# GENG-2050: Identification, Evaluation and Prioritization of Distribution Main Segments for Replacement

| **Date Revised:** | 05/21/2007 | **Filed:** | Yes | **Application:** | LI-MA-NH-NYC |
|---|---|---|---|---|---|
| | | **Review:** | 3 years | **Lead Org:** | System Integrity & Corrosion |
| **Revision:** | | | | | |
| Location: | From: | | | To: | |
| | | | | New document | |

## DESCRIPTION

This procedure describes and details the identification, evaluation, and prioritization of distribution main segments for replacement.

## PROCEDURE

### A. Identification of main segments for replacement

1. Main Replacement Levels by Material will be established annually for each Region (NYC, LI, NE), where deemed necessary due to large inventories of underperforming pipe and/or known problems with main population segments. Levels are developed to maintain projected steady state integrity and leak rates. If, however, the amount of main determined to contain active corrosion exceeds projected levels, all actively corroding main must be replaced in accordance with the established timeframes.
2. Main segment candidates are identified through three avenues:
   a. Field Requests, which will be reviewed throughout the year.
   b. Mains located in Public Improvement Job Areas, which will also be reviewed throughout the year, as requested by Field Operations and/or Public Works employees.
   c. Annual screenings by Gas Engineering, as deemed appropriate. Screenings will vary among the regions, based on the data and tools available for the systems.
3. All identified main segment candidates will be evaluated and prioritized by Gas Engineering in accordance with the criteria set forth in this procedure. Minimum segment lengths for screening and Engineering review will vary among the regions, however, no Engineering review is required for O&M replacements up to 50 feet.

### B. Evaluation/prioritization of steel main segments for replacement

1. **STEP 1** – Data Collection - Minimum Data Required**:**
   a. All Repaired Corrosion Leaks on Main Segment for the last 10 years (not service leaks)
   b. All Open Leaks that are believed to be on the actual Main Segment
      - For all applicable leaks, the following data is required:
        a. Leak Number
        b. Date (date found for open leaks, date repaired for repaired leaks)

c. Leak Class (original class for open leaks, repaired class for repaired leaks)

- For repaired leaks, the following additional data is also required:
  a. Number of Clamps Installed to Repair and specific clamp locations
  b. Condition of Main When Repaired
  c. Specific Leak Location
  d. Length of Segment being considered for replacement
  e. Building Types in Area of Main Segment
     *(None, Single Family Houses, Small Buildings, Public Buildings)*

2. **STEP 2** – Calculate a main deterioration factor ("D") using the formula
   D = N x 500 / L
   L = Length of Segment

(The segment length used in calculations is not necessarily the total length being considered for replacement. "L" should be determined by the evaluating engineer as the length of the segment exhibiting significant leak activity. In no case should the length used for calculations extend beyond the locations of the leaks)

N = Repair Factor (within the defined "L")
If the leak was repaired with 1 clamp, by another method (service) or is still open, N=1
If the leak was repaired with 2-3 clamps, N=2
If the leak was repaired with 4-5 clamps, N=3
If the leak was repaired with 6-7 clamps, N=4
If the leak was repaired with >7 clamps, N=5
THE SUM OF ALL THE "N"'s FOR EACH LEAK IS PLUGGED INTO THE FORMULA

This method estimates the deterioration according to the actual number of physical repairs and normalizes it for the length of the segment.

3. **STEP 3** – Calculate an incident probability factor ("P") using the formula
   P = {[(# Class1 Leaks/0.5) + (# Class2A Leaks/1.5) + (# Class2 Leaks/2) + (# Class3 Leaks/3)] x 500} / L

This method estimates public safety incident probability by weighting each leak based on how far the gas migrated to buildings, again normalized according to the segment length. (Note – If leak class is unknown, Class 2A will be assumed)

4. **STEP 4** – Calculate a risk factor ("R") using the formula
   R = P x C
   P = Probability Factor Calculated in Step 3
   C = Consequence Factor
   If there are no buildings in the area, C = 0
   If there are only single family homes, C = 1
   If there are small buildings (multi-family, strip malls, etc), C = 1.2
   If there are public buildings (school, church, hospital, etc) C = 1.5

This is the standard Risk Analysis calculation where Risk is defined as the product of the likelihood of an event and the potential consequence of that event. Consequences increase with building size and number of people affected.

