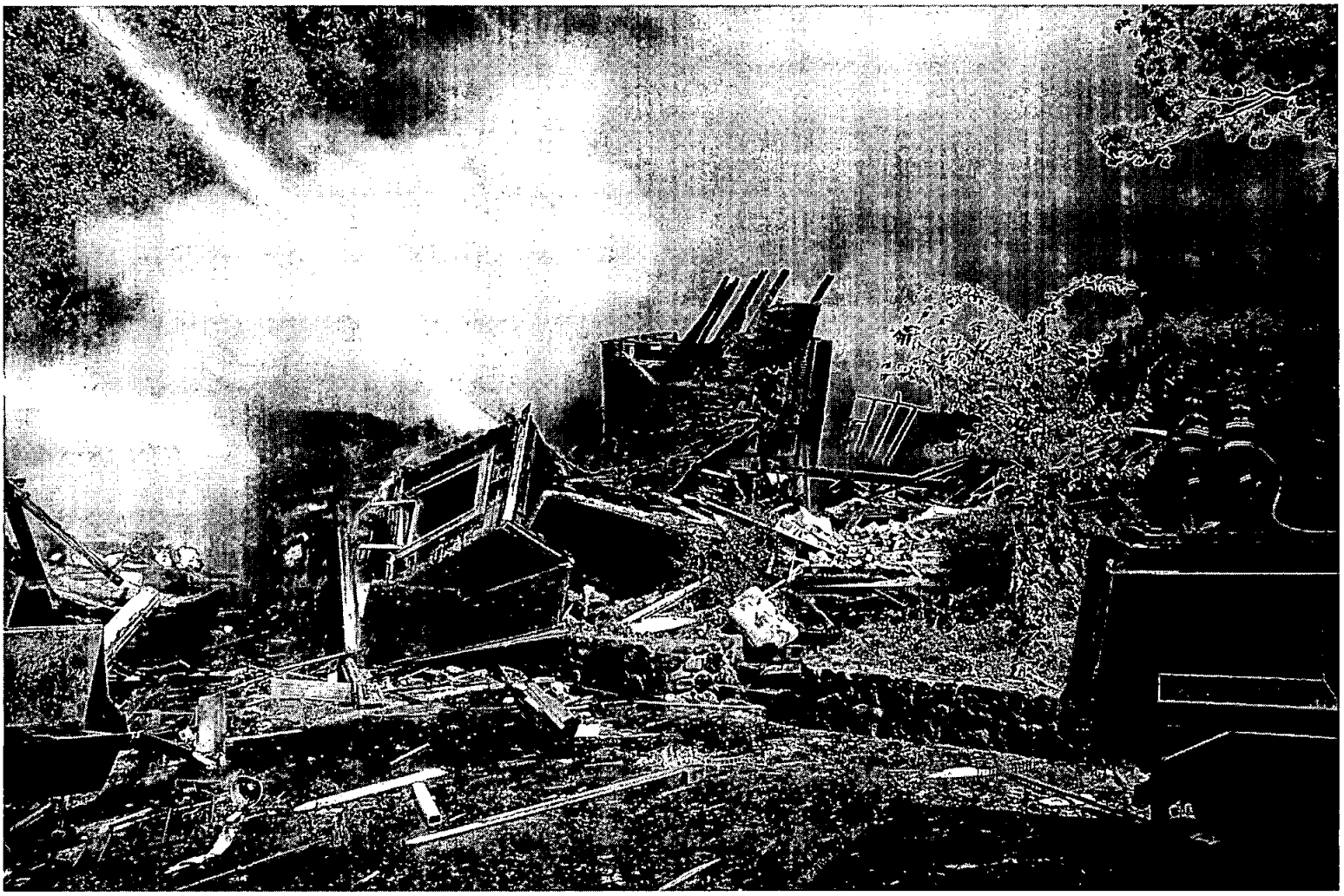

38.5
6'
35.3
43.1
NORTH
Gate
AVE
11.7
2" Main
Tap
VILES ST

EXHIBIT 8

Photographs of the explosion site





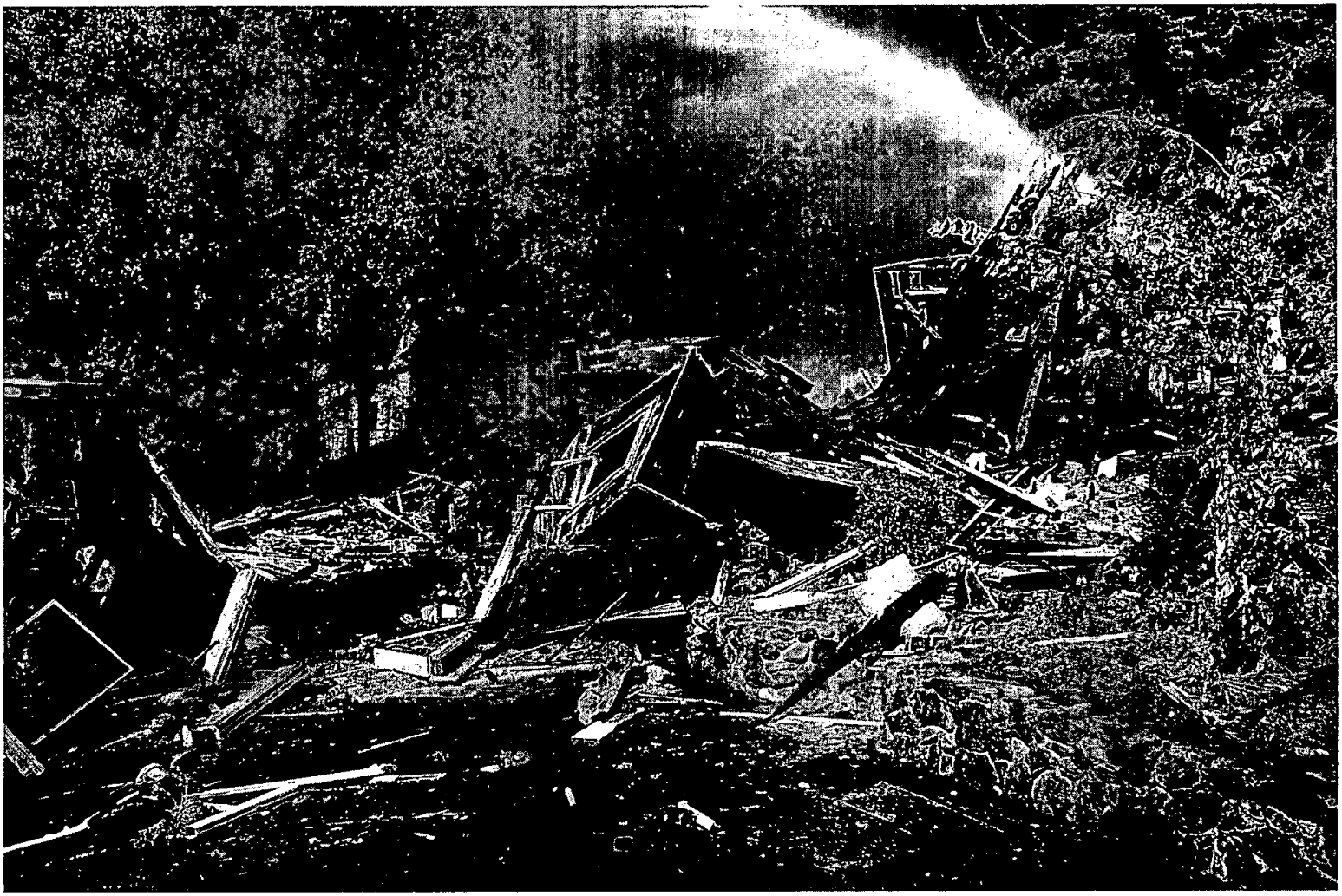


EXHIBIT 9

Photograph of excavator


SEP 12 2005

EXHIBIT 10

Photograph of Service Riser

EXHIBIT 11

KeySpan's Damage Prevention Procedures – DAMG-5020

DAMG-5020: Procedure for Locating and Marking Out Sub-Surface Facilities

Date:	TBD	Filed:	Yes	**Application**	MA
Rev #:	0	**Review:**	1 Year	**Lead Org**	DP
Revision: May 7, 2004, Charles C. Cotting 781-466-5286					

Purpose

This procedure is used by field personnel when notification of proposed excavation is received to ensure that company owned sub-surface facilities are properly marked in compliance with the requirements of MA Chapter 82 -- Section 40, MA General Laws, Regulating Notice Requirements for Excavations in Public Ways.

1. Emergency Dispatch receives all emergency markouts directly fom the one-call center and assigns the emergency markouts to the proper field personnel.

2. The Damage Prevention area of Field Operations is responsible for responding to all outside requests for markouts, re-marks, or emergencies.

3. Each Damage Prevention Area Supervisor is responsible for the scheduling of all in progress markouts.

NOTE: This work method shall apply to both company and the Locate and Markout Contractor (LMC) personnel performing markouts.

Equipment Description

1. Pipe locator. (Conductive or Inductive) includes various makers and manufacturers of locating equipment.

2. Yellow paint - identifies gas facilities.

3. Wood stake - 1" x 1" x 48" with a yellow flag attached
    a. Yellow flags with "Gas" markings may be substituted.

Definitions

1. Pipe and Cable Locator - Also known as an "M Scope" or other terms is used to locate, tone, trace and determine the location and/or the depth of pipe and tracer wire or other buried metallic lines and facilities.

2. "Conductive Markout or Conductive Methods" - A means of locating and marking underground facilities. The location is made through use of the conductive property of metal. Facility location is achieved by attaching the leads of a toning instrument (M-scope) onto the gas facility or appurtenance (ex. valve, purge or test station) to transmit the toning signal. The receiving part of the toning instrument is then used in a sweeping motion over the facility to identify the precise location of the facility. After the precise location has been identified, field markout operations are performed (paint or stake).

3. Emergency Notifications - Notifications of intent to excavate on an emergency basis or notification of an excavation already in progress.

4. Excavation - An operation for the purpose of movement or removal of earth, rock or other materials in or on the ground by use of mechanized equipment.

5. Excavator - A person who is engaged in the trade or business which includes the carrying out of an excavation or demolition.

6. Locate and Markout Contractor (LMC) - An organization contracted by KeySpan and responsible to perform record research and physical markout of KeySpan facilities.

7. Critical Facility – Any main with an MAOP greater than 100 psig; any main that, if taken out of service on a o degree day, would impact (i.e. cause an outage) 5,000 or more customers; any feeder main in the Boston IP system; or any Boston IP main that includes a cast-iron drip pot. These facilities are denoted in a heavy green highlight in AMMS.

8. Dig Safe Center (DSC) - The agency that receives all "one call" requests to excavate and notifies operators of facilities to mark out their substructures. The New England DSC is Dig Safe System, Inc. and can be contacted at 1-888- Dig-Safe or 1-888-344-7233.

9. One Call - Markout Request Number - A unique reference number issued to an excavator by a One Call Center in order to have all of the utilities identified in the field with color coded paint or location marker stakes.

10. Operator - A person who operates an underground facility or facilities to furnish any of the following services or materials such as: electricity, gas, steam, liquid petroleum products, telephone, telegraph, communications, cable television, sewage removal, traffic control systems, or water.

11. Underground facilities - pipelines, or other such facilities, or their attachments which have been installed underground by an operator to provide their services or materials.

Procedures

A. Receipt and Assignment of Dig Safe Notices

Dig Safe notifications are received and assigned electronically through Field Data Capture (FDC) units (page and Nextel call to the locator from Emergency Dispatch for emergency notices, "priority" Blasting notices, and Violations) to appropriate markout persons. Normal 72-Hour Notices, "priority" Blasting notices, 72-Hour blasting notices, Violations, 24-Hour remark requests, and Free-Form updates are assigned as the computer system updates the FDC. Emergency tickets are dispatched as soon as possible by Emergency Dispatch.

B. Priority Handling of DigSafe Notices

The DigSafe Primary Completion form within FDC unit is *the* legal Dig Safe document. The DigSafe Work Order Detail form shows that we have received notification of the excavation.

1) ***Emergency Notice*** - is received on same form as a normal notice but marked emergency. The response time (24 hours per day and 7 days a week) for markout is as soon as possible, but should not exceed four hours.

2) ***Violation Notice*** - is received on same form as a normal notice, but the Dig Safe number will contain a "V" which indicates a violation.

Violation Notice Types:

- Excavation Start Date prior to Legal Start Date: Excavator is starting a non-emergency job prior to 72-hour start date, it has priority over normal 72-hr notice for markout. These notices should be handled as a "priority" job. An attempt shall be made to locate and markout our facilities prior to proposed start date.
- Excavation Not Premarked prior to calling DigSafe: Excavator has not premarked area of excavation prior to calling DigSafe. **An attempt shall be made to contact excavator and request pre-marking or determine excavation scope and actual location.** However, ticket shall be marked in its entirety prior to targeted completion date – unless an arrangement can be made with excavator listed on ticket prior to due date.

3) ***Blasting Notice*** - is received on same form as normal notice, but designated as blasting. These notices should be handled and dispatched as a "priority" job.

Response Time to Blasting Notice Types is as follows:

- Unanticipated blasting: **within 4 hours.**
- Scheduled blasting: **within 72 hours** (of additional notice or as indicated on the original ticket).

4) ***Reference (Re-Mark) Notice*** - is received on the same form as the normal notice and designated remark. These notices should be handled and dispatched as a "priority" job. **Response Time to Remark Notice is within 24 hours.**

5) ***72-Hour Normal Notice*** – is received and must be responded to within 3 working days (Monday through Friday). If contractor is observed excavating prior to the 72-hour starting time, the markout person shall indicate an "Other" Follow-up Inspection for Contractor Negligence on the Primary DigSafe Completion Form, and report this finding to his/her immediate supervisor. These violations of Mass. DigSafe State Law will be reported to DTE.

6) ***Correctional Notices*** shall be treated as a 24-Hour Notice. (I.e. the original ticket was listed as 72 Joseph **Rd**, instead of 72 Joseph **Dr**.).

C. Responsibility of Mark Out Person

Each locator shall complete the DigSafe Primary Completion form (within FDC unit): completely, legibly and accurately – for each individual ticket request/notice. This includes entering the number and addresses of services marked, taking representative photographs of all markouts and logging the information, relevant comments, making specific recommendations and investigating and indicating "Follow-up" Inspections when required on each individual ticket request.

Responsibilities of Locator when Locating/Marking Underground Facilities:

Review and Scheduling of Notices Prior to Markout Site Visit

Review Notices for the following prior to Site Visit:

1. Within extent of area to be marked:
   Length of main
   Number of services
2. If the excavation information is sufficient.
3. Review the "Contractor Adverse List".
4. Town location relative to other mark out requests

Contact Excavator for Additional Information Not Stated in Original Notice:

Such as:

1. Actual Starting Date and Location (i.e. large project)
2. Length of Project
3. Type of construction (i.e. directional boring etc.)
4. Date, Time and Location of Blasting
5. Obtain project plans, if necessary

Where possible, determine if no gas involved (NG) prior to site visit

- **Check for Critical Mains (Heavy green highlighting on AMMS). If area of excavation involves Critical Mains, special care should be given to ensure main is properly located. See Damage Prevention Group Procedures Concerning Transmission Lines and Critical Mains – Attachment 5020 MA –1. Locator should notify their Damage Prevention supervisor as soon as possible.**
- **Special attention must be used when marking regulator stations.** Mark out personnel must ensure that all mains; control lines and vent lines are clearly identified. Regulator Construction Notes should be utilized for this purpose and should be on file in the Mapping area at Division's HQ. Contact the area's pressure group supervisors for additional information. **See Critical Mains Procedures as mentioned above.**

Markout of Area of Excavation:

1. All DigSafe ticket notices shall be marked prior to Targeted (i.e. legal) Due Date. If due to extenuating circumstances, markout person cannot provide "positive" response prior to targeted due date, **locator shall make every attempt** (i.e. call and/or leave voice message and document in comments) to contact contractor/excavator listed on ticket and inform them that location of utilities is still be determined.
2. Once on-site, the markout person shall markout the facilities of proposed excavation as completely and accurately as possible to ensure the protection of company facilities -- using electronic equipment and/or available records. **(See 5020 MA Attachment 2)**

Locator should utilize any or all of the following Map & Records:

a) Maps and Records provided electronically through FDC unit
b) Scanned records provided electronically through FD unit
c) S-Pipe file provided electronically through FDC unit **(See 5020 MA Attachment 3)**
d) New construction notes or information
e) Regulator construction notes available upon request through Pressure Group

3. Note: Polygons are used on mapping system within FDC unit - to designate areas of new main installation - which have not yet been plotted.
4. Locator shall periodically review the AMMS Backlog report (available on-line at the FMS-NE, ArcFM Reports or through Field Supervisors) when an AMMS polygon is indicated. This report indicates mains installed – which have not been plotted within mapping system.

5. Location of facilities shall be marked according to our standard methods of marking.
6. All mains and services shall be marked utilizing electric pipe locating equipment and/or records, ensuring service tees and main offsets are clearly marked.
7. The markout person shall, whenever possible, use the direct or conductive method when using electronic locating equipment. The locator shall always attempt to gain entry to any building for direct contact to inside services. If this is not possible, use indirect method along with all available records to locate facilities. The markout person shall use their electronic pipe locator and their best judgment to markout the service.
   (i) If the location of the gas service is still questionable, they shall leave CGI access request form (available through stock room).
   (ii) Notify excavator if you could not gain access to an address to verify gas facilities.
   (Document in the FDC how excavator notification was done.
8. On large projects (i.e. large projects or ticket requests for replacing poles or trees – where multiple tickets for same contractor have been requested), locator shall make every attempt - prior to Targeted Due Date - to contact excavator before placing ticket in "ongoing" status. Locator should note any specific arrangements made with excavator within comments field for specific ticket on Primary Completion form.
9. If no record is available, make electronic search. If there are indications, mark facility.
10. If even after exhausting all available resources, the location of the proposed excavation is still questionable, the markout person shall notify their Damage Prevention Supervisor and contact the appropriate parties (i.e. excavator, municipalities etc.).
11. It is recommended that, when marking large/long projects, marks should ensure visual consistency. Visual consistency means the location of the facilities is clear and marks are within a reasonable distance of each other
12. "Positive Response" either in person or by phone (i.e. leave message if busy, if no answer or line disconnected.) Document your attempt within comments section within FDC for specific ticket) Document, within the FDC, all tickets in which there is **"No Gas Involved"**—prior to target due date.
13. If the markout person notices a discrepancy between the engineering records and the actual location of the gas facility, he/she shall fill out the Misc. AMMS Correction Form within FDC unit.
14. For vacations and planned extended absences, the markout person must update his/her replacement on status of workload

Record Keeping

- Record Keeping: Markout personnel will fill in all completion information on the Primary DigSafe Completion form within the FDC unit. When locating services, list each individual service address for each street. Primary Completion forms shall be submitted after completing each work ticket. There are no exceptions to this, **do not "hold" any completion forms.**

Markout Completion Confirmation

- During or after completion of any markout, pictures documenting the markout(s) **shall** be taken. Pictures must be framed to include site specific landmarks.

Follow-up Inspections by Locators: {see "Other" Follow-up Conditions on Page 8}

1. The markout person shall indicate a Follow-up Inspection for "Encroachment", "Blasting", "Adverse List", or "Other" on the DigSafe Primary Completion form within FDC unit.
2. Prior to indicating a Follow-up Inspection, each locator should obtain the following information (see below) –. This information should be entered into the Primary Completion form "comments" section when completing the ticket.

3. Relevant Information to be included on Primary Completion Form:

   Nature of the proposed construction, such as, but not limited to:

   a) Depth, width, and route of any excavation.

   b) Blasting. Knowledge of blasting near any gas facility shall be reported immediately to the appropriate Field Operations Supervisor or Field Coordinator for assessment of action required.

   c) Whether sheeting or shoring will be used, and if so, the type.

The following characteristics of the gas facility:

1. Size of pipe.
2. Material
3. Depth.
4. Pressure
5. Location (i.e. distance from the proposed excavation).
6. Excavator project start date.

When an "Other" Follow-up Inspection is indicated by markout person, comments (such as the following below) shall be included when completing Primary Completion forms for ticket.

1. Additional inspection required.
2. Leak survey is required.
3. Excavation completed before markout. Etc.

Follow-up Inspections Conditions:

The following conditions should be taken into consideration when marking pipelines in the vicinity of excavation or construction activities. A Follow-up Inspection could be required, if one or more of these conditions are present, or you are not sure exactly what or where the excavation activity will be.

Please note that any special or extenuating circumstances should be reported to your immediate supervisor ASAP.

1. The gas facility is expected to be crossed or is running parallel to the excavator's trench and might be exposed. Where soil movement or lack of support (under or beside it) could disturb it, particularly if the gas pipe is cast iron.
   Note: Any relevant comments should be noted on the markout form. The Foreign Opening Inspector and/or Field Supervisor will decide if a relay is necessary from the information you provide, even if the gas pipe was not seen exposed.
   Refer to the section on "Cast Iron Encroachment Guidelines" (See 5020 MA Attachments 5, 6, 7, and 8).

2. Blasting in the area of a gas facility.
   Note: Any relevant comments (i.e. dates of blasting) should be noted on the markout form within the FDC unit. The Field Supervisor and/or Foreign Opening Inspector will perform a flame ionization survey – based upon information provided.

3. The excavator is on the "adverse list" **(See 5020 MA Attachment 4)**.

4. The gas facility is exposed. The condition of the pipeline should be noted and the area MSF supervisor should be contacted if you observe a bell joint that is not clamped/sealed, the gas pipe is damaged, or if there are any other special circumstances.

5. Notification of Instrumentation and Regulation Group when proposed construction may conflict with any part of a regulator station.

6. Contractor is excavating in "Unsafe" or "Negligent" manner in violation of DigSafe State Law. This includes mechanized equipment being used while excavating within "safety" zone.

7. Directional boring project: where contractor will be parallel or cross-trenching company facilities. Locator/Inspector should ensure that the contractor is "potholing" to verify depth and location of all utilities. When digging parallel to company facilities, "potholing" should be performed every 100 ft. along entire length of excavation.

