



# THE Breaker Buzz

Providing Electrical Solutions Worldwide VOL V

SEPTEMBER 2013

## Arc-Flash, Blast Protection Isn't About Fashion

Protect your technicians – and your bottom line – with solutions designed to reduce the chance of catastrophic events.



LIKE ANY ENERGY source, an electrical circuit is a ticking bomb. It's simply waiting for the right conditions to blow. A twisted pole, faulty interlock, and enough energy will turn an electrical firecracker into a mortal lightning strike.

And what does the smart person do when they come upon a ticking box? They turn around and go the other way, of course. And call the authorities.

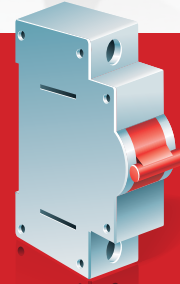
## AMC Introduces Revolutionary Panelboard

The new UL-508A-certified heat trace panelboard serves the natural gas, petroleum, pipeline, and chemical process industries.

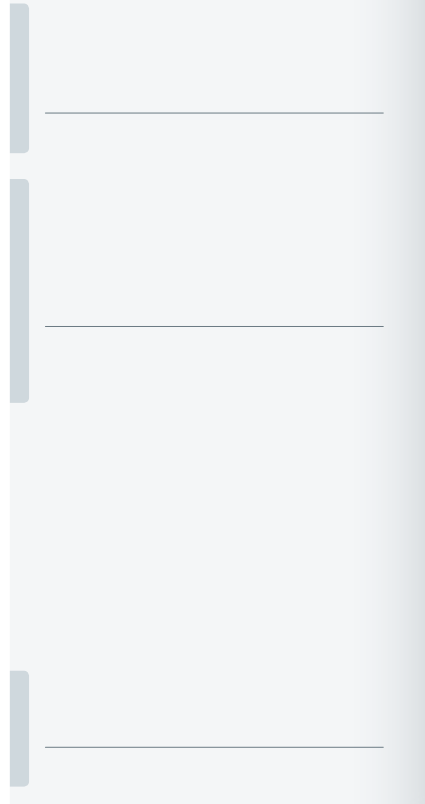


**ADVANCED MOTOR CONTROLS**, a Group CBS company that specializes in electrical equipment manufacturing, remanufacturing, and life extension services, is proud to announce its new UL-508A-certified Heat Trace Panelboards (HTP). Advanced Motor Controls' ProC™ and ProCS™ Series HTP are designed for use in natural gas, petroleum, chemical processing, and related pipeline operations.

"Advanced Motor Controls is proud to become one of the few UL-certified U.S. suppliers of heat trace panelboards in support of the U.S. natural gas and domestic energy markets," said David Muir, business manager of Advanced



INSIDE THIS ISSUE



## THE VIEW FROM FLIGHT LEVEL 410

By *Finley Ledbetter*, CEO, Group CBS

# Group CBS Continues Expansion on All Fronts



Group CBS affiliate companies add key personnel, continue to evaluate new locations in Northeast and around the U.S.

I CANNOT BELIEVE it has been 36 years since I walked into that room at UTA and interviewed for an intern's engineering position at Multi Amp. I guess I should be very happy no one else showed up. Everyone needs to look back and put a check mark next to that spot that helped make them what they are today. I have a few of them. That day at UTA. Meeting Joni. And all the days my kids hit the ground. And, oh yeah, let's not forget the day I called Ray and said, "Meet me for lunch. I have something to talk with you about."

Where am I going with this, you ask? I'm not sure, but it is certainly the truth that surrounding ourselves with great people and being very lucky are great advantages in life and business. I have noticed that the more hours I put in, the luckier I get. And the smarter the guys around me, the smarter I get.

In earlier issues of *BreakerBuzz*, I have written that you should surround yourself with talent, work hard, play hard, and take care of your family. But now I add this one: Let's be the guys who do what we say we will do. Let's be the guys with the products and services that work and do as promised. Let's be the guys who do not have an evil agenda. Let's be the guys who others say, "Hey, there has to be something wrong over there because they're too good." But there is not anything wrong at Group CBS. We are sailing

true and fast. And we are growing in all areas at a time when others are not.

Why is that? I guess if you understand what I wrote above, you get it.

Now around the Group, things are hopping. Western Electrical Sales (WES) has hired a new salesman, Justin Sandlin, to help bolster the Intermountain Region. Let's welcome him and hope for good things out west.

In the East, we are looking to acquire and build a new service shop. Look for more on this in the next *BreakerBuzz*. For now, let me just say that our long-term plans call for us to have a full-service/heavy-service shop in the Northeast by the end of 2015.

Astro Controls has let a contract to double the warehouse in Irving, Texas, allowing us to better organize inventory and bring all our material under one roof.

CBS ArcSafe has hired Tim Kelly to help kick-start that business in the Northeast. Tim has spent the last 25 years working as outside sales for Satin in the New York area. He will work side by side with Lou to help build this market for CBS ArcSafe.

Jeff Voytek has joined Group CBS and will head up the end-service shop setup and build-out. Welcome aboard, Jeff.

Circuit Breaker Analyzer (CBA) has made great progress. We are on our third

**Let's be the guys who do what we say we will do.  
Let's be the guys with the products and services  
that work and do as promised.**

Bill Stephens has accepted the position as president of Circuit Breaker Sales & Repair (CBS&R), and we have started to break ground on a warehouse expansion. Bill will oversee all operations for Group CBS in the Gulf Coast region and help us take CBS&R and Reliable Electrical Testing Services (RETS) in new directions. Bill plans to relocate to Houston and has started to bring in some new staff and ideas to CBS&R and RETS.

release and have sold several accounts. CBA will be adding market and customer support structure to help in the near future. Natalie, Andrew, and Mike have been working tirelessly and have developed a great new CBA version for Windows 7. Look for that new product release before the NETA show in March 2014. It will be a real nice addition to the original iOS version. We are going to give the Windows 7 version for free to all


Continued from page 2

who have already purchased an iOS version. This will be quite a bargain.

Group CBS is working on another acquisition in the Southeast, adding another service shop to our banner. This acquisition should be done and announced before the next *BreakerBuzz*.

Vacuum Interrupters (VI) has been selling MAC (magnetron atmospheric condition) sets and service coast to coast and overseas. We have learned a lot and are improving our hardware and model. Utilities, refineries, chemical plants, and service providers have purchased the sets, and we see a steady stream of data coming from the field. Look for a release of a few new products for both MAC and Vacuum Interrupters Inc. (RVI) before the next *BreakerBuzz*.

Join me in welcoming Finley Ledbetter III to the MAC team after a two-year internship and earning a NETA level 2 card at WES. FL3 has relocated to RVI and will head up field-service demo and training for MAC products. Finley, a 2011 BSEE graduate of Texas Tech's engineering school, is working at RVI learning the ins and outs of MAC field assessment and the particulars of removal and installation of various vacuum interrupters under Jerod Day's watchful eye.

