Measurement of Internal Corrosion

SCOPE AND PURPOSE

This procedure is to ensure when personnel measure the extent of internal corrosion of piping and associated fittings that is performed to ensure accuracy of specific corrosion pit measurement and extent.

It describes practices required to comply with §§192.474, and 192.487.

RESPONSIBILITY

The System Maintenance Supervisor, or other designee, is responsible to ensure when the extent of detected internal corrosion of piping and associated fittings is measured, that it is performed as described in this procedure.

PERSONNEL SAFETY (Where Applicable)

Ensure that the work zone/area is setup to protect the public from danger.
Ensure that all applicable safety equipment is being utilized as per company policy.

EQUIPMENT AND MATERIALS

System maps and records
Sonograph instrument
Pit depth gauge/deflection indicator
Other equipment and materials, as needed

OPERATOR QUALIFICATION

This activity is a covered task under the Operator Qualification Plan and may only be performed by or directed and observed by an individual who is currently qualified to perform this task. Refer to the OQ Plan for specific qualification requirements.

INSTRUCTIONS

1. Clean the pipe and/or fitting sample by removing burrs, corrosion deposits, dirt and coating.
2. Use pit depth gauge, with a pit-measuring tip small enough to reach the bottom of the corrosion pit being examined.
3. The body of the pit depth gauge must lay flat on the internal surface being inspected. Holding the pit depth gauge firmly, push the tip into the different pits and record each pit depth result.
4. If a deflection indicator is used, thoroughly clean the pipe and/or fitting sample(s). Lay the sample with the outside of the pipe on a smooth, flat inspection surface. Using a pointed tip on the deflection indicator that will reach the bottom of the smallest pit, position the sample under the deflection indicator and measure to a smooth pipe or fitting surface that does not have any corrosion pits. This will establish the wall sample thickness. Adjust the dial to read “zero”. Raise the dial tip, do not drag it on the surface of the pipe or fitting, and move the sample into position allowing the tip to move into the bottom of the pit. Read the difference between the “zero” on the dial ace, and the reading in the bottom of the subject pit. Record the information obtained.
5. With all cases of internal corrosion, the problem causing corrosion in one section of pipe might be common to the entire piping system and must be thoroughly investigated.

ADDITIONAL INSTRUCTIONS WHEN USING A SONOGRAPH INSTRUMENT

1. After completely removing an ample amount of pipe coating and any associated mastic material, use a sonograph instrument to measure pipe wall thickness on either a pipe or fitting sample in the field, or from removed samples. Turn the sonograph instrument on, and using the instrument calibration block, that most closely matches the assumed pipe wall thickness, apply a small amount of required gel to the cleaned pipe or fitting surface and again test the instrument for calibration.
2. Apply the required instrument gel to the general pipe or fitting surface area to be tested. Depending on the transducer and the pipe/fitting wall thickness, the transducer slit/window should be parallel or perpendicular to the pipe or fitting length.
3. Several individual tests will have to be performed unless the instrument has “B Scan” capabilities which allows the transducer to be moved across the pipe or fitting surface while the instrument obtains readings and displays the results on a graph. With an instrument without “B Scan”, the transducer will have to be exactly over a pit to register the associated pipe or fitting thickness. Document all readings, recording good pipe wall thickness readings along with defect values.
4. If the sonograph readings indicate that the pipe or fitting wall is reduced to less than 30 % of its original thickness, it is considered “unserviceable”, and must be replaced. Multiple pits, close enough together to affect pipe wall mechanical strength should be addressed appropriately.

REPORTING/NOTIFICATION

The SCUD employee shall complete documentation in accordance with the Operation and Maintenance Manual. SCUD utilizes electronic software to record and maintain all internal corrosion inspections. Any corrosion shall be reported on the electronic Exposed Pipe Form. Engineering shall verify serviceability of any section of pipe found to contain corrosion pits.

ABNORMAL OPERATING CONDITIONS

AOC Main Category (Examples of Specific AOCs)	**Reactions to AOC, as appropriate**	
Unplanned escape of product from a pipeline • Blowing/Escaping gas/Grade I leak	➢ Protect life & Property ➢ Prevent accidental ignition ➢ Notify appropriate personnel ➢ Notify Fire/Emergency Responders ➢ Initiate Emergency Plan	➢ Locate source/cause of AOC ➢ Use appropriate PPE ➢ Stop gas flow ➢ Make repairs/eliminate AOC
Fire or Explosion • Fire on a pipeline • Explosion	➢ Protect life & Property ➢ Prevent accidental ignition ➢ Notify appropriate personnel ➢ Notify Fire/Emergency Responders ➢ Initiate Emergency Plan	➢ Locate source/cause of AOC ➢ Use appropriate PPE ➢ Stop gas flow ➢ Make repairs/eliminate AOC
Unplanned Status Change	➢ Protect life & property ➢ Prevent accidental ignition	➢ Locate source/cause of AOC

• Low structure-to-electrolyte potential • Stray current on a pipeline	➢ Notify appropriate personnel	➢ Make repairs/eliminate AOC
Inadequate Odorization or Reports of Gas Odor • Low odorization • Over odorization • Odor complaint	➢ Protect life & property ➢ Prevent accidental ignition ➢ Notify appropriate personnel	➢ Locate source/cause of AOC ➢ Make repairs/eliminate AOC

RELATED PROCEDURES

MAINT004 – Visual Inspection for Internal Corrosion
MAINT008 – Visual Inspection of New and Exposed Pipe