5. **STEP 5** – Calculate the preliminary prioritization factor ("Pr") using the formula
   Pr = D + R
   D = Deterioration Factor Calculated in Step 3
   R = Risk Factor Calculated in Step 5

The prioritization calculation takes into account both the deterioration of the main and the risk to public safety.

6. **STEP 6** – Adjustments
   1. Before making a final determination and prioritization of a main segment replacement, the details of the job are reviewed and "engineering judgement" is applied where appropriate. This application may result in the following types of adjustments:
      a. Changing the priority of the job
      b. Increasing or decreasing the job length/scope
      c. Breaking the job into smaller segments
      d. Merging several segments into one job

   2. These adjustment may be made based on the following types of information, if available and applicable:
      a. Analysis of the age of the leaks and any increasing frequency of leak occurrences
      b. Pipe vintage and service insert activity associated with the main
      c. Service leaks at the main connection due to corrosion
      d. Adjustments based on very long or very shorts segments
      e. Observed pipe condition from leak repair data
      f. Observed pipe condition from recent field exposure
      g. Clustering of repairs and/or clamps along the segment
      h. Other replacement jobs in the vicinity
      i. Cathodic protection systems in place
      j. Specific locations of intersections, fittings, material transitions, diameter transitions, etc.
      k. Customer complaints, Executive complaints, Regulatory Agency complaints
      l. Corporate good will
      m. Unusual hazards or exposure in the area
      n. Proximity to gas regulating equipment
      o. Proximity to transmission main
      p. Unusual difficulty or expense of repairs
      q. Main location
      r. Identification of outdated construction methods or problematic materials or fittings
      s. Depth of cover and soil conditions
      t. High open leak counts
      u. Water intrusion or other geographic considerations

v. Any special or unusual conditions or considerations identified by Field Operations
w. Any other safety, integrity, operational or economic factors that are available and deemed appropriate

***IMPORTANT: Segments that qualify based on their preliminary prioritization calculation may not be disqualified by adjustments.***

7. **STEP 7** – Job Qualification
   1. Jobs will be approved and prioritized based on the Prioritization Factor "Pr" calculated in Step 5 and adjustments applied in Step 6. Enough jobs should be approved to accommodate the replacement levels determined by the model(s) in use at the time.
   2. Some jobs will be mandatory to replace. In general, a condition of "Active Corrosion" will be determined when the preliminary Prioritization Factor ("Pr") calculation exceeds 12. Each region will be further responsible for declaring jobs as "Active Corrosion" by modifying this criteria based on specific regional operating conditions as required to comply with any more stringent definitions provided by the regulators in the State(s) in which the region operates. Any unprotected bare steel main containing "Active Corrosion" must be replaced within two years – unless extenuating circumstances make it unfeasible to do so, in which case, other appropriate mitigative measures are to be taken. Any unprotected coated steel main containing "Active Corrosion" must have cathodic protection engineered and installed within one year or be replaced within two years - unless extenuating circumstances make it unfeasible to do so, in which case, other appropriate mitigative measures are to be taken. Any cathodically protected main containing "Active Corrosion" must be brought up to acceptable cathodic protection within one year or replaced within two years - unless extenuating circumstances make it unfeasible to do so, in which case, other appropriate mitigative measures are to be taken. An example of such a circumstance may be when a street is under guarantee or a moratorium from excavation.

8. **STEP 8** – Impact Identification
   1. Every approved job should be processed through the Planning and Corrosion areas of Gas Engineering for:
      a. Sizing (determining the appropriate replacement material and diameter).
      b. Determining if the replacement will have any impact on existing cathodic protection systems.

**C. Evaluation/prioritization of cast iron main segments for replacement**

Cast Iron Main Segments will be evaluated in a similar manner as Steel Main segments, where the Prioritization factor will be the sum of the Deterioration Factor and the Risk factor (Pr = D + R).