From around the Group, here are but a few of the stories behind the people. Yes, that is where we started. Dare to find the right people and put them in positions to help you do more than you could alone. Remember: To manage, you must measure, and to measure, you must have something worth measuring! 

## AMC Introduces Revolutionary Panelboard

Continued from page 1

Motor Controls. "With UL-508A certification, our energy customers and their electrical suppliers can be confident that our heat trace panelboards include only UL-listed components and comply with all UL, NEMA, and NEC design criteria in addition to some of the fastest alarm condition response times available today."

Heat tracing maintains process temperatures for reservoirs and piping that must store or transport substances that solidify at ambient temperatures. Heat Trace Panelboards monitor electrical resistance in the heat-tracing system. Typically, heat-tracing systems include electric trace heaters, support components, and other electric heating devices that are external to the Heat Trace Panelboard. When the HTP detects an impedance change, it triggers a response of the external components in the heat-tracing system.


Advanced Motor Controls offers two lines of Heat Trace Panelboards: our ProCS™ Series and the ProC™ Series. The ProCS™ Series, our flagship product, uses a solid state programmable micro-processor-based HTP, resulting in fewer nuisance trips for better control during auto tune and setup, improved monitoring accuracy, and faster response times, all while simplifying the installation of high-circuit-count panels for "plug-and-play" operation. Many Heat Trace Panelboards are installed in isolated locations with long cable runs that result in normal ground resistance of 5 to 20 mA, just below trip levels for a standard 30-mA circuit breaker, which makes the ProCS™ Series a perfect solution. For shorter runs and more simplified applications, we offer an economical solution, the ProC™ Series Panelboards, which use a standard 30-mA ground fault circuit breaker.



**Advanced Motor Controls offers the ProCS™ and the ProC™ Series Heat Trace Panelboards.**

Advanced Motor Controls' Advanced Heat Trace Panels can be fabricated as floor or wall-mounted enclosures, and include a panelboard distribution center, power distribution block, control power transformer, and microprocessor-based ground fault relay or standard 30-mA ground fault circuit breaker. The panel has options for an integrated main circuit breaker, main contactor, alarm relay, alarm horn, door disconnect, hand/off/auto selector switch, and push-to-test lights on the panel front. Taken together, these features mean that Advanced Motor Controls' Heat Trace Panels offer advanced features common to high-priced panelboards with minimal cost and lead-time.

Advanced Heat Trace Panels come in a variety of NEMA-rated enclosure types, including NEMA 1, 3R, 4, 4X, and 12. In addition to these stock solutions, Advanced Motor Controls also can build custom panelboards to a specific user's electrical service requirements.

Advanced Motor Controls' Advanced Heat Trace Panels are available immediately with an average lead-time of less than four weeks for standard panelboard configurations. For more information, contact Advanced Motor Controls at 972-579-1460, by email at [dmuir@advancedmotorcontrols.com](mailto:dmuir@advancedmotorcontrols.com), or visit [www.advancedmotorcontrols.com/heat-trace-panel-boards.htm](http://www.advancedmotorcontrols.com/heat-trace-panel-boards.htm). 

## Arc-Flash, Blast Protection Isn't About Fashion

Continued from page 1

Electricians, maintenance personnel, and inspectors are the authorities, however. There is no pass for them. And that means they better know the causes of an arc flash, the difference between arc flash and arc blast, and how to mitigate the dangers from both conditions if they want to succeed at their job and look forward to a happy retirement.

### Thank You, Ralph Lee

In 1982, IEEE Life Fellow Ralph Lee wrote the seminal arc-flash paper, "The Other Electrical Hazard: Electric Arc Blast Burns." In it, Lee tells us that arc flashes are caused by poor electrical contacts or insulation between an energized piece of metal and some other conductor. Unlike a plasma, which solely uses ionized oxygen or trace gas molecules in the air

to conduct electricity between two points, an arc flash is carried by the vaporized (and ionized) metal molecules. The metal is vaporized because the available fault current is high enough to create an electric arc with a temperature of 35,000°F, or approximately four times the temperature of the sun's surface. That is hot enough to kill any unprotected person standing within 5 feet and send the person standing 10 feet away to the hospital with third-degree burns.

### That's Bad News. But It Gets Worse.

The heat from the arc flash causes atmospheric gases to expand at a furious rate, resulting in a peak pressure of up to 2,100 psi at the source of the arc flash. According to bomb studies conducted by the U.S. Department of Defense, 10 psi is sufficient to turn a person's insides into various types of fatal goo. So if the flash doesn't kill you, there is a chance the arc blast will if you're standing too close, regardless of whether you're wearing PPE

rated to handle the temperatures.

In both cases, there is only one sure way to survive. Don't be around when the arc flash/blast goes off. And while that may sound sarcastic, the electrical industry has a number of solutions designed to both reduce the chances of arc flashes/ blasts and protect your technicians when accidents happen.

### PPE and Arc Flash Calculations – Which Do You Trust?

Obviously, the best line of defense against arc flash and arc blasts is to only work on de-energized equipment. Unfortunately, that's not always possible.

For occasions when the power has to stay on, the National Fire Protection Association's (NFPA) 70E, also known as the National Electrical Code (NEC), Tables 130.7(C)(9-11), define hazard risk categories (HRCs) for various classes of equipment, as well as what level of PPE employers need to provide to employees based on the minimum arc thermal performance value (ATPV). A common mistake is to determine the HRC and therefore required PPE level based solely on the class of equipment instead of the actual 70E standard requirements, which are based on available fault current and clearing times for the overcurrent protection device (OCPD).

However, even this approach assumes that the fuse or circuit breaker will actually perform to the OEM specification. For example, fuses may not react quickly to a secondary fault and are only effective if the fault current falls within the prescribed range. Circuit breakers aren't perfect, either. An in-house study conducted by our technicians based on more than 2,000 "as found" circuit breaker field tests revealed that more than 30 percent of low- and medium-voltage breakers installed for 24 months or more did not meet OEM time current curves (TCCs).



March 4, 2009, at the Jubail Project in Riyadh, Saudi Arabia: Three workers were removing a 480-V molded-case circuit breaker from the bucket of an energized motor-control center (MCC) when an electrical arc flash occurred, severely injuring them. All three sustained first- and second-degree burns and were hospitalized following the accident.

After proper testing and maintenance, that number fell to 12 percent. Today, electrical testing companies offer a number of ways to quantify TCC, including a recent iPhone app that uses the phone's internal accelerometer to capture vibration signatures over time value in all three spatial dimensions. When used with remote actuators, this data can provide important insight into the electrical and mechanical health of OCPD devices.

