Implementing Cathodic Protection Testing

It's easier than you think...

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For many propane marketers, cathodic protection inspections and documentation are the "procrastination task" on their checklist. Though cathodic protection is required by the National Fire Protection Association (NFPA), many propane marketers aren't meeting requirements because they aren't sure what is required to satisfy the guidelines. You may be surprised to learn the process is more straightforward than you think. We'll cover the details one should know about implementing cathodic protection and help introduce this important safety requirement within a company's container portfolio.

Step 1: Understanding the Requirements

The NFPA has strict and specific requirements regarding cathodic protection testing values. I've compiled them below as a reference for your propane company, but you can also find them in your copy of the *NFPA 58 Liquefied Petroleum Gas Code Handbook*. This is also good information to keep in your company's policies and procedures manual, which should be easily accessible to every employee.

Installation and testing requirements include:

- Cathodic protection installed and tested in underground containers placed after their State adopted the 2011 edition of NFPA 58.
- Cathodic protection must be at least -.85 D.C. or more (meaning negative) using a copper-copper-sulfate half cell.
- Test must be completed upon installation unless prohibited by climatic conditions, in which case testing shall be done within 180 days after installation of the system.
- For continued verification of the effectiveness of the system, test again 12 to 18 months after the initial test.
- Periodic follow-up testing shall be performed at intervals not to exceed 36 months.
- Systems failing a test shall be repaired as soon as practical unless climatic conditions prohibit this action, in which case the repair shall be made not more than 180 days thereafter. Testing schedule shall be restarted as required initially.
- Documentation of the results of the two most recent tests shall be retained.

Step 2: Acquiring Equipment Needed for the Task

Once you are familiar with the requirements outlined by the NFPA for cathodic protection, there are a few pieces of equipment you'll need to acquire to install and monitor cathodic values. This equipment includes:

- Volt meter
- Copper-sulfate half cell

Basic cathodic protection inspection test kits can be purchased from all major liquefied petroleum equipment suppliers, such as Ray Murray, Webb and Gas Equipment (contact me via email if you can't find the equipment you need).

Step 3: Having a System for Documenting Inspections & Reporting Re-Inspections

To effectively implement cathodic testing and reporting, you'll need initial testing documentation as well as follow-up inspection forms. Historically, the industry has conducted these inspections using paper forms. One drawback to consider is that paper forms stuffed in a filing cabinet have no way of letting you know when they've expired (and neither do filled-out PDF files).

Instead, there are now software providers specializing in digital documentation, which can automatically flag inspections needing follow-up on your dashboard for management staff to see. Using software to store, retrieve and track cathodic protection documentation makes this process extremely efficient. Plus, software can notify you immediately when corrective action is necessary, unlike forms, which often sit unattended for months.

No matter which method you go with to document periodic inspections, be sure to choose something that works well for your company, your employees and your customers, along with meeting documentation industry standards.

→ ***Tip:*** *When you've decided upon a tracking method, outline it in your policies and procedures manual so that both employees and auditors can clearly see how your company performs such inspections.*

Step 4: Training Your Team

Are your employees trained in proper cathodic testing methods? Ensure that all staff members have received hands-on field training to conduct cathodic tests appropriately per NFPA 58. Training should include:

1. Review and complete Certified Employee Training Program's (CETP) Topical Cathodic Training found in the Learning Center

→ ***Tip:*** *Propane Education & Research Council (PERC) has recently revamped CETP to make it easier for marketers to provide specific training.*

2. Provide field training for your employees

→ ***Tip:*** *After the required training, I've found that the best way my employees learn is by seeing the equipment in action in the field. I take them to the job site and walk them through an inspection so they can see it in real time and then try it themselves.*

Step 5: Having a Plan for Failed Cathodic Tests

It's critical that your company has a procedure in place for the installation or replacement of a missing or failing cathodic protection anode or tank. This corrective process is referred to within the industry as retrofitting.

Failed cathodic protection inspections are often due to one of these common factors:

- Tank does not have cathodic protection installed
- Anodes are old and have worn out, needing replacement
- The entire tank needs replacement
- Dielectric union is required to protect underground piping

Diagnosing the problem will become second nature. The first step is ensuring the issue is not the lack of a dielectric union. Look under the dome of the tank to see if a dielectric union is installed on the tank connection to the gas line. The second spot the dielectric union may be located is between the underground piping and the house. If there is no dielectric union, you will need to install one.

If you do find a dielectric union but continue to have a bad reading, you should determine if the issue is the anode or the tank itself. Start by attaching an anode bag and wire to the tank. If there is an increase in the protection number (*e.g.* -.5 to -.85), you now have a good reading. If there is no increase in the number when you complete this procedure, you will need to disconnect the tank from the gas line and retest the system, which will tell you whether the problem is with the tank or the line.

Step 6: Implementing Cathodic Protection Testing

It's now time to decide the most efficient way for your company to maintain this important inspection requirement. The two most common methods I've seen in the field are:

- Training all drivers on cathodic protection: have them test tanks when they make deliveries
  - *You will not have to send employees on return jobsite visits.*
- Training a few specialists who drive around, focused on cathodic testing specifically
  - *You will not have to buy as many cathodic test kits.*

You know your team and delivery routes best—choosing which method will be most efficient for your propane company is a personal decision and can always be adjusted later for best results. **ICM**

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