1. Candidates are reviewed that contain at least 2 breaks or graphitization repairs within 400 ft.

2. Important - If the candidate segment meets the above identification criteria and:
   - The Pressure is greater than inches of water column – automatic approval for replacement
   - The Pressure is in inches of water column – approval will be based on the Prioritization calculation

     If Pr > 12, replacement will be required (however, a cast iron segment is not deemed active corrosion)

     If Pr < 12, prioritize and replace according to resources and replacement level recommendations

3. The Repair Factor "N" (as defined in Step 2 for steel evaluation), will be assigned for each leak, as follows: For cast iron – main breaks, graphitization (corrosion of cast iron) and joint leak repairs are examined.

   If the leak is still open and Type 3, N = 0.5
   If the leak is still open and workable, N = 1
   If the leak was repaired by joint sealing, N = 0.5 x (the number of joints sealed)
   If the leak was a circumferential break, N = 2
   If the leak was a the result of graphitization, N = 2

4. Engineering judgment should also be applied to both the prioritization and determination of the segment length to be replaced based on the pressure, diameter, dates of failures, surrounding areas, etc.

**D. Evaluation/prioritization of plastic main segments for replacement**

1. Plastic Main Segments will be evaluated in the same manner as Steel Main segments, with the exception of the calculation of the Repair Factor "N" in Step 2. For plastic – previous squeeze-offs, point loading failures (eg – rock impingement) and material defects (eg – cracking) and construction defect failures (eg – butt fusion joint) are examined.

   N = Repair Factor (within the defined "L")

   Where N will be the product of an "Initial N" (Ni) and Material Factor (Mf)

   N = (Ni) x (Mf)
   If the leak is still open, Ni = 1
   If the leak was the result of an improper squeeze-off, Ni = 1 x (the number known squeeze-offs)
   If the leak was the result of a point loading failure, Ni = 2
   If the leak was a the result of a construction defect, Ni = 3
   If the leak was a the result of a material defect, Ni = 3

2. Additionally, a material factor will be applied to "N", as follows:
   MATERIAL FACTOR (Mf)

   If the main is known to be old vintage Aldyl-A pipe (Green Plastic), Mf = 1.5
   If the main is known to be new vintage Aldyl-A pipe (Pink Plastic), Mf = 1.5

**E. Note regarding jobs in public improvement areas or reinforcements:**

1. Additional adjustments are applied for candidate segments in public works areas or for which reinforcement opportunities have been identified - by the addition of a Public Works (PW) or Reinforcement (RI) factor to the Prioritization calculation:

   Pr = D + R + PW + RI
   For Road Resurfacing, PW = 2.4
   For Road Reconstruction, PW = 4.2
   For Size-Upgrade Reinforcement, RI = 2.5
   For Reinforcement With No Size Upgrade, RI = 0

   **<u>IMPORTANT</u>: These adjustments are only to be used to qualify a job that previously did not qualify, or to upgrade the priority of a qualified job.** ***They may not upgrade a job to active corrosion status****.*

*These factors are applied because of potential cost savings in combining main replacements with other work, as well as anticipated avoidance of performing work on protected streets that were recently improved.*

***(End of GENG2050-LI-MA-NH-NYC)***

ENERGYNORTH NATURAL GAS, INC.
d/b/a NATIONAL GRID NH
DG 10-017

National Grid NH's Responses to
Staff's Data Requests – Set #2

Date Received: June 18, 2010 Date of Response: July 12, 2010
Request No.: Staff 2-83 Witness: Susan L. Fleck

---

**REQUEST:** Ref. Response Staff 1-209, Attachment at 7 of 16. Please describe the actions taken for line item 291, for South Main St. Pressure Regulator, Concord. Provide a breakdown of expenses charged to line item 291 and justification for the project. What other alternatives and schedules were considered prior to approving the project? What would the repercussions have been if the project was not approved? Please provide any maintenance records for the 2 years prior to replacement.