A failed OCPD or even a slow breaker will result in higher incident energies than your technician's PPE protection when the arc-flash calculation is based solely on OEM specifications. NFPA's 70E Article 205.3 requires that all electrical equipment be maintained in association with the OEM instructions or industry standards. NETA's maintenance frequency MTS table based on equipment class and environmental condition is a good place to start when developing your preventive maintenance-planning schedule. Clearly, good maintenance is a first line of protection against arc flash/blasts.

For these reasons, the best way to determine the arc-flash danger for a given device in a given installation is to use IEEE's standard 1584 arc-flash calculations based on actual test data for the given device at a given installation.

**An in-house study revealed that more than 30 percent of low- and medium-voltage breakers installed for 24 months or more did not meet OEM time current curves.**

### **Save Me Switchgear, Save Me**

There's a recurring myth that switchgear is arc-flash resistant. And while it is unquestionably safer to operate or rack a breaker or motor control with the door closed, older switchgear and panelboards were not made with built-in remote actuators and extraction/racking capabilities.

Realizing the gap between fact and



**On May 23, 2009, a power plant in the Midwest experienced a severe arc-flash incident. The incident occurred while racking in a closed Siemens 15-kV GMI breaker with a faulty interlock. When the (closed) breaker contacted the bus, a large arc flash occurred. The breaker was being racked in remotely (wireless); the operators were in another room, and there were NO injuries of any kind. The RRS-1 was used after the arc-flash incident to remove the damaged GMI from the cell for evaluation. Plant personnel who were present are convinced that lives were saved that day.**

fiction, OEMs have started developing switchgear cubicles with integrated remote actuation and racking/extraction features. This switchgear allows your technicians to actuate the OCPD or other device while it is still behind the metal enclosure. Some manufacturers will say that the safest racking takes place behind the closed door of the switchgear. I disagree. I say the safest racking operation takes place while I'm in another room

way, I'd still prefer to have the concrete building between me and the arc blast.

Arc-flash-resistant switchgear also strives to direct the arc flash up and away from the technician, and you can easily search on the Internet for each switchgear manufacturers' latest equipment design.

### **Distance Is Safety**

While arc-flash-resistant switchgear that complies with IEEE C37.20.7 "Guide for Testing Medium-Voltage Metal-Enclosed Switchgear for Internal Arcing Faults" with remote actuation and racking/extraction is a move in the right direction, it can be prohibitively expensive to replace all your aging switchgear with new enclosures and gear.

In response, the industry offers a number of portable remote actuation/extraction/racking systems that can work on virtually any OCPD or motor-control center and enclosure. Rather than having an embedded unit for each cubicle, these systems come with a por-

and the OCPD is behind its door while I'm behind mine. Let's not forget about the dangers of pressure waves from arc blasts. An explosion that creates a 10-psi pressure wave also will generate maximum wind speeds of 294 mph. Double that to 20 psi, and maximum wind speeds are more than 500 mph, which will "severely damage or demolish" a concrete building. But either

# Vacuum Interrupter Tests Can Finally Predict Remaining Field Life

The MAC test offers a new way to attain accurate vacuum measurement in the shop or field.

By Finley Ledbetter

VACUUM INTERRUPTERS (VI) have widely replaced older air-magnetic and oil interrupters for circuit breakers rated at 1 kV or higher. These devices offer up to 10 times the expected lifetime than newer SF-6 gas interrupters.

Unfortunately, nothing lasts forever. The 20-year manufacturer's original suggested life has generally been ignored by users. This has placed a large portion of the U.S. industrial and utility distribution switchgear at risk of failure.

Only through diligent testing and some luck can users expect no events to occur in the future. No one suggests that ignoring this possible failure is acceptable. And every VI will fail; we just do not know when. Luckily, there are several traditional and one new field testing methods for verifying the isolation capability of your VI-protected circuit breakers and motor controls. Let's look at them in greater detail.

## Vacuum Interrupter Test Methods

The following tests are among those that are most commonly applied by manufacturers when a VI is manufactured and/or when it ships to a customer. These tests may be performed on an entire batch of new VIs or — more commonly — on a statistically significant sampling taken from the new batch. The three that are dis-

cussed are related directly to the service life of the VI. Of the three factory tests detailed here, only two have been used in the field — the contact-resistance test and the high-potential test. Neither of these is able to determine the vacuum pressure inside the VI.

### Contact-Resistance Test

A micro-ohmmeter is applied to the closed contacts of the VI, and the resistance is measured and recorded. The result is compared to the design and/or the average values for the other VIs in the same run.

### High-Potential Test

A high-potential voltage is applied across the open contacts of the VI. The voltage is increased to the test value and any leakage current is measured. Factory testing may be done with either AC or DC high-potential test sets. DC is less commonly used because high DC voltages can generate x-rays when they are applied across a vacuum contact.

The high-potential test is a go/no-go result, and even a DC high-potential test set will not give predictable results that can be used. The DC high-potential test results may show a gradual decrease in resistance over time, but it is not sufficient to determine when, or if, the gas pressure

has dropped to critical levels — at least not until the interrupter fails.

As previously noted, the pressure inside a VI will increase with time. There always will be some leakage in even the best-made VI. That leakage may be slow enough that the VI will meet or even exceed the manufacturer's predicted service life. On the other hand, unexpected increases in the leakage rate can greatly shorten its life.

### Leak-Rate Test (MAC Test)

Based on the long-used factory leak test, a new field test is successfully being used to measure the vacuum pressure on service-aged VIs. This test is based on the Penning discharge principle, which states that when a high voltage is applied to open contacts in a gas and the contact structure is surrounded with a magnetic field, the amount of current (ion) flow between the plates is a function of the gas pressure, the applied voltage, and the magnetic field strength.

The test equipment that is used to test vacuum in a VI is called a magnetron. Until recently, technical and logistical problems have prevented the use of magnetrons in the field. With industry improvements in components and manufacturing capability, magnetrons such as

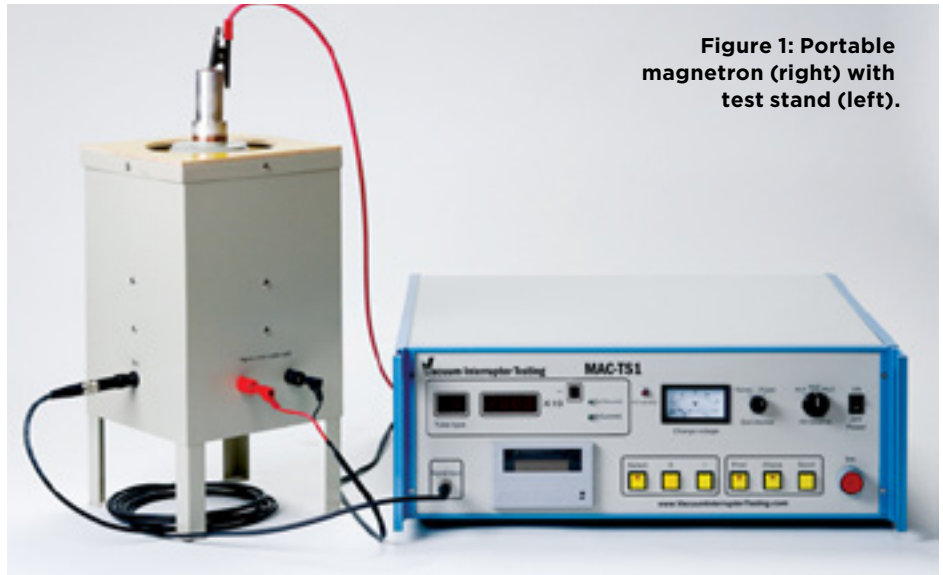


Figure 1: Portable magnetron (right) with test stand (left).

