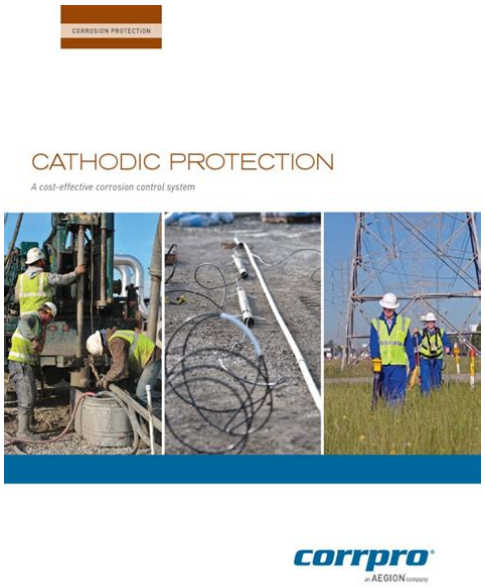
corrpro cathodic protection manual



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BACKFILL

Loresco EnviroCoke IV™ and PermaPlug™
Specialty Backfills

Protection For Environmentally Sensitive Areas

Contamination of underground aquifers is a major concern in today's environmentally conscious society. To prevent deep groundbed cathodic protection systems from polluting ground water in environmentally sensitive zones, Corrpro supplies Loresco's EnviroCoke IV and PermaPlug specialty backfills.

EnviroCoke IV is a conductive carbon-based cementitious backfill with an extremely low permeability. It is designed to surround the casing at the discharge zones of a cathodic protection system and prevent the intermixing of waters held in separate aquifers. The material mixes with water, and can be easily pumped for placement around the well casing. After settling for 24 hours, the protective backfill becomes structurally stable.

PermaPlug is a non-conductive backfill designed to seal the entrance of a deep-anode-bed cathodic protection system. The backfill is made from naturally occurring bentonite rock, which swells when saturated with water to provide a leak-tight seal. This seal stops surface fluids from flowing into the well and contaminating potable water aquifers. The material does not require mixing, and can be poured directly into the hole at the surface of the deep anode bed. Because the material completely seals the entrance of the cathodic protection system, it is strongly advised that a vent pipe be utilized to release gases and to provide access to the system so that water can be added if necessary.

PERMA PLUG
COARSE
LORESCO
ENVIRO COKE IV

Typical Applications

EnviroCoke IV and PermaPlug specialty backfills are designed for use in deep groundbed cathodic protection systems located in environmentally sensitive zones. Used in conjunction, the two backfills effectively protect underground aquifers from contamination. Both products have been tested according to EPA leacherate standards, and have been found to meet all quality requirements for materials utilized in underground burial. The backfills should be stored in a dry area prior to use.

CHEMICAL COMPOSITION

EnviroCoke IV	PermaPlug
49% Portland Cement	98% Bentonite
48.9% Fixed Carbon	2% Wetting Agents
0.1% Ash	—
0.0% Moisture	—
0.0% Volatile Matter	—

Corrpro Companies Europe Limited
Adam Street, Bowesfield Lane, Stockton on Tees, TS18 3HQ
Telephone: (01642) 614106 (8 lines) Telex: 587386
Fax: (01642) 614103 E-mail: cos@corrpro.co.uk