**RESPONSE:** South Main St. @ Gas St., Concord was a discretionary capital project for improved performance and reliability of the station. The work included the replacement of the four regulator block valves, and upgrading the Fisher 399A boot style regulators with Mooney FlowMax regulators. The breakdown of expenses charged to this project was as follows:

| Project Location | Capital Categories | Total |
|---|---|---|
| S.MAIN@GAS STREET CONCORD NH | Base Labor | $2,991 |
| | Benefits | $3,131 |
| | Contractors/Consultants | $4,439 |
| | Employee Exp | $50 |
| | Materials | $802 |
| | Other | $5,676 |
| | Overhead | $2,768 |
| | Overtime | $3,565 |
| **TOTAL** | | **$23,421** |

This project was necessary because a complete replacement of the regulator station with a prefabricated unit is not expected in near term. If the project was not approved, additional maintenance and operating cost would have increased. Spare parts were becoming costly, and the block valves were becoming difficult to operate.

Attachment Staff 2-83 contains the requested maintenance records.

# Station Inspection Form

**Regulator Station** SO. MAIN ST. & GAS ST.

City CONCORD

Division EnergyNorth | Due Date: 9/08/2005 | Performed Date: 7-21-05 | Employee: DB, FG + JB

Standard Inlet Pressure: 60# | Standard Outlet Pressure: 12" | Single Feed ☐

## Valves

Key Valve Number 575

| | | |
|---|---|---|
| Primary Valve Location Verified | ☑ | |
| Primary Valve Cleared, Operated | ☑ | Record No. of Turns: 18 Notes: |
| Primary Valve Fully Closed | ☑ | If No, Explain: |
| Primary Valve Greased | ☐ | N/A |
| Primary Valve Gate Key Fits On | ☑ | |
| Primary Valve Cover and Inside Painted Red | ☑ | |
| Stamped with Valve Number | ☑ | |
| Primary Valve Leak Checked | ☑ | Method: CGI ☑ SoapTest ☐ |
| | | Gas Leak Reading: 0% Notes: |
| All Valve Boxes Gas tested Max % | ☑ | |
| All Valve Boxes Clear | ☑ | |
| Valve Key fit Properly on Valves | ☑ | |
| Valves in Correct Position | ☑ | |
| Outlet Valve Painted Green | ☑ | |
| Hands off Guards on By-Pass Valve | ☑ | |
| Hands off on Control Line Valves | ☑ | |

## Vault, Pit or Building

| | | |
|---|---|---|
| Flow Sheet Correct | ☑ | |
| Flow sheet posted on station | ☑ | |
| Water Depth (in feet) | | 0 |
| Water Pumped | ☐ | N/C |
| Atmosphere Check | | OK |
| Vault Covers/Doors/Gate | ☑ | |
| Gutters Clean (Bilco) | ☑ | |
| Ventilating Duct Ends Unobstructed | ☑ | |
| LNG Tap Inspected | ☐ | N/A |
| General Condition of Vault/Building | | Good |

## Recording Gauge

| | | |
|---|---|---|
| Recording Chart Accurate | ☑ | Telemetering |
| Vent Pole Condition | | Good |
| General Notes | | |

# Regulator Maintenance

**Regulator Station**

| | | | |
|---|---|---|---|
| City | CONCORD | SO. MAIN ST. & GAS ST. | |
| Regulator | 4211 | | |
| Notes: | WORKER | | 7-21-05 |
| Outlet Pressure: | 12" | Inlet Pressure: | 60# |

| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: |
|---|---|---|---|---|---|---|
| FISHER | 399 EZ JOE | 4" | 150# | 10924919 | | |

| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: |
|---|---|---|---|---|---|
| Fisher | 161-Y-1 | | | No | |

| | Check for Yes | |
|---|---|---|
| Rebuilt Regulator | ✓ | |
| Internal Inspection | ✓ | |
| Smooth Full Stroke Operation | ✓ | |
| 100% Lockup Obtained | ✓ | |
| Rebuild / Replace Pilot | ✓ | Replaced Pilot |
| Pilot Operation Normal | ✓ | |
| Pilot Filter Element Visually Inspected | ✓ | |
| Pilot Filter Element Changed | ✓ | installed new filter |
| Vent lines blown out with air | ✓ | |
| 1/2 PSIG air and soap of Atm System | ✓ | |