# CBS Receives ISO 9001:2008 Recertification

This important standard ensures that customers receive a quality product the same way every time while allowing Group CBS affiliates to be competitive in the marketplace.

CIRCUIT BREAKER SALES has received recertification for the ISO 9001:2008 standard. The designation establishes minimum business practices for the production and delivery of products and services through the implementation of a formal quality management system that ensures customer requirements are consistently met.


“CBS’s ISO 9001:2008 compliance

ISO 9001 is “not just a badge to be worn; it is a set of standards to be followed,” Briley notes, adding that the designation is quickly sweeping the world as an international standard. “Those companies who ignore ISO 9001 will be left behind. The advantages far outweigh the disadvantages if a company strictly follows the ISO 9001 guidelines. Being ISO

**“ISO 9001 is not just a badge to be worn; it is a set of standards to be followed. Those companies who ignore ISO 9001 will be left behind. ... Being ISO 9001 certified means following the guidelines to build a competitive company in a global economy.”**

ensures that customers will receive a quality product the same way every time,” explains Mike Briley, Circuit Breaker Sales’ ISO/safety manager. “Companies strive for a total quality system because quality is what the customer demands. What’s more, both internal and third-party audits eliminate the need for customers to come to our facilities to do their own compliance checks on our system.”

9001-certified means following the guidelines to build a competitive company in a global economy.”

Two other Group CBS companies—Vacuum Interrupters, Inc. and CBS Store—have ISO 9001:2008 certifications as well. Briley currently is working with Advanced Motor Controls to attain the designation by year’s end. CBS also holds ISO 14001:2004 certification, an environmental management standard. 


## Tim Kelly Joins CBS ArcSafe as Northeast Field Sales Rep



CBS ARCSAFE is pleased to welcome Tim Kelly as its new Northeast field sales representative. Kelly, an expert in the Northeastern utility, industrial, and government sectors, brings 25 years of experience in the switchgear and circuit breaker marketplace to his new position. He previously serviced the electrical industry in the Northwest United States.

“We are very excited to have Tim join CBS ArcSafe,” says Ashley McWhorter, president of CBS ArcSafe. “With his strong technical background and experience, he will bring a lot of good opportunities to ArcSafe in the Northeast region. We will get to learn from him, as we always enjoy adding a quality asset to our team.”

“I look forward to this new opportunity with CBS ArcSafe and am excited to expand my territorial responsibilities,” Kelly adds.

Kelly will be based out of New Milford, Conn., where he lives with his wife and three children. He can be reached at 203-788-9149 or [tkelly@cbsarcsafe.com](mailto:tkelly@cbsarcsafe.com). 

### Other reasons why a company may seek a quality system include:

- Ensuring that products and services provided meet customer requirements
- Ensuring consistency in day-to-day operations
- Ensuring that processes are repeatable and predictable
- Allowing the company to create and retain satisfied customers
- Improving efficiency, reducing operating cost, and minimizing unproductive time

## Vacuum Interrupter Tests Can Finally Predict Remaining Field Life

Continued from page 6

the one shown in Figure 1, are now coming onto the market for field use. It is small and portable and will retain calibration with only the normal procedures as specified in industry standards for field testing.

The field is created by a DC current and remains constant during the test. A constant DC voltage, usually 10 kV, is applied to the open contacts, and the current flow through the VI is measured. Since the magnetic field (DC) and the applied voltage (DC) are both known, the only variable remaining is the pressure of the gas. If the relationship between the gas pressure and the current flow is known, the internal pressure can be calculated based on the amount of current flow.

### First Predictive Field Tests for Vacuum Interrupters

Since removing the VI from its breaker is time-consuming and may lead to errors, flexible magnetic field coils (FMFC), such as those shown in Figure 2, have been developed. This specially designed coil is shown wrapped around the VI itself — a method not physically possible on all vacuum breakers. Placement of the FMFC cannot be arbitrary. Research has furnished the required information on where to place the coil to create reproducible, accurate results. Further research has shown that the FMFC also can be used around one or more field pole assemblies as shown in Figure 3.

Using the magnetron in the field allows the VI vacuum pressure to be tested every time field-testing is performed. The tested pressure value, along with other relevant data, is entered into a modern CBM diagnostic and predictive algorithm. The algorithm evaluates the results and



**Figure 2: Flexible magnetic field coils.**



**Figure 3: FMFC applied around entire pole.**

develops a highly accurate evaluation of the current data to previous data, and calculates expected future values for life prediction purposes.

Any statistical analysis package, such as a CBM process, requires a histori-

The algorithm evaluates the results and develops a highly accurate evaluation of the current data to previous data, and calculates expected future values for life prediction purposes.

cal data set to work properly. Since MAC testing is relatively new to field maintenance, the process is still early. Because of the large number of different manufacturers and models of VIs, developing individual curves for each vacuum interrupter will be a laborious task. Curves for a large number of the more common VIs are currently being developed, and curves for any VI can be developed on request. However, research shows that the vacuum versus current relationship strongly correlates to the geometry of the VI. It has been seen that accuracies of +/-10% are realized when curves are developed solely on

the basis of VI diameter. This relationship has allowed the development of six or possibly seven generic curves that can be used successfully in determining the vacuum in most vacuum interrupters in service today.


However, data is being collected, and the comparison of collected data to previous maintenance areas (such as the evaluation of insulating liquid) is very promising. In only a few years, we expect to see a marked improvement in maintenance efficiency and a reduction in the number of unexpected failures of vacuum interrupters.

### Conclusion

Thousands of medium-voltage power circuit breakers have passed through service shops and the hands of credible testing companies. When these breakers were returned to their owners, many thought that they were guaranteed to last until the next maintenance cycle. This is not true.

When breakers are maintained and tested using traditional methods, they go back into service with only one guarantee: This device will function today.

Many of these have failed or will fail before the next scheduled maintenance cycle. This is a problem we have been working to solve for more than 10 years.

