



## City of Duluth

DEPARTMENT OF PUBLIC WORKS/UTILITIES  
Engineering Division  
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July 20, 2011

Mr. David Barrett  
Director, Central Region  
Pipeline and Hazardous Materials Safety Administration  
Suite 462  
901 Locust Street  
Kansas City, MO 64106-2641

RECEIVED AUG 1 2011

Re: CPF 3-2011-1005M

Dear Mr. Barrett:

On May 10-12, 2010, representatives of the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Minnesota Office of Pipeline Safety (MNOPS), pursuant to Chapter 601 of 49 United States Code, inspected the City of Duluth Public Works and Utilities interstate natural gas transmission pipeline in Duluth, Minnesota.

We are not contesting the Notice of Amendment dated April 7, 2011 and as a result of this inspection and the subsequent Notice we are submitting the following changes that have been made to our plans and procedures to address the referenced inadequacies:

- Item 1: **§192.13(c) and 192.225(b)** – According to API Standard 1104 for the welding procedure specification, the range of pipe diameters is only a suggested grouping and pipe diameter is not an essential variable which when changed requires re-qualification of the welding procedure. However, the attached Welding Procedure Specification DPWU-3 has been qualified using 10.500" outside diameter, 0.250" wall thickness, X-60 pipe for pipe outside diameter grouping greater than or equal to 2.375" to less than or equal to 12.750".
- Item 2: **§192.605(a) and (b)(8)** – Procedures to evaluate work performed by operating personnel and to modify procedures when deficiencies are identified have been added to the attached Section 01.01 General (192.605) of the Gas Operation & Maintenance Manual.
- Item 3: **§192.605(b)(4) and 191.15(a)** – Procedures for filing Form 7100.2 for transmission line incidents have been added to the attached Section 07.02.02 Written Distribution (191.9) & Transmission (191.15) System Incident Reports of the Gas Operation & Maintenance Manual.

**§192.605(b)(4) and 191.15(b)** – Procedures for filing supplemental incident reports as soon as practical have been added to the attached Section 07.02.02 Written Distribution (191.9) & Transmission (191.15) System Incident Reports of the Gas Operation & Maintenance Manual.

Item 4: **§192.605(b)(2) and 192.461(a)** – The procedures for external protective coating are in compliance with the manufacturer’s recommendations for Tapecoat 20 Hot Applied Coal Tar Pipeline Coating which is one of the products specified for this use. The manufacturer recommends an overlap for both spiral wrap and cigarette style wrap of 1/4” to 1”. Current procedures specify a 1/2” overlap for spiral method and a 1” overlap for the cigarette method. However, a note that tape shall be installed in accordance with the manufacturer’s recommendations has been added to the attached Section 25.06 Field Coating Application (Below Grade) of the Gas Operation & Maintenance Manual.

Written procedures for patch stick repairs in accordance with the manufacturer’s recommendations have been added to the attached Section 25.06 Field Coating Application (Below Grade) of the Gas Operation & Maintenance Manual. Hot melt patch sticks have also been added as a hot applied coating to the attached Section 14.06.04.B Field Coatings (Below Grade) – Hot Type Applications of the Gas Operation & Maintenance Manual.

Item 5: **§192.605(b) and 192.465(b)** – The attached Section 09.11 Rectifiers of the Gas Operation & Maintenance Manual has been revised to require rectifier inspections at intervals not exceeding 2-1/2 months or at least 6 times per year.

Item 6: **§192.605(b) and 192.479(a)** – Materials for coating soil to air interfaces have been added in the attached Section 14.06.05.E Field Coatings (Above Grade) of the Gas Operation & Maintenance Manual.

Item 7: **§192.605(b) and 192.481(c)** – Procedures for monitoring atmospheric corrosion have been revised by adding documentation for inspecting the condition of pipe supports and soil to air interfaces on the Atmospheric Gas Main Corrosion Report and Mains Where Physical Damage or External Loading Could Occur Report, included with the attached Section 09 Corrosion Control (192.453) of the Gas Operation & Maintenance Manual. The attached Section 09.15.A Atmospheric Corrosion – Monitoring Pipeline of the Gas Operation & Maintenance Manual already requires special inspection of pipe supports and soil to air interfaces. An addition has been made to this section specifying corrective action procedures to be taken when atmospheric corrosion is found on steel pipeline and a timeline for completion of corrective actions.

Item 8: **§192.605(b)(1) and 192.617** – Procedures for addressing protection and preservation of physical evidence in the investigation of failures have been added in the attached Section 06.03.B Pipeline Failure Investigation – Investigation of the Gas Operation & Maintenance Manual. In addition, a Chain of Custody Record form has been added to the attached Section 06 Failure Investigation (192.617) of the Gas Operation & Maintenance Manual for documenting the chain of custody for material evidence associated with a failure.

Item 9: **§192.605(b) and 192.705(a)** – Documentation of procedures for follow-up when transmission line patrolling identifies conditions requiring further action and for completing the annual patrol of the entire transmission line have been added to the

attached City of Duluth Transmission Main Patrol form included with Section 35.01 General of the Gas Operation & Maintenance Manual.

Item 10: **§192.605(b) and 192.707(a)** – Procedures for placing and maintaining line markers at highway and railroad crossings have been added to the attached Section 05.10 Gas Line Markers of the Gas Operation & Maintenance Manual.

**§192.605(b) and 192.707(c)** – Procedures specifying that line markers will be maintained have been added to the attached Section 05.10 Gas Line Markers of the Gas Operation & Maintenance Manual for buried pipelines and to the attached Section 05.11 Exposed Pipeline Signs/Labels of the Gas Operation & Maintenance Manual for exposed piping.

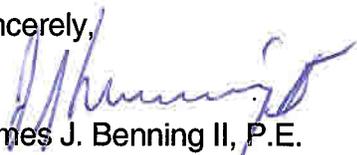
Item 11: **§192.605(b) and 192.709(a)(b)** – Procedures for maintaining records of repairs to the transmission line have been included in a new Maintenance section added to the attached Section 37.02 Record Retention Table of the Gas Operation & Maintenance Manual.

Item 12: **§192.605(b) and 192.727(b)** – Procedures for purging the transmission line are included in the attached Section 13.02 Purging 10" Great Lakes Interconnect Transmission Line from Gas to Air and Section 13.03 Purging 10" Great Lakes Interconnect Transmission Line from Air to Gas of the Gas Operation & Maintenance Manual. Procedures for purging the transmission line in the attached Section 20.03 Transmission Line include a reference to Section 13.02 Purging 10" Great Lakes Interconnect Transmission Line from Gas to Air and Section 13.03 Purging 10" Great Lakes Interconnect Transmission Line from Air to Gas of the Gas Operation & Maintenance Manual. A reference to preparing a procedure for abandoning any transmission pipeline in place prior to any work has been added to the attached Section 21.02 Abandoning Transmission Lines and Gas Mains of the Gas Operation & Maintenance Manual.

Item 13: **§192.605(b) and 192.745(a)** – Procedures and details of transmission line valve inspections have been added to the attached Section 33.02 Transmission Line Valves of the Gas Operation & Maintenance Manual.

Should you have any questions or concerns please do not hesitate to contact me or Larry Winner, Project Engineer.

Sincerely,



James J. Benning II, P.E.

Director

Department of Public Works and Utilities

cc: Larry Winner  
Eric Shaffer  
Howard Jacobson  
Steve Lipinski

Nick Petrangelo  
Tim Beber



## GAS OPERATION & MAINTENANCE MANUAL

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### SECTION 01: INTRODUCTION

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#### 01.01 General (192.605)

This manual outlines procedures and methods for the operation and maintenance of the City of Duluth local distribution system from the point where gas is received from our supplier at the Town Border Stations to the point where gas is delivered to the consumers. Point of delivery is usually at the outlet of the meter.

Also included in this manual are Department policies on customer utilization equipment and fuel lines which may be more restrictive than the Minnesota State Building Code but which the operators are permitted to adopt for increased safety to gas consumers.

Requirements in this manual must be in compliance with both specifics and generalities of "Pipeline Safety Regulations, Parts 191 and 192, Code of Federal Regulations - Title 49 - Transportation by the U.S. Department of Transportation and its current amendments.

Policy dealing with business matters will not be a part of this manual except if they relate to the safety of operating or maintaining the gas systems. Business matters normally will be contained in "Gas and Water Policy Manual."

All work is to be performed according to the requirements outlined in this manual. Any requested deviations from these requirements must be approved in writing by the Chief Engineer of Utilities. Such approval shall not be intended as a blanket approval or a change in these requirements for similar instances in the future.