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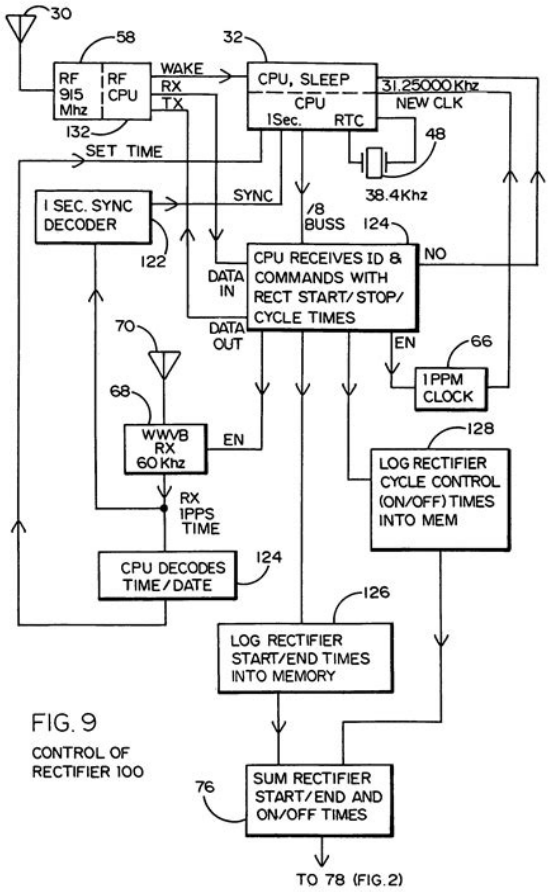
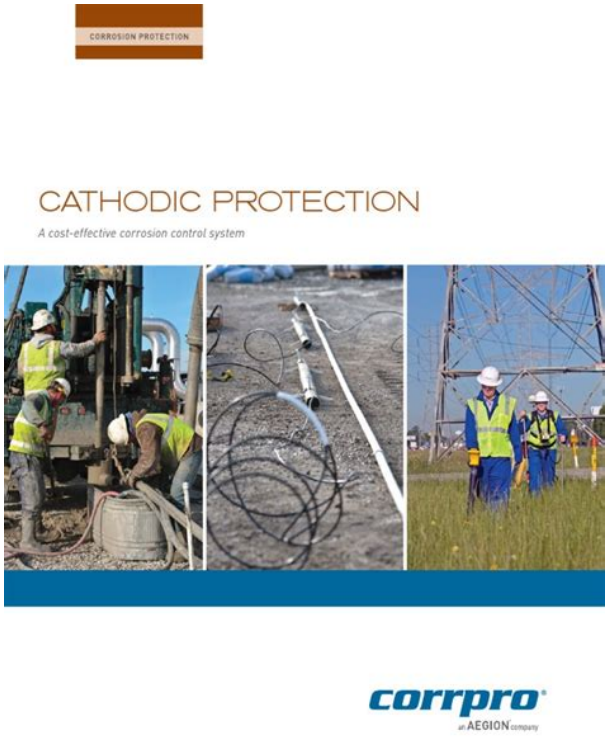


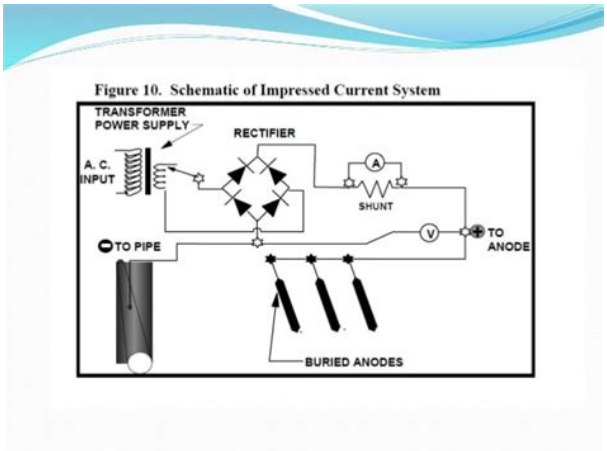
The fouling organisms enter the system in microscopic and macroscopic form eg.Traditional chemical methods of water treatment to prevent fouling are now less favoured, particularly chlorination. Chlorine accelerates corrosion rates, usually by causing pitting attack on steel, is environmentally unacceptable and treatment requires continuous monitoring and control. Similarly, iron anodes are utilized for cupronikel pipework. Mussels are not killed by the systems the environment it creates prevents them settling or developing.The current flowing to each anode is indicated by digital display. This allows visual monitoring of all the separate anode currents. The unit also incorporates the following features as standard Whilst installation is a straight forward procedure, Corrpro staff are always on hand to provide specialized advice and to assist with commissioning. In addition Corrpro can supply replacement anodes and spares for most types of antifouling systems and box coolers. We have our head office in Ramlosa, Helsingborg, in the south of Sweden. Please check your entries and try again. All Rights Reserved. Designed by Paramount Tech Network If you continue to use this site we will assume that you are happy with it. Ok. Smaller tanks built on concrete slab foundations typically do not have cathodic protection applied to them. ASTs require significant current, which generally precludes the use of galvanic anodes. Almost all AST CP systems today are designed with impressed current systems to provide the current required over a long period of time. CP is still recommended for tanks with coated bottoms. In many cases, it may make sense to install the anode system and test the actual circuit resistance using a portable rectifier or car battery before committing to a specific rectifier size. Often, these can be located in nonclassified areas with minimal additional cost of cable while saving significantly on the cost of the enclosures and classified components.http://ailemsin.com/Upload/firebug-manual-pdf.xml