8. Other potential Follow-up Inspections:
   Damaged coating or pipe
   Unclamped bell joint
   Service tee exposed (plastic add cathodic protection)
   Gate boxes that require raising due to road resurfacing

DigSafe Follow-up Descriptions for "OTHER" Follow-ups within MPA.

EXCA ADV = Excavator on adverse list
GAS EXPO = Gas facility is exposed
BLASTING = Blasting near facilities
GAS CROS = Gas facility is crossed
PARALLE = Parallel trenching (could be undermined)
DAMAGED = Damaged costing or pipe
UNCLAMP = Unclamped bell joint
GATE BOX = Gate boxes raised (road resurfacing)
UNSAFE = Contractor operating in a negligent/unsafe manner
EXCA CON = Excavation in conflict with a regulator station
EXCA COM = Excavation completed before markout

Damage Prevention Group Procedures Concerning Transmission Lines and Critical Mains including Drips

Mapping:
Mapping shows **Critical Mains** on the MPA in **GREEN** highlight. These mains and the drips on these mains have been designated as critical to our distribution system operation as they require special attention. Please see below.

Markout Procedure
When a DigSafe request is received that involves a critical main or transmission line, the locator shall mark all lines as prescribed in the DigSafe request. Every attempt shall be made to mark the lines by conductive (direct contact) methods. Inductive methods shall be used only when conductive means are not feasible. Any and all locates by electronic means shall also be verified by any measurements obtained from MapViewer or SPIPE. The main shall then be marked according to Standard Operating Procedures. The size and material of the pipe shall be clearly marked.

Notification of Others:
As soon as possible, the **locator** shall notify:
The area Damage Prevention Supervisor

The **area Damage Prevention Supervisor** shall then notify:
Emergency Dispatch
Gas Control (Nextel 36999) who will contact the area Instrumentation and Regulation Supervisor, if necessary.

After normal business hours, the locator shall notify Emergency Dispatch who, if the situation requires, will notify the area Damage Prevention Supervisor and the area Instrumentation and Regulation Supervisor.

Special Note: If the proposed or actual excavation is **within 20 feet of any IP system drip**, the locator shall notify Emergency Dispatch and the area Damage Prevention Supervisor **immediately**. Emergency Dispatch will **immediately** notify Operations Engineering.

Follow-up
During the markout process, the locator shall call the contractor to determine an exact start time of the proposed construction. He shall also inform the contractor that the construction involves a critical main or transmission line. The locator shall generate a follow-up request being sure to note the start time and date as well as any other pertinent information and complete the original DigSafe request. The follow-up order shall be dispatched to the area Foreign Opening Inspector, a locator, or the area MSF Supervisor. If the locate takes longer than one day, the locator shall originate the Follow Up action on the first day.

The Foreign Opening Inspector shall visit the work site on a daily basis or more often if the work requires. The Foreign Opening Inspector should be on site during any work within 20 feet of a Critical Main drip.

Transmission Line Inspection
When a transmission line is involved, a Keyspan representative must be on-site continuously during construction. Excavator must hand dig a test hole shall first and shall be made to locate and expose the transmission line in the construction area. Whenever a transmission line is exposed, the locator will immediately notify the Corrosion Department, or Emergency Dispatch, for a coating inspection. **Hand digging only** is mandatory for any excavation within the designated tolerance zone. The tolerance zone is defined as the area within eighteen inches of

either side of the pipe. Any damage or defect shall be **reported immediately** to the appropriate department – Instrumentation and Regulation, Corrosion or MSF - for their inspection and/or repair.

Completion
When the construction is complete the FOI shall complete the follow-up order including any other forms that may be necessary, such as an AMMS correction form or an exposed pipe form. The FOI should then inform The area Damage Prevention Supervisor, Emergency Dispatch, and Instrumentation and Regulation that the work is complete. Any additional permanent markings that may help delineate and protect the facility should be installed at this time.

METHODS OF IDENTIFYING AND MARKING COMPANY FACILITIES

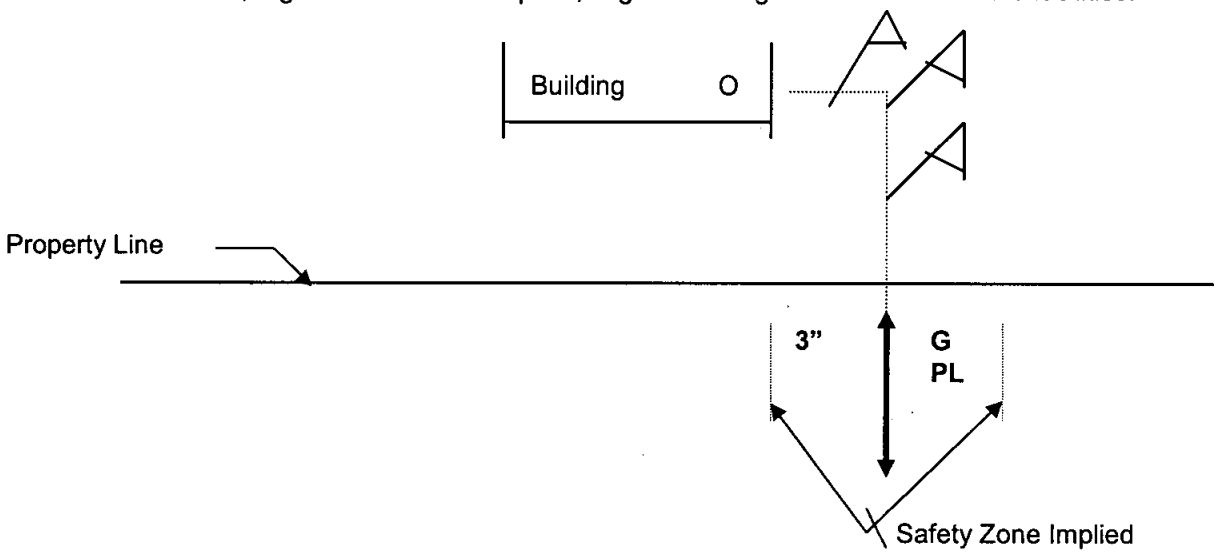
1. MATERIAL ABBREVIATION MARKINGS
2. GAS LINE PAVEMENT MARKINGS - CENTER LINE MARKINGS
3. THE SAFETY ZONE IN CENTER LINE MARKINGS
4. MARKING LATERALS USING THE CENTER LINE METHOD
5. COLOR CODE FOR MARKINGS
6. LIMITS OF GAS LINE MARKING
7. OFF PAVEMENT MARKINGS
8. OFFSET STAKING

MATERIAL ABBREVIATION MARKINGS

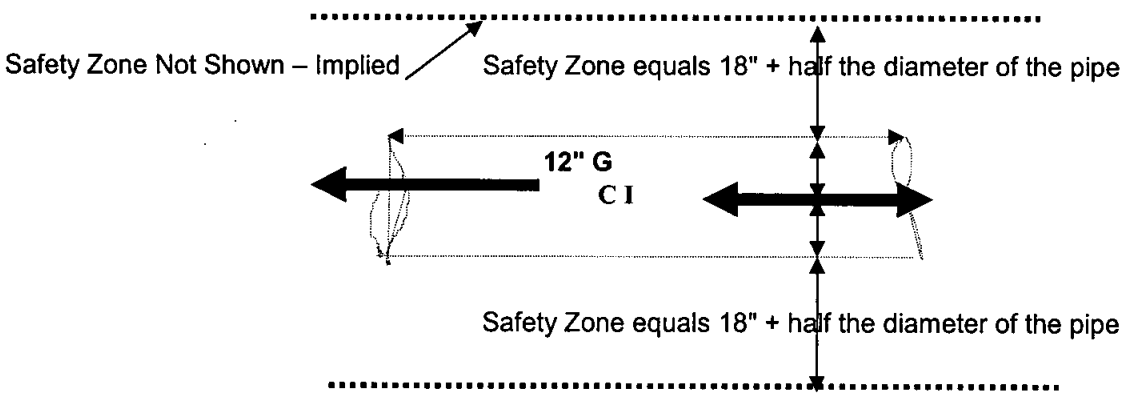
Pipe Material	Abbreviation When Marking
Cast Iron	CI
Copper	CU
Plastic	PL
Steel (Bare or Coated)	ST
Wrought Iron	WI

GAS LINE PAVEMENT MARKINGS (YELLOW)
CENTER LINE MARKINGS
(ALL SIZE GAS LINES)

In centerline markings only the center of the facility is marked. A "Safety Zone" is implied, and is therefore not shown, regardless of whether paint, flags or staking is used to denote the facilities.

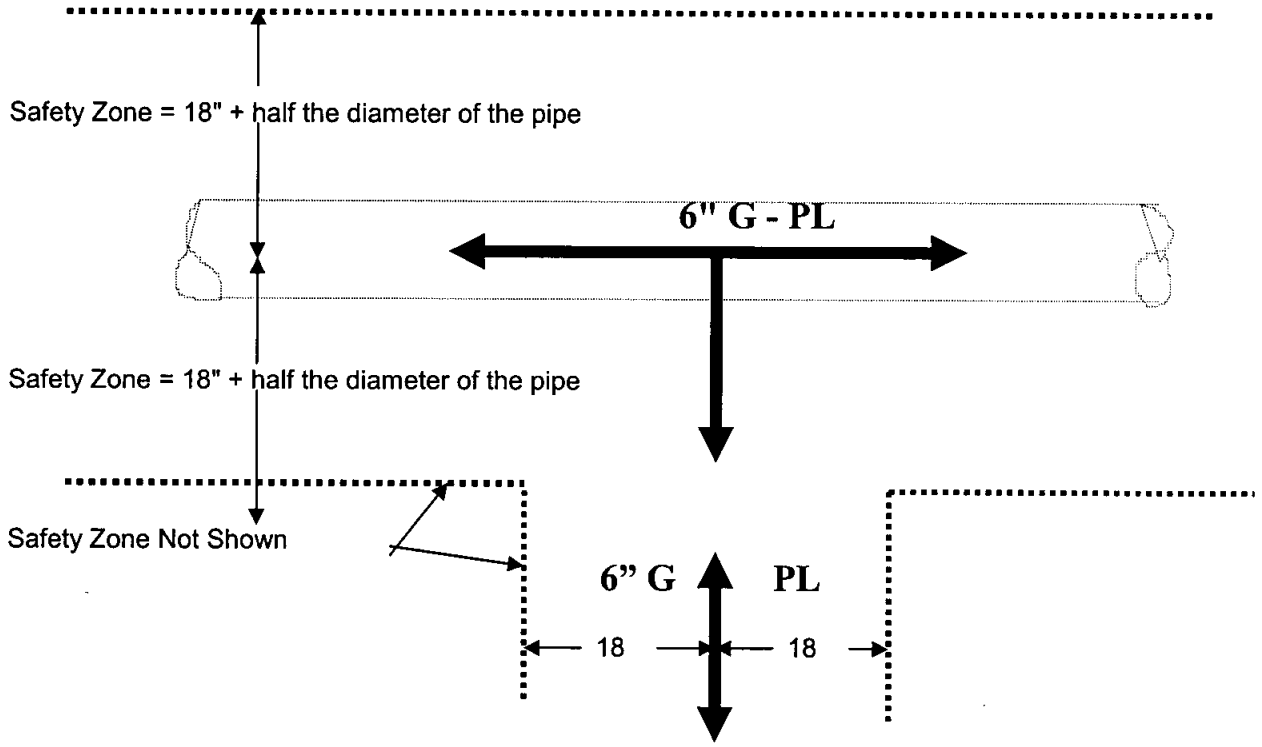


THE SAFETY ZONE IN CENTER LINE MARKINGS



Note: Mark the diameter of the pipe to the safety zone if pipe diameter is greater than 2".

MARKING LATERALS USING THE CENTER LINE METHOD



COLOR CODE FOR MARKINGS

Red:	Electric power lines, cables, conduit or light cables
Yellow:	Gas, oil, petroleum, steam or other gaseous materials
Orange:	Communications cables or conduit, alarm or signal lines
Blue:	Water, irrigation and slurry lines
Purple:	Reclaimed Water
Green:	Sewer and drain lines
White:	For pre-marking proposed excavations

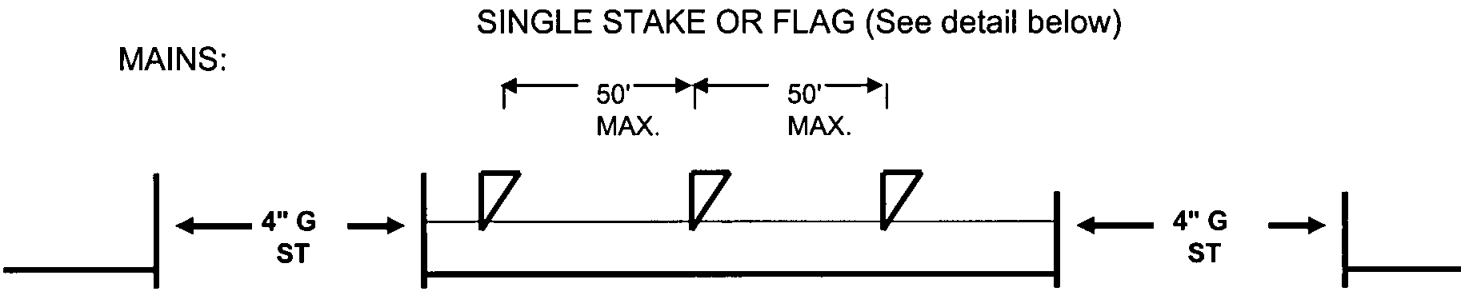
LIMITS OF GAS LINE MARKING

When the location of proposed excavation is premarked, mark all gas lines within the premarked area and within fifteen feet of the area.

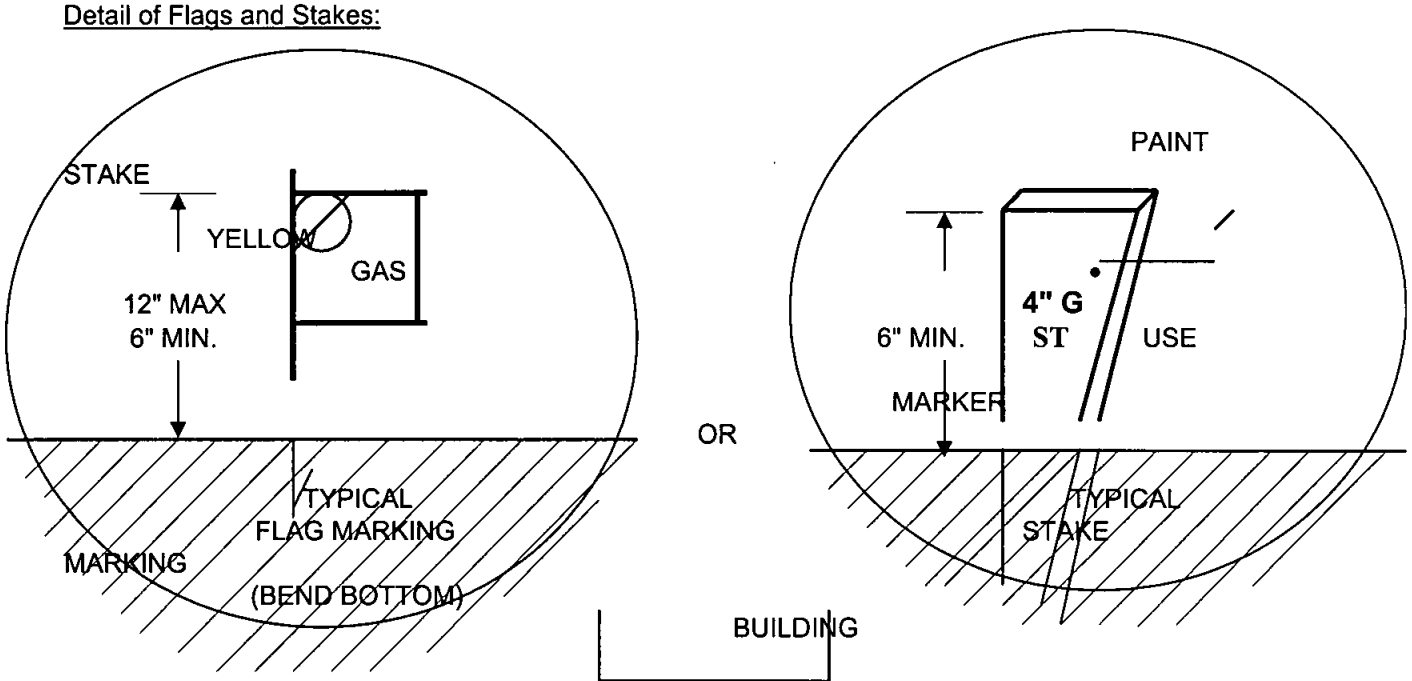
When only the approximate location of proposed excavation is known, contact the excavator to determine the appropriate area and facilities to be marked. Document the conversation with the contractor in the comment section of the Primary Completion form within FDC unit (i.e., contact person, date and time)

OFF PAVEMENT MARKINGS

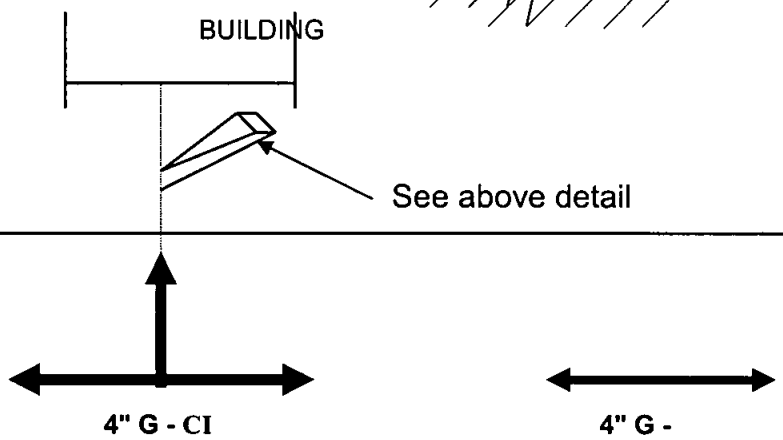
MAINS:



Detail of Flags and Stakes:



SERVICES:

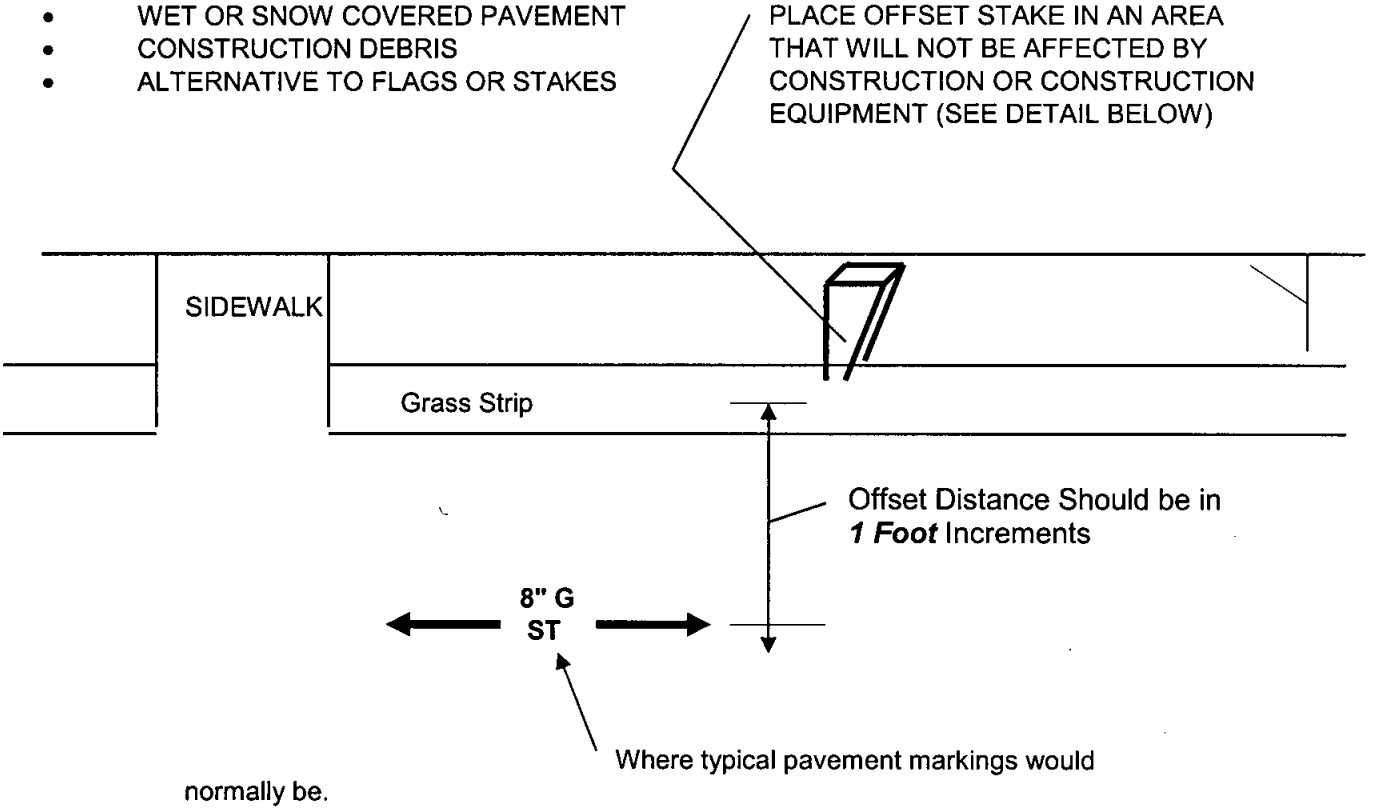


OFFSET STAKING

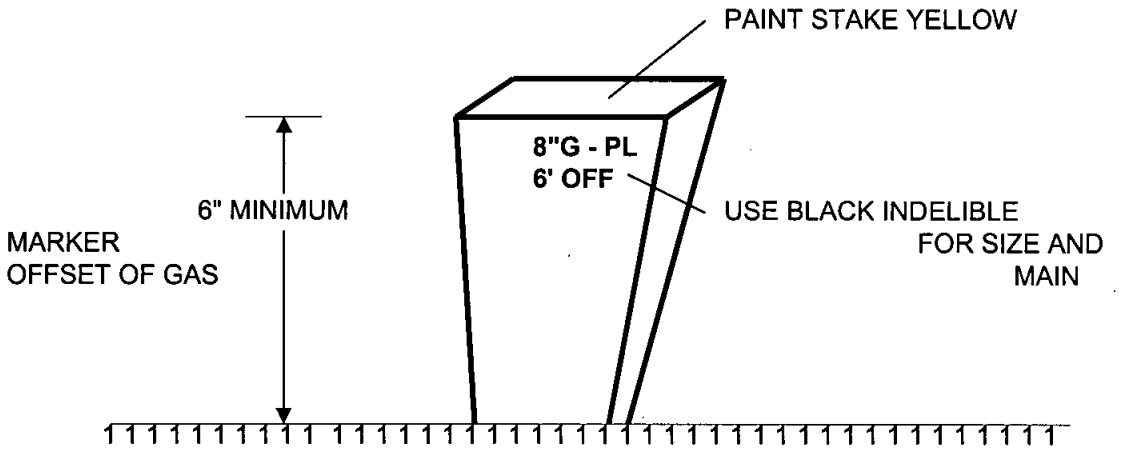
Use when conditions exist that would render pavement markings or center line staking impractical. Note the reason for using an alternative marking method in the comments.