The manual will be kept current on a continuing basis by introduction of changes being presented by staff members of the respective divisions and formal approvals granted by the Department Director. The Operating and Maintenance Manual will be updated and have a general staff review at least once a year, but not to exceed 15 months. Date of last review meeting 01/23/07 09/16/10 by the Public Works & Utilities Staff.

(192.613) All Department personnel are continually on the alert for any changes to its facilities and are aware of the procedures specified in O&M Section 36 (Continuing Surveillance) to bring forward any unusual operating and maintenance conditions to the appropriate staff. In addition, work being done by operating personnel will be reviewed periodically through training and operator qualification to ensure the effectiveness and adequacy of the procedures set forth in this manual. Any proposed changes to a procedure or the manual should be forwarded to the Chief Engineer of Utilities when deficiencies are found.

(192.605(b)(3) Construction records, maps, and operating history will be available to appropriate operating personnel by request through the engineering office.

This manual also outlines procedures and methods for operation and maintenance of the City of Duluth transmission line from the GL Meter site located at 4525 South Irondale Road to the GL Regulator Station located at 502 East McCuen Street.

## GAS OPERATION & MAINTENANCE MANUAL

### SECTION 05: PUBLIC AWARENESS AND DAMAGE PREVENTION PROGRAM

(192.616)

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When an excavator or driller fails to notify the Department prior to excavation within six feet of a 6" or larger main or prior to directional drilling under or above a main 6" or larger, or fails to place a one-call for utility locates, the Department will excavate and expose its facilities to check for damage.

The excavator or driller must "pothole" all mains prior to directionally drilling under or above them.

#### 05.08 Hit Log

A record shall be maintained by the Utility Engineering Section for each gas pipeline hit by an excavator which requires pipe repair, excluding pipe limited only to coating repair. Record shall indicate name of excavator, whether excavator called for location, size and type of pipe damaged, date, and other information necessary to document relevant information for billing or statistical purposes. The Department representative on site will interview the excavator and record the cause of damage and action required to prevent recurrence on the Gas System Hit Report. The Utility Engineering Section will investigate all each hits to the extent necessary to determine cause and cost responsibility and will record the date that action was implemented to prevent recurrence on the Gas System Hit Report.

#### 05.09 Blasting

All persons blasting in the City of Duluth are required to obtain a permit from the Fire Marshall in accordance with section 7701.3.1 Minnesota Uniform Fire Code (1997) as required by the Fire Chief.

#### 05.10 Gas Line Markers

Buried gas or water pipelines located in non-developed areas, will be marked with identifying flexible markers. Critical valves on these lines shall also be marked.

In addition, gas mains in Class 1 & 2 areas and the gas transmission pipeline will be marked with identifying markers at each public road and railroad crossing and wherever necessary to reduce the possibility of damage. Limits of Class 1 & 2 locations are identified in Section ~~03.02~~ 04.02. Marker location records shall be filed in Utility Engineering Section.

Markers shall also be installed at certain gas valves, the locations of which are difficult to re-establish from records and measurements. The Valve Record Book shall indicate which valves are marked.

The warning signs shall be written legibly and have a yellow background with black lettering. The first line lettering shall be at least 1" high with a one-quarter inch stroke

## **GAS OPERATION & MAINTENANCE MANUAL**

### **SECTION 05: PUBLIC AWARENESS AND DAMAGE PREVENTION PROGRAM**

**(192.616)**

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with the words:-

#### **CAUTION: GAS PIPELINE**

**BEFORE DIGGING, CALL: 1-800-252-1166 (Minnesota)**

**1-800-242-8511 (Wisconsin)**

**DULUTH PUBLIC WORKS & UTILITIES DEPT: 1-218-730-4100**

All warning signs shall be maintained and those found in poor condition or that do not include the above message shall be replaced with an updated sign.

#### **05.11 Exposed Pipeline Signs/Labels**

All regulator stations, exposed piping, or any other exposed pipeline components that are accessible to the public will have a warning sign/label attached to it. All warning signs/labels shall be maintained and those found in poor condition or that do not include the message below shall be replaced with an updated sign.

The warning signs shall be written legibly and have a yellow background with black lettering. The lettering shall be at least 1" high with a one-quarter inch stroke with the words:

#### **CAUTION: GAS PIPELINE**

**DULUTH PUBLIC WORKS & UTILITIES DEPARTMENT**

**218-730-4100**

06.01 Coordination

Following an incident which results in implementing emergency procedures, the Safety & Training Specialist **Officer or designee** shall begin an investigation. The purpose of the investigation will be to determine the cause(s), including employee activities, so measures can be considered which may prevent recurrences.

Failures which result in leakage but do not create an emergency will be listed as to cause and reported according to Section 03.04.03 **06.03**.

06.02 Investigation Considerations

A. Safety & Training Specialist **Officer or designee** may:

- \* Schedule a post-emergency debriefing
- \* Interview employees involved
- \* Request summary reports from involved persons
- \* Determine if drug/alcohol testing is necessary

B. Review the investigation data, including employee activities, with a selected committee if desired, and prepare a preliminary report to the Director. A formal report shall follow as soon as possible with recommendations for changes to be considered in policy, specifications, procedures and equipment if deemed appropriate.

C. The Director, Operations Manager for Gas and Water Supply, **City Engineer**, Chief Engineer of Utilities or their designee, shall coordinate all matters with the Mayor, the Legal Department, and the news media.

D. The Safety & Training Specialist **Officer or designee** will conduct meetings with the various divisions involved and discuss the related incident to determine if any changes in the procedures, methods, or materials should be made and make a full report to the Director of Public Works and Utilities Department.

06.03 Pipeline Failure Investigation

A. Leaks/incidents are classified as follows:

Corrosion: escape of gas resulting from a hole in the pipeline or component caused by galvanic, bacterial, chemical, stray current, or other corrosive action:

Third Party: outside force damage directly attributed to the striking of gas pipeline facilities by earth moving equipment, other equipment, tools, vehicles, vandalism, etc. Damage is by personnel other than the operator or the contractor working for the

operator.

Outside Force: damage resulting from earth movement, including earthquakes, washouts, landslides, frost, etc. Also included is damage by lightning, ice, snow, etc., and damage done by operator's personnel or operator's contractor.

A Construction Defect: is one resulting from failure of original sound material that is due to external force being applied during field construction which caused a dent, gouge, excessive stress, or other defect which resulted in subsequent failure. Also included are faulty wrinkle bends, faulty field welds, and damage sustained in transportation to the construction or fabrication site.

A Material Defect: is one resulting from a defect within the material of the pipe or component or the longitudinal weld/seam that is due to faulty manufacturing procedures.

Other: would be the result of any other cause, such as equipment operating malfunction, failure of mechanical joints, or connections not attributable to any of the above.

**B. Investigation**

Utility Operations Division will deliver defective pipe/fitting to Utility Engineering Section or request site inspection by Utility Engineering Section for analysis, except that corrosion failure shall initiate a request for Gas & Water Supply Division involvement at the time of repair.

Where appropriate, the failed material may be then delivered to an independent testing laboratory for analysis.

The Chain of Custody Record form found in this section must be completed and signed by all individuals either relinquishing or receiving failed materials. The failed material date and time of collection, location and description of the failed material or incident, contact information for the collector of the failed material and any tests to be performed shall be entered on this form.

- C. Utility Operations Division shall report repairs and other data on Form WG-124 (Daily Report). Customer Service Division shall report on Form WG-143 (Dist. Leak Report).
- D. Reports shall be forwarded to Utility Engineering Section which will summarize failures annually. Record shall list each failure by date, location, size/material, other pertinent data, and cause of failure.

**06.04 Testing of Service Involved in an Incident**

If an incident could have resulted from a service leaking, the following shall apply:

## GAS OPERATION & MAINTENANCE MANUAL

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### SECTION 06: FAILURE INVESTIGATION (192.617)

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- A. Test service at no higher than system operating pressure.
- B. An OQ qualified Utility Operations staff person shall be present when test is made.
- C. The City Claims Adjuster must be notified (730-5276).

Utility Engineering Section will assist with the preparation of testing procedures and work orders after an incident.