If Claymax or other conductive type liners are to be used, the anodes do not have to be placed between the liner and the tank bottom. It is important to note that the actual operating life of ASTs often exceeds this value and depending on the design of the tank, its location, and the selection of a containment liner. Replacement of the CP system may be difficult to impossible so some consideration should be given to the economic value of extending the design life.These are typically augured into depths of 510 feet. This design approach only works when there is no electrically isolating secondary containment liner under the tank. Above ground storage tank bottoms are large bare surfaces requiring a lot of current. To assure that current distributes properly, the anode depth and distance from the tank are critical. Shallow peripheral anodes are not able to throw current to the center of all but the smallest of ASTs. This approach has some limitations in heavily congested plant environments where current can flow to other buried structures. When multiple deep wells are employed to protect more than one tank in a cluster, care must be taken to assure proper current distribution. Even with a deep well approach, when dealing with new construction, reference electrodes should be installed under each tank. The economics of this design, both in terms of installation costs and material costs, are not favorable and this design has been dropped in favor of either a grid system or linear anodes in a parallel concentric ring arrangement. The MMO ribbon anode is field spot welded to the titanium conductor bar to provide both mechanical and electrical connections. Wherever the titanium conductor bars cross, they too must be field welded together. Power feeds preassembled cables with a flat plate to connect to the conductor bar are secured to the titanium bar in multiple locations and routed to the ring wall penetration.

The attachment of the power feeds to the titanium grid is critical to the system reliability. From a design perspective, the spacing of the anodes and conductor bars must be sufficient to assure even current distribution. This provides for an exceptionally simple installation while assuring the highest system reliability; installation costs are minimal. Please refer to MATCOR’s Installation, Operation and Maintenance IOM Manual for a detailed installation description with pictures. The anode connections are field spliced to loop cables, which terminate at two anode junction boxes. The second key advantage to this configuration is that it eliminates the need for two field splices for each anode segment. Each ring can be manufactured with the appropriate length of header cable to run each end directly to the single anode junction box. These field splices are weak links subject to

premature failure over the life of the anode system. MATCOR's experience with ring configurations is extensive and we have determined through numerous installations and our own inhouse testing that for tank bottom applications with bare bottom plates and an anode depth of 1 foot, concentric rings with a spacing of 10 feet provide thorough current distribution. When the anodes can be placed deeper than 1 foot, the anode spacing can be extended.Once the tank is erected, making accurate potential measurements at various locations along the tank can only be accomplished if reference electrodes have been installed below the tank. Typically, coppercopper sulfate CuCuSO4 reference electrodes are installed in strategic locations underneath the tank. These reference electrodes are often mistakenly called "permanent" reference electrodes; however, they are not permanent as over time the copper copper sulfate solution becomes contaminated and ceases to provide accurate information.



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Once a baseline for performance is established over a sufficient operating period, maintaining the appropriate current output to achieve NACE criteria is all that is required. While the zinc reference electrodes are not as consistent, they provide a much longer operating life and can be calibrated against the coppercopper sulfate electrodes. These can also function as leak detection tubes. As with any impressed current system, monthly rectifier checks should be performed by plant maintenance to assure that the rectifier is on and that the voltage and current outputs remain stable. Based on 1 foot depth, MATCOR uses 10 foot spacing between anodes. This is not based on any theoretical modeling but has been derived empirically by testing performed by MATCOR and validated on numerous actual applications. MATCOR has researched the available literature and has not found any published data or theoretical modeling that can be used to determine current distribution for concentric rings beneath a storage tank bottom.It just makes for a nice geometric value. This equates to a geometric equation of 2d tan78.7, which is not as elegant a number as 60. But we know from our testing using reference electrodes that have been placed inclose proximity to the tank bottom that current distributes sufficiently to meet NACE criteria between ring segments. The total anode length is then calculated. MATCOR's design program allows for the anode spacing to be adjusted to optimize the anode length and anode rating as needed to meet the desired design life requirements. The resistance of each anode ring is calculated using Dwight's equation for a ring of wire The actual design life is calculated based on the design output divided by the rated output times 20 years to provide a calculated design life at design output.Contact us at the link below. View our Privacy Policy. Email This field is for validation purposes and should be left unchanged.