EXAMPLES:

- WET OR SNOW COVERED PAVEMENT
- CONSTRUCTION DEBRIS
- ALTERNATIVE TO FLAGS OR STAKES



TYPICAL STAKE MARKINGS

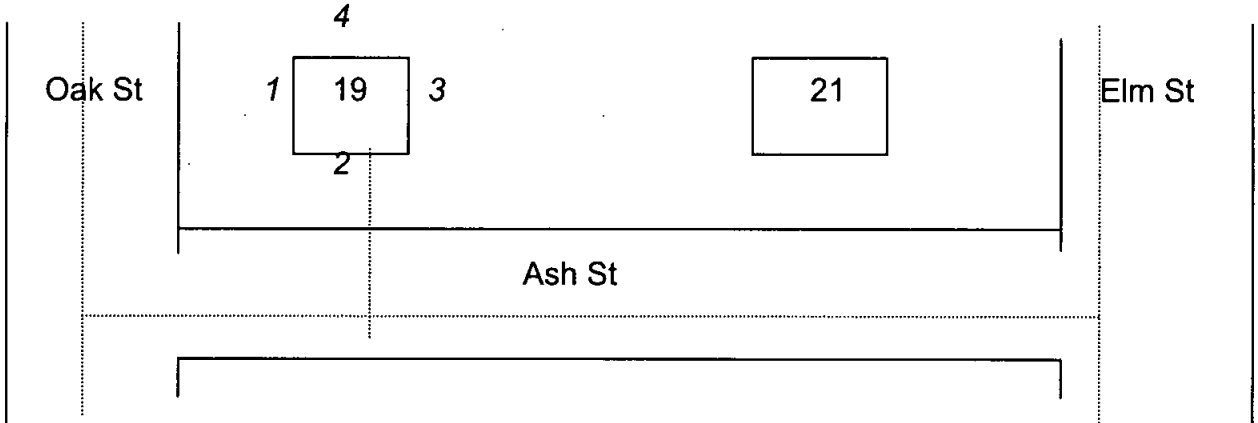


Reading SPIPE (Service Pipe) Micro-Fiche

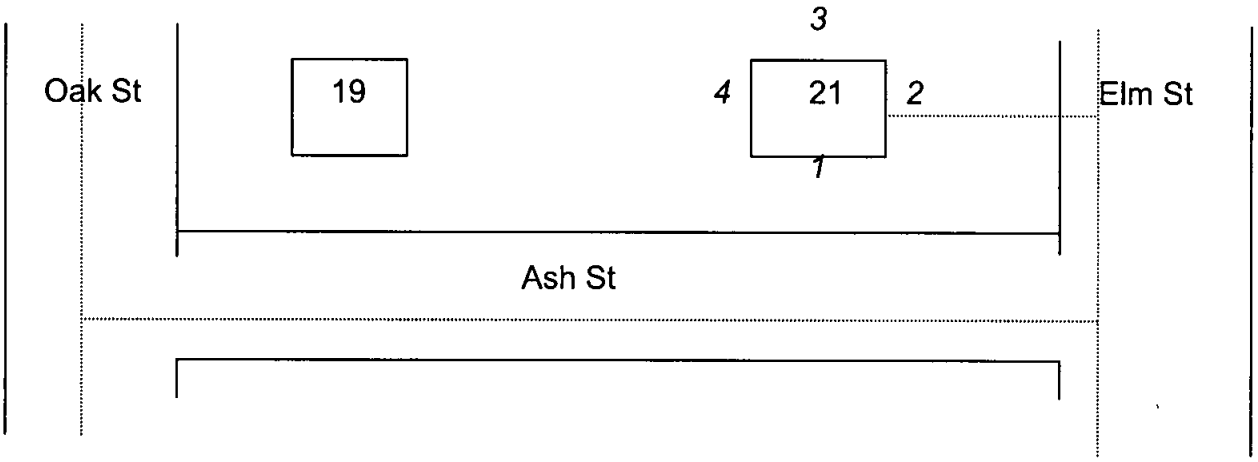
The first rule of SPIPE is that you are standing at the ***TAP*** looking at the HOUSE, for all measurements.

With this in mind, the SPIPE system uses numbers to indicate the point of entry into the building. These numbers are always relative to the tap location (where you should be standing). When you face the building, you will always be facing Wall #2, which will be considered the "Front". Wall #1 will be the side wall to your left; Wall #3 will be the wall to your right; and Wall #4 will be the back wall (which you can't see). Please note that these numbers may or may not correspond to the *actual* "front" or "back" of a building.

Example 1: You are standing on the Tap to #19 Ash St. The building walls would be referenced as shown because the tap for #19 is on Ash St.



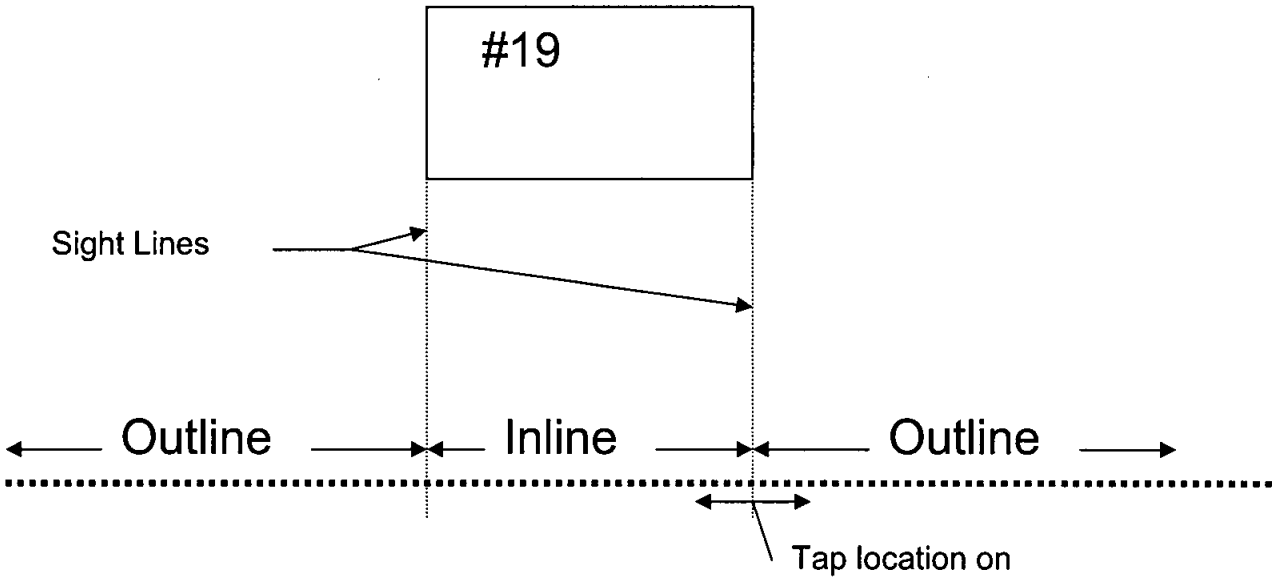
Example 2: You are standing on the tap to 21 Ash St. In this case you are actually standing on Elm St. because the tap for 21 Ash is on Elm. The building walls would be numbered as shown.



SPIPE - "*Inline*" and "*Outline*" Locations:

The terms "*Inline*" and "*Outline*" are used in the SPIPE system to denote the location of the TAP relative to the front of the building.

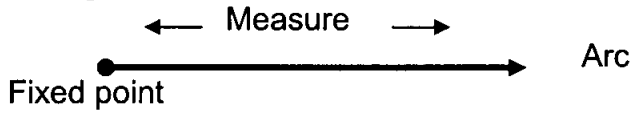
Sight lines are projected out from the corners, perpendicular to the "front" of the building. The area in-between these lines is considered "inline", the areas to either side are considered "outline".



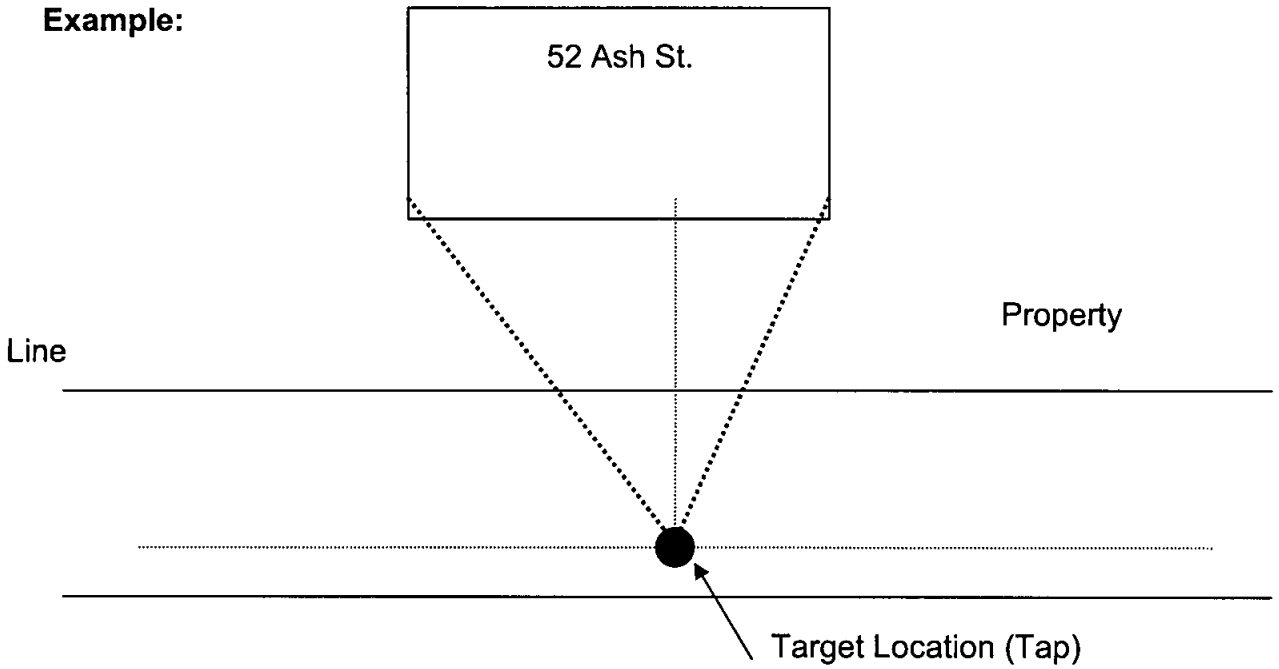
SPIPE - Ties: Swing Ties

A swing tie is a type of measurement where you need at least two reference points, such as the corners of a building. The user holds one end of the measuring tape at each fixed or known location, measures out the prescribed distance, and "swings" an arc from each location. Where these "arcs" intersect is the location of the facility.

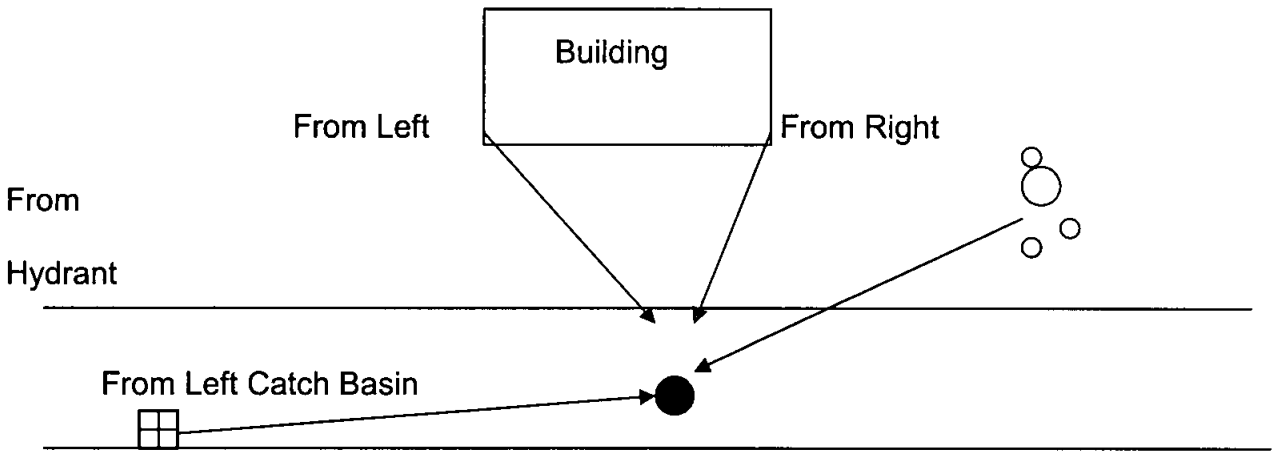
Basic Swing Tie:



Example:

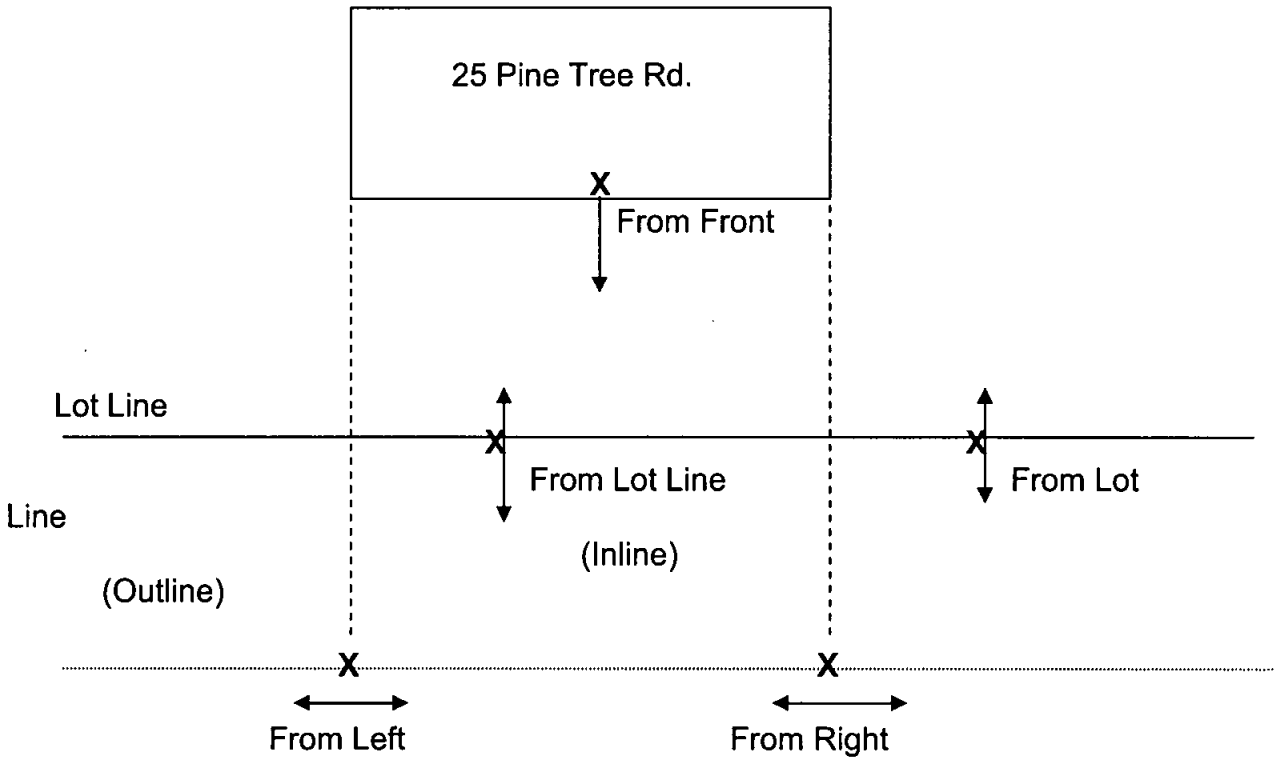


Common Reference Point Locations:



SPIPE - Ties: Right Angle Ties

A Right Angle tie is a measurement where the user measures from a known location (i.e., wall, fence, property line) in a direction perpendicular to the object or location as shown below:



SPIPE - How to Read SPIPE Sentences

Each SPIPE record relays information in the same basic fashion as follows:

Type of Tie: Swing Tie or Right Angle Tie?

Distance: How far do we need to measure?

Starting Point: Where do we need to measure from?
FROM right; FROM left; FROM Front…

The END: Inline or Outline?

***Examples*:** Specific tie information;
Loc: RIGHT ANGLE, 33 ft, From Front, Inline;
Loc: Swing 45.5 ft., From Left, Inline;

Adverse Contractor List - MA
2004-2003-2002

Contractor	Count
P. Gioioso & Sons Inc.	131
Albanese Bros. Inc.	46
M D R Construction Co., Inc.	30
Revoli Construction Co. Inc.	30
Roads Corporation	26
Fiore Construction Co.	23
Defelice Corporation	22
McCourt Construction Co.	20
Baltazar Contractors Inc.	16
D & S Albanese	16
NStar	16
R J V Construction Co.	16
Neuco	15
P. A. Landers Construction	15
A. V. Construction Company, Inc.	13
Bortolotti Construction Inc.	12
Modern Continental Const. Co.	12
Oliveria Construction	12
J. Marchese Inc.	11
Mirra Company, Inc.	11
T. Gioioso Constuction, Inc.	11
Andreassi Brothers Inc.	10
Lawrence - Lynch Corp.	10
N. Granese and Sons Inc.	10
DiLorenzo Corporation	9
J. W. Dubis & Sons, Inc.	9
Paolini Corp	9
Charles Contracting Co.	8
J. B. D'Allessandro Corp.	8
John DiLetizia & Sons	8
Mario Susi & Sons	8
Metro Equipment	8
S & R Construction Enterprises	8
Susi & Dimascio	8
Charles R. Todd Cont. Inc.	7
Dracut Sewer Service	7
E. B. Rotondi & Sons Inc.	7
Todesco Equipment Co	7
Tornare Construction Corp.	7
D'Alessandro Construction	6
Derbes Brothers, Inc.	6
J. Damico Inc.	6
McLaughlin Bros. Const.	6
Middlesex Corporation	6
R. H. White Construction	6
S. B General Contracting	6
Shannon Construction	6
SPS New England	6
Aggregate Industries	5
Bay State Piping	5
Borges Construction	5
Bro-Con Construction	5
Dow Company	5
J. Trapeano Inc.	5
LeBlanc General Contractors	5
Midway Land Contractors	5
Northern Seal Coating and Paving	5
Pavao Construction	5
C. C. Construction	4
D & C Construction Co.	4
DeRosa Construction	4
Dow Construction	4
E Z Excavating	4
ERV Construction	4
Feeney Bros. Excavation Corp	4
G. Conway Inc.	4
J. Derenzo Co.	4
J. Masterson Construction	4
Joseph P. Cardillo & Son Inc.	4
Maverick Sherin Const. Corp.	4
MDR Construction	4
Meninno Construction Company	4
PKM CONTRACTORS INC	4
R. M. Pacella Inc.	4
R. W. Bryant Contracting	4
Richard Pacella	4
Spillane's Nursery & Landscape	4
Zenone Construction Inc.	4

4 for more At Fault Damages over 3 years

CAST IRON ENCROACHMENT GUIDELINES

Definitions (Some definitions have been modified for clarity.):

Angle of Influence – A 45-degree angle above the horizontal starting from the bottom edge of the trench nearest to the main rising to the surface.

Deep Trench - An excavation that is more than 5' deep.

High Pressure Cast Iron – A distribution line that feeds at a higher pressure than that supplied to a customer. (i.e., normally a regulator is required to serve a customer.)

Low Pressure Cast Iron – A distribution line that feeds at the same pressure as what is supplied to a customer. (i.e., normally no regulator is required to serve a customer.)

Shallow Trench – An excavation that is 5' or less in depth.

Sheeting – Bracing or shoring used to support the sides of an excavation to prevent its collapse during an excavation project.

Soft Clay – Earth that is easily molded by hand.

113.06: Replacement of Cast-Iron Pipe at Trench Crossings

(1) Cast-iron pipe, eight inches or less in nominal diameter, that is exposed and undermined by a trench crossing the pipeline shall be replaced immediately:

(a) When there is less than 24 inches of cover; or

(b) When there is 24 inches or more of cover and the trench widths set forth in Table 1 are exceeded.

Table 1 - Maximum Allowable Trench Width

Depth of Cover:→	2 to 4 feet	4 feet or more
Nominal Pipe Diameter		
4 inches or less	3 feet	4 feet
6 inches	4 feet	6 feet
8 inches	5.5 feet	8 feet

The trench width shall be determined by the distance along the centerline of the exposed pipe.

(2) The minimum length of the replacement shall be equal to the trench width plus twice the distance from the top of the pipe to the bottom of the crossing trench, extending equally on both sides of the crossing trench.

(3) When cast-iron pipe is intersected by a trench and the pipe must be replaced in accordance with 220 CMR 113.06, the pipe shall be surveyed daily for gas leakage and monitored daily until the pipe is replaced.