Regulator Filter Wet ☐ Sample taken ☐

Corrosion Inspection — 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking

| | | |
|---|---|---|
| Regulator | 1 | scraped + Painted |
| Pilot | 1 | New |
| Main Pipe | 1 | scraped + painted |
| Control Lines | 1 | |
| Filter | 1 | New |
| All Above Ground Piping | 1 | scraped + painted |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | N/A | |
| Main Line Strainer Cleared | ☐ | N/A | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 50# | | |
| Station Inlet Pressure-Left: | 50# | | |
| Setpoint - Found: | 7" | | |
| Setpoint - Left: | 7.3" | | |

Action taken Notes: Installed complete Repair Kit Boot, Gaskets & orng. Also installed new Becker Fap 30 pilot with 1/16" nozzle Pilot has purple spring 4" wc to 40" wc and installed new snubber filter for Becker pilot.

# Regulator Maintenance

**Regulator Station**

| | |
|---|---|
| City | CONCORD |
| Regulator | 4211M |
| Notes: | MONITOR 7-21-05 |

SO. MAIN ST. & GAS ST.

Outlet Pressure: 12" Inlet Pressure: 60#

| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: |
|---|---|---|---|---|---|---|
| FISHER | 399 EZ JOE | 4" | 150# | 10924918 | | |

| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: |
|---|---|---|---|---|---|
| Fisher | 161-Y-1 | | | No | |

| Check for Yes | | |
|---|---|---|
| Rebuilt Regulator | ☑ | |
| Internal Inspection | ☑ | |
| Smooth Full Stroke Operation | ☑ | |
| 100% Lockup Obtained | ☑ | |
| Rebuild / Replace Pilot | ☑ | replaced Pilot |
| Pilot Operation Normal | ☑ | |
| Pilot Filter Element Visually Inspected | ☑ | |
| Pilot Filter Element Changed | ☑ | installed new filter |
| Vent lines blown out with air | ☑ | |
| 1/2 PSIG air and soap of Atm System | ☑ | |

Regulator Filter Wet ☐ Sample taken ☐

| Corrosion Inspection | 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking |
|---|---|---|---|---|---|
| Regulator | 1 | scraped + painted | | | |
| Pilot | 1 | New | | | |
| Main Pipe | 1 | scraped + painted | | | |
| Control Lines | 1 | | | | |
| Filter | 1 | New | | | |
| All Above Ground Piping | 1 | scraped + painted | | | |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | N/A | |
| Main Line Strainer Cleared | — | N/A | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 50# | | |
| Station Inlet Pressure-Left: | 50# | | |
| Setpoint - Found: | 17" wc | | |
| Setpoint - Left: | 12" wc | | |

Action taken Notes: installed complete repair Kit Boat, Gaskets + oings also installed new Becker top 30 pilot with 1/16 nozzle pilot has purple spring 9" wc to 40" wc and installed new mooney filter for Becker pilot.

# Station Inspection Form

**Regulator Station** SO. MAIN ST. & GAS ST.

City CONCORD

Division EnergyNorth | Due Date: 7/21/2006 | Performed Date: 10-11-06 | Employee: BB+KF

Standard Inlet Pressure: 60# | Standard Outlet Pressure: 12" | Single Feed ☐

## Valves

Key Valve Number 575

| | | |
|---|---|---|
| Primary Valve Location Verified | ☒ | |
| Primary Valve Cleared, Operated | ☒ | Record No. of Turns: ____ Notes: ____ |
| Primary Valve Fully Closed | ☐ | If No, Explain: ____ |
| Primary Valve Greased | ☐ | NA |
| Primary Valve Gate Key Fits On | ☒ | |
| Primary Valve Cover and Inside Painted Red | ☒ | Valve Box Needs To be Replaced |
| Stamped with Valve Number | ☐ | |
| Primary Valve Leak Checked | ☒ | Method: CGI ☒ SoapTest ☐ |
| | | Gas Leak Reading: 0% Notes: ____ |
| All Valve Boxes Gas tested Max % | ☒ | |
| All Valve Boxes Clear | ☒ | |
| Valve Key fit Properly on Valves | ☒ | |
| Valves in Correct Position | ☒ | |
| Outlet Vlv Painted Green | ☒ | |
| Hands off Guards on By-Pass Valve | ☒ | |
| Hands off on Control Line Valves | ☒ | |