**GAS OPERATION & MAINTENANCE MANUAL**

**SECTION 06: FAILURE INVESTIGATION (192.617)**

| <b>Chain of Custody Record</b>       |  |                    |         |
|--------------------------------------|--|--------------------|---------|
| Date of collection                   |  | Time of collection | AM / PM |
| Address item was collected at        |  |                    |         |
|                                      |  |                    |         |
| Who collected the samples?           |  | Telephone          |         |
| Description of the collected item(s) |  |                    |         |
|                                      |  |                    |         |
| Description of failure or incident   |  |                    |         |
|                                      |  |                    |         |
| Test(s) to be performed              |  |                    |         |
|                                      |  |                    |         |
|                                      |  |                    |         |

| <b>Record of Custody Transfers</b>                             |   |
|--|---|
| Date   | Time                                      |
| Name of individual relinquishing item(s)-must be the Collector | Signature of person relinquishing item(s) |
| Name of individual receiving item(s)                           | Signature of person receiving item(s)     |
| Date   | Time                                      |
| Name of individual relinquishing item(s)                       | Signature of person relinquishing item(s) |
| Name of individual receiving item(s)                           | Signature of person receiving item(s)     |
| Date   | Time                                      |
| Name of individual relinquishing item(s)                       | Signature of person relinquishing item(s) |
| Name of individual receiving item(s)                           | Signature of person receiving item(s)     |

## GAS OPERATION & MAINTENANCE MANUAL

### SECTION 07: REPORTING PROCEDURES

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1. An event that involves a release of gas from a pipeline and
    - a. A death, or personal injury necessitating in-patient hospitalization; or
    - b. Estimated property damage, including cost of gas lost, of the operator or others, or both, of \$50,000 or more.
  2. An event that is significant, in the judgment of the operator, even though it did not meet the criteria of paragraph (1).
- C. For events or incidents which require calling, the call must be made within two hours following the occurrence by one of the managers listed above or the manager on-call.

|                     |                |
|---------------------|----------------|
| Federal OPS Number: | 1-800-424-8802 |
| State Duty Number:  | 1-800-422-0798 |
| Wisconsin PSC       | 1-608-266-2800 |

Give the following information:

1. Your name, title, telephone number and City of Duluth Public Works and Utilities Department.
2. Location of incident.
3. Date and Time of incident.
4. Number of fatalities and/or personal injuries, if any.
5. Description of property damaged.
6. Other facts (no assumptions) that are known by the Department relative to the cause of the incident or extent of damages.
7. Record the reference # given by the Federal or State OPS.

#### 07.02.02 Written Distribution (191.9) & Transmission (191.15) System Incident Reports (191.7)

Within 30 days following detection of an incident reported by telephone to Federal OPS and as defined in Section 07.02.01(B) above, a written incident report must be made completed on DOT Form RSPA F 7100.1 for distribution and F 7100.2 for transmission. ~~by~~ The Director and shall submitted both forms to the Federal OPS at the following address:

Information Resources Manager  
Office of Pipeline Safety  
~~Research and Special Programs Administration~~  
Pipeline and Hazardous Materials Safety Administration  
US Department of Transportation  
PHP-10  
400 7<sup>th</sup> Street SW, Room 7128 1200 New Jersey Avenue, S.E.  
Washington, D.C. 20590-0001

Also, a copy of the both reports must be submitted to the State OPS at the following address:

Director, MN Office of Pipeline Safety  
444 Cedar St. - Suite 147  
St. Paul, Minnesota 55101-5147

The report must contain, in addition to the information which was called in, all relevant information including a chronological progression of events preceding and throughout the incident by all involved persons, results of failure investigation if available, and other information which may be helpful.

When additional relevant information is obtained after the report is submitted, a supplementary report shall be filed with reference by date and subject to the original report. The supplementary report shall be submitted as soon as practical but not more than 30 days after discovery of additional relevant information.

In the event that a telephonic report has been made and further investigation reveals that the situation was not an "incident" and therefore not reportable, the telephone report shall be nullified with a letter.

#### 07.02.03 Written Safety Related Condition Report (191.23) (191.25)

A. Within 5 working days after it is determined that an unsafe condition exists in a pipeline, but not more than 10 working days following discovery of condition, a written report must be submitted if any of the following safety-related conditions exist:

1. A pipeline that operates at a hoop stress of 20 percent or more of its specified minimum yield strength and has general corrosion that has reduced the wall thickness to less than that required for the MAOP, and localized corrosion pitting to a degree where leakage might result. Operation and maintenance personnel should refer to Section 09 to determine if this safety-related condition exists.
2. Unintended movement or abnormal loading by environmental causes, such as a Landslide or flood which impairs the serviceability, structural integrity or

09.08 Test Stations

Test stations will be installed throughout the steel piping system to take pipe-to-soil readings to determine the level of cathodic protection. It should be noted that a valve that is in a valve box, exposed main, or a service that is continuous with the main may be used as a test station.

09.09 Coating; Hot and Cold Applied; Tapes and Mastic

Materials - See Section 04.12.5(d) & (e) 14.06.04 & 14.06.05

Application - See Section 04.13.7(e) & (f) 25.06 & 25.07

09.10 Anodes

Cathodic protection requiring anodes will be prescribed by the Corrosion Technician or the Chief Engineer of Utilities. Size and type will be prescribed except where already specified in detail construction drawings.

Anode material specifications are in Section 04.12.5(a) 14.06.01.

Anode installation specifications are in Section 04.13.7(a) 25.02.

09.11 Rectifiers

Two rectifiers are being used to primarily protect the West and North sections of the gas distribution system. One rectifier is located on Morris Thomas and Riveness Roads. The second is located at TBS 1. A third rectifier that only protects the transmission gas line is located along County Road W, near the DNR trail, approximately 1 mile south of Oliver, in Douglas County, Wisconsin. These rectifiers shall ~~are to be~~ inspected at intervals not exceeding checked every 2 to 2-1/2 months, or at least 6 times per year. The voltage and current output are to be recorded, and these records will be kept in the Gas & Water Supply Division. Efficiency tests will be made at least once each year and the results shall also be kept in the Gas & Water Supply Division.

Any deficiencies indicated will receive prompt remedial action, but in no case will remedial action exceed 2-1/2 months.

When an impressed current [192.473(b)] cathodic protection system or rectifier system is installed, interference testing will be conducted to determine if current is affecting existing adjacent underground structures.

Interference testing was performed on all foreign pipeline crossings in 2005 along the transmission line. When cathodic protection systems change or unusual pipe-to-soil readings are detected through routine field measurements, it may require additional interference testing.

The electrical check must include, at a minimum, a general check of the bond by connecting to the transmission line, the foreign line and looking at the current flow direction and a check to see that the bond is not damaged. Additionally, the person inspecting the bond should note any other unusual conditions they find. Any deficiencies, i.e. no reading, current reversal, continuity of the bond, found during the check must be reported to Utility Operations or Engineering that day so any remedial action necessary can be completed by the next recording cycle or documented why such actions were not taken. In no circumstances will the correction not be made within 15 months of reporting necessary action.

#### 09.13 Surge Current Protectors

Whenever an insulating flange is exposed to the possibility of lightning or fault currents, lightning arresters will be used and specified by the Corrosion Technician.

If a steel pipeline is in close proximity of an electrical transmission line or if it parallels a high voltage electrical line and electrical shock is experienced along the line, grounding devices shall be considered.

#### 09.14 Internal Corrosion

Each time a hot tap coupon or any steel pipe is removed from a pipeline, it shall be labeled with location & date and returned to the warehouse to allow inspection for internal corrosion by Gas & Water Supply Division.

Each time a change in configuration is made to the transmission line, a third party with corrosion expertise will be hired to evaluate the impact on internal corrosion risk to the downstream portion of the line. A provision shall be made for removal of liquids and internal corrosion shall be monitored as appropriate.

#### 09.15 Atmospheric Corrosion - Monitoring

##### A. Monitoring Pipeline

Steel pipeline that is exposed to the atmosphere will be inspected at least once every intervals not to exceed 3 years but at intervals not exceeding 39 months. Exposed pipeline includes, but is not limited to, river crossings, pipe on bridges, pipe on buildings. Service risers and meter connection piping are not included in this inspection. Regulator stations are to be inspected according to Section 05.02 32 and are not included in this inspection. Inspections shall include, but not be limited to, evidence of corrosion, coating damage, damage to pipe, damaged supports or to structure which contains supports.

Special attention will be given to such areas as soil-to-air interfaces, under supports, and around disbanded coating.

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### SECTION 09: CORROSION CONTROL (192.453)

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The Gas & Water Supply Division will be responsible for inspection. Deficiencies with remarks helpful for generating maintenance orders, the date of inspection and name of inspector shall be recorded for each location.

If atmospheric corrosion is found on steel pipeline that is exposed to the atmosphere, the pipeline shall be protected by cleaning and coating the pipeline within 6 months. Coating materials shall be suitable for the prevention of atmospheric corrosion in accordance with Section 14.06.04 or 14.06.05.

#### B. Monitoring Service Riser and Meter Connection Piping

Above-ground service piping will be recoated on a revolving ten (10) year program. Individual locations which are deemed necessary for recoating earlier than program schedule shall be recoated or replaced based on visual observations by Department personnel.