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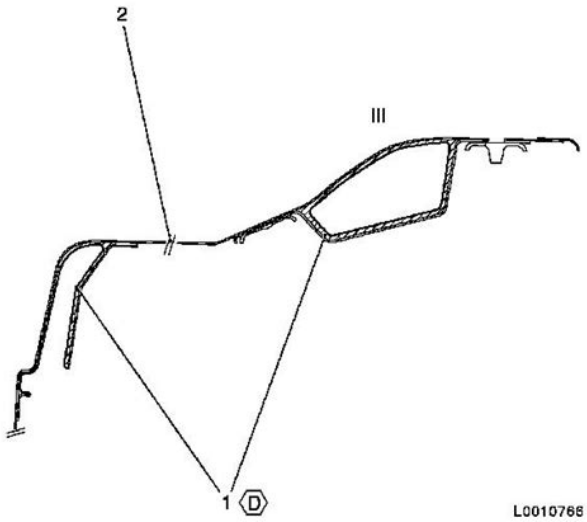

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SACRIFICIAL ANODES

Hull, Ballast Tank, and Condenser

Cast Zinc Anodes

Protection for Marine Environments

Stopping corrosion begins with selecting an appropriate protection material. On many marine type structures, this material is zinc. To address the demand for this protective material, Compro manufactures hull, ballast tank, and condenser zinc anodes for use on structures in brackish and saltwater environments. The anodes are cast using 99.99%-pure high-grade zinc, and are alloyed to meet military specification MIL-A-19001 and the ASTM-B-418, Type I chemical composition standard. Through the addition of nominal percentages of aluminum and cadmium, Compro zinc anodes are resistant to the formation of zinc hydroxide around the anode surface, which restricts current flow and can shorten anode life. Their unique composition also allows for a current capacity of 354 amp.-hrs./lb., and an open current voltage of 1.05 (with respect to an Ag/AgCl reference cell).

All Compro marine zinc anodes are manufactured using galvanized steel cores. By galvanizing the cores, a stronger bond is created, thus minimizing the chance for core separation and anode defect. The cores are available in strap, pipe, or rod configurations, allowing numerous mounting possibilities. Other measures taken to ensure quality include the performance of chemical analysis and electrochemical tests.

Typical Applications

Corrpro hull, ballast tank, and condenser anodes are designed for use on ships, vessels, piers, pilings, and other metal structures in brackish and saltwater environments. The use of these anodes should be avoided in areas where temperatures may exceed 140°F, or which contain high alkalinity (above 9.5 pH). This is because zinc is prone to polarity reversal in these areas.

CHEMICAL COMPOSITION

Element	Content %
Al	0.1-0.5
Cd	0.02-0.07
Fe	0.005 max
Pb	0.006 max
Cu	0.005 max
Zinc	remainder