(4) At the operator's discretion, cast-iron pipe does not have to be replaced to comply with 220 CMR 113.06(1)(b) when a pipe segment is exposed and undermined in a shallow trench crossing, provided that:

(a) the backfill supporting and surrounding the pipe shall be thoroughly compacted for the full trench width and for a distance equal to one-half of the trench width on both sides of the centerline of the pipe;

(b) the backfill shall be free of objectionable material or debris, such as, but not limited to, pavement, frozen soil, trash and rocks; and

(c) The backfilling techniques used to comply with 220 CMR 113.06(4)(a) and (b) shall be included in the operator's operating and maintenance plan.

113.07: Replacement of Cast-Iron Pipe Adjacent to Parallel Excavations

(1) Cast-iron pipe, eight inches or less in nominal diameter, that is adjacent to parallel excavation shall be replaced immediately, provided that the excavation exceeds eight feet in length and a condition exists as set forth in
220 CMR 113.07(2), (3) or (4).
(2) A low-pressure cast-iron pipe that is parallel to a shallow trench excavation shall be replaced if:

(a) the pipe is exposed and undermined; or
(b) at least one-half of the pipe diameter lies within the angle of influence; and
1. the bottom of the excavation is below the water table; or
2. the excavation is in soft clay.

(3) A low-pressure cast-iron pipe that is parallel to a deep trench excavation and lies within the angle of influence shall be replaced if:

(a) the pipe is exposed and undermined; or
(b) the pipe is totally, or in part, within three feet of the edge of the trench and sheeting that may have been used is not left in place; or
(c) the operator determines that the strain on the pipe caused by, but not limited to, excessive ground movement or inadequate pipe support shall exceed 0.05% (500 microstrain).

(4) A high-pressure cast-iron pipe that is parallel to a shallow or deep trench excavation shall be replaced if:

(a) the pipe is exposed and undermined; or
(b) at least one-half of the pipe diameter lies within the angle of influence and sheeting that may have been used is not left in place.

(5) When cast-iron pipe is adjacent to a parallel excavation and must be replaced in accordance with 220 CMR 113.06, the pipe shall be surveyed daily for gas leakage and monitored daily until the pipe is replaced.
(6) Any pipe that replaces cast-iron pipe shall extend a safe distance, determined by the operator, beyond the point where parallel excavation terminates.

113.08: Training

(1) Each operator shall provide and implement a written plan of initial training to instruct all appropriate operating, maintenance, supervisory, and engineering personnel about:

(a) the requirements of 220 CMR 113.00;
(b) the programs and procedures that are developed to comply with 220 CMR 113.00;
(c) the methodology for selecting, prioritizing, and scheduling cast-iron pipe for replacement or abandonment; and
(d) any operating and maintenance plans or procedures adopted to meet the requirements of 49 C.F.R. Part 192 pertaining to cast-iron pipe. The initial training shall be completed within 210 days of the effective date of 220 CMR 113.00.

(2) A written plan of continuing instruction shall be developed and carried out at intervals of not more than two years to keep all appropriate personnel current on the knowledge and skills they have gained in the initial program and any modifications that have occurred as a result of the operator's annual review of any program and procedures.

Cast Iron Encroachment Guidelines
Parallel Excavations

INFORMATION REQUIRED:

1) **Size** of CI pipe.
2) **Actual cover** over Cast Iron pipe. We need to carefully distinguish between the depth of the gas trench, the depth of the centerline of the gas pipe and the cover over the gas pipe.
3) **Distance between** edge of foreign excavation and nearest edge of CI pipe. Note: This not properly measured from the pavement cutback.
4) **Actual depth** of the foreign excavation. Note: This is not usually the same as the depth as listed on the Dig Safe notification.

CONDITIONS:

All of the following conditions MUST be met to constitute an encroachment:

1) Cast iron pipe only
2) 8" or less in nominal diameter.
3) The cast iron pipe is adjacent to a parallel excavation more than 8' long.

CRITERIA:

Shallow Trench: If the above conditions are met, the cast iron pipe must be replaced if:

1) The pipe is exposed and undermined as defined by Cross Trench Encroachment Criteria.
2) At least one half of the pipe diameter lies within the angle of influence AND the bottom of the excavation is below the water table, OR
3) At least one half of the pipe lies within the angle of influence AND the excavation is in soft clay.

Deep Trench: If the above conditions are met the cast iron must be replaced if:

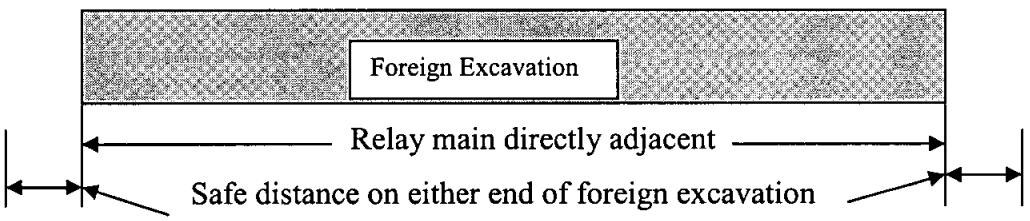
1) The pipe is exposed and undermined as defined by Cross Trench Encroachment Criteria.
2) The pipe lies within the angle of influence and any part of the pipe is within three feet of the excavation and sheeting that may have been used is not left in place OR
3) The pipe is beyond three feet of the excavation and at least one half of the pipe diameter lies within the angle of influence, and sheeting is not left in place. For situations where close spaced sheeting was installed and removed, provide Engineering with the above "Required information" as well as soil type and ground water level, to calculate the strain and determine if the pipe requires replacement. (Test holes should be considered to confirm that our if the pipe falls within the angle of influence.)

High Pressure CI: If the above conditions are met, then the cast iron must be replaced if:

1) The pipe is exposed and undermined as defined by Cross Trench Encroachment Criteria.
2) At least one-half of the pipe diameter lies within the angle of influence and sheeting that may have been used is not left in place.

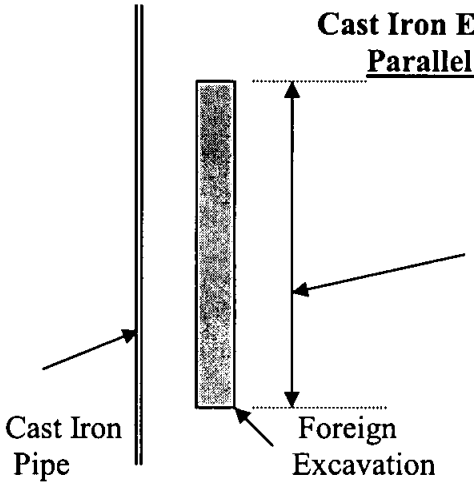
REPLACEMENT FOOTAGE:

Calculation of encroached piping to be replaced. The minimum length of replacement shall be equal to length of the area encroached plus a safe distance beyond the point where the parallel excavation terminates. On each end this safe distance may often be the distance between the top of the gas line and the bottom of the foreign trench.

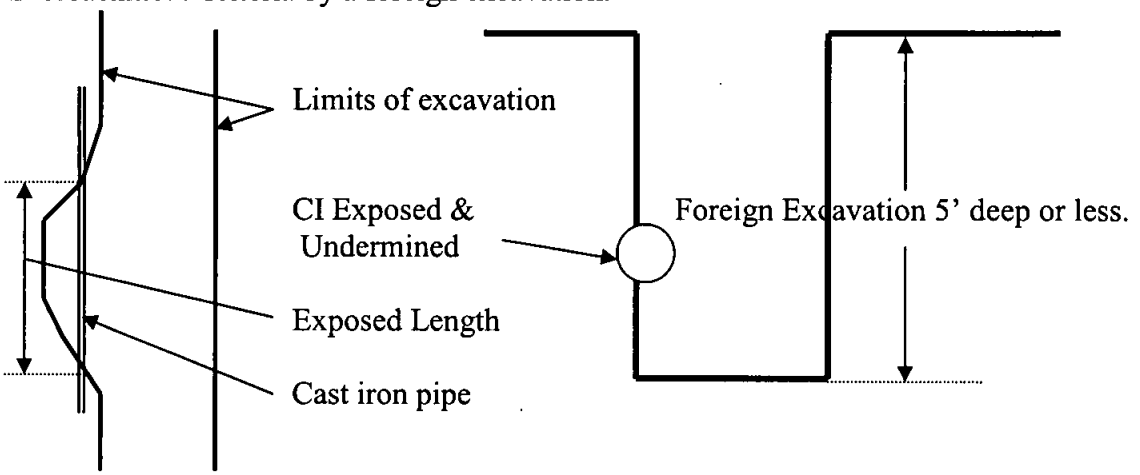


Cast Iron Encroachment Guideline Examples

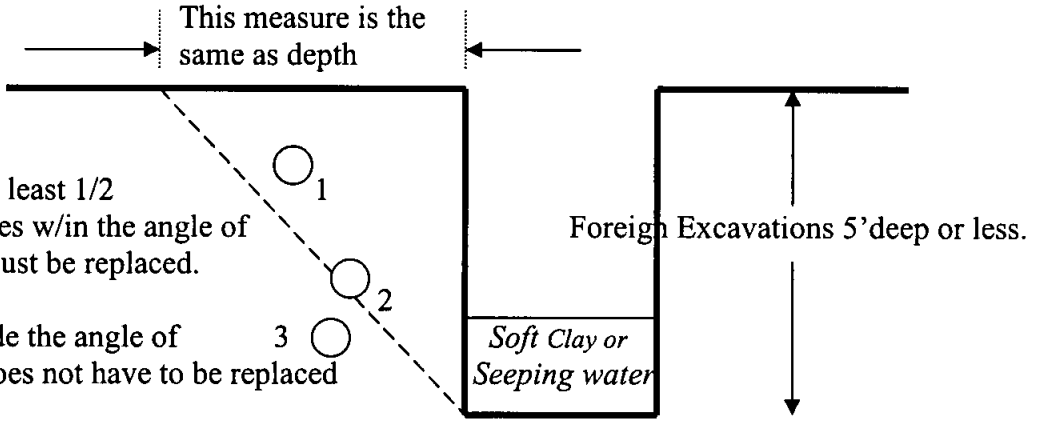
Parallel – SHALLOW – Low Pressure



1) Cast Iron is encroached if it is **exposed & undermined** as defined by Cross Trench Encroachment Criteria by a foreign excavation.



2) The Cast Iron is encroached if the centerline of the pipe lies within the angle of influence and the bottom of the excavation is either **below the water table** (water seeps into the bottom of the excavation from the ground, not due to rain), **or is in Soft Clay**.



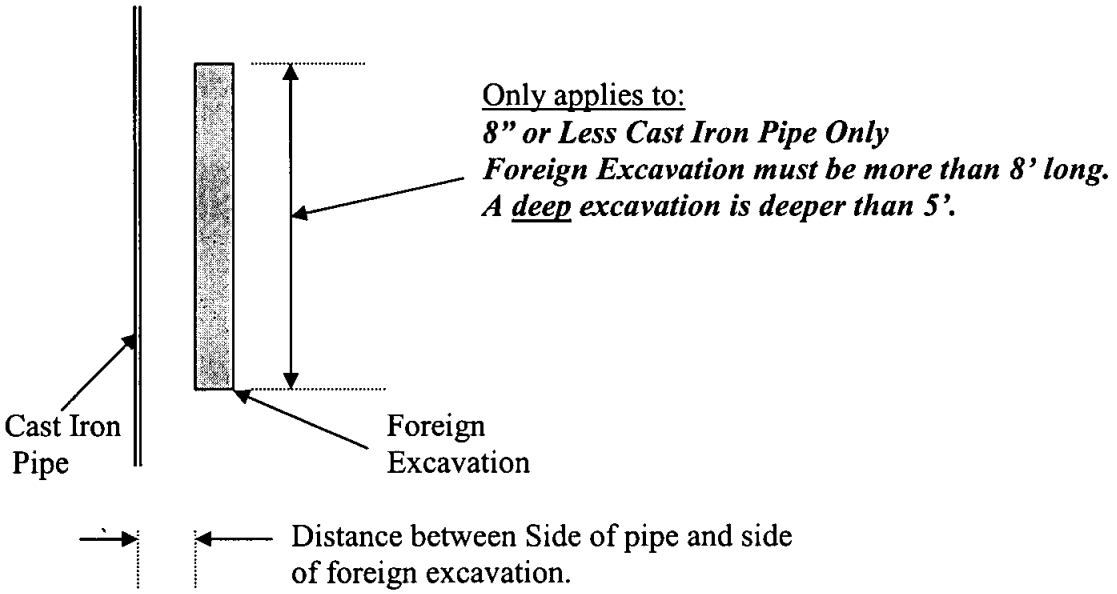
Pipes 1 & 2: At least 1/2 Pipe diameter lies w/in the angle of influence and must be replaced.

Pipe 3: Is outside the angle of influence and does not have to be replaced

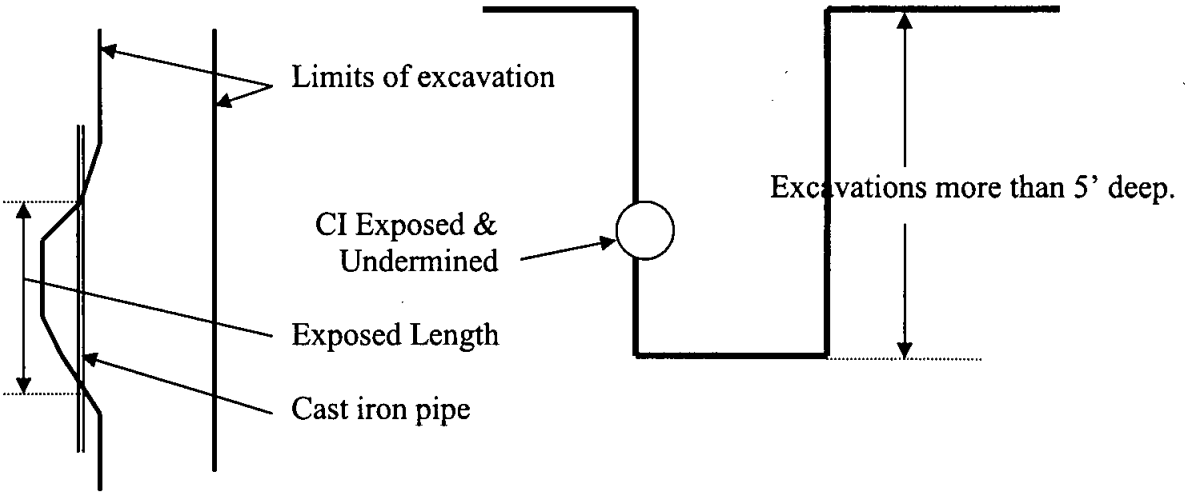
NOTE: If the excavation is NOT soft clay or below the water table neither pipes 1 or 2 need to be replaced. Pipe 3 never has to be replaced, regardless of conditions because it is not within the angle of influence.

Cast Iron Encroachment Guideline Examples

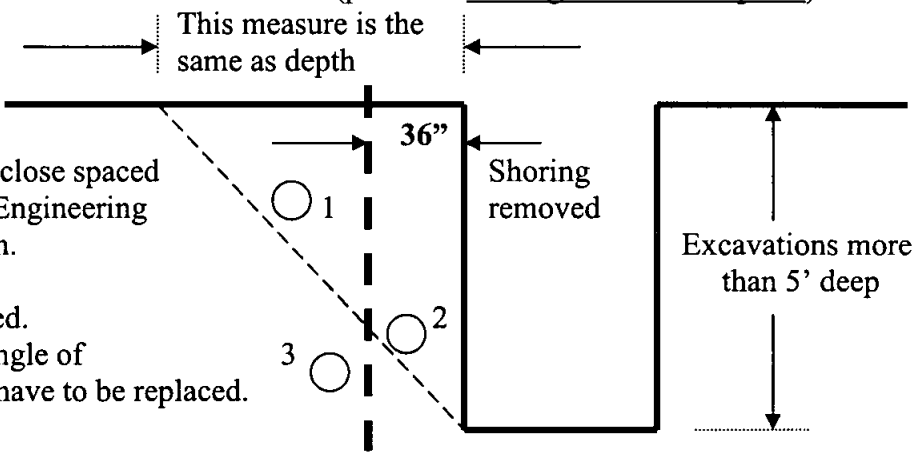
Parallel – DEEP – Low Pressure



1) Cast Iron is encroached if it is **exposed & undermined** as defined by "Cross Trench Encroachment Criteria" by a foreign excavation.



2) Cast iron is encroached if the centerline of the pipe lies within the angle of influence **and any part of the pipe is within 36" of the excavation** (provided shoring is **not** left in place).

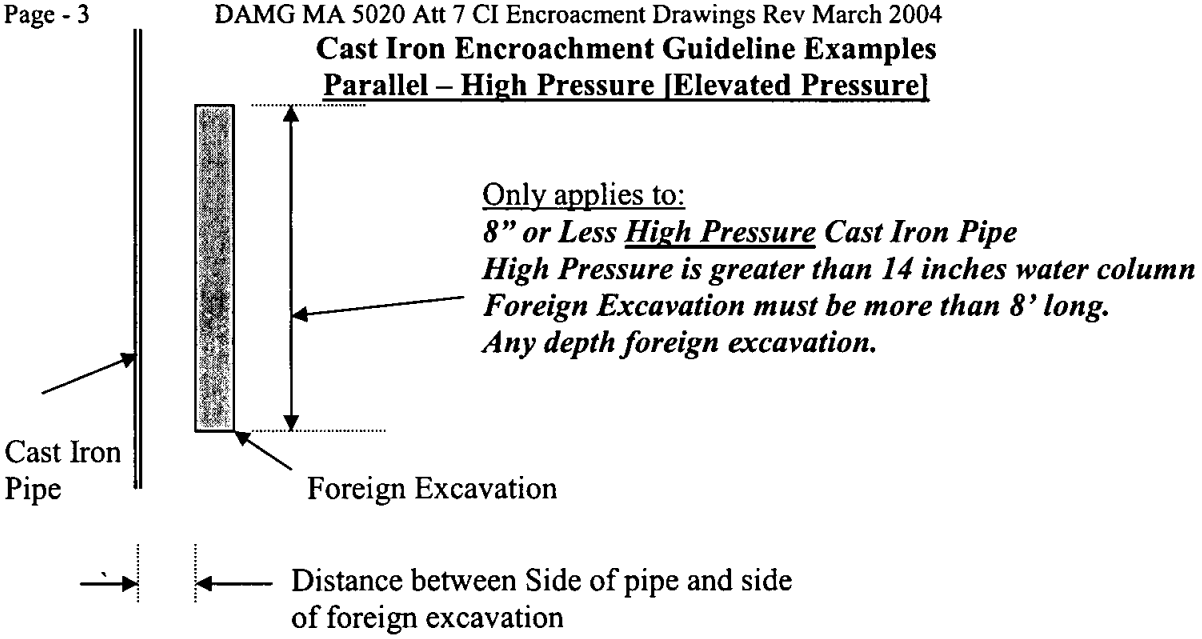


Pipe 1: Replace unless close spaced sheeting was used and Engineering can do stress calculation.

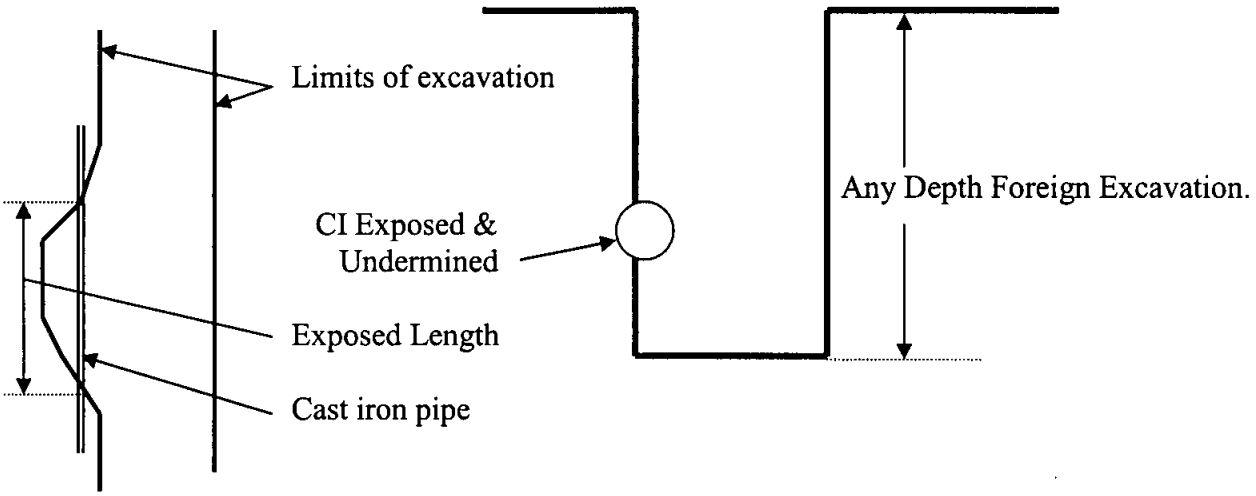
Pipe 2: Must be replaced.
Pipe 3: Is outside the angle of influence and does not have to be replaced.

Cast Iron Encroachment Guideline Examples

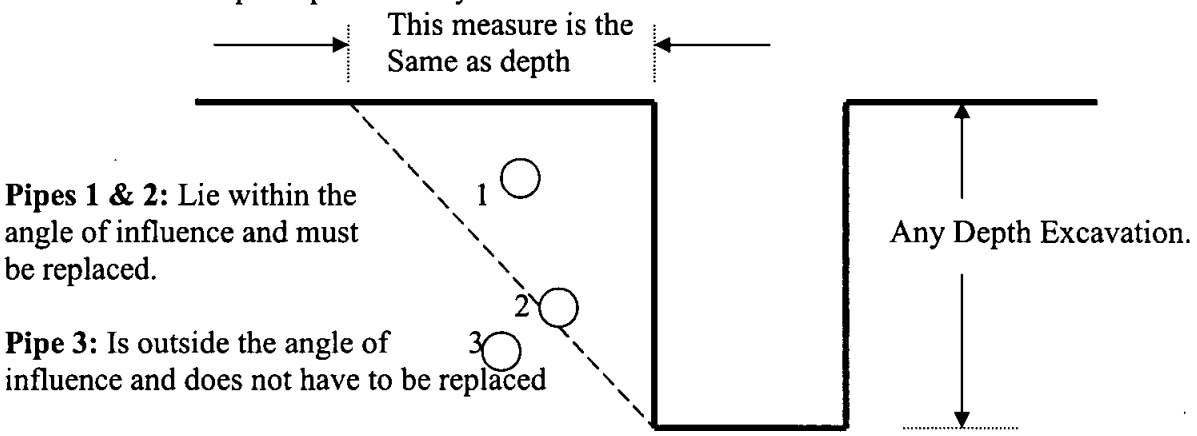
Parallel – High Pressure [Elevated Pressure]



1) HP Cast Iron is encroached if it is **exposed & undermined** as defined by "Cross Trench Encroachment Criteria" by a foreign excavation.