Inside Service piping upstream of the customer meter outlet shall be inspected for atmospheric corrosion during leak surveys once every 3 years, at intervals not to exceed 39 months.

#### 09.16 Underground Pipe Corrosion Monitoring

##### A. Monitoring mains, including electrically continuous services.

Pipe-soil potentials shall be measured at each test station and at each service at least once each calendar year, but not exceeding 15 months.

If a low (below -0.850V) [192.473(a)] reading on the main is found, a short survey shall be conducted to determine if stray current from another structure is affecting that portion of main. The result of this survey shall be evaluated as part of a larger problem or an isolated problem and a decision as to what needs to be done shall be determined from that evaluation.

Any corrective action will be completed prior to the next scheduled inspection but not to exceed 15 months.

##### B. Monitoring Isolated Steel Service Risers

Steel service riser Pipe-to-Soil readings will be taken at intervals not to exceed 10 years and corrective measures taken whenever readings are less than 0.850V.

When the potential of an isolated steel service riser is found below -0.850 volts or a service insulator is found shorted to customer fuel piping, it shall be repaired or investigated as to cause.

## ATOMOSPHERIC GAS MAIN CORROSION REPORT

LOCATION: \_\_\_\_\_

|                    | Cond | Date | Type pf Repair | Date of Repair |
|--------------------|------|------|----------------|----------------|
| Visible Damage     |      |      |                |                |
| Needs Paint        |      |      |                |                |
| Needs Taping       |      |      |                |                |
| Needs Label        |      |      |                |                |
| Needs Marker       |      |      |                |                |
| Barrier Condition  |      |      |                |                |
| Support Condition  |      |      |                |                |
| Air Soil Interface |      |      |                |                |

REMARKS:

INSPECTED BY:

## ATOMOSPHERIC GAS MAIN CORROSION REPORT

LOCATION: \_\_\_\_\_

|                    | Cond | Date | Type pf Repair | Date of Repair |
|--------------------|------|------|----------------|----------------|
| Visible Damage     |      |      |                |                |
| Needs Paint        |      |      |                |                |
| Needs Taping       |      |      |                |                |
| Needs Label        |      |      |                |                |
| Needs Marker       |      |      |                |                |
| Barrier Condition  |      |      |                |                |
| Support Condition  |      |      |                |                |
| Air Soil Interface |      |      |                |                |

REMARKS:

INSPECTED BY

**MAINS WHERE PHYSICAL DAMAGE OR EXTERNAL LOADING COULD OCCUR**

LOCATION: \_\_\_\_\_

|                    | Cond | Date | Cond | Date | Cond | Date | Cond | Date |
|--------------------|------|------|------|------|------|------|------|------|
| Visible Damage     |      |      |      |      |      |      |      |      |
| Needs Paint        |      |      |      |      |      |      |      |      |
| Needs Taping       |      |      |      |      |      |      |      |      |
| Needs Label        |      |      |      |      |      |      |      |      |
| Needs Marker       |      |      |      |      |      |      |      |      |
| Barrier Condition  |      |      |      |      |      |      |      |      |
| Support Condition  |      |      |      |      |      |      |      |      |
| Air/Soil Interface |      |      |      |      |      |      |      |      |

REMARKS:

INSPECTED BY:

LOCATION: \_\_\_\_\_

|                    | Cond | Date | Cond | Date | Cond | Date | Cond | Date |
|--------------------|------|------|------|------|------|------|------|------|
| Visible Damage     |      |      |      |      |      |      |      |      |
| Needs Paint        |      |      |      |      |      |      |      |      |
| Needs Taping       |      |      |      |      |      |      |      |      |
| Needs Label        |      |      |      |      |      |      |      |      |
| Needs Marker       |      |      |      |      |      |      |      |      |
| Barrier Condition  |      |      |      |      |      |      |      |      |
| Support Condition  |      |      |      |      |      |      |      |      |
| Air/Soil Interface |      |      |      |      |      |      |      |      |

REMARKS:

INSPECTED BY:

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### SECTION 13: PLANNED INTERRUPTIONS AND RESTORATION OF GAS SERVICE

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#### 13.01 Planned Gas Main Shutdown

The following pertains to planned shutdowns. For emergency shutdowns refer to Section 02.03.08.

For maintenance or construction purposes, a segment of a high pressure gas main may be required to temporarily be taken out of service. To insure all other portions of the system operate effectively, proper planning and coordination of the operation is necessary.

~~For emergency purposes, refer to Department Emergency Manual, Section 02.02.08.~~

For a planned temporary shutdown of a segment of pipeline, the process below shall be followed:

- A. ~~Drawing made showing:~~ A drawing depicting the shutdown location shall be prepared that at a minimum includes the following:
- ~~1. Work site and work to be performed~~
  2. Work to be performed
  3. Location of shut off points
  4. Area to be affected
- B. A minimum of 48 hours prior to shutdown, a coordination meeting must shall be held with the following appropriate personnel, if a meeting is determined to be necessary by the Chief Engineer of Utilities, Operations Manager for Gas & Water Supply, Utility Operations Manager or their designee.:
- ~~1. Chief Engineer of Utilities or designee~~
  - ~~2. Operations Manager for Gas & Water Supply or designee~~
  - ~~3. Chief Gas Controller~~
  - ~~4. Manager, Utility Operations or designee~~
  - ~~5. Manager, Customer Service or designee~~
  - ~~6. Any other personnel deemed necessary~~
- C. The following items shall be reviewed and/or coordinated at if a coordination meeting is held:
1. Finalized date and time of shutdown
  2. Determine estimated turn-on time
  3. Schedule notification of affected customers
  4. Determine if any interruptible customers will have to be curtailed.
  5. Any other items necessary
- D. Before shutting down a segment of gas main, notification must be made with the

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Gas Controller if gas supply is to be interrupted in a critical portion of the gas system.

- E. When gas supply is interrupted which results in loss of pilots, the gas supply must be turned off to each affected customer.
- F. Upon completion of work on gas main:
  - 1. Chief Gas Controller to be notified if the Gas Controller was notified of the planned temporary shutdown.
  - 2. Customer Service Division to be notified if the gas supply must be turned back on to affected customers and relights are necessary as a result of loss of pilots.
  - 3. Gas main to be reactivated in accordance with procedure.

#### 13.02 Shutdown and Purging 10" Great Lakes Interconnect Transmission Line from Gas to Air

In general, the pressure in the main transmission line should be reduced by closing the valves at the Great Lakes Custody Discharge Point (GLCDP) south of Oliver, Wisconsin, and letting the gas flow into the City of Duluth's distribution system through the Great Lakes Regulator Station (GL Reg Sta) in Gary New Duluth.

If there is an immediate hazard to human life, than the line should be isolated ASAP and the gas within the line should be vented to the atmosphere using the blowoff valves at either the GLCDP and/or GL Reg Sta. After the 10" pipeline has been isolated and the gas pressure reduced to near 0, it must be purged of all natural gas before work can begin on the 10" line. This line will be purged of all natural gas using the procedures as listed below.

- A. A drawing depicting the work shall be prepared that at a minimum includes the following: A general drawing must be prepared showing,
  - 1. Work site and work to be performed
  - 2. Location of shut off points
  - 3. Area to be affected
- B. A coordination meeting must be held prior to purging the line to ensure all personnel understand the purging procedure.
- C. Items to be reviewed and/or coordinated at this meeting shall include the following:
  - 1. Finalizing date and time for purging to take place.
  - 2. Schedule notification of affected companies/agencies (Great Lakes Gas Transmission Company, City of Duluth PW&U, police and fire departments,

etc.)

3. Discuss the hazards involved, such as weather conditions, power lines, public highways, railroads and other obstructions.
4. Notification schedule for houses near the GLCDP and GL Reg Sta.
5. Any other items deemed necessary.