Corrpro Companies Europe Limited

Coatings Inspector in managing the offshore inspection activities Supervise, train, and direct Coatings Inspector I Review requirements of jobs and develop plans for implementation Analyze, revise, and make recommendations for improvements to the inspection process Understand and abide by the procedures set by Corrpro corporate procedural manuals, the Inspection Quality Manual and the project specification Verify the proper use and calibration of inspection instruments as described in the Inspection Quality Manual Perform hold point inspections of surface preparation and coating work in accordance with the procedures of the Inspection Quality Manual Review the project specification and attend prejob meetings and conferences pertaining to the specification Initiate changes to the Inspection Quality Manual via notification to the Coatings Inspector III or the District Coatings Manager Qualifications NACE CIP Level II or Level III required TWIC Card Huet Water Survival Training and Certification 3 Years offshore coating inspection experience 5 years related coatings inspection experience Correspond and verbally communicate in a professional manner with customers Work is offshore so m ust be able to travel to sites Our company offers a Competitive Salary with Career Growth Opportunities and a Full Benefits Package including Medical, Dental and Vision Insurance, Per Diem, Matching 401k, Tuition Assistance, Paid Time Off, and much more. Equal opportunity is a sound and just concept to which Aegion is firmly bound. Aegion will not engage in discrimination against, or harassment of, any person employed or seeking employment with Aegion on the basis of race, color, religion, sex, sexual orientation, gender identity, national origin, age, nondisqualifying disability, status as a protected veteran or other characteristics protected by law. VEVRAA compliant priority referral Protected Veterans requested. New Orleans, LA Corrpro Companies, Inc. Corrpro Companies, Inc.

Corrpro, a subsidiary of Aegion Corporation, is among the worlds largest corrosion engineering, cathodic protection, and corrosion monitoring business for the protection and preservation of infrastructure. For more details, visit www. Assist Manager, QA and Sr. Coatings Inspector in managing the offshore inspection activities Review requirements of jobs and develop plans for implementation Analyze, revise, and make recommendations for improvements to the inspection process Understand and abide by the procedures set by Corrpro corporate procedural manuals, the Inspection Quality Manual and the project specification Verify the proper use and calibration of inspection instruments as described in the Inspection Quality Manual Perform hold point inspections of surface preparation and coating work in accordance with the procedures of the Inspection Quality Manual Review the project specification and attend prejob meetings and conferences pertaining to the specification Initiate changes to the Inspection Quality Manual via notification to the Coatings Inspector III or the District Coatings Manager NACE CIP Level II or III required Huet Water Survival Training and Certification 3 Years offshore coating inspection experience 5 years related coatings inspection experience Correspond and verbally communicate in a professional manner with customers Work is offshore so must be able to travel to sites Our company offers a Competitive Salary with Career Growth Opportunities and a Full Benefits Package including Medical, Dental and Vision Insurance, Per Diem, Matching 401k, Tuition Assistance, Paid Time Off, and much more. Job Type Fulltime offshore coatings inspection 3 years Preferred Drivers License Required TWIC Card Preferred NACE CIP II or III Required Huet Water Survival Preferred United States Required A job for which military experienced candidates are encouraged to apply Get job updates from Corrpro Companies, Inc.

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discrimination against, or harassment of, any person employed or seeking employment with Aegion on the basis of race, color, religion, sex, sexual orientation, gender identity, national origin, age, nondisqualifying disability, status as a protected veteran or other characteristics protected by law. Measure dimensions of products to verify conformance to specifications, using measuring instruments such as rulers, calipers, gauges, or micrometers. Read blueprints, data, manuals, or other materials to determine specifications, inspection and testing procedures, adjustment methods, certification processes, formulas, or measuring instruments required. Record inspection or test data, such as weights, temperatures, grades, or moisture content, and quantities inspected or graded. Mark items with details such as grade or acceptancerejection status. Notify supervisors or other personnel of production problems. Discard or reject products, materials, or equipment not meeting specifications. Collect or select samples for testing or for use as models. Write test or inspection reports describing results, recommendations, or needed repairs. Compare colors, shapes, textures, or grades of products or materials with color charts, templates, or samples to verify conformance to standards. Recommend necessary corrective actions, based on inspection results. Grade, classify, or sort products according to sizes, weights, colors, or other specifications. Analyze test data, making computations as necessary, to determine test results.