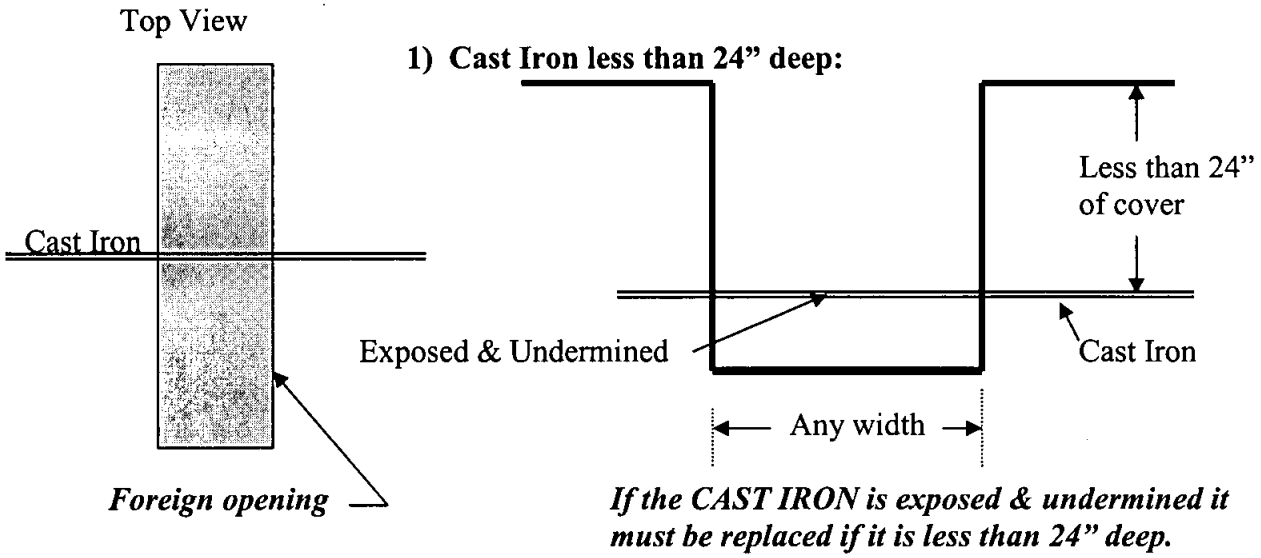
2) The HP cast iron is encroached if the centerline lies within the angle of influence and shoring will **not** be left in place permanently.



Pipes 1 & 2: Lie within the angle of influence and must be replaced.

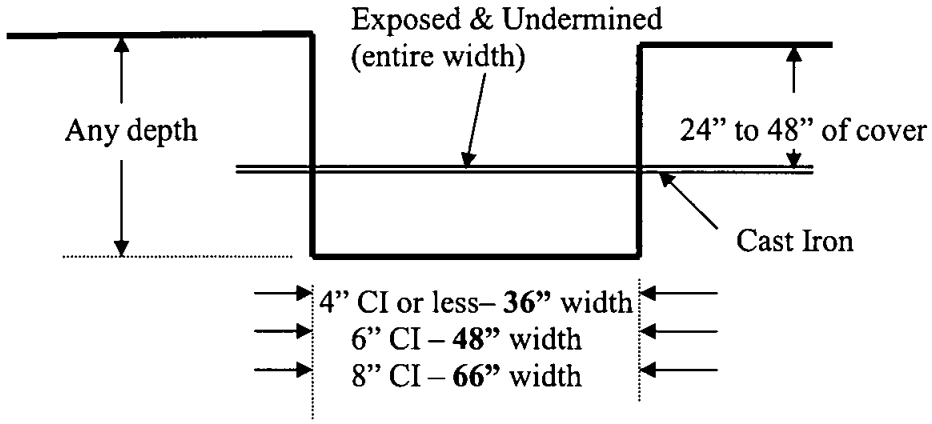
Pipe 3: Is outside the angle of influence and does not have to be replaced

Cast Iron Encroachment Guideline Examples
Cross Trench

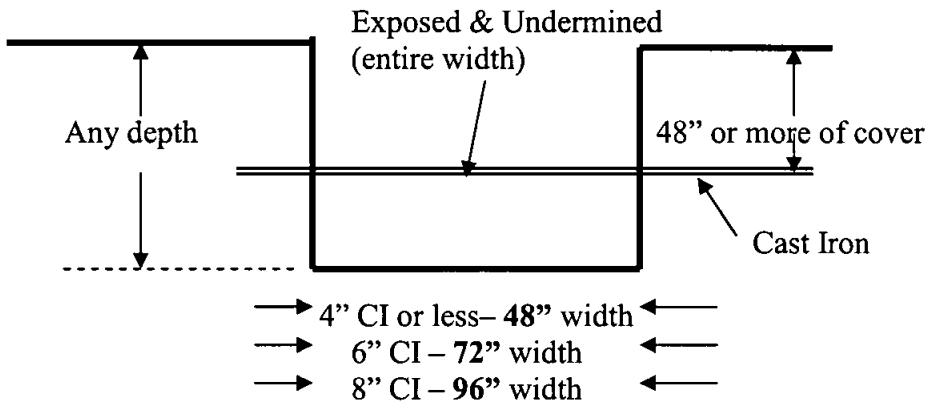


NOTE: On Shallow excavations (5' deep or less), if the backfill material is properly compacted, the pipe does not need to be replaced.

2) Any depth excavation, with cast iron that is 24" deep but less than 48" deep, the cast iron is encroached if the trench widths exceed the following:



3) Any depth excavation, with Cast Iron 48" or deeper, the cast iron is encroached if the trench widths exceed the following:



Cast Iron Encroachment Guidelines
Trench Crossings- DEEP Or SHALLOW - Any Pressure

INFORMATION REQUIRED:

The following information is required to determine if an encroachment has occurred:

1) **Size** of the cast iron main
2) Actual **depth of cover** of the cast iron main (measured from the pipe, not the top of a bell joint).
3) **Actual depth** (to bottom of excavation) of the foreign excavation
4) Actual **width** of foreign excavation, **measured at the exposed cast iron main**. (Note: Trench width is measured along the centerline of the exposed pipe, not the patch over the excavation.)

CONDITIONS:

All of the following conditions MUST be met for the crossing to constitute an encroachment:

1) The gas main must be cast iron pipe, and;
2) The pipe must be 8" or less in nominal diameter, and;
3) The pipe must be BOTH exposed and undermined as specified below.

CRITERIA:

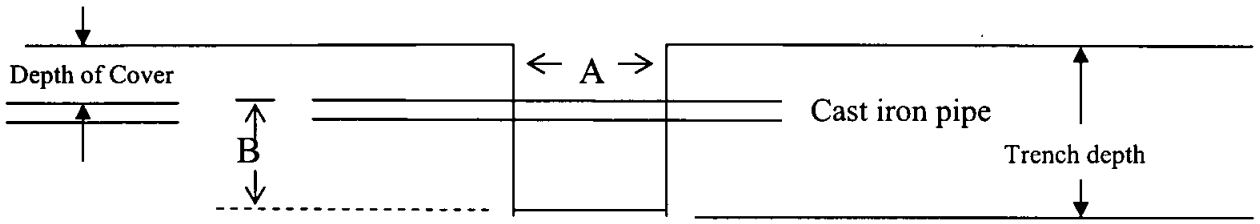
For DEEP or Shallow cross trenches, if the above conditions are met, then the cast iron pipe must be replaced if:

1) The cover of the cast iron pipe is less than 24" of cover.
2) The cover of the cast iron pipe is at least 24" and less than 48".
   - 4" or less cast iron and the foreign excavation width is greater than 36"
   - 6" cast iron and the foreign excavation width is greater than 48".
   - 8" cast iron and the foreign excavation width is greater than 66".
3) The cover of the cast iron pipe is 48" or greater.
   - 4" or less cast iron and the foreign excavation width is greater than 48".
   - 6" cast iron and the foreign excavation width is greater than 72".
   - 8" cast iron and the foreign excavation width is greater than 96".

Note: SHALLOW FOREIGN EXCAVATION: If the above criteria in #2 or #3 are met for a shallow trench crossing, then either the section of cast iron must be replaced or the cast iron must be backfilled in such a way that the backfill supporting and surrounding the pipe shall be thoroughly compacted for the full trench width and for a distance equal to one-half of the trench width on both sides of the centerline of the pipe. The backfill shall be free of objectionable material or debris, such as, but not limited to, pavement, frozen soil, trash or rocks.

REPLACEMENT FOOTAGE:

The minimum length of replacement shall be equal to the trench width (A) and extend the distance (B) (from the top of the pipe to the bottom of the crossing trench) on both sides of the crossing trench.



Replacement footage = B + A + B

EXHIBIT 12

First Set of Information Request Responses: 1-17

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-17

Respondent: Charles C. Cotting

Q. Provide a detailed explanation as to the procedures the locator followed when he marked out the service to 225 North Avenue. Provide a copy of the procedures. Indicate in your response the extent to which the locator followed the company's procedures.

A.
The following are the steps the KeySpan locator reported he took onsite at 225 North Avenue, Weston to locate and flag the service.

The KeySpan locator said he first used his field computer to try to find the Scanned service records for 225 North Avenue. Using the Scanned Records application for Massachusetts service records, he entered "North Ave*" in the "Street Name" box and, using the drop down list, clicked on "MA-WESTON". He retrieved one service card image – 535 North Avenue. (See excerpt below from DAMG 5020 #2. Procedure followed, although application not accessed correctly. See D.T.E. 1-11)

The KeySpan locator then used the Host Inquiry application on his MPA to try to locate the SPIPE records for 225 North Avenue. He entered the application, cleared a number of boxes on the application page, and made sure that "NEGSPI Spipe" was showing in the Source System box. He then entered "North Ave" in the On Street box. He then clicked on the drop down arrow in the "Town" box to retrieve WES for Weston. He then added "MA" to the state box. He got to a window saying that there were no SPIPE records. (See excerpt below from DAMG 5020 #2. Procedure followed, although application not accessed correctly.)

The KeySpan locator then went to the house to look for a meter and found an outside meter on the left side of the house. He tied into the service riser using his pipe and cable locating equipment and flagged out the service as shown in the mark-out photo (see D.T.E. 1-15). He did not see any tracer wire. He said that he looked for a gate box but did not find one. KeySpan locator should have contacted Mapping or Supervisor for assistance in gathering records for this address. (See D.T.E. 1-16)

The KeySpan locator indicated that he got a good signal and stepped off the service. (See DAMG 5020 #7)

The KeySpan locator did not attempt to locate the main. He said that he did not because the work was "on property". This additional step would have tied in the service from the main end and confirmed any marks or flags placed.

If the KeySpan locator had any concerns about this markout or his equipment, he should have notified his supervisor of the problems and sought assistance. (See DAMG 5020 #10. Procedure was not followed.)

Excerpts from **DAMG 5020** below: Similar information is provided in the Damage Prevention Manual of which this procedure is a part.

DAMG-5020: Procedure for Locating and Marking Out Sub-Surface Facilities

Date:	TBD	Filed:	Yes	**Application**	MA
Rev #:	0	**Review:**	1 Year	**Lead Org**	DP
Revision: May 7, 2004, Charles C. Cotting 781-466-5286					

Excerpts from the following section:
C. Responsibility of Mark Out Person

Responsibilities of Locator when Locating/Marking Underground Facilities:

Markout of Area of Excavation:

1. All DigSafe ticket notices shall be marked prior to Targeted (i.e. legal) Due Date. If due to extenuating circumstances, markout person cannot provide "positive" response prior to targeted due date, **locator shall make every attempt** (i.e. call and/or leave voice message and document in comments) to contact contractor/excavator listed on ticket and inform them that location of utilities is still be determined.
2. Once on-site, the markout person shall markout the facilities of proposed excavation as completely and accurately as possible to ensure the protection of company facilities -- using electronic equipment and/or available records. **(See 5020 MA Attachment 2)**

Locator should utilize any or all of the following Map & Records:

a) Maps and Records provided electronically through FDC unit

b) Scanned records provided electronically through FD unit
c) S-Pipe file provided electronically through FDC unit **(See 5020 MA Attachment 3)**
d) New construction notes or information
e) Regulator construction notes available upon request through Pressure Group

7. The markout person shall, whenever possible, use the direct or conductive method when using electronic locating equipment. The locator shall always attempt to gain entry to any building for direct contact to inside services. If this is not possible, use indirect method along with all available records to locate facilities. The markout person shall use their electronic pipe locator and their best judgment to markout the service.

(i) If the location of the gas service is still questionable, they shall leave CGI access request form (available through stock room).
(ii) Notify excavator if you could not gain access to an address to verify gas facilities.
(Document in the FDC how excavator notification was done.

10. If even after exhausting all available resources, the location of the proposed excavation is still questionable, the markout person shall notify their Damage Prevention Supervisor and contact the appropriate parties (i.e. excavator, municipalities etc.).

-End of DAMG 5020 excerpts-

EXHIBIT 13

First Set of Information Request Responses: 1-20

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-20

Respondent: Charles C. Cotting

Q. What locating equipment was provided to the locator who marked 225 North Avenue? What locating equipment does KeySpan provide all of its locators?

A. The KeySpan locator had the following pieces of equipment in his vehicle and available to him:

MetroTech Model 810 pipe and cable locator – one meter not working properly
MetroTech Model 510 pipe and cable locator
Heath Sure-lock All Pro pipe and cable locator
Pipehorn Model 100 pipe and cable locator.

KeySpan locators use the above equipment. Other types of equipment that may be available include the following:
MetroTech Model 810 DX pipe and cable locator
MetroTech Model 530 pipe and cable locator
Pipehorn Model 500 pipe and cable locator.
MetroTech Model 480 pipe and cable locator
Radio Detection Model RD433HCTx pipe and cable locator

The KeySpan locators also have various types of valve box locators including:
Chicago Steel Tape MagnaTrak
MetroTech 220
Goldak 720
Radio Detection Model 312
Schonstedt
Fisher M96
GoldDac disk

EXHIBIT 14

First Set of Information Request Responses: 1-22

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY.

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-22

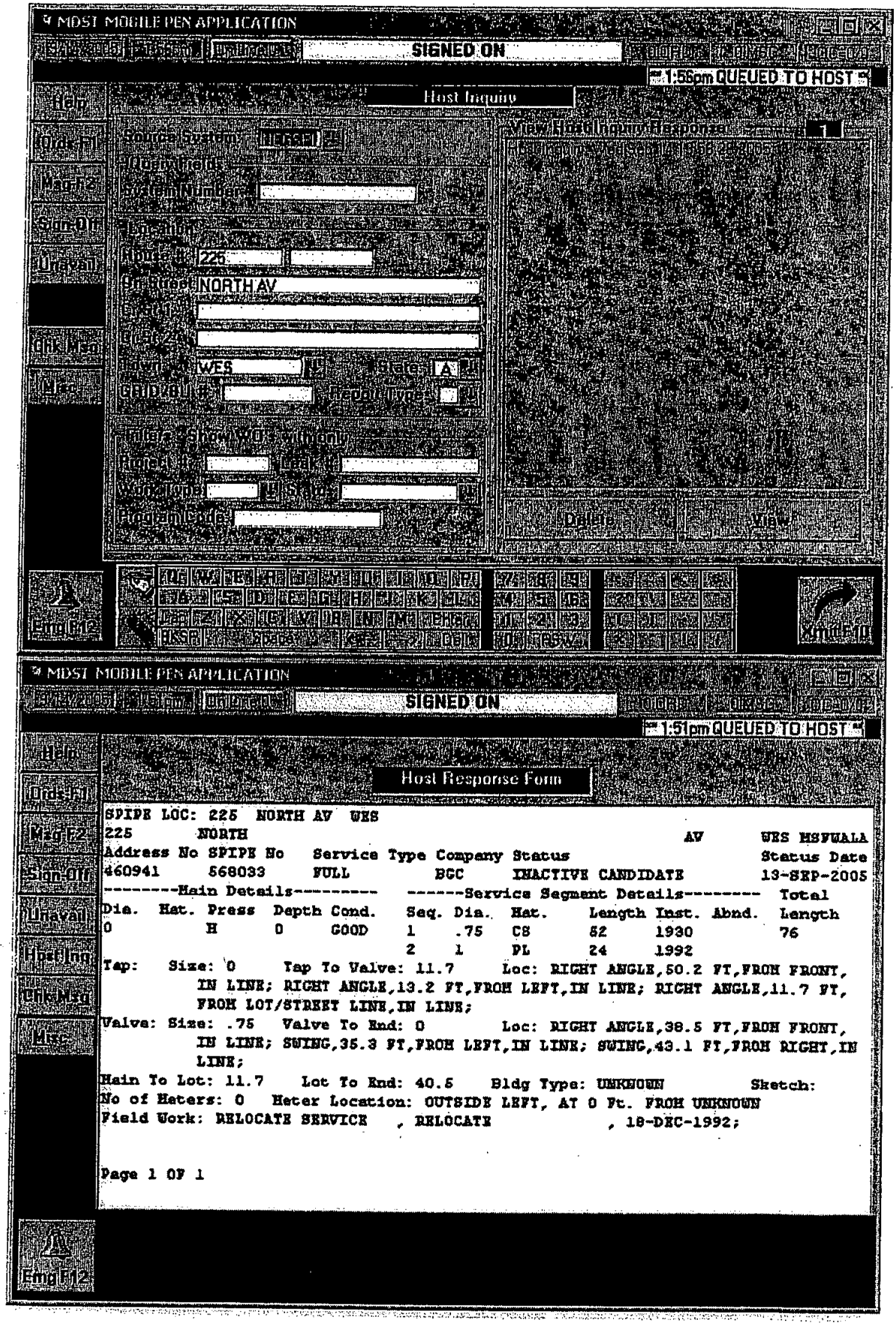
Respondent: Charles C. Cotting

Q. Provide the date the 510 locating machine, used by the locator who marked 225 North Avenue, was last calibrated. Provide a copy of the manufacturer calibration procedures.

A. The 510 locating machine used by the locator was manufactured and calibrated on or about July 16, 2003. Attached please find the Operation Manual for the Model 510 Pipe and Cable Locator (Exhibit 16).

EXHIBIT 15

First Set of Information Request Responses: 1-22

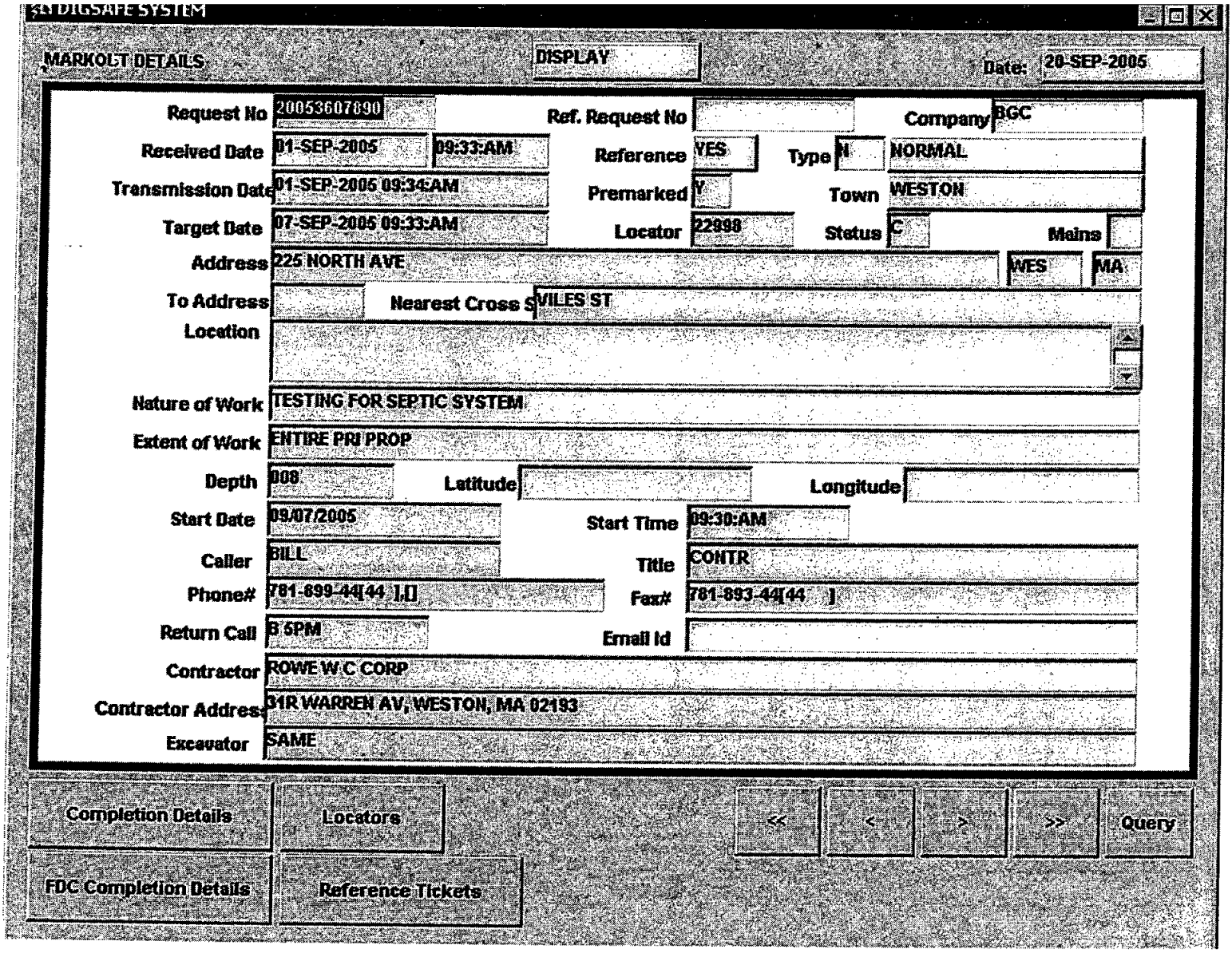



```
SPIPE LOC: 225  NORTH AV  WES
225       NORTH                                          AV       WES MSPWALA
Address No SPIPE No   Service Type Company Status                  Status Date
460941     568033     FULL         BGC     INACTIVE CANDIDATE      13-SEP-2005
--------Main Details---------   ------Service Segment Details--------- Total
Dia.  Mat. Press  Depth Cond.   Seq. Dia.  Mat.     Length Inst. Abnd.  Length
0          H      0     GOOD    1    .75   CS       82     1930         76
                                2    1     PL       24     1992
Tap:   Size: 0     Tap To Valve: 11.7     Loc: RIGHT ANGLE,50.2 FT,FROM FRONT,
          IN LINE; RIGHT ANGLE,13.2 FT,FROM LEFT,IN LINE; RIGHT ANGLE,11.7 FT,
          FROM LOT/STREET LINE,IN LINE;
Valve: Size: .75   Valve To End: 0        Loc: RIGHT ANGLE,38.5 FT,FROM FRONT,
          IN LINE; SWING,35.3 FT,FROM LEFT,IN LINE; SWING,43.1 FT,FROM RIGHT,IN
          LINE;
Main To Lot: 11.7    Lot To End: 40.5    Bldg Type: UNKNOWN          Sketch:
No of Meters: 0   Meter Location: OUTSIDE LEFT, AT 0 Ft. FROM UNKNOWN
Field Work: RELOCATE SERVICE    , RELOCATE             , 18-DEC-1992;


Page 1 OF 1
```

