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Protection from Underground Danger

The fuel distribution piping at your facility may be in danger. The danger is not because of terrorism, vandalism, or other human influence, but in fact from a natural occurring process. Corrosion is the cause of about 35% of all fuel pipeline accidents according to the US Department of Transportation's Office of Pipeline Safety. Luckily, a method was discovered back in 1824 that halts this process. Enter the birth of cathodic protection.

Cathodic protection is the process of negatively charging the underground fuel piping (called a cathode) and positively charging a sacrificial metal, called the anode, to complete the circuit. Oxidation or corrosion will occur in the anode rather than the pipe, therefore maintaining its integrity. This is the most common type of protection and used by most facilities having natural gas or oil distribution piping.

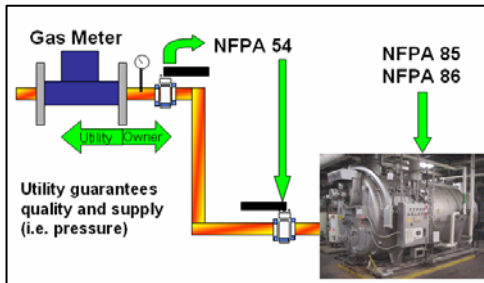


Access point for easily testing cathodic protection.

End of story, right?

Wrong. Eventually the sacrificial metal will be depleted leaving your piping vulnerable to major damage. That is why you must have your cathodic protection system tested to monitor the rate of depletion. You are not alone as the local utility must ensure their main supply up to the discharge flange of the meter is properly protected. This is required to be performed by the National Association of Regulatory Utility Commissioners (NARUC) once a year, but did you know that many utility companies are years behind with these tests?

Your responsibility for fuel distribution piping starts with the discharge flange of the utility's meter? This means that the piping from the meter that goes back underground, maybe through the parking lot, is your responsibility to repair if it is leaking. In some cases, the facility's main fuel supply must be shut off at the street bringing the plant down while repair crews work around the clock to get you up and running again.



The National Fire Protection Association (NFPA) has developed the NFPA 54 (also known as the National Fuel Gas Code) for the proper operation, service and maintenance gas distribution piping.

A short case study of a major automotive company

On a warm summer day an employee walking through the parking lot at an automotive plant smelled natural gas. She reported the smell to the maintenance department who said they would look into it. Upon inspection, they realized the odor was emanating from a crack in concrete near the main metering and regulation station. Further inspection uncovered hundreds of feet of buried piping that closely resembled swiss cheese. Luckily this happened during the plant's summer shutdown, but it still required multiple crews working nonstop for two weeks to be completed in time for start up.



Replacing damaged piping can be expensive and time consuming.

So what can you do?

For starters, make sure the utility company is checking the integrity of their natural gas piping cathodic protection. CEC has drafted a template of a letter that you may [download](#) and customize for your facility to let the utility company know that this testing should be done and you would like to see proof that it has occurred.

The following steps can help get a handle on your responsibilities:

- Review and update drawings of natural gas piping systems within the plant. This step includes manually walking or tracing the layout through your facility
- Evaluate natural gas piping, especially uncoated (bare) steel pipe. To include:
 - Leak detection
 - Review of condition to include opening of line with visual and sonic testing
 - Review need for cathodic protection
 - Isolation and pressure testing, if needed
- Ask around to see if there are any service records from plant personnel or third-party firms.
- Evaluate pipe replacement/upgrade/remediation program based on conditions identified above
- Identification and documentation of current gas loads by area, department, piece of equipment
- Line sizing calculations, based on above
- Review need for additional valving and/or pressure control to isolate or provide additional control to sections of the plant
- Review facility isolation or abandonment (decommissioning of unused segments of gas piping)

If this list seems daunting, there are third-party firms that professionally test and validate the integrity of the underground piping network.

Monitoring For Trouble - There are many gas odor signals that un-noticed or documented. Are there any fluctuations in gas supply pressures or are your combustion systems experiencing pressure excursions that are tripping the gas pressure switches? Make sure plant personnel have a reporting mechanism for stray odors. Mother Nature is also a resource. Many times leaks are detected as someone notices dead grass, melting snow, or bubbles coming up from the ground after a rain storm.

You also want to make sure that no one tampers with the cathodic protection. You may see wires above ground that are attached to the underground pipe, but **DO NOT SNIP THEM!** That is the connection for testing.

Don't let your facility be susceptible to lost production, unscheduled downtime, or even lost fuel dollars because your cathodic protection is not working or has not been tested.

For question or comments about this article or if you need help getting started, please call Justin Kowallek, Market Specialist or Dale P. Smith, President at 216-749-2992.