Clean, maintain, calibrate, or repair measuring instruments or test equipment, such as dial indicators, fixed gauges, or height gauges. Remove defects, such as chips, burrs, or lap corroded or pitted surfaces. Read dials or meters to verify that equipment is functioning at specified levels. Check arriving materials to ensure that they match purchase orders, submitting discrepancy reports as necessary. Make minor adjustments to equipment, such as turning setscrews to calibrate instruments to required tolerances. Fabricate, install, position, or connect components, parts, finished products, or instruments for testing or operational purposes. Inspect or test raw materials, parts, or products to determine compliance with environmental standards. Compute defect percentages or averages, using formulas and calculators. Position products, components, or parts for testing. Stack or arrange tested products for further processing, shipping, or packaging. Monitor production operations or equipment to ensure conformance to specifications, making necessary process or assembly adjustments. Adjust, clean, or repair products or processing equipment to correct defects found during inspections. Monitor machines that automatically measure, sort, or inspect products. Compute usable amounts of items in shipments. Weigh materials, products, containers, or samples to verify packaging weights or ingredient quantities. Interpret legal requirements, provide safety information, or recommend compliance procedures to contractors, craft workers, engineers, or property owners. Disassemble defective parts or components, such as inaccurate or worn gauges or measuring instruments. Administer tests to assess whether engineers or operators are qualified to use equipment. Inspect or test cleantech or green technology parts, products, or installations, such as fuel cells, solar panels, or air quality devices, for conformance to specifications or standards.

Active Listening Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. Speaking Talking to others to convey information effectively. Quality Control Analysis Conducting tests and inspections of products, services, or processes to evaluate quality or performance. Mathematics Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications. English Language Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar. The training curriculum is focused to serve craft and frontline field.Corrpro, a subsidiary of Aegion Corporation, isCorrpro, an Aegion company, is among the worlds largest corrosion engineering, cathodic protection, and corrosionInsituform Technologies LLC, is a leading worldwide provider of curedin place pipe CIPP and otherInsituform Technologies, LLC, a subsidiary of Aegion Corporation, is aSGS is recognized as the global benchmark for quality and integrity. With more than 94,000 employees, SGS operates a

network of over 2,600 offices and laboratories around the world. Job.Responsibilities Serve as a primary inspector for phase or.The NRTC Broadband Solutions OSP Inspector is responsible for ensuring that units placed by contractors are placed and recorded accurately as according to the design plans. The position requires working.Start your career as a Foreman Trainee and be promoted to a Foreman in an average of 8 weeks. At Osmose, we believe in providing opportunities for growth.Our devotion to teamwork has allowed us to build communities and expand our skylines. Here at WSP, anything is within our reach and yours as a WSP employee. Come join us and help shape the.This position offers great opportunity for.SGS is recognized as the global benchmark for quality and integrity.

With more than 94,000 employees, SGS operates a network of over 2,600 offices and laboratories around the world. Job.SGS is recognized as the global benchmark for quality and integrity. With more than 94,000 employees, SGS operates a network of over 2,600 offices and laboratories around the world.Job. A subsidiary of Insituform Technologies, Inc., Corrpro offers corrosion solutions for every market including pipeline, refinery, water, wastewater, above and underground storage tanks, concrete, infrastructure, offshore, and marine. Nominate them for WQPs Young Professionals and Industry Icon programs today. What better way to preserve and maintain infrastructure than to mitigate corrosion. Some CP systems are comprised of sacrificial anodes that naturally corrode to protect less active metals such as steel. Others require power sources to drive protective current in the right direction. The most common impressed current voltage sources are rectifiers, which can break down. This article discusses the fundamentals of rectifier operation and maintenance along with basic recommendations. The root purpose of any cathodic protection CP system is to mitigate corrosion. Preserving a pipe or other metallic structure by preventing corrosion damage allows it to endure. Therefore, corrosion mitigation leads to sustainability. A galvanic CP system is comprised of sacrificial anodes typically made of active metals aluminum, magnesium, or zinc that corrode in order to provide protective currents for a less active metal, such as pipeline steel. An impressed current CP ICCP system utilizes external power in the form of a rectifier or other voltage source that drives impressed current anodes e.g., cast iron, graphite, and mixed metal oxide to corrode in order to distribute protective current to the structure cathode. It is imperative that a rectifier remain in a state of constant operation. Because a rectifier is an electrical device, it is vulnerable to power surges.