## Vault, Pit or Building

| | | |
|---|---|---|
| Flow Sheet Correct | ☒ | |
| Flow sheet posted on station | ☒ | |
| Water Depth (in feet) | | 0 |
| Water Pumped | | NO |
| Atmosphere Check | | OK |
| Vault Covers/Doors/Gate | ☒ | |
| Gutters Clean (Bilco) | ☒ | |
| Ventilating Duct Ends Unobstructed | ☐ | NA |
| LNG Tap Inspected | ☐ | NA |
| General Condition of Vault | | Good |

## Recording Gauge

| | | |
|---|---|---|
| Recording Chart Accurate | ☒ | |
| Vent Pole Condition | | Good |

General Notes: Inlet Valve Box Broken apart Box needs to be replaced NO COVER ON BOX

# Regulator Maintenance

**Regulator Station**

| | |
|---|---|
| City | CONCORD |
| Regulator | 4211 |
| | SO. MAIN ST. & GAS ST. |
| Notes: | WORKER 10-11-06 |

Outlet Pressure: 8" Inlet Pressure: 60#

| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: |
|---|---|---|---|---|---|---|
| FISHER | 399 EZ JOE | 4" | 150# | 10924919 | | |

| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: |
|---|---|---|---|---|---|
| Fisher | 161-Y-1 | | | No | |

Check for Yes

| | |
|---|---|
| Rebuilt Regulator | ☑ |
| Internal Inspection | ☑ |
| Smooth Full Stroke Operation | ☑ |
| 100% Lockup Obtained | ☑ |
| Rebuild / Replace Pilot | ☐ |
| Pilot Operation Normal | ☑ |
| Pilot Filter Element Visually Inspected | ☑ |
| Pilot Filter Element Changed | ☐ NO |
| Vent lines blown out with air | ☑ |
| 1/2 PSIG air and soap of Atm System | ☑ |

Regulator Filter Wet ☐ Sample taken ☐

Corrosion Inspection — 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking

| | |
|---|---|
| Regulator | 1 |
| Pilot | 1 |
| Main Pipe | 1 |
| Control Lines | 1 |
| Filter | 1 |
| All Above Ground Piping | |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | NA | |
| Main Line Strainer Cleared | ☐ | NA | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 56 psi | | |
| Station Inlet Pressure-Left: | 56 psi | | |
| Setpoint - Found: | 8.5" | | |
| Setpoint - Left: | 8.5" | | |

Action taken Notes: installed Rebuilt Kit tube, o-rings & cage ok Pilot filter ok

# Regulator Maintenance

**Regulator Station**

| | | | |
|---|---|---|---|
| City | CONCORD | | |
| Regulator | 4211M | SO. MAIN ST. & GAS ST. | |
| Notes: | MONITOR | | 10-11-06 |
| Outlet Pressure: | 12" | Inlet Pressure: | 60# |

| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: |
|---|---|---|---|---|---|---|
| FISHER | 399 EZ JOE | 4" | 150# | 10924918 | | |

| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: |
|---|---|---|---|---|---|
| Fisher | 161-Y-1 | | | No | |

| | Check for Yes | |
|---|---|---|
| Rebuilt Regulator | ✓ | |
| Internal Inspection | ✓ | |
| Smooth Full Stroke Operation | ✓ | |
| 100% Lockup Obtained | ✓ | |
| Rebuild / Replace Pilot | | |
| Pilot Operation Normal | ✓ | |
| Pilot Filter Element Visually Inspected | ✓ | |
| Pilot Filter Element Changed | | NO |
| Vent lines blown out with air | ✓ | |
| 1/2 PSIG air and soap of Atm System | ✓ | |

Regulator Filter Wet ☐ Sample taken ☐

Corrosion Inspection — 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking

| | |
|---|---|
| Regulator | 1 |
| Pilot | 1 |
| Main Pipe | 1 |
| Control Lines | 1 |
| Filter | 1 |
| All Above Ground Piping | |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | NA | |
| Main Line Strainer Cleared | ☐ | NA | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 56 PSI | | |
| Station Inlet Pressure-Left: | 56 PSI | | |
| Setpoint - Found: | 12" wc | | |
| Setpoint - Left: | 11" wc | | |

Action taken Notes: Installed Rebuild Kit, tube + orings cage + Regulator dirty cage is showing wear on vains should be replaced nexted year.