EXHIBIT 16

Dig Safe Ticket and Completion Form


DIGSAFE SYSTEM
MARKOUT DETAILS
DISPLAY
Date: 20-SEP-2005
Request No 20053607890
Ref. Request No
Company BGC
Received Date 01-SEP-2005 09:33:AM
Reference YES
Type N NORMAL
Transmission Date 01-SEP-2005 09:34:AM
Premarked Y
Town WESTON
Target Date 07-SEP-2005 09:33:AM
Locator 22998
Status C
Mains
Address 225 NORTH AVE
WES
MA
To Address
Nearest Cross S VILES ST
Location
Nature of Work TESTING FOR SEPTIC SYSTEM
Extent of Work ENTIRE PRI PROP
Depth 000
Latitude
Longitude
Start Date 09/07/2005
Start Time 09:30:AM
Caller BILL
Title CONTR
Phone# 781-899-4[44],[]
Fax# 781-893-44[44]
Return Call B 5PM
Email Id
Contractor ROWE W C CORP
Contractor Address 31R WARREN AV, WESTON, MA 02193
Excavator SAME
Completion Details
Locators
<<
<
>
>>
Query
FDC Completion Details
Reference Tickets

DIGSAFE SYSTEM

COMPLETION MARKOUTS DETAIL - PAGE 1

Locator: 22998 Locator Name: R RAVINO Date: 20-SEP-2005

Digsafe #: 20053607890 BGC Reported Loc: 225 NORTH AVE,WES

Markout Date: 03-SEP-2005 10:51 Actual Loc:

- [x] Visited site
- [ ] Contractor premarked location
- [ ] No Gas Involved

Method(s) of Locating

Measure:		How Located:
[ ] SPIPE	[ ] Microfiche	[x] Direct
[ ] AMMS	[x] Other	[ ] Indirect

mains marked: 0 # of services marked: 1

For each main marked

Size:	Material:	Footage:
		0
		0
		0
		0
		0

Photo Taken?

First roll #: RR

Frame from: 177 to: 0

Second roll #:

Frame from: to:

Next Page | Follow Up | << | < | > | >> | Query | Exit

DIGSAFE SYSTEM

COMPLETION MARKOUTS DETAIL - PAGE 2

☐ Ongoing job

Final Completion Date

03-SEP-2005 10:51

Follow up work

☐ Encroachment

☐ Blasting

☐ Contractor on adverse list

Other follow up

1)

2)

If other follow up, notified supervisor:

How contacted contractor

IN PERSON

# of pipes exposed:

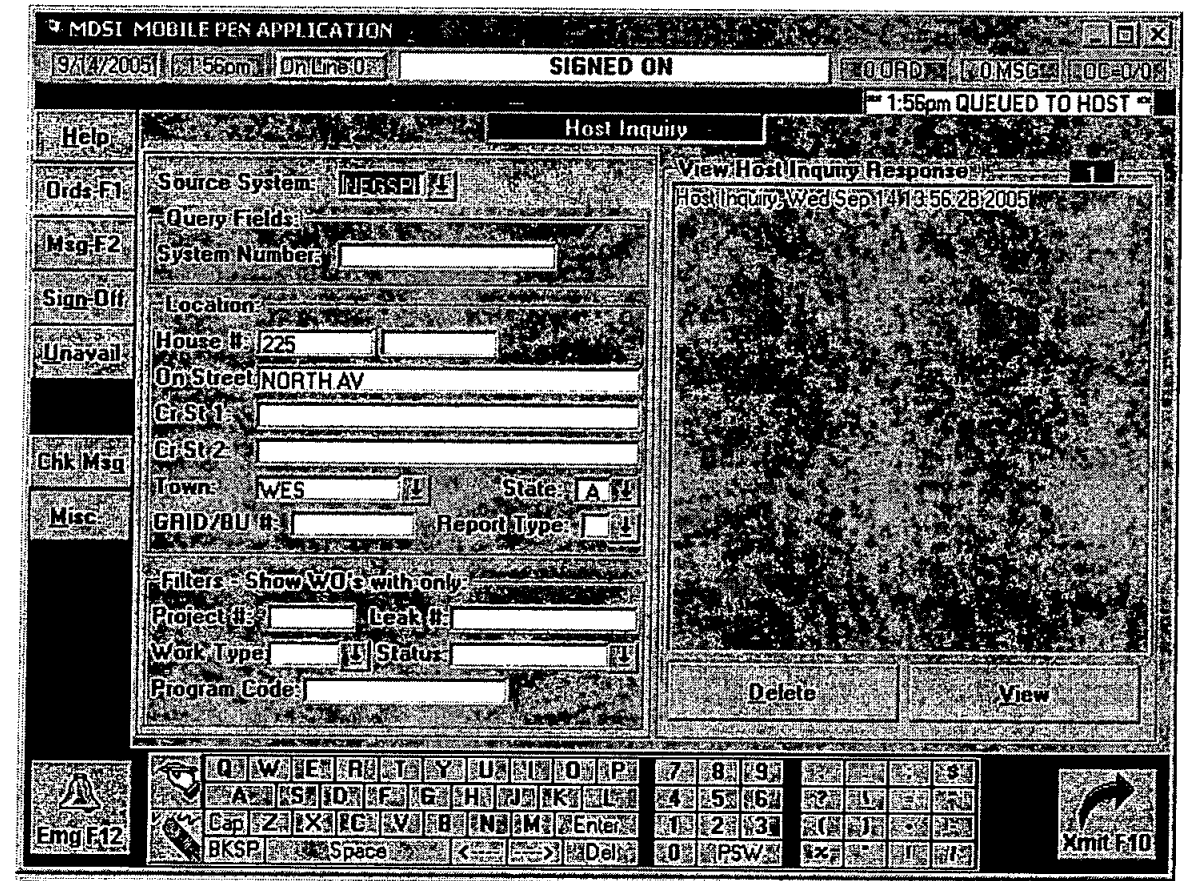
Comments

FLAGGED SERV.

NO SERVICE CARD,LOCATOR DOWN.

TALKED TO OWNER,DONT DIG IN GAS AREA.

Prev. Page | Follow Up | Query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9/14/2005
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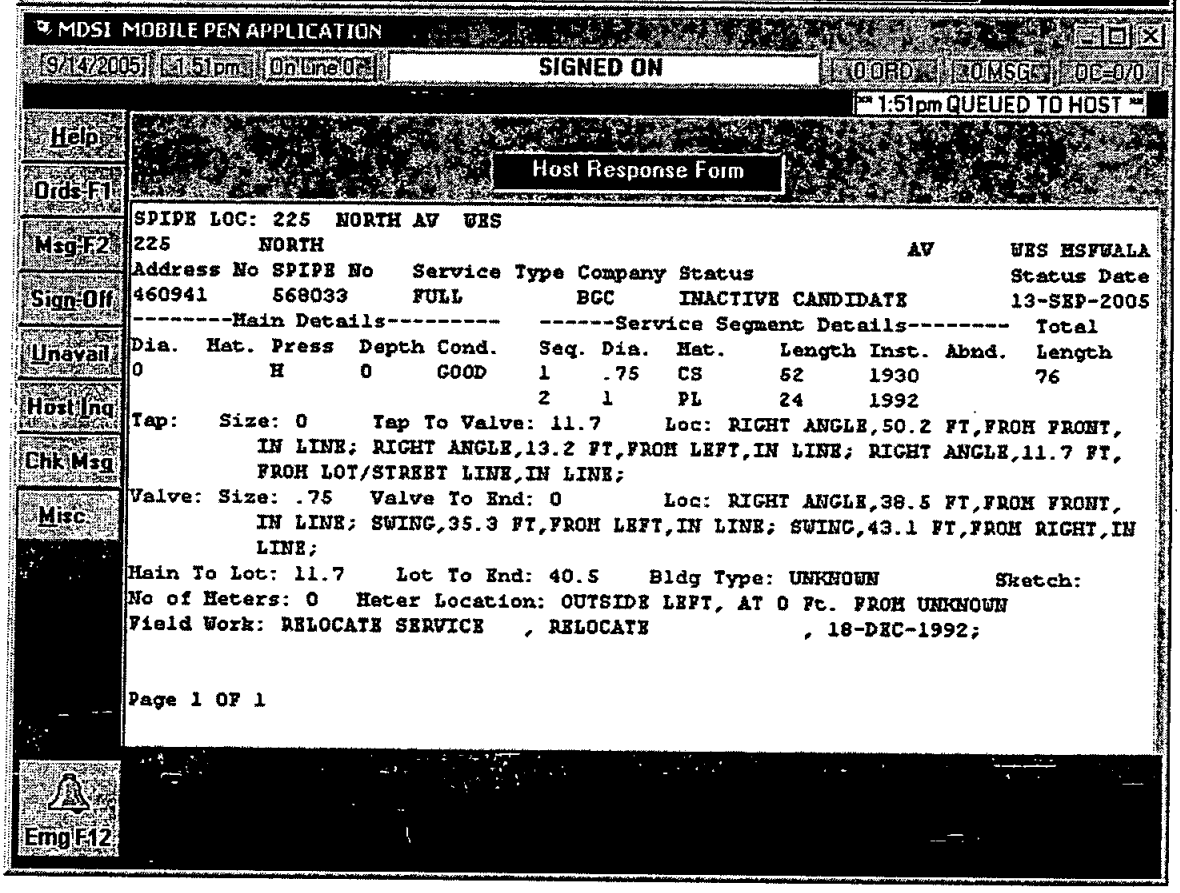
On Line 0
SIGNED ON
0 ORD
0 MSG
0C=0/0
1:56pm QUEUED TO HOST
Help
Ords-F1
Msg-F2
Sign-Off
Unavail
Chk Msg
Misc
Host Inquiry
Source System: NEGSPI
Query Fields:
System Number:
Location
House #: 225
On Street: NORTH AV
Cr St 1:
Cr St 2:
Town: WES
State: A
GRID/BU #:
Report Type:
Filters - Show WO's with only
Project #:
Leak #:
Work Type:
Status:
Program Code:
View Host Inquiry Response
Host Inquiry: Wed Sep 14 13:56:28 2005
Delete
View
Emg F12
Xmit F10


MDSI MOBILE PEN APPLICATION
9/14/2005
1:51pm
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SIGNED ON
0 ORD
0 MSG
0C=0/0
1:51pm QUEUED TO HOST
Help
Ords-F1
Msg-F2
Sign-Off
Unavail
Host Inq
Chk Msg
Misc
Host Response Form
SPIPE LOC: 225 NORTH AV WES
225 NORTH AV WES HSFWALA
Address No SPIPE No Service Type Company Status Status Date
460941 568033 FULL BGC INACTIVE CANDIDATE 13-SEP-2005
--------Main Details--------- ------Service Segment Details-------- Total
Dia. Mat. Press Depth Cond. Seq. Dia. Mat. Length Inst. Abnd. Length
0 H 0 GOOD 1 .75 CS 52 1930 76
2 1 PL 24 1992
Tap: Size: 0 Tap To Valve: 11.7 Loc: RIGHT ANGLE,50.2 FT,FROM FRONT, IN LINE; RIGHT ANGLE,13.2 FT,FROM LEFT,IN LINE; RIGHT ANGLE,11.7 FT, FROM LOT/STREET LINE,IN LINE;
Valve: Size: .75 Valve To End: 0 Loc: RIGHT ANGLE,38.5 FT,FROM FRONT, IN LINE; SWING,35.3 FT,FROM LEFT,IN LINE; SWING,43.1 FT,FROM RIGHT,IN LINE;
Main To Lot: 11.7 Lot To End: 40.5 Bldg Type: UNKNOWN Sketch:
No of Meters: 0 Meter Location: OUTSIDE LEFT, AT 0 Ft. FROM UNKNOWN
Field Work: RELOCATE SERVICE , RELOCATE , 18-DEC-1992;
Page 1 OF 1
Emg F12

EXHIBIT 17

First Set of Information Request Responses: 1-32

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-32

Respondent: Charles C. Cotting

Q. Was tracer wire an available resource to the locator at the time of the mark-out? If not, please provide a detailed explanation as to why it was not available. Provide a copy of KeySpan's [procedure] addressing the installation of tracer wire.

A. The KeySpan locator indicated that he did not locate tracer wire prior to marking the service.

Tracer wire was found during the excavation of the site after the incident along the plastic portion of the service to 225 North Avenue, Weston. (See attached photographs attached as Exhibits 20 and 21). Tracer wire was found wrapped around the steel potion of the service when it was excavated after the incident (See Photograph attached as Exhibit 22).

After the entire section of plastic service was excavated, the plastic pipe and the tracer wire were placed beside each other and there was tracer wire for the entire length of the plastic portion of the service line (See Exhibit 23).

It has been a long standing procedure to install tracer wire with plastic services. Please see attached procedure regarding the installation of tracer wire. (Exhibit 24)

The reason that the tracer wire was not available to the locator is undetermined at this time.

KeySpan D.T.E. 1-32 Information Response

EXHIBIT 20

KeySpan D.T.E. 1-32 Information Response

EXHIBIT 21


OCT 19 2005

KeySpan D.T.E. 1-32 Information Response

EXHIBIT 22

KeySpan D.T.E. 1-32 Information Response

EXHIBIT 23

KeySpan D.T.E. 1-32 Information Response

EXHIBIT 24

MAIN-5030: Installation of Polyethylene Pipe

Date:	07/01/04	Filed:	Yes	Application:	MA
		Review:	Annual	Lead Org:	Construct
Revision:					

DESCRIPTION

This specification prescribes the general requirements for the construction methods and handling and storage of direct burial PE 2406 Medium Density (MD) and PE 3408 High Density (HD) polyethylene (PE) plastic gas pipelines 1/2" CTS to 12" IPS. This specification applies to all work performed by the Company and outside Contractor personnel. Unless if otherwise specified herein, PE material referenced shall include pipe, tubing and fittings for both MD and HD classification for applications up to an MAOP of 100psig.

For General Construction requirements, see CNST-5010.

PROCEDURE

A. Qualification for Plastic Pipe Joiners

All heat fusion of plastic pipe, including electrofusion, shall be performed by individuals qualified in heat fusion procedures that conform to the manufacturer's procedures or those adopted by the Company.

B. Equipment

All fusion tools and equipment shall be maintained in good working order in accordance with the manufacturer's recommendations.

C. Direct Burial

1. In a trench, the bending radius of plastic pipe that includes a joint (e.g., butt or socket fusion) shall be greater than 125 times the nominal pipe diameter, and a pipe without fittings or joints shall have a bending radius greater than 20 times the nominal pipe diameter.

2. Plastic pipe may be joined either above ground or in the trench. Joining done in the trench shall be performed when there is enough space available to allow for proper alignment of the pipe. In either case, care shall be taken in handling the pipe.

3. Protective sleeves shall be installed at service line branch connections, transition fittings, where plastic pipe emerges from sleeves/casings, and other locations in accordance with the manufacturer's recommendations.

4. Plastic pipe shall not be installed within 18 feet of steam lines[1], unless approved otherwise by the Company supervisor responsible for the job. In addition, plastic pipe shall not be installed near any heat source where it will be subjected to temperatures above 140°F.

5. In warm weather, the pipe shall be snaked in the trench to allow for contraction.

6. Tracer wire shall be installed in close proximity to the plastic pipe. Where possible, the tracer wire should not be installed above the pipe.

7. Proper backfilling procedures shall be observed to avoid excessive bending of the plastic pipe due to settlement. The trench shall be padded with thoroughly compacted sand or other suitable fine backfill material.

8. Plastic pipe damaged prior to or during installation shall be replaced (e.g., kinks, buckles, scratches, and gouges that reduce the wall thickness by 10% or more).

9. Warning Tape

    a. Warning tape shall be placed over all pipe during backfilling, approximately 12 inches below finished grade.

    b. For EBBO installations, sufficient backfill shall be installed prior to installing warning tape. The crew installing the pipe shall install the warning tape.

D. Horizontal Directional Drilling

1. The leading end of the plastic pipe shall be adequately capped prior to being installed through the drilled hole to prevent intrusion of debris.

2. Tracer wire shall be installed through the drilled hole along with the plastic pipe and connected to existing facilities in such a manner that electronic locating of the plastic pipe will be possible.

3. Connections to an existing pipe shall be made with an approved transition or mechanical fitting or by an appropriate fusion technique.

4. Warning tape shall not be required above pipe that has been installed by directional drilling or other similar trenchless technologies, except where it is practicable to do so (e.g., at tie-in locations).

E. Gas Main Renewal by Insertion of Plastic Pipe

1. All plastic joints that will be inside a casing shall be made by butt fusion.

2. Mechanical or transition fittings used to join plastic pipe shall be designed to withstand the longitudinal pullout forces caused by thermal expansion or contraction of the pipe.

3. Anodes shall be installed on steel fittings as specified. No primer or mastic should be allowed to come in contact with plastic pipe when coating steel pipe or fittings. If coating materials do come in contact with the plastic pipe or components, it shall be wiped off as soon as practicable.

4. Both ends of the existing main shall be exposed prior to insertion.

5. The trench shall be of sufficient length to allow the plastic pipe to be inserted without buckling or excessive bending. The required length of the trench shall be dependent upon the casing depth and the diameter of the plastic pipe to be inserted in the casing. The following table of trench lengths for insertion is provided as a guide.

6. Suggested Trench Lengths for Inserting Various Sizes of Plastic Pipe in Mains at Various Depths

Plastic Pipe Size	Depth Of Existing Main				
	2	3	4	5	6
1 ¼"	4	5	7	8	9
2"	6	7	10	12	14
3"	8	10	12	14	16
4"	10	12	14	16	20
6"	12	14	17	20	24
8"	14	16	20	24	28

7. The existing service lines to be inserted should be exposed at the main before the main is inserted.

8. All service lines connected to the section of main to be inserted shall be shut off or disconnected from the main.

9. The sources of gas supply for the section of main to be inserted shall be determined before attempting to isolate that section.

10. All sources of gas supply to the section of main to be inserted shall be isolated by valves or an approved stoppering fitting(s).

11. The existing main shall be purged of gas in accordance with PURG-5010.

12. The service lines shall be disconnected at the main

13. Preparing the Casing Pipe

    a. All drips, valves that are not full-opening, branch connections, obstructions, or projections into the casing pipe shall be removed.

    b. The casing pipe shall be cleaned if it is found to contain water, oil, deposits, or other debris. If required, a pig shall be used to clean the pipe. A pig shall not be used where there are obstructions such as short protrusions, offsets, or old taps.

    c. Service lines shall be reamed or blown clear with air.

14. Inserting the Plastic Pipe

    a. A plastic protector shall be placed in the open ends of the casing pipe to prevent shaving or gouging of the plastic pipe during insertion.

    b. The end of the plastic pipe shall be protected from debris during insertion (e.g. taping the end).

    c. The plastic pipe shall be installed by pushing, not pulling. While inserting, caution shall be used to avoid damaging the plastic pipe on the pavement or other abrasive areas.

    d. The leading end of the plastic pipe, which has been pushed through the casing, shall be inspected for gouges and other damage. Sections of damaged pipe shall be cut off. The end of the plastic pipe shall be cut squarely.

    e. For lengths over 100 feet, the plastic pipe should be allowed to cool to ground temperature before the final tie-in. This is important when the plastic pipe was in direct sunlight prior to insertion or when the ambient temperature is higher than 75°F.

    f. At locations where the plastic pipe is exposed, the annular space between the plastic pipe and the existing casing pipe shall be filled with an appropriate material (e.g., permagum, duct seal) to protect the plastic pipe and to prevent dirt or other foreign material from entering this space.

    g. Tracer wire shall be installed in such a manner that future electronic locating of the plastic pipe will be possible (e.g., inserting the tracer wire with the plastic pipe or attaching the tracer wire to the casing pipe).

    h. Plastic pipe shall not be installed within 18 feet of steam lines, unless directed otherwise by a Company supervisor responsible for the job. In addition, plastic

pipe shall not be installed near any source of heat where it will be subjected to temperatures greater than 140°F.

i. Plastic pipe shall not be inserted where it would be located in gasoline stations or oil storage facilities.

j. The installation of warning tape shall not be required above inserted pipe, except where it is practicable to do so (e.g., at tie-in locations).

15. Supporting the Plastic Pipe

a. Plastic pipe shall be prevented from bearing on the ends of the casing pipe. The inserted plastic pipe shall be centered at the ends of the casing pipe by, but not limited to, rubber wedge seals, plastic foam, or spacers.

b. Segments of the plastic pipe that are not encased shall be laid on undisturbed or well-compacted soil.