**D. Procedure for Purging Natural Gas from Line using Air Movers**

1. At least 2-20 lb fire extinguishers shall be at the GLCDP and GL Reg Sta during the entire purging operation.
2. Gas CGI's shall be recently calibrated and ready for use at the GLCDP and GL Reg Sta.
3. The Operator will be responsible to ensure that no ignition sources are allowed in the work areas during purging operations.
4. No flames, smoking, electric hand tools, or electrical equipment shall be used during purging operations.
5. Do not purge any gas out of the line when an electrical storm is in the vicinity.
6. Ensure all valves are in the closed position.
7. Remove the blow off stack blind flange on 4" vertical valve #9738 at pig receiver.
8. Install an air mover above the 4" vertical valve #9738 at the GL Reg Sta.
9. Open the 4" vertical valve #9738 below the air mover and turn on the air mover.
10. Remove the blow off stack blind flange on 4" vertical valve #9736 at pig launcher.
11. Open the 4" vertical valve #9736 at pig launcher at the GLCDP. This is the inlet air supply for purging the line of natural gas.
12. Use a CGI at the outlet of the air mover to determine when all the gas has been purged from the main. No work can begin on the line until the gas has been completely purged.
13. The air movers must be continually staffed by personnel in contact with personnel performing work on the line.
14. The air movers must operate continuously until all welding has been completed.
15. Reduce the pressure settings on the air movers to reduce the vacuum on the pipeline to eliminate the blow-in of welds as the pipeline is closed to the atmosphere.
16. Once all work has been completed, the air mover can be removed.
17. Close 4" vertical valve #9724 at pig receiver. Reinstall 4" blind flange on blow off stack. Use a new gasket when reinstalling the blind flange.
18. Close 4" vertical valve #9738 at pig launcher. Reinstall 4" blind flange on blow off stack. Use a new gasket when reinstalling the blind flange.
19. Purge air from the pipeline in accordance with Section 13.03 and return it back into service.

**13.03 Purging 10" Great Lakes Interconnect Transmission Line from Air to Gas**

After all work on the transmission line has been completed, the pipe 10" transmission line must be purged of all air before returning it to service. In general, the line will be purged from the Great Lakes Custody Discharge Point (GLCDP) south of Oliver, Wisconsin, to the City of Duluth's Great Lakes Regulator Station (GL Reg Sta) in Gary New Duluth. This line will be purged using the procedures as listed below.

- A. A general drawing showing, depicting the work shall be prepared that at a minimum includes the following:
1. Work site and work to be performed
  2. Location of shut off points
  3. Area to be affected
- B. A coordination meeting must be held prior to purging the line to ensure all personnel understand the purging procedure.
- C. Items to be reviewed and/or coordinated at this meeting shall include the following:
1. Finalizing date and time for purging to take place.
  2. Schedule notification of affected companies/agencies (Great Lakes Gas Transmission Co, City of Duluth PW&U, police and fire departments, etc.)
  3. Discuss the hazards involved, such as weather conditions, power lines, public highways, railroads and other obstructions.
  4. Notification schedule for houses near the GLCDP and GL Reg Sta.
  5. Any other items deemed necessary.
- D. Procedure for Purging Air from Line
1. At least 2-20 lb fire extinguishers shall be at the GLCDP and GL Reg Sta during the entire purging operation.
  2. Gas CGI's shall be recently calibrated and ready for use at the GLCDP and GL Reg Sta.
  3. The Operator will be responsible to ensure that no ignition sources are allowed in the work areas during purging operations.
  4. No flames, smoking, electric hand tools, or electrical equipment shall be used during purging operations.
  5. Ensure all valves are in the closed position.
  6. Install a 0 to 100 psi pressure gauge near the GLCDP 10" pig launcher valve #9724 to be used for pressurizing the 10" line.
  7. Remove the blow off stack blind flange on 4" vertical valve #9738 at pig receiver. Ensure stack is grounded.
  8. Open the 4" vertical valve #9738 on pig receiver at GL Reg Sta.
  9. To start purging, bring the inlet pressure at the GLCDP quickly to 12 psi using

- the 10" valve #9724 on the pig launcher. Maintain this pressure for 12 minutes.
10. At the end of the 12 minutes, turn off the 10" valve #9724 at the GLCDP.
  11. Leave the 4" vertical valve #9738 on pig receiver at the GL Reg Sta open for an additional 6 minutes. Use a CGI to analyze the gas-air mixture throughout the purging operation and confirm that the gas is free of any air.
  12. Close the 4" vertical valve #9738 on pig receiver at the GL Reg Sta.
  13. Remove 0 to 100 psi gauge at pig launcher.
  14. Open the valve at the GLCDP to load the pipeline at a controlled rate of 100 psi for the first hour.
  15. After the pipeline has been pressurized to 100 psi, the loading rate can be increased @ 200 psi per hour.
  16. Once the pressure has equalized on both sides of the valve, the 10" valve #9724 can be fully opened and the 10" pipeline can be placed back into service.
  17. Reinstall the 4" blind flange on the blow off stack for valve #9738 on the pig receiver. Use a new gasket when reinstalling the blind flange.

test stations to be supplied by Public Works & Utilities Department, Utility Operations, 520 Garfield Avenue, unless otherwise specified.

14.06.03 Insulators

Flange insulators for ANSI 150# through 300# full face flanges shall be phenolic retainers with nitrile sealing elements, complete with full length Mylar sleeves and glass clad phenolic washers for insulating bolts on one side of flange. Flange insulators for ANSI 600# full face flanges shall be G-10 retainers with Teflon or Viton sealing elements, complete with full length G-10 sleeves and G-10 washers for insulating bolts on one side of flange. Gasket shall be Type E faced, 1/8 inch thick, for ANSI 150# through 600# full face flanges, as manufactured by Pipe Seal and Insulator Company (PSI), Central Plastics Company, or an approved equal.

Casing insulators shall be two or more segments of molded polyethylene bolted together so the segments fit tightly around the carrier pipe. Insulator shall be "Pipeline Seal and Insulator" Model PE, F H Mahoney Pipeline Products, Model 60, or T D Williamson, Inc., Model N-2, or approved equal.

Pipe support insulators shall be molded fiberglass shaped to conform to fit over specified pipe sizes, one or two pieces as specified, complete with epoxy seam sealer which fills all voids between pipe and insulator. Pipe support insulators shall be similar or equal to "Glas Mesh Type 180, Type 240, or Type 220/240.

Pipeline insulators for electrically isolating sections of steel gas lines shall be one piece weld end spools, fabricated with API 5L Grade B Steel, rated for ANSI 150# or 300#, coated internally and externally with epoxy resin coating except for weld end cutbacks. Dielectric materials shall be compatible with natural gas.

| Size (OD) | Wall Thickness | Size (OD) | Minimum Wall Thickness |
|-----------|----------------|-----------|------------------------|
| 4.500"    | 0.188"         | 10.75"    | 0.219"                 |
| 6.625"    | 0.188"         | 12.75"    | 0.250"                 |
| 8.625"    | 0.188"         | 16.00"    | 0.250"                 |

Pipeline insulators shall be "IsoJoint" by Advance Products & Systems, Inc.; "PSI Electro-Stop Isolators" by Pipeline Seal & Insulator Inc.; Kerotest "Zunt" Type 1-A, or pre-approved equal.

14.06.04 Field Coatings (Below Grade). See Section 25.06 for appropriate application.

A. Cold Type Applications. Cold applied coatings shall be one of the following approved commercial types or approved equals:

- Polyken 930-35 mill tape with #927 brush primer or #935 spray primer

- Tapecoat H-35G mill tape.
- Scotchkote Corrosion Protection Tape #50 with Scotchrap pipe primer.
- Royston Greenline Tape with 747 Primer
- T C Mastic
- Wax Tape by Trenton Corporation or approved equal for irregular fittings.
- Fusion bonded epoxy only by Engineering approval.

B. Hot Type Applications. Hot applied coatings shall be one of the following tape-prime combinations or approved equal:

- Tapecoat 20 with T C Omniprime.
- Thermofit (shrink) pipe sleeves by Raychem (Ultratec Division) or T C Omniprime
- Holidays less than two square inches in the epoxy pipe coating may be repaired using hot melt patch sticks, Scotchkote 226P or equivalent.

C. Directional boring pipe (shrink) sleeves shall be Dirax (by Raychem)

14.06.05 Field Coatings (Above Grade). See Section 25.07 for appropriate application.

- A. Rust-O-Leum Primer #678 or 769, Rustex, Derusto, shall be used when specified in Section 15.08(F). Color shall be gray unless otherwise specified.
- B. Polyamide epoxy, high build, two part, one coat, similar or equal to Pittsburgh "Pit Guard" DTR or Rust-O-Leum High Performance Epoxy 9100V shall be used when specified. Color shall be gray unless otherwise specified.
- C. Acrylic Urethane enamel with a compatible primer similar or equal to Pitthane Acrylic Urethane enamel with Medalhide 1001 inorganic zinc rich primer, or Aquapon Polymide-epoxy organic primer shall be used when specified. Color shall be gray unless otherwise specified. An approved equal is Devthane 379 Top Coat with Devoe Bar Rust 235. Primer shall be Devoe.
- D. Tape coating, when specified for above grade applications, shall be similar or equal to Tapecoat H35 grey. Tapecoat H50 grey shall be used where abrasion from street grit is evident. System shall be resistant to ultraviolet light, shrinkage, ambient temperature changes.

Wax Tape by Raychem (Ultratec Division) or Polymide epoxy, (see 2 above) in color white, shall be applied to irregular fittings when tape coating is not practical.