With the addition of the MAC test in the field, this is no longer the case. 



# How to Get Up and Running After a Hurricane

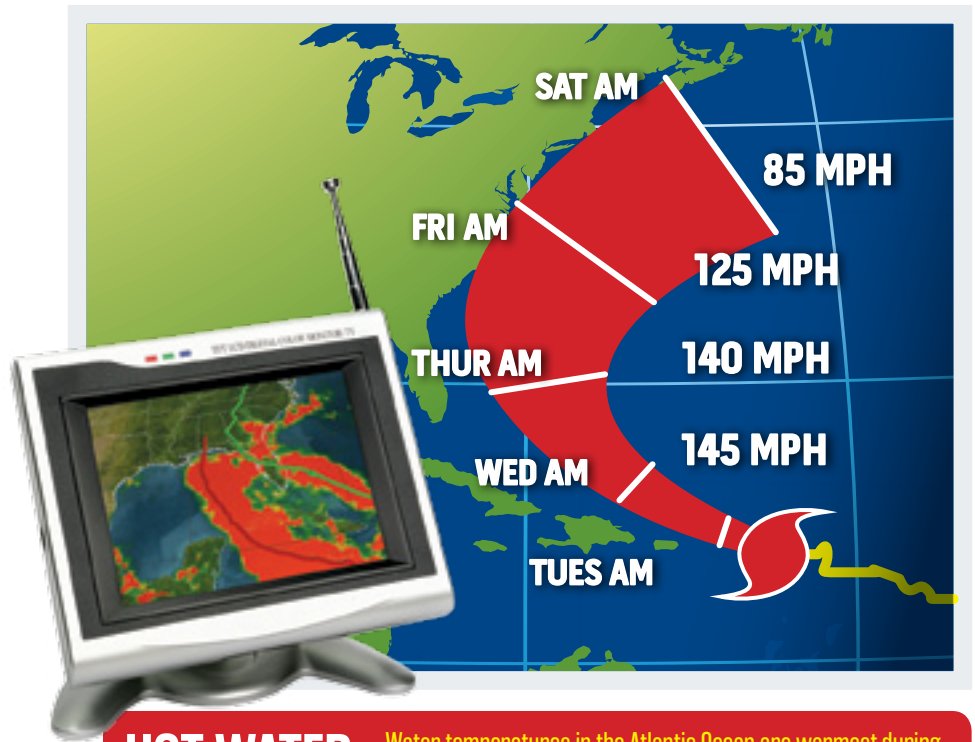
**ELECTRICAL EQUIPMENT** exposed to water can be extremely dangerous if re-energized without proper reconditioning or replacement. To help guide your restoration efforts after hurricanes or other water-related events, Circuit Breaker Sales & Service (Lakeland, Fla.) offers this "Recondition/Replace" guide based on NEMA guidelines.

## REPLACE:

- Molded-case circuit breakers
- Fuses
- Electronically controlled and solid-state contactors and starters
- Components containing semiconductors and transistors
- Overload relays
- All dry-type transformers regardless of kVA ratings
- All dry-type control circuit transformers
- Any wire or cable listed for dry locations only, such as type NM-B cables, should be replaced if exposed to water.
- Any cable that contains fillers – such as polypropylene, paper, etc – should be replaced if the ends of the product have been exposed to water.
- GFCIs and surge protectors
- Lighting fixtures

## RECONDITION:

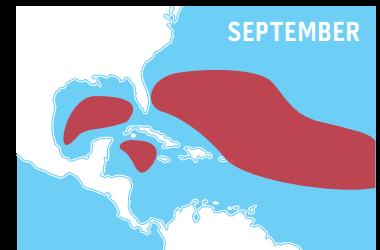
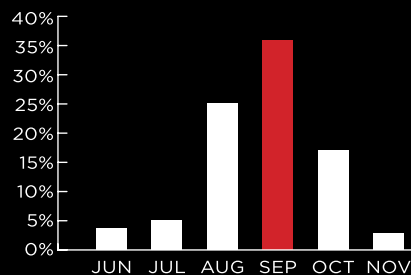
- Enclosed switches
- Busway
- Panelboards and switchboards
- Manual and magnetic motor controllers
- Motor-control centers
- Alternating current high-voltage circuit breakers
- Low-voltage power circuit breakers
- Protective relays, meters, and current transformers
- Low-voltage switchgear
- Medium-voltage switchgear
- Liquid-filled transformers (*Analysis of the insulating medium is required for evaluation of this equipment.*)
- Cast-resin transformers
- Fire pump controllers
- Motors



## HOT WATER

Water temperatures in the Atlantic Ocean are warmest during September. Most hurricanes occur during this month.

Typical Hurricane Frequency by Month



Typical Tropical Storm Formation Zones

# WES Restructures Management Team to Address Continued Growth



IN RESPONSE to significant growth over the last several years, Western Electrical Services (WES) has hired new talent to continue meeting our customers' needs. But like any company that experiences a rapid rise, WES has experienced growing pains.

Throughout the course of our growth, we've recognized the need for an organizational revamp. The current management structure does not allow for consistency in all locations, accountability has been too subjective, locations were becoming isolated from one another, and support from other locations was becoming more territorial.

In order to maintain and expand upon our success, WES has reorganized its management team to allow managers to better evaluate resources, job profitability, and other company processes. The restructure also has resulted in these changes:

- Clarification of reporting lines for the Apparatus division
- A new divisional leader for the Field Service division
- Creation of a Business Development department that will take the lead on all sales and marketing efforts
- A new separate Engineering division to bring more focus on true engineering services


## Management changes include:

**Dan Hook**, EVP, Business Development: Responsible for all sales and marketing efforts, new business, new markets, and strategic opportunities.

**Rob Coomes**, VP, Engineering division: Responsible for all engineering studies, such as short circuit, coordination, arc-flash-hazard analysis, etc; field-service support for Intermountain Region; and overall field support from an engineering perspective.

**Tony Asciutto**, VP, Field Services division: Responsible for all aspects of field services from operations, cost and profit, and equipment and manpower resources, as well as assisting with customer and project-specific sales and marketing efforts.

**Matt Zemanek**, VP, Apparatus Services division: Responsible for operation, resources, and cost and profit for Sumner and Phoenix apparatus service shops; also supports apparatus repair and upgrade services in the field.

With everyone working together, Western Electrical Services, Inc. is poised for a great future. 

## WES Becomes PEARL Full Member

By Craig Archer


WES IS PLEASED to announce that it has become a Full member of the Professional Electrical Apparatus Recyclers League (PEARL). As a Full member, WES must meet PEARL's strict technical, safety, and operational requirements to ensure the proper recycling and reuse of electrical power equipment.