# Station Inspection Form

**Regulator Station** SO. MAIN ST. & GAS ST.

City: CONCORD

Division: EnergyNorth | Due Date: 9/11/2007 | Performed Date: 9-11-07 | Employee: DB + KF

Standard Inlet Pressure: 60# | Standard Outlet Pressure: 12" | Single Feed: ☐

## Valves

Key Valve Number: 4211

| | | |
|---|---|---|
| Primary Valve Location Verified | ☑ | |
| Primary Valve Cleared, Operated | ☑ | Record No. of Turns: ____ Notes: |
| Primary Valve Fully Closed | ☑ | If No, Explain: |
| Primary Valve Greased | ☑ | |
| Primary Valve Gate Key Fits On | ☑ | |
| Primary Valve Cover and Inside Painted Red | ☐ | Valve Box Broken + Cover Missing |
| Stamped with Valve Number | ☐ | |
| Primary Valve Leak Checked | ☑ | Method: CGI ☑ SoapTest ☐ |
| | | Gas Leak Reading: 0% LEL Notes: |
| All Valve Boxes Gas tested Max % | ☑ | |
| All Valve Boxes Clear | ☑ | |
| Valve Key fit Properly on Valves | ☑ | |
| Valves in Correct Position | ☑ | |
| Outlet Vlv Painted Green | ☑ | |
| Hands off Guards on By-Pass Valve | ☑ | |
| Hands off on Control Line Valves | ☑ | |

## Vault, Pit or Building

| | | |
|---|---|---|
| Flow Sheet Correct | ☑ | |
| Flow sheet posted on station | ☑ | |
| Water Depth (in feet) | | 0' |
| Water Pumped | ☐ | |
| Atmosphere Check | | 0% LEL |
| Vault Covers/Doors/Gate | ☑ | |
| Gutters Clean (Bilco) | ☑ | |
| Ventilating Duct Ends Unobstructed | ☐ | |
| LNG Tap Inspected | ☐ | N/A |
| General Condition of Vault | | Good |

## Recording Gauge

| | | |
|---|---|---|
| Recording Chart Accurate | ☐ | Telemetering |
| Vent Pole Condition | | Good |
| General Notes | | 1 - Worker<br>2 - Monitor |

Pipe to Soil Read

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | .561 | 3. | | 5. | | 7. | |
| 2. | 1.015 | 4. | | 6. | | 8. | |

# Regulator Maintenance

**Regulator Station**

| | | |
|---|---|---|
| City | CONCORD | SO. MAIN ST. & GAS ST. |
| Regulator | 4211 | |
| Notes: | WORKER | 9-11-07 |
| Outlet Pressure: | 8" | Inlet Pressure: 60# |

| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: |
|---|---|---|---|---|---|---|
| FISHER | 399 EZ JOE | 4" | 150# | 10924919 | | |

| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: |
|---|---|---|---|---|---|
| Fisher | 161-Y-1 | | | No | |

| | Check for Yes |
|---|---|
| Rebuilt Regulator | ☐ |
| Internal Inspection | ☐ |
| Smooth Full Stroke Operation | ☑ |
| 100% Lockup Obtained | ☑ |
| Rebuild / Replace Pilot | ☑ |
| Pilot Operation Normal | ☑ |
| Pilot Filter Element Visually Inspected | ☑ |
| Pilot Filter Element Changed | ☑ |
| Vent lines blown out with air | ☑ |
| 1/2 PSIG air and soap of Atm System | ☑ |

Regulator Filter Wet ☐ Sample taken ☐

| Corrosion Inspection | 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking |
|---|---|---|---|---|---|
| Regulator | 1 | | | | |
| Pilot | 1 | | | | |
| Main Pipe | 1 | | | | |
| Control Lines | 1 | | | | |
| Filter | 1 | | | | |
| All Above Ground Piping | | | | | |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | N/A | |
| Main Line Strainer Cleared | ☐ | N/A | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 58.5 PSI | | |
| Station Inlet Pressure-Left: | 58.5 PSI | | |
| Setpoint - Found: | 8.4" wc | | |
| Setpoint - Left: | 8.5" wc | | |

Action taken Notes: INSTALLED NEW MOONEY FLOW MAX REGULATOR 4" SER# 01048 ALSO NEW PILOT MOONEY 20C W/ 5" 1015" SPRING + NEW INLET + OUTLET VALVE: BOTH ARE KEROTAS T VALVES.