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### SECTION 14: MATERIAL REQUIREMENTS FOR HP GAS PIPELINES

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- E. Soil to air interfaces shall be coated with Polyken 930-35 mill tape with #927 brush primer or #935 spray primer or Tapecoat H-35G mill tape. Above grade the pipe shall be double wrapped with rock shield.

20.01 General

This section of the Standard Specifications establishes requirements and policies for purging HP gas pipelines, transmission mains and services.

20.02 Purging High Pressure Gas Mains and Services, gas to air and air to gas.

Safety and Preventing Accidental Ignition

- A. Whether purging the line from air to gas or from gas to air, the purging material shall be introduced at a rate indicated in the purging table. If this rate cannot be achieved, then a slug of inert gas such as nitrogen must be introduced into the line before purging begins, to separate the gas and air.
- B. Before purging begins, all sources of potential ignition must be removed from the area, and a fire extinguisher must be on site and visible.
- C. Warning signs shall be posted where appropriate to caution or instruct others who are in or near the affected area.

20.03 Transmission Line

Refer to Section 13.02, Purging 10" Great Lakes Interconnect Transmission Line from Gas to Air and Section 13.03, ~~Shutdown and Purging 10" Great Lakes Interconnect Transmission Line from Air to Gas.~~

20.04 Distribution System

20.04.01 Purging 2" or larger Pipes.

- A. Purging 2" and larger mains or services shall be by Department personnel or directed by a Department inspector. Purge stacks at exit end of pipe are required.
- B. Entry and exit fittings and apparatus should not restrict flow velocity to less than 200 feet per minute through the purged pipe. The main shall not be purged through services with an EFV.

Table 20-1  
Purge Venting

| Pipe Size to be Purged | Volume (CFH) to obtain Vel of 200 FPM | *Max Length of ½" pipe if used to exit purge gas |
|------------------------|---------------------------------------|--|
| 2"                     | 280                                   | 440'   |
| 3"                     | 615                                   | 110'   |
| 4"                     | 1060                                  | 35'  |
| 6"                     | 2410                                  | Engineer to Determine                            |
| 8"                     | 4325                                  | Engineer to Determine                            |
| 10"                    | 6880                                  | Engineer to Determine                            |
| 12"                    | 9825                                  | Engineer to Determine                            |
| 16"                    | 15720                                 | Engineer to Determine                            |

\*Based on 15 PSI min - inlet pressure

- C. Stack shall be a grounded metal stack, a minimum of one size smaller than the line being purged. Stack shall extend at least 6' above grade and be directed upward but angled away from wall if at a building.
- D. Person at purge location shall have visual or audio communication contact with person at control valve.
- E. Purging air to gas should be continuous at each purge point until a gascope indicates at least 85% pure gas. Where possible, valved branches should be turned off until that branch is purged. Any connected services also purged consecutively and without delay. On a system with several purge locations not isolated by valves, the highest ends shall be purged first.

Purging gas to air should be continuous until a mixture less than 10% LEL is measured at venting end.

#### 20.04.02 Purging 1" or 1/2" Gas Services

Purging 1" or 1/2" gas services may be done by the Contractor without direct department supervision, gascope testing, or vent stack, except a vent stack to unconfined space is required if pipe end is below grade or inside of enclosed structure.

**SECTION 21: ABANDONING GAS PIPELINES**

21.01 General

This section of the Standard Specifications establishes requirements and policies for abandoning existing gas pipelines and services.

21.02 Abandoning Transmission Lines and Gas Mains

Any transmission pipeline abandoned in place will require a procedure prepared by Engineering prior to any work.

Each pipeline abandoned in place must be physically disconnected from all sources of gas supply. Any main being abandoned which is 2" or larger and a length of 50 feet or longer shall be purged of gas following the procedures outlined in Section 20.02, Purging High Pressure Gas Mains & Services.

Purge shall continue until a mixture less than **10% LEL** is measured at vented end. Mains specified on the Plan to be abandoned shall be abandoned in place. The Contractor shall effect the cutoffs where the main is steel or plastic and has been depressurized and purged, if necessary.

The Department will provide labor and materials to seal any end still connected to a gas source using standard fuse or welded end caps or blind flanges.

Openings at ends which have been disconnected from any gas source shall be sealed either by Department or Contractor as follows:

|  |  |
|--|--|
| 2"+ Steel Mains  | by weld-on plate, coupling and end cap, blind flange, injected sealant foam or concrete. |
| 2"+ Plastic Mains  | by fused end cap   |
| Cast Iron Mains<br>pipe plug,<br>(previously<br>abandoned) | by M.J. cap, M.J. coupling & plug, tamp on plastic<br>injected sealant foam or concrete. |

When removing sections of the previously abandoned low-pressure cast iron gas system it is necessary to provide at least a 1" Type K copper or PE jumper drain to allow the abandoned system to continue draining freely. Exemptions to this requirement will only be made by the Engineer in areas where the old abandoned low-pressure gas system is on level terrain.

**SECTION 21: ABANDONING GAS PIPELINES**

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21.03 Abandoning Services (Cut off at main)

Any abandoned service must be disconnected from gas source and depressurized. Purging of gas is required if service is 1" or larger and longer than 50 feet. When purging a service, the same procedure as purging abandoned main (Section 21.02) shall be followed.

- A. P.E. Services (1/2" & 1" with P.E. Service Tees). Turn down self-tap cutter, soap and reinstall cap, cut service and attach short capped 1/2" stub with mechanical fitting or fuse-on P.E. cap as close to service tee as practical.
- B. 1/2" P.E. or 5/8" Service with steel tap tee. Turn down self-tap cutter in mini-tee, reinstall cap, remove extrude steel service, insert short capped  $\pm$ " P.E. stub in compression fitting and retighten nut to seal. P.E. stub must have stiffener installed.
- C. P.E. Services (2" & 3" with Tee or branch saddle off P.E. main). Squeeze off service and fuse on end cap as close to main tee as practical. If a P.E. Service valve is too close to main, then shut valve, install end cap just downstream, and do not replace box.
- D. Steel Service (1-1/4", 1-1/2" & 2"). Connected to main with weld on No-Blo tee. Remove cap, insert rubber stopper using machine, cut off service, weld a sized steel slug in end, reinstall completion plug and cap.
- E. Steel Service (2" & larger which have no tap valve or No-Blo tee). Stopple service as close to main as possible; weld on end cap.

21.04 Partially Abandoning Services (Cut off at service valve)

Steel Service (2" & larger which have tapping valve at main). Shut off service valve, install blind flange on valve, **do not** replace box. If valve is a plug type, it must be lubricated before burying. Record to remain in active service file and noted as "cut off at valve."

Each test lead wire must be connected to the pipeline so as to remain mechanically secure and electrically conductive. Each test lead wire must be attached to the pipeline so as to minimize stress concentration on the pipe. Each bared test lead wire and bared metallic area at point of connection to the pipeline must be coated with an electrical insulating material compatible with the pipe coating and the insulation on the wire. (See Detail Drawing G-18).

**Before any new test lead is connected to the transmission line, the pressure in the line must be reduced such that it is below 20% SMYS on the line.**

#### 25.05 Continuity Wires

Whenever continuity cannot be assured when connecting steel gas mains or services with compression type couplings, continuity shall be maintained with #4 stranded copper bond wires coated for direct burial. Ends shall be cadwelded or thermit welded from pipe-to-pipe and pipe-to-coupling and the welds coated.

#### 25.06 Field Coating Application (Below Grade)

Each external protective coating, whether conductive or insulating, applied for the purpose of external corrosion control must:

- A. Be applied on a properly prepared surface;
- B. Have sufficient adhesion to the metal surface to effectively resist underfilm migration of moisture;
- C. Be sufficiently ductile to resist cracking;
- D. Have sufficient strength to resist damage due to handling and soil stress; and,
- E. Have properties compatible with any supplemental cathodic protection.

Each external protective coating which is an electrically insulating type must also have low moisture absorption and high electrical resistance.

If coating pipe is installed by boring, driving, or other similar method, precautions must be taken to minimize damage to the coating during installation.

Coating materials specified in Section 14.06 shall be applied to all uncoated portions of pipe, fittings, valves, including bolts, couplings, damaged coatings, and other related steel components of the gas system. Casing pipes do not require coatings.

Field coating for underground pipeline shall be applied as follows:

TC Mastic or wax tape by Trenton or approved equal shall be applied to mechanical bolt-type couplings, flanges and flanged fittings, no-blo tees, tapping saddles, and other irregular shaped fittings.

All valves shall be field coated regardless of existing factory applied coatings.

Cold tapes -- Weld joints, weld fittings, and coating repair.