A nearby lightning strike can cause the circuit breaker to trip or a diode to short. Therefore, routine inspections and monitoring are necessary to maintain a properly functioning, longlasting rectifier. The goal of any task related to rectifier operation is to perform the work safely, which includes wearing the proper protective equipment. The purpose of the transformer is to safely separate the incoming AC voltage primary side from the secondary side, which is adjusted to control the output voltage of the rectifier. Typically, these adjustments are made with tap bars connected to the secondary side windings at intervals that offer several setting options. The stack is the actual rectifier and is comprised of a set of silicon diodes or selenium plates that function as unidirectional current valves. The diodes or plates are configured so that cycling AC flows in one direction and is blocked in the other, resulting in both directions of the AC wave flowing in the same direction. The cabinet, which includes the test panel, safely houses these components, and allows for monitoring and other advanced operations. The main purpose of monitoring is to ensure the rectifier is still operating and that a power surge hasn’t tripped the breaker. Some facilities require certain inspections at particular intervals. For example, natural gas and petroleum pipeline operators are required to inspect their rectifiers six times per year in intervals that don’t exceed 21 months. Also, company policy may dictate an even stricter inspection interval. Testing often includes taking manual measurements of the rectifier output voltage and current to verify meter accuracy and structuretoelectrolyte potentials. Equipment to remotely monitor rectifiers that are difficult to access is also available; however, these devices are best used as an adjunct to onsite monitoring

rather than a replacement of it.

As a minimum, safety glasses, leather work boots with moisture barriers where appropriate, and leather or rubber gloves should be used. Company policy may identify additional PPE requirements. Use all senses to detect evidence of malfunction, including visual e.g., scorching and audible e.g., crackling. Test the cabinet for the presence of AC with an approved AC detector. The oldfashioned way of determining whether the cabinet is electrified or hot was to brush it with the back of the hand. With the advent of the AC detector, this is no longer necessary or advisable. Knock on the cabinet to notify any inhabitants wasps, mice, spiders, and even snakes that you are coming in. Be sure to have insect spray handy. Before performing any troubleshooting of a nonfunctioning rectifier, be sure to turn it off, both at the circuit breaker and at the panel disconnect. The purpose of troubleshooting is to systematically isolate the rectifier components until the defective part is found, and following the rectifier manufacturer's recommendations for maintenance and troubleshooting is recommended. Keep an eye out for loose connections, signs of arcing, and strange odors. Additional testing may be required to verify the integrity of the structure and groundbed lead wires. Since output voltage suggests that the rectification circuits are intact, one or both of the output cables might be broken, or the anode groundbed might be completely depleted. To begin troubleshooting, identify a suitable temporary ground that is electrically isolated, such as a culvert, fence, power pole guy wire anchor, or street sign. Turn the rectifier off, then disconnect the structure lead wire, and connect the temporary ground to the negative lug. Adjust the tap bars to one of the lowest settings, and energize the rectifier. If the rectifier now produces both volts and amps, then the structure lead wire is broken.

If there are still no amps, then turn the rectifier off, return the structure lead wire to the negative lug, disconnect the anode lead wire, and connect the temporary ground to the positive lug. Energize the rectifier. If the rectifier now produces both volts and amps, then the anode lead wire is broken or the existing groundbed is depleted. If there are still no amps, then additional testing is required to evaluate the effectiveness of the structure and anode lead wires to determine if the problem involves both wires. This may be the result of a power surge and simply requires the installation of a replacement fuse. However, rectifier fuses can be quite expensive. Temporarily installing a circuit breaker across the fuse clips permits testing the rectifier's operation without consuming several fuses. A typical homestyle circuit breaker, appropriately sized for the application, may be used for this test. Simply attach test lead wires to each end of the circuit breaker, and attach the lead wires to each of the fuse's existing mounting clips. Be sure to prevent the circuit breaker and lead wires from contacting the rectifier cabinet or any other metallic object. If the breaker doesn't trip, then simply replace the fuse. If the circuit breaker trips, then other problems exist and additional troubleshooting should be performed. This might be the result of a power surge and simply requires the circuit breaker to be reset. However, surges are not desirable as the rectifier might remain off for long durations. Be sure to test the effectiveness of the rectifier's electrical grounding and follow the National Electric Code NEC guidelines. Install supplemental grounding as required. In addition, there are available surge suppressors that may be installed to help mitigate power surges. Be sure to follow the manufacturer's sizing recommendations. Insect and rodent nests can be dangerous inside a rectifier cabinet. Insect stings or even snake bites are definitely not desirable.