"Western Electrical Services has always been focused on providing end-to-end solutions for our electrical customers, from testing to repair and retrofits," says Dan Hook, executive vice president of business development for WES. "Becoming a PEARL Full



member in addition to being a certified NETA Accredited Company (NAC) tells our customers that WES adheres to the

highest standards for its field-testing operations, as well as its shop repair, retrofit, and upgrade services."

WES specializes in the maintenance, repair, and testing of switchgear, circuit breakers, and other electrical equipment. WES's capabilities in manufacturing, remanufacturing, retrofitting, reverse engineering, and replacement parts can economically extend the life of electrical apparatuses. With offices in four locations in the western U.S., WES serves customers in Arizona, Washington, Oregon, Utah, Idaho, Nevada, and western New Mexico. 

# U.S. Steel Manufacturer Turns to WES for Magne-Blast On-Site Rebuilds

When no one else would take the job, WES steps forward to save the day.



**Left:** WES's manufacturing capabilities were on full display when it rebuilt all cubicles for more than a dozen Magne-Blast circuit breakers for a U.S. steel manufacturer. **Right:** GE Magne-Blast AM 13.8-750-2H 2,000-amp with VCP-WR element air-magnetic circuit breaker that has been vacuum retrofitted.

A U.S. STEEL manufacturer recently planned on taking its hot-strip steel processing line down for seven days of maintenance. During that week-long period, plant electricians and outside contractors would perform numerous equipment checks and upgrades, including electrical testing and repairs of GE Magne-Blast circuit breaker cubicles that fed a hot-strip steel processing line.


Before the outage, the manufacturer put out the bid to three companies. One declined to work on the project, while another said parts were virtually impossible to come by, but they would test and repair what they could. But thanks to extensive Magne-Blast part inventories and in-house machining and manufacturing capabilities, WES was able to rebuild all 14 cubicles for more than a dozen Magne-Blast AM 7.2-500 1,200-amp and 2,000-amp circuit breakers.

"The vertical-lift GE Magne-Blast cubicle elevating mechanisms were causing misalignment and damage when breakers were elevated into the connected position," explains Craig Archer, president

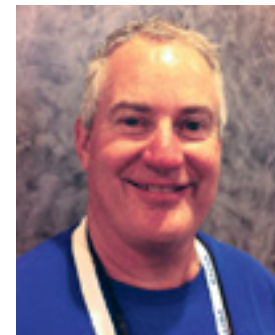
of WES. "At times they would hang up, and plant personnel would not be able to remove the breakers. This would require them to de-energize the entire lineup to get the breaker out of the cubicle. WES went in with prior proven components manufactured in our Seattle facility and rebuilt all elevating mechanisms."

When gears, shafts, and elevating motor parts were not available, WES technicians reverse engineered the defective parts and either modified off-the-shelf components or manufactured the necessary parts from steel blanks.

"We manufactured gears/shafts in our machine shop facility in Seattle, then shipped them overnight to the job site," says Ryan Herbst, SW apparatus supervisor at WES. "All new miter, spur, and pinion gears were manufactured or final machined in our Seattle facility prior to mobilizing to the job site for the rebuilding of the cubicles. All shaft bearings were replaced with off-the-shelf dimensionally matched bearings.


"They gave us seven days to do the job," Herbst recalls. "We did it in five." 

## WES Hires Justin Sandlin for Intermountain Region Sales



WESTERN ELECTRICAL SERVICES is pleased to welcome Justin Sandlin to support our Intermountain Region sales efforts. Justin has been in the electric power industry since 1989. A resident of the Denver area for 13 years, Justin has worked for EATON, ABB, and Arizona Electrical Apparatus.

"I am really excited to have Justin onboard," says Dan Hook, executive vice president of business development for WES. "He brings in-depth knowledge of the market and customers who are on the fringe of our current service area. His efforts will allow for WES's continued expansion to cover all of the western U.S. as our name promises."

Justin's services are available to any Group CBS company that needs help in the Intermountain Region. Contact him at 888-395-2021 (office), 303-517-3266 (mobile), or via email at [jsandlin@westernelectricalservices.com](mailto:jsandlin@westernelectricalservices.com). 

## Arc-Flash, Blast Protection Isn't About Fashion

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table design and power supply. The best examples of remote racking/actuation work with horizontal or vertical racking systems, use magnetic latching that does not require any modification to existing equipment, and accommodate a variety of equipment makes and models. In some cases, the technician can stand up to 500 feet away from the gear in question, well outside the arc-flash and arc-blast danger boundaries, which is defined as the distance at which incident energy drops below 1.2 cal/cm<sup>2</sup>.

These portable systems also can provide preventive maintenance data on the force required to rack a unit. For example, during a recent service call, eight ITE HV 1,200-amp breakers had all undergone recent maintenance in a 50-year-old power plant.

A portable remote-racking device was used to install the breakers and record the ft-lbs of force required to rack the breakers.


The technician observed racking values of 15.4, 15.7, 15.4, 15.7, 15.7, 15.7, and 25.4. The torque required to rack the last breaker at 25.4 represented more than a 50 percent increase in force. Remote rack-

isn't an option — it's a necessity per OSHA and NEC requirements. It starts with an accurate arc-flash calculation based on real field tests, which will pay double dividends when you use that data as part of

**Protecting yourself and your employees from arc-flash and arc-blast dangers isn't an option — it's a necessity per OSHA and NEC requirements.**

ing identified that a problem was present. While the remote-racking device could not identify the specific problem, it did give maintenance the information it needed to check the cubicle for a dry/non-lubricated racking screw, problems stemming from a settling facility foundation in a 50-year-old power station, a bent racking mechanism, a worn racking mechanism, bent finger clusters, lacquered grease on the stabs and finger clusters, and melted bus, among others. A qualified maintenance person identified the real cause of the increased friction and corrected the problem before a catastrophic event could occur.

Protecting yourself and your employees from arc-flash and arc-blast dangers

a preventive maintenance program. But realize that whenever a piece of electrical equipment with sufficient fault current is operated, there is a danger. And PPE will not always protect your workers. While PPE is useful, it is also expensive, impossible to test its actual temperature resistance without damaging the equipment, and a misery for your technicians who have to wear it. Consider newer solutions for your technicians who perform testing, actuation, and extraction/racking operations from well outside the danger zone. Only then can you be sure that not only is your equipment in good working order, but you've done all you can to protect both your employees and your bottom line. 

| Peak over-pressure | Maximum wind speed | Effect on structures   | Effect on the human body                          |
|--------------------|--------------------|--|---|
| 1 psi              | 38 mph             | Window glass shatters  | Light injuries from fragments occur               |
| 2 psi              | 70 mph             | Moderate damage to houses<br><i>(windows and doors blown out and severe damage to roofs)</i> | People injured by flying glass and debris         |
| 3 psi              | 102 mph            | Residential structures collapse  | Serious injuries are common, fatalities may occur |
| 5 psi              | 163 mph            | Most buildings collapse  | Injuries are universal, fatalities are widespread |
| 10 psi             | 294 mph            | Reinforced concrete buildings are severely damaged or demolished                             | Most people are killed                            |
| 20 psi             | 502 mph            | Heavily built concrete buildings are severely damaged or demolished                          | Fatalities approach 100%                          |

*\*Peak PSI from arc-flash event is 2,100 psi, 35,000°F*

# Heat Safety Takes Priority on Sunny Days

Heat exhaustion is a heat-related illness that can occur after you've been exposed to high temperatures for several days and have become dehydrated.