Optional hot-type applications shall be as follows:

Shrink Sleeves - weld joints and boltless compression couplings

Tapecoat 20 - weld joints, weld fittings, and coating repair

Directional bore pipe shrink sleeves, Dirax by Raychem

Coating shall be applied to dry, clean and primed surfaces.

Primer must be the companion to the manufacturer's coating.

Tape shall be installed in accordance with the manufacturer's recommendations and shall overlap 1/2 inch for spiral method of wrapping and 1 inch for the cigarette method.

Holidays over two square inches shall be repaired by wrapping tape completely around the pipe.

Holidays less than two square inches in the epoxy pipe coating may be repaired using P hot melt patch sticks, Scotchkote ~~226P~~ 206-P or equivalent. Hot melt patch sticks shall be applied as follows:

1. Roughen the surface of the parent fusion bonded epoxy (FBE) coating using 80-mesh to 120-mesh sandpaper. Clean the surface and wipe away the sanding residue with a non-contaminating cloth.
2. Preheat the parent-coating surface using a non-contaminating heat source, such as portable hand-held butane torch. Heat should be applied in a manner that avoids burning or charring of the epoxy coating. Slight browning of the parent coating is acceptable, but charring or blistering is not. Avoid heat application directly to the patch stick while pre-warming the coating surface.

**SECTION 25: INSTALLATION OF CATHODIC PROTECTION MATERIALS**

3. While continuing to heat the FBE surface, occasionally draw the patch stick across the repair area until it leaves a residue. Then rub the stick in a circular motion and utilize the torch to help melt it and maintain the pipe coating temperature. Continue until the patch is smooth and has a thickness of at least 15 mils (380 microns) greater than the parent coating.

4. Allow the patch to cool before handling.

25.07 Field Coating Applications (Above Grade)

| General Applications  | System                                    |  |                      |                                    |
|---|---|--|----------------------|------------------------------------|
|   | Top Coat                                  | Primer   | Prep.                | Applic.                            |
| A. New Meter Connections, New outdoor fuel pipe                                   | None Required                             | Rust-oleum #678 or 769 14.06.05A                   | SSPC-SP1 & SSPC-SP2  | Brush                              |
| B. Regulator Stations   | Pittsburg 2 part Urethane Gray            | Dupont Vari Prime-Green (acid base)                | SSPC-SP1 & SSPC-SP2  | Brush or Spray                     |
| C. Meter Set Piping Recoating Program   | Polymide Epoxy 14.06.05B 5-8 Mills        | None Required                                      | SSPC-SP2             | Brush                              |
| D. New Uncoated gas mains, fittings, on creek crossings, bridges, etc.            | Acrylic-Urethane Enamel 14.06.05C         | Inorganic zinc-rich primer 3 Mills                 | SSPC-SP10 Or NACE #2 | Spray or Brush                     |
| E. Previously painted mains, fittings on creek crossings, bridges, etc.           | Acrylic-Urethane Enamel 14.06.05C         | Organic zinc-rich primer 3 Mills                   | SSPC-SP6 Or NACE #3  | Spray or Brush                     |
| F. Previous coal tar, 3M or X-TRU, coated mains on creek crossings, bridges, etc. | Tape coating & Aluminizd Mastic 14.06.05D | TC Omni Prime None Required for Mastic or Wax Tape | SSPC-PC7 Or NACE #4  | Machine or hand, mastic is brushed |

**33.01 Sectionalizing Valves**

All high pressure gas valves that have been determined to be sectionalizing valves or might be required during an emergency except the 3" emergency bypass valves at the GL Regulator Station, shall be inspected at least once each year but not to exceed 15 month intervals. Each plug valve shall be operated by a 1/8 turn, greased if necessary.

A gate or ball valve shall be turned at least 2 complete turns. If a sectionalizing valve is marked as a plastic valve, they should be treated as a plug valve. The valve box must be examined and any necessary repairs made. If the condition warrants repair beyond the scope of the crew checking valves, the conditions of the valve or valve box will be reported to the supervisor for preparation of a work order. The repair will be completed prior to the next scheduled maintenance interval or an alternative valve designated. If the crew checking valves cannot gain access to a valve to adequately inspect its operation, it will also be reported to the supervisor for preparation of a work order. The work required to inspect the valve shall be completed prior to the next scheduled inspection interval or an alternative valve designated.

**33.02 Transmission Line Valves**

All transmission line gas valves shall be inspected at least once each year but not to exceed 15 month intervals. Each above ground transmission line gear operated sectionalizing valve shall be operated a minimum of 3/4 of the full operation range as indicated by the travel indicator while checking the valve operation. Each transmission line valve at the GL Regulator Station shall be operated by a full 1/4 turn, checked for ease of operation and visually inspected for leaks. ~~The valve box must be examined and any necessary repairs made.~~ If the condition warrants repair beyond the scope of the crew checking valves, the conditions of the valve or valve box will be reported to the supervisor for preparation of a work order. The repair will be completed prior to the next scheduled maintenance interval or an alternative valve designated. If the crew checking valves cannot gain access to a valve to adequately inspect its operation, it will also be reported to the supervisor for preparation of a work order. The work required to inspect the valve shall be completed prior to the next scheduled inspection interval or an alternative valve designated.

**33.03 Operating Valves**

All other valves on the gas distribution system will be treated as operating valves. The Manager, Utility Operations will schedule inspection and repairs as necessary. Any valve found inoperable shall be repaired or if not, then reported to Utility Engineering Section to so note in Valve Book.

**33.04 Records**

Inspection will be made on a form provided by Utility Engineering Division. The condition of sectionalizing valves, the date checked and the person checking the valves

will be noted on the sectionalizing valve check list and a copy forwarded to the Utility Engineering Section for their records.

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### SECTION 35: PATROLLING GAS LINES SUBJECT TO SEVERE CONDITIONS (192.705) (192.721)

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#### 35.01 General

Distribution mains in place or on structures where anticipated physical movement or external loading could cause failure or leakage must be patrolled at intervals not exceeding 4-1/2 months but at least 4 times per year.

Inspection shall consist of a visual check to determine if conditions have changed since the last inspection. A change of condition, gas leakage, external damage, movement, or coating or paint damage shall be noted.

A patrolling list shall be maintained by the Corrosion Technician which lists: pipe location, reason why pipe is listed, condition same or changed with comments for recommended action if necessary, date of inspection, inspector's initials.

A copy of inspection shall be forwarded to Utility Engineering Section if conditions have changed since the last inspection.

When a new condition is added to the list, the Manager for Gas and Water Supply will make a determination whether a "Safety Related Condition Report" in accordance with Section 07.02 must be filed with Federal and State OPS.

The Manager for Gas and Water Supply will determine from periodic inspections or special inspection whether a change in a previously listed condition will now require a report.

Patrolling for the transmission line will take place once every 15 months, but not to exceed once each calendar year; except highway and railroad crossings which will be patrolled once every 7-1/2 months, but at least twice each calendar year. This patrolling form can be found on the next page.

**OPERATION & MAINTENANCE MANUAL**

**SECTION 35: PATROLLING GAS LINES SUBJECT TO SEVERE CONDITIONS  
(192.705) (192.721)**

**CITY OF DULUTH TRANSMISSION MAIN PATROL**

**GREAT LAKES LINE**

**CLASS 1 & 2**

**Inspector:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Inspection Data**

| Patrol Checklist                              | Locations   |              |           |      | Annual Patrol |
|---|-------------|--------------|-----------|------|---------------|
|   | County Rd W | Carnegie St. | Lake Ave. | R.R. |               |
| Indication of Gas Leakage                     |             |              |           |      |               |
| Indication of Past Construction Activities    |             |              |           |      |               |
| Indication of Current Construction Activities |             |              |           |      |               |
| Wash-Out or Erosion                           |             |              |           |      |               |
| Pipeline Marker Installation Adequate         |             |              |           |      |               |
| Pipeline Row Clear for Equipment Access       |             |              |           |      |               |

Comments: \_\_\_\_\_

Follow up conducted: \_\_\_\_\_

Check if Annual Leak Survey was completed.      Date of Annual Patrol: \_\_\_\_\_

Inspector: \_\_\_\_\_      Date: \_\_\_\_\_

**GAS OPERATION & MAINTENANCE MANUAL**

**SECTION 37: RECORD RETENTION [192.605(B)(3)]**

**37.01 General**

Construction records and operating maintenance history for each facility shall be recorded on either hard copy (paper) forms or their computerized equivalents. The records for each facility shall be kept at the office responsible for that facility. Construction records, maps, and operating history shall be made available to appropriate operating personnel. Contact the Engineering Division for adding, removing or revising forms listed in the O&M Manual.