F. Pigging, Testing, and Pressurizing

1. The Company supervisor responsible for the job may require that a main or a large-diameter service line be pigged prior to pressure testing. Pigging shall be considered when there has been a possibility of water or foreign material entering a pipeline during construction (e.g., pipe left exposed in trench overnight without end caps; or water in the trench). The use of the pig should be in accordance with the manufacturer's recommendations.

2. Pipelines shall be pressure tested in accordance with MAIN-5180 or MAIN-5190.

3. New distribution facilities shall be fully pressurized before placing them into service.

(End MAIN-5030)

EXHIBIT 18

First Set of Information Request Responses: 1-28

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-28

Respondent: Thomas Sheehan

Q. Did KeySpan uncover and attempt to operate the service curb valve at 225 North Avenue? If not, provide the reason it was not accessed to stop the flow of gas to the house.

A. No. KeySpan could not locate the service curb valve at 225 North Avenue, Weston. The valve apparently had been covered by a stone wall.

EXHIBIT 19

First Set of Information Request Responses: 1-16

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-16

Respondent: Charles C. Cotting

Q. Was the service at 225 North Avenue marked correctly after receiving W.C. Rowe's Dig Safe request? If not, provide the reason(s) it was not marked correctly. Include complete and detailed documentation to support your response.

A.

The service piping was not in the area of the flagging put in place by the KeySpan locator on September 3, 2005.

The reasons:

KeySpan locator did not properly look up the available service records to 225 North Avenue in the Scanned Records application as per training on May 10, 2005 by Supervisor Steve Dombrowski. (See D.T.E. 1-11 under May 10, 2005. and DAMG-5020 #2 below)

KeySpan locator, on finding an outside riser to the left of the building at 225 North Avenue, did not request aid from KeySpan Mapping or from his supervisor in looking for existing service records for this building. All existing services are listed in the SPIPE system. A response from the Host Inquiry SPIPE system that no service records were found should have suggested to the locator the existence of either a records problem or a records retrieval problem, and assistance should have been requested. Even if there were, in fact, no available service records in either the SPIPE or Scanned Records applications, his request for aid would have alerted the Company of a records problem. (See excerpt from DAMG-5020 #s 10 and 15.)

The KeySpan locator reported that he tied his electronic pipe and cable locating equipment directly to the outside service riser. This was done, he said, because no tracer wire was visible. The locator reported that he followed the signals he heard from the locating equipment and marked the service location.

The KeySpan locator attaching his locating equipment directly to the outside riser. The equipment would have provided electronic signals had this been a steel service or if tracer wire was tied in directly to the service riser piping. However, when a KeySpan supervisor tested the locating equipment by making direct connection to the service riser at the building site on September 29, 2005, the locating equipment did not provide signals in the flag-marked location. Instead, signals were found along the front wall of the building in the location shown on the 1992 service card.

Excerpts from **DAMG 5020** below: Similar information is provided in the Damage Prevention Manual of which this procedure is a part.

DAMG-5020: Procedure for Locating and Marking Out Sub-Surface Facilities

Date:	TBD	Filed:	Yes	**Application**	MA
Rev #:	0	**Review:**	1 Year	**Lead Org**	DP
Revision: May 7, 2004, Charles C. Cotting 781-466-5286					

Excerpts from the following section:
Responsibilities of Locator when Locating/Marking Underground Facilities:
under
Markout of Area of Excavation:

2. Once on-site, the markout person shall markout the facilities of proposed excavation as completely and accurately as possible to ensure the protection of company facilities -- using electronic equipment and/or available records. **(See 5020 MA Attachment 2)**

Locator should utilize any or all of the following Map & Records:

a) Maps and Records provided electronically through FDC unit
b) Scanned records provided electronically through FD unit (FD should be FDC)
c) S-Pipe file provided electronically through FDC unit **(See 5020 MA Attachment 3)**
d) New construction notes or information
e) Regulator construction notes available upon request through Pressure Group

10. If even after exhausting all available resources, the location of the proposed excavation is still questionable, the markout person shall notify their Damage Prevention Supervisor and contact the appropriate parties (i.e. excavator, municipalities etc.).

15. If the markout person notices a discrepancy between the engineering records and the actual location of the gas facility, he/she shall fill out the Misc. AMMS Correction Form within FDC unit.

EXHIBIT 20

First Set of Information Request Responses: 1-19

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-19

Respondent: Charles C. Cotting

Q. If a locator finds that a service exists that was not located in the field data capture unit, what are the procedures that should be followed at that point? Provide a detailed explanation and a copy of the procedures. Indicate in your response the extent to which the locator followed the company's procedures.

A. If a KeySpan locator finds any kind of discrepancy in the records available in the Field Data Capture – map records, SPIPE records, or Scanned Records—they are to fill out a Misc. AMMS Correction Form available within the Field Data Capture unit. This point was covered in the two latest Waltham Safety and Operations meetings as shown below. It is also part of the procedure DAMG 5020 shown below and the Damage Prevention Manual.

The KeySpan locator did not turn in an AMMS data correction form for this address.

Excerpt from memo re March 1, 2005 Safety and Operations meeting conducted by Steve Dombrowski, Damage Prevention supervisor for the Waltham area.

- **SPIPE, Scanned Services** –Use these tools properly, far too many damages occur that can be prevented by using these systems. Use AMMS data correction form under Misc. button on MPA to report changes in maps or areas not plotted.

Excerpt from May 10, 2005 Safety and Operations meeting conducted by Steve Dombrowski and Jeff LoConte, Damage Prevention supervisors for the Waltham area.

- **SPIPE, Scanned Services** –Use these tools properly, far too many damages occur that can be prevented by using these systems. Use AMMS data correction form under Misc. button on MPA to report changes in maps or areas not plotted.

Excerpt from **DAMG 5020** below: Similar information is provided in the Damage Prevention Manual of which this procedure is a part.

DAMG-5020: Procedure for Locating and Marking Out Sub-Surface Facilities

Date:	TBD	Filed:	Yes	**Application**	MA
Rev #:	0	**Review:**	1 Year	**Lead Org**	DP
Revision: May 7, 2004, Charles C. Cotting 781-466-5286					

Excerpts from the following section:
C. Responsibility of Mark Out Person

Responsibilities of Locator when Locating/Marking Underground Facilities:

Markout of Area of Excavation:
15. If the markout person notices a discrepancy between the engineering records and the actual location of the gas facility, he/she shall fill out the Misc. AMMS Correction Form within FDC unit.
- End or excerpt -

EXHIBIT 21

First Set of Information Request Responses: 1-11

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-11

Respondent: Charles C. Cotting

Q. Provide the Damage Prevention Program training records for the locator who marked the 225 North Avenue location. Include in your response the last training record along with an outline of the training class.

A. Please find the following training records:

Employee training – Robert Ravino
August 17, 2005 – Received one-on-one training from Supervisor Jeff LoConte in operation of MetroTech 810 pipe and cable locator.

August 16, 2005 – Mark out OQ testing completed at the Norwood Training Center – Passed.

June 22, 2005 – After a reported mismark at 33 Juniper Road, Weston, Rob received more than one hour of on-site training from Supervisor Jeff LoConte. Jeff covered the entire mark out process and the steps needed to determine whether a locate is accurate or not (i.e. good reads, logical termination points, correct ties from service card, etc.).

Jeff asked Rob Ravino if he looked up the service card for this particular locate and he said that he did not. Jeff told him to utilize all of his resources when performing a locate (SPIPE, scanned service cards, maps, direct connect onto tracer wire, etc) Jeff emphasized the use of service card sketches when locating a service line. Jeff said that you can confirm your locate by tying back to the service card sketch and seeing if it visually makes sense. Mr. Ravino was instructed that if he was ever uncomfortable with a locate (having trouble with

read, can't find information, etc.), that he should call Mr. LoConte for assistance and he would always be there to help.

May 10, 2005 – Local S&O meeting at the Waltham Yard (See S. Dombrowski memorandum-Exhibit 9). As part of this S&O and training session, Supervisor Steve Dombrowski, using his laptop, demonstrated the proper method to look up services in the Scanning Records application. Steve suggested using the street name, only, with an *, or wildcard, at the end (e.g.. Smith*) to find scanned service records. Steve also suggested using a shortened version of the street name in case of a question in the proper spelling of the street name (e.g. Smit*). Steve also told them not to put in a street address in Scanned Records because they would miss addresses with no street number such as lot numbers, pole numbers.

March 1, 2005 – Local S&O meeting (See S. Dombrowski memorandum-Exhibit 10)

Records from the Training Department:

Mark-out Refresher Training:	12/10/2004 includes OQ tests
	12/17/2002
	10/28/2002 OQ testing
	02/06/2001
	05/15/2000
	05/24/1999
	05/24/1999
District Inspector Training:	05/27/1998
	03/28/1997
	07/15/1996
	03/02/1995
	03/07/1994

Note 1: District Inspector training and Mark-out Training are the same. With the mergers in the late 1990s, we changed it to Mark-out Training to be in common with all companies. Course content is the review of the Damage Prevention Manual. We also cover each year a review of maps, records, SPIPE. Chris Frasier also included the electronic means to access records.

EXHIBIT 22

First Set of Information Request Responses: 1-25

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-25

Respondent: Charles C. Cotting

Q. Provide Operator Qualification records for locator. Include task(s) number and associated qualification date.

A. Robert Ravino Operator Qualification Record Review:

August 16, 2005 - Passed
December 10, 2004 - Passed
October 28, 2002 – Passed
OQ Testing includes:
Test 6: Inspecting for atmospheric corrosion
Test 8: Visually inspecting for internal corrosion
Test 21: Line locating and Markout
Test 22: Inspecting 3rd Party Excavations
Test 23: Inspecting Exposed Pipe
Test 24: Inspecting pipe at a maintenance job for damage and
Test 70: Abnormal Conditions and Properties of Natural Gas

EXHIBIT 23

First Set of Information Request Responses: 1-24

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-24

Respondent: Charles C. Cotting

Q. Does KeySpan have any records of this particular locator having mis-marked facilities in the past?

A. The KeySpan locator was the locator of record on the following damages in 2005:

06/01/2005	4 Whispering Lane, Weston
06/06/2005	17 Robert Best Road, Sudbury
06/29/2005	1 Highland Road, Sudbury

Also, please see response to 1-23.

EXHIBIT 24

First Set of Information Request Responses: 1-23

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-23

Respondent: Charles C. Cotting

Q. Provide any documentation of any communication from the locator, who marked 225 North Avenue, of any problems he was having with his 510 locating machine. Also provide a description of any actions taken by KeySpan upon being notified of problems associated with this particular machine.

A.
33 Juniper Road, Weston (June 22, 2005): Damage Prevention supervisor, Jeff LoConte responded to the site after a contractor requested a re-mark because of a potential mis-mark and found that the service had been mismarked. Mr. LoConte called Mr. Ravino to the site and reviewed the entire mark-out procedure with him. He explained to the locator how to determine if a locate is "good". Mr. LoConte asked the Mr. Ravino if he had looked up the service card to 33 Juniper Road. And Mr. Ravino replied that he had not. The supervisor said he should always use a service card because they provide a sketch with ties. The supervisor reminded the locator of the ties from the fire box to the gate box. The locator said that he remembered.

It was at this location that the KeySpan locator asked for another piece of locating equipment. The supervisor said that he would look into available equipment.

August 17, 2005. The KeySpan locator received a MetroTech 810 locator. The supervisor met him onsite at Windsor Way in Weston to go over a current job with the new locator. He spent an hour at the site with the KeySpan locator showing him how to use the Model 810 and how to make sense of the digital reads, the depth readings, the volume tones and the meter. The supervisor demonstrated the equipment by locating the service and main and then had the

KeySpan locator locate the utility himself. He seemed to like the Model 810, and the supervisor told him to report back on how he was doing with the equipment.

After 8/17/05: The supervisor received several reports back from the KeySpan locator saying he liked the Model 810. He said he was taking his time on the jobs.

29 Barnett Road, Sudbury (September 1, 2005). The KeySpan locator called his supervisor and told him that the meter on the Model 810 was pinned and not working. His supervisor told the locator that he could still use the Model 810 if the digital readout still worked. If that did not work, he could use the Model 510 until it was fixed. The locator used the Model 510 locator and said that he could not get a good read on his locator and there were stumps all over the place – it was a stump removal job and septic installation. The supervisor was busy at another site.

The supervisor ended up going to this site that evening and checking the marks. He said that he found some flags on and some others were off up to three to four feet. The supervisor revised the incorrect marks and told the locator that he had been at the site and had found some incorrect marks. The supervisor said they could get together to go over the mark out on another day.

EXHIBIT 25

First Set of Information Request Responses: 1-21

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-21

Respondent: Charles C. Cotting

Q. Has KeySpan had any reported problems with its locating equipment, including the 510 and 810 locating machines over the last five years? If so, provide a list of the problems and actions taken upon discovery of the problem(s). Include complete and detailed documentation to support your response.

A. When any problems are found with locating equipment, they are sent to or picked up by repair specialists hired to make repairs. If repairs cannot be made, the equipment is retired.

No central records of equipment repairs are kept.

EXHIBIT 26

KeySpan Incident Investigation Report

INCIDENT INVESTIGATION REPORT
New England

Incident Investigation Team Members:
Lead Inside Emergency Coordinator: John C. Higgins
KED Onsite Incident Lead: Michael F. Smith
QA/QC Representatives: Kevin J. Mahoney
Field Operations Representative: Charles C. Cotting
Gas Engineering Representative: David Iseler, Ernest Grasso
Emergency Dispatch Representative: Amy S. Smith
PSC/DTE/PUC Representatives: David E. Weber, Leo T. Cody

Date of Incident: **Monday September 12, 2005**

Location of the Incident: **225 North Avenue, Weston, MA**

Time of Incident: **Live HP service was struck by excavating contractor at or before 10:20 AM. 10:35 AM house explosion and fire.**

Date of Investigation: **Began Monday September 12, 2005**

Cause of the Incident:

- Corrosion	**- Damage by Internal Forces**
- Construction/Material Failure	**X Procedure Failure**
X Damage by Outside Forces	**X Operator Error**
Customer Error	**- Other**

Fatalities and/or Injuries: **Two minor injuries**

Customer Assistance Center Notified by: **Dig Safe System, Inc. (one call center) @ 10:20 AM**

Customer Assistance Center Notification to Gas Dispatch: **10:22 AM**

First Responder Arrival On-Site: **10:45 AM – Field Supervisor Thomas Sheehan**

Gas System Operator Notified: **10:25 AM**

Field Operations notified by: **Emergency Dispatch**

Field Operations Crews and Supervisory Personnel On-Site:
Thomas Sheehan @ 10:45 AM – Field Supervisor Maintain
Irmin Lynch ERU @ 10:49 AM – ERU, Waltham
Jeffery LoConte @ 10:50 AM – Field Supervisor Damage Prevention
Stephen Morganto – Field Supervisor Service

Kathy Clancy – Manager - Service
Michael Smith – Manager Maintain
MSF Crew @ 11:03 AM
Donna Stewart – Field Supervisor Damage Prevention
Joseph Carroll – Manager Corporate Affairs
Michael Bruno – Senior Coordinator Corporate Affairs
Sheila Colon-Bagley – Senior Representative Media Relations
John Gatherum – Senior Coordinator Risk Management
Thomas Teehan – Senior Counsel

DTE Office Notified: 10:50 AM Christopher Bourne, Director Pipeline Safety Division

Activation of the Notification Classification Guideline System: 10:35 AM

Made Safe Time: 12:10 PM

Evacuation Required – Customers Affected:

Gas Outage - # of Gas Services/Customers Affected: 2

Gas Main Returned to Normal Operating Condition: Main Shut Down Not Required

Contributing to the Damage:
The mis mark of the High Pressure service at this address.

W.C Rowe Corporation, an excavating contractor doing septic work at 225 North Avenue, hit an active HP gas service pulling the steel section of the service out of a threaded coupling underground some (15' to 30') distance from the house. The contractor had dug a test hole in the area of the markout flags, but found no service line. The contractor then continued to dig with a backhoe in other parts of the front yard where he struck the service and pulled it up out of the ground.

Work Scope Being Performed by KeySpan:
Mark out of the service to 225 North Avenue, Weston, MA

Crew Member: Robert Ravino, District Inspector, KeySpan locator, (Local 12003)

A. DESCRIPTION OF THE INCIDENT:

Includes:

- **Chronological Sequence of Events**

1. September 1, 2005 contractor W.C. Rowe Corp. contacts Dig Safe System, Inc. (Dig Safe), the NE one call center, with an excavation notification for 225 North Avenue, Weston, MA. Rowe's nature of work was "testing for septic work" with an extent of "entire pri prop" (entire private property). The stated Start Date was September 7, 2005.

2. The request from Dig Safe was received electronically by KSE's Dig Safe System and was automatically sent to the field data capture unit of the District Inspector assigned to Weston, MA – Robert Ravino.

3. On Saturday September 3 KeySpan District Inspector Robert Ravino completed the mark out of the HP service to 225 North Avenue.

4. Monday September 12, 2005: W.C. Rowe Corporation begins work. Sometime before 10:20 AM – Contractor hits and pulls service @ 225 North Ave, Weston

5. 10:20 AM – W. C. Rowe notifies Dig Safe System, Inc. (Dig Safe) and the Weston Fire Department (Weston FD), and the Weston Police Department regarding a hit service @ 225 North Avenue, Weston

6. 10:21 AM – KeySpan Call center representative Karen Baker receives call from Dig Safe reporting that a contractor working at 225 North Ave, Weston, MA hit a gas line. It was reported by Dig Safe that the contractor could not hear or smell gas.

7. 10:22 AM – KeySpan Call center representative Karen Baker issues a Type L2 Leak Order (leak at the service wall where the pipe enters the property)

8. 10:25 AM – KeySpan Dispatcher Coleman Flaherty dispatches call to KeySpan Service Technician Irmin Lynch

9. 10:26 AM – Weston FD on site

10. 10:32 AM – Weston FD confirms explosive gas levels - evacuates home.

11. 10:34 AM – KeySpan Service Technician Irmin Lynch is en route to site.

12. 10:35 AM – Explosion and fire at 225 North Avenue, Weston

13. 10:35 AM – Maintain Field Supervisor Tom Sheehan, Service Supervisor Steve Morganto, and Damage Prevention Supervisor Jeff LoConte, notified.

14. 10:45 AM – Supervisor Tom Sheehan, MSF Waltham arrives on site.

15. 10:46 AM – Follow up call from Dig Safe to KeySpan Call Center. Dig Safe informs call center representative Eileen Lyons that contractor called to report that the house at 225 North Avenue, Weston has exploded.

16. 10:48 AM – Call Center representative Eileen Lyons informs Dispatcher Ed Warren that Dig Safe called with report that house at 225 North Avenue, Weston had exploded.

17. 10:49 AM KeySpan Service Technician Irmin Lynch arrives on site.

18. 10:50 AM – Damage Prevention Supervisor Jeff LoConte arrives on site.

19. 10:50 AM – Dispatch Supervisor Kristin Kennedy notifies Chris Bourne, MA DTE Director Pipeline Safety Division

20. 11:03 AM MSF crews arrive on site

21. 12:10 AM – Gas off and safe per Mike Smith, Field Operations Manager Maintain.

22. 12:18 PM – Dispatch Supervisor Kristin Kennedy notifies Johnson @ DOT (ref# 772181)

- **Description of Facilities Involved**
  ¾" 1930 coated steel and 1" 1992 plastic High Pressure service to 225 North Avenue, Weston

Attachments:

- **Dig Safe System Markout Request**
  Copy of September 1, 2005 Dig Safe request for 225 North Avenue, Weston

- **Dig Safe System Markout Completion Form**
  Copy of September 3, 2005 mark out Completion Form for 225 North Avenue, Weston.

  Photograph of the mark out of the service at 225 North Avenue, Weston in response to Dig Safe ticket number 20053607890

- **Gas Facility Maps**
  Sections of ArcFM map showing main in front of 225 North Avenue, Weston

- **Historical Record Review**
  - Copies of services cards for original ¾" 1930 coated steel service and the 1" 1992 plastic service cut back and relocation service.
  - Copy of the SPIPE record available through the Host Inquiry application on the FDC in mark out vehicles.
  - Copy of SPIPE information available through the SPIPE application on network desktop computers

- **Gas Operating Procedure Review (SOP, etc.)**
  Procedure DAMG 5020
  Damage Prevention Manual

- **Robert Ravino Operator Qualification Record Review – this is required every three years**
  August 16, 2005 - Passed
  December 10, 2004 - Passed
  October 28, 2002 – Passed

- **Other Training Records – Robert Ravino**

August 17, 2005 – One-on-one field training in operation of MetroTech 810 pipe and cable locator by DP supervisor Jeff LoConte

June 22, 2005 – One-on-one field training by Jeff LoConte. Covered the entire mark out process and the steps needed to determine whether a mark out is good or not. Mr. LoConte instructed the employee to utilize all of his resources when performing a locate - SPIPE, scanned service cards, maps, and direct connect onto the tracer wire.

May 10, 2005 – Local Safety and Operations meeting conducted by Field Supervisor Steve Dombrowski as part of this training session, Steve, using his laptop, demonstrated the proper method to look up services in the Scanned Records application. Steve suggested using the street name only with an *, or wildcard, at the end (i.e. Smith*) to find scanned service records. Steve also suggested using a shortened version of the street name in case of a question in the proper spelling of the street name (i.e. Smit*). Mr. Dombrowski also told them not to put in a street address in Scanned Records because they would miss addresses with no street number such as lot numbers, pole numbers.

March 1, 2005 – Local Safety and Operations meeting conducted by Field Supervisor Steve Dombrowski

Training Sessions at the Norwood Training Center:

Mark-out Refresher Training:	12/10/2004
	12/17/2002
	02/06/2001
	05/15/2000
	05/24/1999
	05/24/1999
District Inspector Training:	05/27/1998
	03/28/1997
	07/15/1996
	03/02/1995

Note 1: District Inspector training and Mark-out Training are the same. With the mergers in the late 1990s, we changed it to Mark-out Training to be in common with all companies.