THERE ARE TWO TYPES of heat exhaustion: water depletion and salt depletion. Signs of water depletion include excessive thirst, weakness, headache, and loss of consciousness. Salt depletion warning signs include nausea and vomiting, frequent muscle cramps, and dizziness.

Although heat exhaustion isn't as serious as heat stroke, it isn't something to be taken lightly. Without proper intervention, heat exhaustion can progress to heat stroke, which can damage the brain and other vital organs, and even cause death.

## Treatment for Heat Exhaustion

If you, or anyone else, have symptoms of heat exhaustion, it's essential to immediately get out of the heat and rest, preferably in an air-conditioned room. If you can't get inside, find the nearest shady place.

Other recommended strategies to combat heat exhaustion include:

- Drink plenty of fluids (avoid caffeine and alcohol).
- Remove any unnecessary clothing.
- Take a cool shower or bath.
- Apply other cooling measures such as fans or ice towels.

If such measures fail to provide relief within 30 minutes, contact a doctor because untreated heat exhaustion can progress to heat stroke.

After you've recovered from heat exhaustion, you'll probably be more sensitive to high temperatures during the following week. So it's best to avoid hot weather and heavy exercise until your doctor tells you that it's safe to resume your normal activities.

## Risk Factors for Heat Exhaustion

Heat exhaustion is strongly related to the heat index, which is a measurement of how hot you feel when the effects of relative humidity and air temperature are combined. A relative humidity of 60 percent or more hampers sweat evaporation, which hinders your body's ability to cool itself.

The risk of heat-related illness dramatically increases when the heat index climbs to 90 degrees or more. So it's important — especially during heat waves — to pay attention to the reported heat index, and also to remember that the heat index is even higher when you are standing in full sunshine.




## Symptoms of Heat Exhaustion

The most common signs and symptoms of heat exhaustion include:

|           |                  |
|-----------|------------------|
| Confusion | Muscle cramps    |
| Dizziness | Nausea           |
| Fainting  | Pale skin        |
| Fatigue   | Profuse sweating |
| Headache  | Rapid heartbeat  |

If you live in an urban area, you may be especially prone to develop heat exhaustion during a prolonged heat wave, particularly if there are stagnant atmospheric conditions and poor air quality. In what is known as the "heat island effect," asphalt and concrete store heat during the day and only gradually release it at night, resulting in higher nighttime temperatures.

Check with your doctor to see if your health conditions and medications are likely to affect your ability to cope with extreme heat and humidity. 



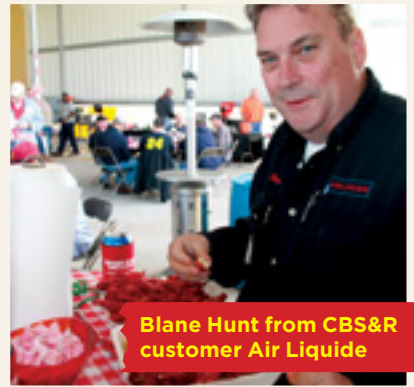
## Other ways to beat the heat...

Staying Cool: A local woman in Denton, Texas, makes sure her trusty steed stays cool on a hot summer day at the local Dairy Queen.

# OPEN HOUSE in LaPorte, Texas

CBS&R Hosts Customer Appreciation  
Crawfish Boil in May 2013

Circuit Breaker Sales & Repair facility



Blane Hunt from CBS&R customer Air Liquide



Group CBS President Finley Ledbetter and Julia Neves, Vice President & Operations Manager at Vacuum Interrupters, Inc.



Ray Kinney, CEO and Chief Scientist at Group CBS



Circuit Breaker Sales & Repair management and staff, from left to right: Lee Heine, Israel Sosa, Tre Ponce, Roger Vogel, and Tom Brawner



CBS Arc Safe race crew team members (right) are excited to get a closer look at the CBS race car (left)





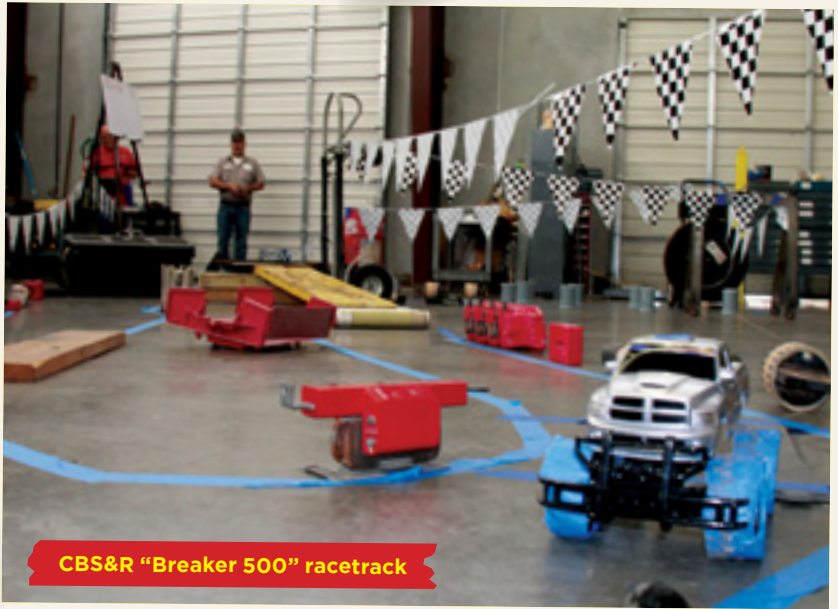
Customers, guests, and helpers enjoy CBS&R's Customer Appreciation Crawfish Boil!



More guests



CBS&R's Tre Ponce discusses cell interlocks with a customer



CBS&R "Breaker 500" racetrack



CBS&R breaker technician Travis Matthews



Tiffany Beck (left) and Joshua Sons (far right) interact with customers at the Reliable Electrical Testing Services, LLC table



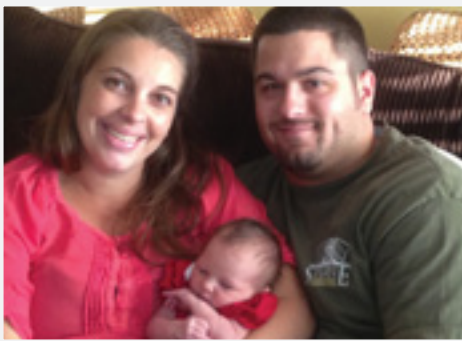
# GCBS Community

## CBS Gives Back to Oklahoma Tornado Survivors



When Circuit Breaker Sales heard that one of our local churches was going to make a trip to the Moore, Okla., area to help out victims of the May 20 tornado, we knew we wanted to make a difference in the lives of our neighbors to the north. CBS promptly got on board and teamed up with First Baptist Church of Gainesville, Texas, which delivered food, water, baby diapers and formula, and other supplies to those who suffered from the devastating storm.