**37.02 Record Retention Table**

| Form Name  | Frequency                                 | Location Contained                 | Minimum Retention Period   |
|--|---|------------------------------------|----------------------------|
| <b>Construction:</b>   |   |                                    |                            |
| Construction As-built Drawing  |   | Project File                       | Life of Facility + 5 years |
| Service/Application & Foreman Cards  |   | Engineering                        | Life of Facility + 5 years |
| Service Line As-built  |   | Project File                       | Life of Facility + 5 years |
| Service Cards  |   | Engineering                        | 10 years                   |
| Work Orders  |   | Engineering                        | 10 years                   |
| <b>Maintenance:</b>  |   |                                    |                            |
| Transmission Line Pipe Repair  |   | Utility Operations/<br>Engineering | Life of Facility + 5 years |
| Transmission Line Pipeline System Repair   |   | Utility Operations/<br>Engineering | 5 years + current          |
| <b>Corrosion:</b>  |   |                                    |                            |
| Anode Location   |   | Corrosion Technician               | Life of Facility + 5 years |
| Atmospheric Corrosion Inspection   | Every 3 years                             | Corrosion Technician               | Life of Facility + 5 years |
| Atmospheric Gas Main Corrosion Report  | Every 3 years                             | Corrosion Technician               | 5 years + current          |
| Physical Damage or External Loading Report   | 4 times a year not to exceed 3 1/2 months | Corrosion Technician               | 5 years + current          |
| Exposed Main Reports   |   | Corrosion Technician               | Life of Facility + 5 years |
| Interference Survey  | As Needed                                 | Corrosion Technician               | Life of Facility + 5 years |
| Rectifier Inspection   | 6 times a year not to exceed 2 1/2 months | Corrosion Technician               | Life of Facility + 5 years |
| Efficiency Report  | Annually                                  | Corrosion Technician               | Life of Facility + 5 years |
| Interference Bond Report   | 6 times a year                            | Corrosion Technician               | Life of Facility + 5 years |
| Test Point & Surveillance (including casings)  |   | Corrosion Technician               | Life of Facility + 5 years |
| <b>Damage Prevention:</b>  |   |                                    |                            |
| Emergency Plan Training (review)   | Annually                                  | Safety & Training Officer          | 5 years + current          |
| One-Call System Ticket   |   | Engineering                        | 5 years + current          |
| Newspaper Ads/Bill Stuffers/misc. Public Awareness notices, Public Official Training |   | Customer Service                   | 5 years + current          |

**GAS OPERATION & MAINTENANCE MANUAL**

**SECTION 37: RECORD RETENTION [192.605(B)(3)]**

| Form Name                                       | Frequency                                 | Location Contained                         | Minimum Retention Period          |
|---|---|--|-----------------------------------|
| <b>DRS:</b>                                     |   |  |                                   |
| Flow Charts                                     | Daily                                     | Gas Supply                                 | 2 years + current                 |
| Flow Logs                                       | Daily                                     | Gas Supply                                 | 2 years + current                 |
| Pressure Logs                                   | Daily                                     | Gas Supply                                 | 2 years + current                 |
| Regulator Station Inspection                    |   | Engineering                                | 5 years + current                 |
| <b>Leak:</b>                                    |   |  |                                   |
| Steel Service Line Leak Tested                  | Annually                                  | Customer Service                           | Life of Facility + 5 years        |
| Carbon Monoxide Investigation Check List        |   | Customer Service                           | Permanent                         |
| Gas Detection Calibration Equipment             | Monthly                                   | Measurement Center                         | 5 years + current                 |
| Distribution Leak Survey                        | Ongoing                                   | Measurement Center                         | 10 years + current                |
| Field Leak Report                               |   | Measurement Center                         | 5 years + current                 |
| <b>Incident Report</b>                          |   | <b>Engineering</b>                         |                                   |
| Building Leak Report                            |   | Measurement Center                         | 5 years + current                 |
| Utility Radio Dispatcher's Daily Gas Hit Report | Daily                                     | Utility Radio Disp. Office/<br>Engineering | 5 years + current                 |
| <b>MNOPS Annual Utility Damage Report Form</b>  | <b>Annually</b>                           | <b>Engineering</b>                         | <b>19 years + current</b>         |
| FI Instrument Calibration                       | Annually                                  | Measurement Center                         | 5 years + current                 |
| Emergency Response Reporting Form               | Bi-monthly                                | Utility Operations                         | 5 years + current                 |
| Transmission Leak Survey                        | Annually                                  | Measurement Center                         | Life of Facility + 5 years        |
| <b>Transmission Line Patrol</b>                 | <b>2 times a year</b>                     | <b>Corrosion Technician</b>                | <b>Life of Facility + 5 years</b> |
| Failure Investigation                           |   | Engineering                                | 10 years                          |
| <b>Odorization:</b>                             |   |  |                                   |
| Odorometer Calibration Record                   | Annually                                  | Measurement Center                         | 5 years + current                 |
| Odorization Report                              | Ongoing                                   | Gas Supply                                 | 5 years + current                 |
| Sniff Test Report                               | Ongoing                                   | Gas Supply                                 | 5 years + current                 |
| <b>Incident Report</b>                          |   | <b>Engineering</b>                         |                                   |
| <b>MNOPS Annual Utility Damage Report Form</b>  | <b>Annually</b>                           | <b>Engineering</b>                         | <b>19 years + current</b>         |
| Atmospheric Gas Main Corrosion Report           | Every 3 years                             | Corrosion Technician                       | 5 years + current                 |
| Physical Damage or External Loading Report      | 4 times a year not to exceed 3 1/2 months | Corrosion Technician                       | 5 years + current                 |
| Transmission Line Patrol                        | 2 times a year                            | Corrosion Technician                       | Life of Facility + 5 years        |
| <b>Pressure Test:</b>                           |   |  |                                   |
| Certification of Prestested Stock Pipe          |   | Weld Shop                                  | Life of Facility + 5 years        |
| Test Certification Report                       |   | Weld Shop                                  | Life of Facility + 5 years        |
| Steel Pressure Charts                           |   | Corrosion Technician & Project File        | Life of Facility + 5 years        |
| Plastic Pressure Test Information               |   | Engineering                                | Life of Facility + 5 years        |
| <b>Utility Radio Dispatcher:</b>                |   |  |                                   |
| Dispatcher's Daily Log                          | Ongoing                                   | Utility Radio Disp. Office                 | 5 years + current                 |

**GAS OPERATION & MAINTENANCE MANUAL**

**SECTION 37: RECORD RETENTION [192.605(B)(3)]**

| Form Name   | Frequency | Location Contained                         | Minimum Retention Period   |
|---|-----------|--|----------------------------|
| <b>Safety:</b>  |           |  |                            |
| Confined Space Entry Permit                             | Ongoing   | Safety & Training/<br>Measurement Center   | 5 years + current          |
| Vehicle Accident Report                                 | Ongoing   | Chief Engineers Office/<br>Human Resources | Permanent<br>Personnel     |
| <b>Upgrading:</b>                                       |           |  |                            |
| Design, Operating & History                             |           | Project File                               | Life of Facility + 5 years |
| Pressure Upgrading Forms                                |           | Corrosion Technician                       | Life of Facility + 5 years |
| <b>Other:</b>   |           |  |                            |
| Operator Qualifications                                 | Ongoing   | Safety & Training Officer                  | 5 years + current          |
| Distribution Report                                     | Annually  | Corrosion Technician                       | 5 years + current          |
| Transmission Report                                     | Annually  | Corrosion Technician                       | 5 years + current          |
| High Volume Meter Set Review                            |           | High Volume File<br>(Measurement Center)   | Life of Facility + 5 years |
| MAOP Documentation                                      |           | Project File                               | Life of Facility + 5 years |
| Plastic Pipe Fusion Logs                                |           | Engineering                                | 5 years + current          |
| Fuser Test Reports                                      |           | Safety & Training Officer                  | 5 years + current          |
| Valve Location  |           | Valve Book- Engineering                    | Life of Facility + 5 years |
| Valve Maintenance                                       |           | Engineering                                | 5 years + current          |
| Department Welder Qualification                         |           | Weld Shop/<br>Safety & Training Officer    | 5 years + current          |
| Contractor Welder Qualification Destructive Test Report |           | Weld Shop/<br>Engineering/<br>Project File | 5 years + current          |
| X-Ray Records   |           | Engineering                                | See Note 6                 |
| Contractor OQ Plan                                      | Ongoing   | Safety & Training Officer                  | 5 years + current          |
| Contractor Drug & Alcohol Plans                         | Ongoing   | Safety & Training Officer                  | 5 years + current          |

Notes 1-6