# Regulator Maintenance

Regulator Station

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | CONCORD | SO. MAIN ST. & GAS ST. | | | | | | |
| Regulator | 4211M | | | | | | | |
| Notes: | MONITOR | 9-11-07 | | | | | | |
| Outlet Pressure: | 12" | Inlet Pressure: | 60# | | | | | |
| Manufacturer: | Model Number: | Size: | ANSI: | Serial Number: | Type Loading: | Actuator: | | |
| FISHER | 399 EZ JOE | 4" | 150# | 10924918 | | | | |
| Pilot Mfg: | Pilot Model: | Override Pilot Mfg: | Override Pilot Model: | Remote Pilot: | Weight Setting: | | | |
| Fisher | 161-Y-1 | | | No | | | | |

| | Check for Yes |
|---|---|
| Rebuilt Regulator | ☐ |
| Internal Inspection | ☐ |
| Smooth Full Stroke Operation | ☑ |
| 100% Lockup Obtained | ☑ |
| Rebuild / Replace Pilot | ☑ |
| Pilot Operation Normal | ☑ |
| Pilot Filter Element Visually Inspected | ☑ |
| Pilot Filter Element Changed | ☑ |
| Vent lines blown out with air | ☑ |
| 1/2 PSIG air and soap of Atm System | ☑ |

Regulator Filter Wet ☐ Sample taken ☐

| Corrosion Inspection | 1 - No Corrosion | 2 - Surface Rust | 3 - Minor Pitting | 4 - Deep Pitting | 5 - Leaking |
|---|---|---|---|---|---|
| Regulator | 1 | | | | |
| Pilot | 1 | | | | |
| Main Pipe | 1 | | | | |
| Control Lines | 1 | | | | |
| Filter | 1 | | | | |
| All Above Ground Piping | | | | | |

| | | | |
|---|---|---|---|
| Main Line Filter Element Changed | ☐ | N/A | |
| Main Line Strainer Cleared | ☐ | N/A | |
| Regulator Filter Wet | NO | Sample taken | NO |
| Station Inlet Pressure-Found: | 58.5 psi | | |
| Station Inlet Pressure-Left: | 58.5 psi | | |
| Setpoint - Found: | 12.7" wc | | |
| Setpoint - Left: | 12" wc | | |

Action taken Notes: INSTALLED NEW MOONEY FLOW MAX REGULATOR 4" SER#91554 ALSO NEW MOONEY 20L PILOT W/5 TO 15" WCSPRING NEW INLET + OUTLET VALVES KEROTEST + NEW FISHER 67CF PILOT FOR SUPPLY PRESSURE.

**ENERGYNORTH NATURAL GAS, INC.**
**d/b/a NATIONAL GRID NH**
**DG 10-017**

**NH PUC Staff Responses**
**To Data Requests of National Grid NH**

Date Received: November 5, 2010 | Date of Response: November 23, 2010
Request: Grid-Staff 49 | Witness: Randall Knepper

**REQUEST:**

Ref. p. 9, l. 18- p. 10, l. 4 of Mr. Knepper's testimony. Are there other situations that Mr. Knepper is aware, aside from the one mentioned in Mr. Knepper's testimony, where he believes the Company prematurely replaced an adequately functioning appurtenance? If so, please identify each such instance.

**RESPONSE:**

There are other instances Staff where it believes that the Company prematurely replaced an adequately functioning appurtenance. Staff is attempting to confirm whether its beliefs are accurate. Therefore, Staff does not have specific examples at present. Staff will provide a supplemental response with specific examples when it has confirmed or dispelled its belief.