Note 2: Course content is the review of the Damage Prevention Manual. We also cover each year a review of maps, records, SPIPE. Chris Frasier also included the electronic means to access records the end of 2004.

B. INVESTIGATION OF THE INCIDENT:

1. The KeySpan District Inspector, Robert Ravino, was interviewed to determine the steps that he took on Saturday September 3, 2005 to complete the Dig Safe request for a mark out at 225 North Avenue, Weston. (See DS ticket 20053607890 attached.) The excavator was legal to dig on September 7 at 09:33 AM.

2. Mr. Ravino said that he first used his field computer to try to find the Scanned service record for 225 North Avenue, Weston. Using the application he entered "North

Ave*" in the "Street Name" box and, using the drop down list, clicked on "MA-WESTON". He retrieved one service card image – 535 North Avenue.

3. Mr. Ravino then used the Host Inquiry application on his MPA to try to locate the SPIPE records for 225 North Avenue. He entered the application and cleared a number of boxes on the application page and made sure that "NEGSPI Spipe" was showing in the Source System box. He then entered "North Ave" in the On Street box. He then clicked on the drop down arrow in the "Town" box to retrieve WES for Weston. He then added "MA" to the state box. Mr. Ravino got to a window saying that there were no SPIPE records.

4. Mr. Ravino then went to the house to look for a meter and found an outside meter on the left side of the house. He tied his MetroTech 510 pipe and cable locating equipment directly to the service riser as no tracer wire was visible. Mr. Ravino said that he got signals from his locating equipment and placed flags along the path of the service.

5. Mr. Ravino said that he looked for a gate box but did not find one.

6. Mr. Ravino photographed the markout with his digital camera.

7. Mr. Ravino did not attempt to locate the service to 225 North Avenue indirectly from the main in the street into the property.

8. Mr. Ravino completed the required Dig Safe Completion form on his FDC unit. The mark out was completed on Saturday September 3, 2005 at 10:51 AM. Mr. Ravino noted on his Completion Form that his locator was down. This referred to Mr. Ravino's MetroTech 810, which had a broken meter but still received signals. During further discussion Mr. Ravino stated that he had had "problems" with some mark outs using the MetroTech 510 equipment. Mr. Ravino contacted his supervisor, Jeff LoConte, on two occasions where he had problems with a mark out. On both of these locations Mr. LoConte worked with Mr. Ravino and found that the difficulties arose when there were multiple underground facilities in the area of the mark out.

9. The incident occurred just after 10 AM on September 12, 2005.

10. During a site visit to 225 North Avenue, Weston after the incident, the flags were found to be 12' to 15' from the service location.

C. FINDINGS and CONCLUSIONS:

Note: Based on the preliminary investigation, it was decided to reconstruct the actual mark out at the site using the actual locating equipment used by Mr. Ravino.

1. The incident site was under the control of investigators for the owner's insurance company and many representatives of insurances companies, MA DTE investigators, excavators working for the insurance company investigators, and KeySpan personnel. The site was being cleared with great care to preserve equipment and piping within the structure. KeySpan was given permission to conduct their mark out trial but all of the above mentioned personnel were present on the site.

2. The mark out was performed on site by Field Supervisor Maintain Steve Dombrowski, a former Damage Prevention Supervisor and very familiar with the MetroTech 510 pipe and cable locator, using Mr. Ravino's MetroTech 510 pipe and cable locator. The mark out was observed by those present including Thomas Teehan, Chris Aronson, Thomas Sheehan, John Gatherum, Dan McGarry, and Charles Cotting. Also present on the site were three representatives of the MA DTE – Robert Hayden, Angela Motley, and Glenn LaChance.

3. The MetroTech 510 pipe and cable locator used by Mr. Ravino was tested under field conditions by Donna Stewart, Damage Prevention Supervisor. Ms. Stewart located four separate services in Rockland using the MetroTech 510 equipment and compared the locations provided by the equipment signals and compared them to the actual location shown on service cards for those addresses. The equipment signals and the records matched. It was concluded that the MetroTech 510 equipment was working correctly.

4. Once the area of the mark out flags and a portion of the front and side yards were cleared, Mr. Dombrowski began the mark out process as described by Mr. Ravino.

5. Mr. Dombrowski attached the transmitter lead directly to the riser and the grounding rod was placed into the ground about five feet from the riser. Mr. Dombrowski had to reattach the wire from the transmitter to the grounding rod as it had pulled out from the grounding rod connection.

6. Mr. Dombrowski turned on the receiver and swept the area around the service riser and proceeded out from the riser and from the front wall of the building arcing out to past the area of the mark flags placed by Mr. Ravino – these remained in place after the incident.

7. Mr. Dombrowski swept the area with the receiver repeatedly. The only signals he received were parallel to the front wall and approximately 12" to 14" from the building wall along the building wall from the riser end of the building toward the middle of the building for eight feet. This is the actual route of the plastic portion of the service to 225 North Avenue.

8. No signals were received along the route of the mark out flags placed by Mr. Ravino.

9. No signals were received from any other underground facilities in the area of the flags placed by Mr. Ravino.

Determinations:

1. Mr. Ravino did not properly look up service records to 225 North Avenue, Weston that were available in the Host Inquiry and Scanned Records applications. Had Mr. Ravino entered "North Av" instead of "North Ave" in the Host Inquiry SPIPE application, he would have found accurate service information for 225 North Avenue, Weston.

2. Had Mr. Ravino entered "North*" instead of "North Ave*" in the "Street Name" box of the Scanned Services application on his FDC unit he would have received 179 scanned records for North Avenue, Weston and would have found the two scanned images of the service cards for 255 North Avenue, Weston.

3. Mr. Ravino received training conducted by Steve Dombrowski on the proper method to find service information in the Scanned Records application on May 10, 2005 in the Waltham Yard.

4. When Mr. Ravino arrived on site at 225 North Avenue, Weston and found a service riser on the left side of the building, he did not delay his markout and seek assistance to gather any existing records of the service.

5. When Mr. Ravino met with his supervisor, Jeff LoConte, on Tuesday September 6, a day before the Dig Safe ticket was legal to be dug, to pick up a MetroTech 810 pipe and cable locator, he did not mention problems with finding records to 225 North Avenue, Weston or request Mr. LoConte's assistance with the mark out at that location.

6. The final determination is that the service to 225 North Avenue was improperly marked due to Mr. Ravino not following proper KeySpan procedure and due to locator error. The mismarked gas service was struck and pulled by the excavating contractor ultimately causing the incident.

D. <u>RECOMMENDATIONS:</u>

1. **Recommendation - (Action Taken):** Employee discipline – investigation complete – employee suspended indefinitely pending further action. Employee was suspended for 30 days, the employee's Operator Qualification for mark outs was to be revoked, and the employee should not to return to Damage Prevention as a District Inspector.
2. **Recommendation - (Actions to Be Taken):** Re-train all Damage Prevention employees in records access applications and in the proper operation of electronic locating equipment – continue annually at a minimum. Pilot training program using an outside locating equipment expert is being tested – Charles Cotting
3. **Recommendation - (Actions to Be Taken):** Review of all department procedures and the Damage Prevention Manual – continue annually at a minimum. – Charles Cotting, Damage Prevention BT Team, and the Training Department
4. **Recommendation - (Actions to Be Taken):** Re-training of all others involved in mark out activities in records access applications and in proper operation of electronic locating equipment – continue annually at a minimum. – Charles Cotting and Training Department
5. **Recommendation - (Actions to Be Taken):** Train the trainer sessions for yard training representatives in records access applications – Charles Cotting and Training Department
6. **Recommendation - (Actions to Be Taken):** Damage Prevention supervisors to conduct more frequent periodic field audits of all locating activities – Charles Cotting
7. **Recommendation - (Actions to Be Taken:** Use QA/QC inspectors to periodically review mark out activities of all Damage Prevention employees – Kevin Mahoney

EXHIBIT 27

First Set of Information Request Responses: 1-1

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-1

Respondent: Charles C. Cotting

Q. Provide the sequence of events and a description of the Weston incident. Include in your response the time: (1) KeySpan was notified of the incident; (2) dispatch notified the crew to report to Weston; (3) the crew's arrival time.

A. **Chronological Sequence of Events**

1. September 1, 2005 contractor W.C. Rowe Corp. contacts Dig Safe System, Inc. (Dig Safe), the NE one call center, with an excavation notification for 225 North Avenue, Weston, MA. Rowe's nature of work was "testing for septic work" with an extent of "entire pri prop" (entire private property). The stated Start Date was September 7, 2005.

2. The request from Dig Safe was received electronically by KeySpan's Dig Safe System and was automatically sent to the field data capture unit of the District Inspector assigned to Weston, MA – Robert Ravino.

3. On Saturday September 3, 2005 KeySpan District Inspector Robert Ravino completed the mark out of the high pressure service to 225 North Avenue.

4. Monday September 12, 2005: W.C. Rowe Corporation begins work. Sometime before 10:20 AM – W.C Rowe hits and pulls service @ 225 North Ave, Weston.

5. 10:20 AM – W. C. Rowe notifies Dig Safe System, Inc. (Dig Safe) and the Weston Fire Department (Weston FD), and the Weston Police Department regarding a hit service @ 225 North Avenue, Weston

6. 10:21 AM – KeySpan Call center representative Karen Baker receives call from Dig Safe reporting that a contractor working at 225 North Ave, Weston,

MA hit a gas line. It was reported by Dig Safe that the contractor could not hear or smell gas.

7. 10:22 AM – KeySpan Call center representative Karen Baker issues a Type L2 Leak Order (leak at the service wall where the pipe enters the property)

8. 10:25 AM – KeySpan Dispatcher Coleman Flaherty dispatches call to KeySpan Service Technician Irmin Lynch

9. 10:26 AM – Weston FD on site

10. 10:32 AM – Weston FD confirms explosive gas levels - evacuates home.

11. 10:34 AM – KeySpan Service Technician Irmin Lynch is en route to site.

12. 10:35 AM – Explosion and fire at 225 North Avenue, Weston

13. 10:35 AM – MFS Tom Sheehan, Service PFR Steve Morganto, and Damage Prevention Supervisor Jeff LoConte, notified.

14. 10:45 AM – MSF Tom Sheehan, MSF Waltham arrives on site.

15. 10:46 AM – Follow up call from Dig Safe to KeySpan Call Center. Dig Safe informs call center representative Eileen Lyons that contractor called to report that the house at 225 North Avenue, Weston has exploded.

16. 10:48 AM – Call Center representative Eileen Lyons informs Dispatcher Ed Warren that Dig Safe called with report that house at 225 North Avenue, Weston had exploded.

17. 10:49 AM KeySpan Service Technician Irmin Lynch arrives on site.

18. 10:50 AM – Damage Prevention Supervisor Jeff LoConte arrives on site.

19. 10:50 AM – Dispatch Supervisor Kristin Kennedy notifies Chris Bourne, MA DTE Director Pipeline Safety Division

20. 11:03 AM MSF crews arrive on site

21. 12:10 AM – Gas off and safe per Mike Smith, Field Operations Manager MSF.

EXHIBIT 28

Statement from the Weston Fire Department – September 14, 2005

The Commonwealth of Massachusetts
Executive Office of Public Safety
Department of Fire Services
P.O. Box 1025 ~ State Road
Stow, Massachusetts 01775
(978) 567~3100 Fax: (978) 567~3121

MITT ROMNEY
GOVERNOR

KERRY HEALEY
LT. GOVERNOR

EDWARD A. FLYNN
SECRETARY

STEPHEN D. COAN
STATE FIRE MARSHAL

THOMAS P. LEONARD
DEPUTY STATE FIRE MARSHAL

For Immediate Release: September 14, 2005
Contact: Chief Edmund M. Walker, (781) 893-2324
Jennifer Mieth, DFS, (978) 567-3381

Weston House Natural Gas Explosion Accidental

Sept. 14, 2005 - State Fire Marshal Stephen D. Coan and Weston Fire Chief Edmund M. Walker confirmed today their joint investigation into the house explosion at 225 North Avenue in Weston was an unintentional natural gas explosion. The incident occurred on Monday September 12, 2005 at 10:21 a.m. when private contractors accidentally hit a gas line. The contractor immediately contacted the Weston Fire Department which responded to that address.

Investigators confirmed that the broken gas line contributed to an accumulation of gas in the basement of the home where several appliances could have provided the ignition source. Investigators have no indication this was anything but an unintentional incident. Chief Walker said, "First arriving firefighters metered high levels of natural gas in the basement, and evacuated civilians and public safety personnel." He added, "While it is tragic that this explosion destroyed a family's home, the quick response prior to the explosion certainly prevented death and injuries."

The incident was being investigated by State Police investigators assigned to the Office of the State Fire Marshal, the Weston Fire and Police Departments, and the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives, with the assistance of the state Department of Public Safety.

The state Department of Telecommunications and Energy is continuing to investigate the circumstances around how the gas line was ruptured as well as issues surrounding the marking of the utility lines. The federal Office of Safety and Health Administration (OSHA) is also looking into matters within its jurisdiction.

Chief Walker added, "If you ever smell gas inside your home or workplace, you should get everyone out of the building as quickly as possible and call the fire department from outside of the building."

EXHIBIT 29

First Set of Information Request Responses: 1-9

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-9

Respondent: John Barrett

Q. Provide the odorant level readings taken on North Avenue after the incident.

A. Distinct odor level tests were taken at 227 North Avenue, Weston and 4 Hastings Road, Weston. The results of those tests are described in Exhibit 7.

EXHIBIT 7

KEYSPAN
Energy Delivery

Inter-office Memo
Instrumentation & Regulation NE

To: File

From John Barrett

Date: September 12, 2005

Subject: 225 North Avenue, Weston

On September 12, 2005 at approximately 11:20 a.m. Matt Breslin, Instrumentation and Regulation Supervisor, was notified of a possible gas related incident at 225 North Avenue, Weston. Matt Breslin, John Talbot (Instrumentation & Regulation Supervisor) and Rick Healey (Instrumentation & Regulation Control Technician) met at the site. Distinct Odor Level tests were conducted at 227 North Avenue, Weston and 4 Hastings Road, Weston. These buildings are located in close proximity to the incident. In addition, a reading was taken at the Weston Fire Station located on Boston Post Road, Weston.

The results of these tests are listed below:

Date	Time	Location	Threshold Odor Level (% Gas in Air)	Distinct Odor Level (% Gas in Air)	Test Equip. ID	Test Equip. Calibration Date	Test By
9/12/05	12:15 p.m.	227 North Avenue	0.090	0.120	2127-3	4/15/05	M.B.
	12:20 p.m.	Weston	0.080	0.100	2127-3	4/15/05	R.H.
9/12/05	1:00 p.m.	4 Hastings Road	0.050	0.080	2127-3	4/15/05	M.B.
	1:05 p.m.	Weston	0.040	0.090	2127-3	4/15/05	J.T.
	1:10 p.m.		0.060	0.080	2127-3	4/15/05	R.H.
9/12/05	1:40 p.m.	Weston Fire Station	0.050	0.080	2127-3	4/15/05	M.B.
	1:45 p.m.	Boston Post Road	0.040	0.070	2127-3	4/15/05	J.T.
	1:50 p.m.	Weston	0.060	0.070	2127-3	4/15/05	R.H.

cc: S. Allgor
W. Kildare
T. Vigeant
J. Gatherum
T. Teehan
M. Smith
K. Clancy

Subject: 225 North Avenue, Weston_September12_2005.doc
Date: Wed, 14 Sep 2005 10:47:47 -0400
From: Anita Shulman <ashulman@keyspanenergy.com>
To: Stanley J Allgor <sallgor@keyspanenergy.com>,
William Kildare <wkildare@keyspanenergy.com>, jgatherum@keyspanenergy.com,
pvigeant@keyspanenergy.com, tteehan@keyspanenergy.com, msmith2@keyspanenergy.com,
kclancy@keyspanenergy.com

Hi All:

John asked me to e-mail this to all of you.

Anita

225 North Avenue, Weston_September12_2005.doc	**Name:** 225 North Avenue, Weston_September12_2005 **Type:** WINWORD File (application/msword) **Encoding:** base64 **Download Status:** Not downloaded with messa

EXHIBIT 30

First Set of Information Request Responses: 1-5

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-5

Respondent: Charles C. Cotting

Q. Provide all records for service line to 225 North Avenue, including but not limited to: installation date; line size and material; number of meters; leak history and maintenance; the S-PIPE file for the address; and the service card for the address. Describe any leak history or maintenance performed on customer owned piping or appliances. Please list known appliances at that address.

A. Attached please find two service cards (Exhibits 2 and 3) and the S-PIPE file for 225 North Avenue, Weston (Exhibit 4). KeySpan had one meter at 225 North Avenue, Weston. There were no reported leaks on the service for 225 North Avenue, Weston. KeySpan does not have any records for maintenance performed on customer owned piping or appliances at that address. KeySpan has a record of a house heater and a water heater at that address.

EXHIBIT 31

First Set of Information Request Responses: 1-6

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-6

Respondent: Margaret Sweeney

Q. Provide the date and record of last entry into 225 North Avenue, prior to the incident. Please state the disposition of the visit.

A. The last entry by KeySpan prior to the incident was on January 30, 2004 to repair a leak at the union. Please see attached CAD report (Exhibit 5).

Order Detail

BOSTON

MASTER ORDER DETAIL

Customer Name: SANDRA S RAHMAN **Account #:** 05061818400
Address: 225 NORTH AVE HSE
Town/Zip: WES / 02493
Host Ord Create Dt: 1/30/04 10:20:58 AM **Service** 22596
CICS Term ID: Z077 **Taken By:** 22808 **Group:** D
Dispatcher: 21853 **Disp Time:** 1/30/04 10:21:48 AM

Tran Code: 086 **Class:** H
Reported By: **Reissue:** 001
Appointment Dt: 1/30/04
WTD From: 1/30/04 8:00:00 AM **WTD To:** 1/30/04 2:00:00 PM

Meter Num: 002527367 **Size:** 2160
Lken: 01 **Inst:** 19990210
ERT Num: 016223637 **ERT Batt:** -
Telephone 1: 7816477748 **Telephone 2:** 7816477748

Special Instructions
Call: HOME AFT 3PM-LK@UNIO**
Sys: Pend Ord: Y * Verify Mtr: N * Chg Mtr: N * Theft: N * Contract: *
SHUT OFF/NEED FITTERS *
Disp:

GENERAL COMPLETION DETAIL (16731)

Job Codes: FT IS TN **Job Mins:** 1
CRIS Codes: 086 110 00 **Job Mins:** 1
EnRoute: 1/30/04 5:29:19 PM **EnRoute Override:** **Flu** Y
OnSite: 1/30/04 7:32:15 PM **OnSite Override:**
Comp Date: 1/30/04 7:33:34 PM
Warning: **Gas On:** **Mtr Lck:** **Appl Lck:**
Tag Posted: **Tag Location:** **Aff Appl:**
Problem Found:
Referd To:

Prev-Rem Meter#: 002527367 **Correct Meter #:** **On-Off Rem Read:**
Set Meter #: **Set Read:** **Set Dials:** **Set Locn:**
Set Size: **Set ERT#:**
RG: 00 **WH:** 01 **DR:** 00 **HH:** 01 **SH:** 00 **AC:** 00 **OTH:** 00

Comments: rpd leaks

New Customer Name:

Safety Gas Reading			
	Check?	Reading	Loc
Service	Y	000	
Water		000	
Sewer		000	
Electric		000	
Wall		000	
Barhole Svc		000	
Perimeter		000	
CO Test		0000	
Check Flue	Y		

ORDER NUMBER INFORMATION
CAD Order Num: 16731 **CSS Order** 03035000679
CAD Date/Time: 1/30/04 10:20:58 AM

Top

EXHIBIT 32

First Set of Information Request Responses: 1-7

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
PIPELINE ENGINEERING AND SAFETY DIVISION

FIRST SET OF INFORMATION REQUESTS FROM THE PIPELINE ENGINEERING AND SAFETY DIVISION OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO KEYSPAN ENERGY DELIVERY

Re: Investigation of Incident at 225 North Avenue, Weston, on September 12, 2005

D.T.E. 1-7

Respondent: Philip Quan

Q. Provide the date and results of the last leakage survey of the main and services underlying North Avenue conducted prior to the gas explosion.

A. KeySpan performed a walking survey of the main and service the week of August 18, 2003. KeySpan also performed a mobile survey of the main on November 12, 2004. No leaks were found as a result of these surveys.

EXHIBIT 33

Premise Condition Report

KEYSPAN
Energy Delivery

PREMISE CONDITION REPORT

NOTE: ALL READINGS TAKEN AT FOUNDATION WALLS UNLESS OTHERWISE NOTED

REPORTED ADDRESS	225 North Ave				DATE OPENED	DATE ARRIVED	DATE LEFT	Weston ZIP 02493	SHEET 1 OF 1
FIRST SERV. REP.	Jemin	EXECUTED BY:	Lynch	EMP. NO. 23259	9/12/05 10:49 A.M. P.M.	9/12/05 10:49 A.M. P.M.	9/12/05 A.M. P.M.		COMMENTS

ADDRESS									
225 Northave	TIME	11		FI	Survey				HSE ON FIRE NO Fire Dept here
	READ	GI							
221 "	TIME	11:10	12:10	13:10	14:10	&			
	READ	0	0	0	0				
231 "	TIME	11:20	12:30	13:20	14:20	Main			
	READ	0	0	0	0				
237 "	TIME	11:30				NO			
	READ	0							
219 "	TIME	11:40				Indication			
	READ	0							
	TIME								
	READ								
	TIME								
	READ								
	TIME								
	READ								

LEAK INVESTIGATION COMPLETE	INITIALS FI	HAZARDOUS		✓ NON-HAZARDOUS	✓		
REVIEWED WITH DISTRIBUTION	INITIALS	DIST. CREW LEADER/SUPERVISOR T. Sherman		RELIEVED BY:	EMP. NO.		
LEAK CLASSIFICATION GRADE (1) 2, 3, NA		LEAK SURVEY JL					
LEAK TURNED OVER TO DISTRIBUTION	(YES) NO	TIME TO DIST.	7:50 A.M. P.M.				
LEAK CLOSED OUT	A.M. P.M.	MONITOR SETUP	YES	NO	MONITOR TIME FRAME		HOURS