FARWEST CORROSION CONTROL COMPANY
CORROSION CONTROL PRODUCTS COMPANY

The Corrosion Monitor

Newsletter: Volume 1 - Spring

Topics

Introducing a first of it's kind

POWERMAG® 1000

A Constant Potential, IR-Free Magnesium Anode Controller

U.S. Patent #7585397

Engineers at Farwest have done it again. They have invented, and now patented, a C.P. Controller for steel water tank applications that uses magnesium anodes and an isolated copper electrode, within the tank, to power the controller eliminating the need for ANY outside power. The POWERMAG 1000 controller then automatically regulates the tank-to-water voltage potential in a galvanic cathodic protection (CP) system. It also automatically adjusts the anode current to maintain a constant IR-free tank to water potential.

Using the latest in electronic digital technology, Farwest engineers designed components that have a very low power requirement, allowing operation of the control circuit on no more than 3 milliamperes drain from the anode system. The PowerMag controller also includes a pulse width modulation current regulator and a sophisticated potential measuring system to monitor and control the various functions. This technology provides the ability to regulate the potential of a sacrificial CP system and avoid 'over voltage' issues; something that is very unique. By regulating this CP system, the anodes can run at a lower current output, which results in longer anode life as well.

How it Works….

In a galvanic anode system for a water storage tank, magnesium anodes are installed in contact with the water and are also connected to the tank. These anodes have a more active voltage—a more negative electrochemical potential—than the steel tank (the cathode). The difference in electrochemical potential between the anode and the cathode causes a galvanic current to flow from the magnesium anode to the cathode (steel tank), thus providing the small electrical current. Meanwhile, the magnesium anodes corrode preferentially and provide corrosion protection to the tank. Because of this generated current, no electricity from any external power supply is used.

Typically, galvanic current is difficult to regulate. Because the water level in the tanks can vary unpredictably, the tank-to-water voltage potential in a tank may change as the water level in the tank changes. Often times the anode current is higher than required and

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A "Ground Breaking" Green Solution for Cathodic Protection

Rocky Mountain Division adds CP Engineering!

The Rocky Mountain Division of Farwest Corrosion Control has recently added CP engineering services to it's Denver Colorado operation.

The engineering division, headed by Mr. Dennis Howard, a NACE Certified Corrosion Specialist and an instructor at the NACE Basic Internal Corrosion Course, will be handling all aspects of CP and corrosion control for the region. His expertise lies in external and internal corrosion control of natural gas and liquid pipelines and their associated facilities.

Capabilities will include:

- CP design services
- CP field testing & maintenance
- Corrosion surveys
- Soil resistivity testing
- Pipeline potential surveys
- Current requirement testing
- Interference tests
- Project supervision

The facility, managed by Candy Balerio, a 31 year industry veteran, continues to offer a stocking warehouse and a knowledgeable sales department, now complimented by engineering services. Contact the office at 303-307-1447.

POWERMAG® 1000

Constant Potential, IR-Free, Magnesium Anode Controller

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over protection is possible on the tank's interior. The PowerMag controls this situation, eliminating over-voltage issues.

What NACE recommends...

NACE recommends tank-to-water potentials to be maintained between –0.850 and –1.100 volts. In addition, CP designers are also specifying that all tank-to-water voltage potential measurements be "IR-free"; that is, the measurements are corrected for voltage drops (gradients) within the water that can result in measurement errors. Because most magnesium anode systems are "on" continuously, it is very difficult or impractical to capture a true IR-free potential measurement. The patented circuit design of the PowerMag 1000 maintains the correct potentials and provides an IR-free potential reading at all times.

Water storage tanks are often located in remote areas where an AC power source is simply unavailable. The PowerMag 1000 solves this problem. No external power needed means no monthly utility bills. Now that's a Green solution and a "must have" system for every water tank owner.

Fence Me Out

One day a farmer called on a mathematician, a physicist, and an engineer to fence off the largest possible area with the least amount of fence. The mathematician arranged the fence in a circle and proclaimed he had the most efficient design. The physicist made a long straight line and proclaimed, "We can assume the length is infinite...." and pointed out that fencing off half the earth was certainly more efficient. The engineer just laughed at them. He built a tiny fence around himself and said, "I declare myself on the outside!"

Conquering Challenges

In the pipeline industry, a common method used to install a section of new pipe is via a directional drill. This is done when it's either impractical or impossible to dig a trench, such as under a highway, body of water, or railroad.

The basic process consists of drilling a pilot hole, reaming it to the appropriate size, and pulling the new section of pipe back through the bore. How do you take that difficult process, which is fraught with challenges, and make it even more challenging? You ream the bore to a diameter of 54", and instead of pulling one new pipe section through it, you pull 10 bundled casings, totaling nearly 2,100 feet in length.

In September of 2009 an engineering firm in charge of the design for this directional drilling project contacted Jim Tolly, Technical Sales Representative for Corrosion Control Products Company, for assistance. The project consisted of 10 bundled casings, including 3 – 14", 2 – 12", 2 – 10", 1 – 6", and 2 – 4" pipe casings. The client was interested in coating options for the girth welds along the various casings.

When deciding on which field applied girth weld coating to approve for use, the engineering firm had to ensure that the field applied coating: 1) had to be designed for use in a directional drilling application; 2) had to be compatible with the plant applied coating; and 3) had to perform similarly to the plant applied coating.

Pipelines pulled through the bore of a directional drill are subject to stresses that can very easily damage or destroy their protective coatings. Rock, shale, and gravel can cut through or abrade coatings all the way to the pipe surface. Consequently, coatings used in directional drill projects are typically sturdier and more abrasion resistant than those used in direct bury applications. Additionally, girth weld coatings are sometimes viewed as being the weak link in the pipeline coating chain, adding to the importance of choosing the right product for the job.

The plant applied coating on the casings was a 3-layer polypropylene system. Tolly worked with the engineering firm to specify Canusa-CPS TBK-PP65 Heat-Shrinkable 3-Layer Directional Drilling Kits for the girth welds, which were previously used on directional drills in the project area which have a long history of successful use. The system is comprised of a 100% solids epoxy, a heat shrink sleeve with polypropylene backing and hot-melt adhesive, and a secondary heat-shrinkable sleeve which functions as a sacrificial wear cone.

In January of this year, the pipeline contractor started work on the project and by early February was ready to coat the girth welds. Corrosion Control Products Company supplied the contractor with Canusa-CPS TBK-PP65 Kits, and along with Canusa-CPS, Tolly provided onsite contractor training.

In order for the end result to be a high quality product, the contractor's installation personnel and the pipeline owner's quality control representatives were trained in proper pipe surface preparation and the directional drill kit installation, inspection, and repair.

The good news! Challenges led to solutions that brought successful results. In early April the bore had been reamed to size and the pullback was made. The casings are in place and will allow the enclosed pipelines to transport oil, water, gas, electrical and instrumentation cables from their sources to their destinations.