## WES Welcomes Its Newest Addition



Ryan Herbst, WES's SW apparatus supervisor and his wife, Jennifer, were blessed with a healthy baby girl on Aug. 15. Hadley Herbst came in at 6 pounds, 15 ounces. All are doing well and getting some much-needed sleep.

## GROUP CBS AFFILIATES

### Advanced Motor Control, Inc.

[www.AdvancedMotorControls.com](http://www.AdvancedMotorControls.com)  
Irving, Texas — Ph: 972-579-1460

Supplies electrical equipment, upgrade retrofits, and life-extension services to commercial and industrial customers.

### Astro Controls, Inc.

[www.AstroControls.com](http://www.AstroControls.com)  
Irving, Texas — Ph: 800-289-2757

Sales and service for all types of industrial molded-case circuit breakers, insulated case circuit breakers, and motor controls.

### CBS ArcSafe, Inc.

[www.CBSArcSafe.com](http://www.CBSArcSafe.com)  
Denton, Texas — Ph: 877-4-SAFETY

Remote racking systems, remote switch actuators, and handheld motorized racking tools for low- and medium-voltage switchgear.

### CBS Nuclear Services, Inc.

[www.CBSNuclear.com](http://www.CBSNuclear.com)  
Matthews, N.C. — Ph: 704-882-1875

Specializes in shop and on-site field servicing of Class 1E safety-related low- and medium-voltage switchgear and circuit breakers. Also services industrial and non-nuclear-related circuit breakers and related switchgear and substations.

### CBS Power Products, Inc.

[www.CBSPowerProducts.com](http://www.CBSPowerProducts.com)  
Dallas, Texas — Ph: 940-665-4444

New alternative utility and industrial power products: transformers, switchgear, and other power apparatuses.

### Circuit Breaker Sales Co., Inc.

[www.circuitbreaker.com](http://www.circuitbreaker.com)  
Gainesville, Texas — Ph: 800-232-5809

World's largest inventory of low- and medium-voltage circuit breakers. Millions of parts in stock. Complete service, remanufacture, upgrade, and life-extension services. Match existing switchgear lineup.

### Circuit Breaker Sales & Repair, Inc.

[www.CBSalesAndRepair.com](http://www.CBSalesAndRepair.com)  
Houston, Texas — Ph: 281-479-4555

Servicing the Gulf Coast with shop or field service, repair, upgrade, or replacement of power system apparatus.

### Circuit Breaker Sales & Service, Inc.

[www.cbs-florida.com](http://www.cbs-florida.com)  
Lakeland, Fla. — Ph: 863-646-5099

One-stop service for circuit breakers, switchgear, transformers, protective relays, loadbreak switches, motor controls, unit substations, and renewal parts, as well as repair, upgrade, life extension, and maintenance services.

### Circuit Breaker Store, Inc.

[www.CircuitBreakerStore.com](http://www.CircuitBreakerStore.com)  
Denton, Texas — Ph: 855-227-8673

Your online source for all Group CBS products, a powerful solutions provider with a specialty vendor network that can supply factory new, surplus new, and reconditioned circuit breakers, electrical distribution, control equipment, parts, and remote racking equipment.

### Reliable Electrical Testing Services, LLC

[www.ReliableElectricalTestingServices.com](http://www.ReliableElectricalTestingServices.com)  
La Porte, Texas — Ph: 713-254-0006

On-site commissioning and acceptance testing of new installations and apparatuses; or maintenance, troubleshooting, repair, and electrical testing of existing systems. Also professional electrical power engineering services to ensure the reliable, safe operation of electrical systems.

### Sentinel Power Services, Inc.

[www.SentinelPowerServices.com](http://www.SentinelPowerServices.com)  
Tulsa, Okla. — Ph: 800-831-9550

Sentinel Power Services is an electrical power service company servicing the central U.S. with electrical engineering studies; on-site electrical testing, preventive maintenance and repair services; and repairing, building, and installing electrical power systems.

### Solid State Exchange & Repair, Inc.

[www.SolidStateRepair.com](http://www.SolidStateRepair.com)  
Denton, Texas — Ph: 877-874-7349

Quality, reliable, on-time service and support for all brands and types of solid state power electronics including circuit breaker trip devices, protective relays, motor overload relays, and rating plugs.

### Transformer Sales Co.

[www.TransformerSales.com](http://www.TransformerSales.com)  
Gainesville, Texas — Ph: 940-665-4484

Offers a complete line of new, surplus, and reconditioned dry type, cast coil, and liquid-filled power transformers from 1,000 to 5,000 kVA with primary voltages from 2,400 volts to 34.5kV.

### Vacuum Interrupters, Inc.

[www.VacuumInterruptersInc.com](http://www.VacuumInterruptersInc.com)  
Carrollton, Texas — Ph: 214-442-5877

Provides replacement vacuum interrupters (vacuum bottle interrupters) for virtually any manufacturer's medium-voltage circuit breaker or contactor.

### Western Electrical Services, Inc.

[www.WesternElectricalServices.com](http://www.WesternElectricalServices.com)  
Phoenix, Ariz. — Ph: 888-395-2021

Serving the Southwest with superior quality on-site electrical testing, maintenance, and repair services, as well as rebuild, upgrade, and life extension services for switchgear, circuit breakers, and motor control.

### Western Electrical Services, Inc.

[www.WesternElectricalServices.com](http://www.WesternElectricalServices.com)  
Salt Lake City, Utah — Ph: 888-395-2021

The only full-service electrical testing and maintenance company in the Intermountain Region.

### Western Electrical Services, Inc.

[www.WesternElectricalServices.com](http://www.WesternElectricalServices.com)  
Sumner, Wash. — Ph: 888-395-2021

The Northwest leader in electrical testing, maintenance, and power switchgear services providing on-site electrical testing and maintenance, electrical engineering studies, and sales, repair, upgrade, and life extension services of circuit breakers, switchgear, motor control, and transformers. Also custom manufacturing of engineered and reverse-engineered parts.

### Western Electrical Services, Inc.

[www.WesternElectricalServices.com](http://www.WesternElectricalServices.com)  
Vancouver, Wash. — Ph: 888-395-2021

Utility class service provider to the Northwest T&D market.