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# Unmatched Capabilities. Uncompromised Quality. Unparalleled Growth.

*If you knew NLI well five or so years ago, you might not even recognize NLI today. We've doubled in size (a couple times), quadrupled our square footage, and were recently acquired by an electrical products manufacturer, AZZ incorporated.*



Following two decades of consistent growth, NLI was acquired by AZZ incorporated (NYSE:AZZ), an electrical equipment manufacturer and supplier founded in 1956. NLI moved into its new 200,000 square foot facility a few years ago, quadrupling its space and enabling a near doubling of employees, and a significant increase in sales and shipments. The recent acquisition will enable us to take another quantum leap forward.

NLI is often described as a third party dedicator, and yes, NLI does do that. At one time commercial grade dedication was a major part of NLI's business. But despite being one of the industry's largest providers of third-party dedication services, this is actually a small part of NLI's business today.

It is difficult to describe NLI's complete product offering. We've jokingly said, everything except fuel, but perhaps a better way to describe NLI's products is, everything plants have difficulty obtaining. Given the vast number of items either functionally obsolete or unobtainable in the marketplace, we've been kept quite busy by this focus. If you come to NLI asking for a 6" globe valve, we'll be happy to offer one. But there are plenty of safety-related suppliers for globe valves. However, if you need a metal-seated ball valve or triple-offset butterfly valve, we're right there to help.

**When you can't seem to find what you're looking for or can't live with the price and delivery, call NLI. Or save yourself the time and call us first! Let NLI be your single source.**

NLI is very well known for electrical products. We have several thousand Motor Control Center Cubicles installed at about half the sites in North America, and over one-third of the sites have installed our replacement low voltage circuit breakers. We also supply stationary batteries to roughly half the US fleet. That's the NLI most people know and electrical is about half of our business.

The NLI you might not know manufactures harsh environment actuators, supplies more safety-related chillers than any other US supplier, offers replacement pump parts, large vessels, seismic monitoring systems, spent-fuel pool level transmitters, ultrasonic feedwater flow instruments, digital bargraph meters, valve position switches, station blackout diesel generators, and much more.

When you visit NLI's manufacturing facility in Fort Worth, Texas, you'll see a very large manufacturing area (above), three seismic tables, numerous thermal aging ovens and LOCA chambers. You'll also see a staff of more than 200 nuclear professionals, one-fourth of which are engineers. Our engineering department is nearly three times the size of our sales force. NLI would rather engineer for you the product you need than sell you the product we have. This is the not-so secret of our success.

# AZZ | NLI™

Engineered Solutions



## Everything Except Fuel.

**Nuclear equipment: we provide it.** This is not an overstatement. At NLI, we specialize in supplying our clients with the products they need. We are problem solvers. We do not simply react to plants' needs; we anticipate those needs and actively seek and develop new solutions before they become crises. Utilizing the finest partners, engineers, and technicians, our long list of products and services not only address current nuclear requirements, but will stay reliable and effective for years to come while increasing the bottom line. That defines our solid guarantee of service, standard-setting craftsmanship, and quality. **And that's why we're your single source.**



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[www.azz.com/nli](http://www.azz.com/nli) • 800.448.4124



# WESTINGHOUSE INNOVATION: DEFINING THE FUTURE OF NUCLEAR ENERGY

Right now, there's a new generation of nuclear energy being built, with the construction of the AP1000® nuclear power plants in China and in the United States.

Westinghouse, the world's pioneering nuclear company, hasn't stopped there. We've remained focused on safely and efficiently advancing nuclear power plant technology in order to bring to market our next innovation - the **Westinghouse Small Modular Reactor (SMR)**.

The **Westinghouse SMR** is a >225 MWe integral pressurized water reactor (PWR), with all primary components located inside of the reactor vessel. In keeping with the Westinghouse tradition of safety, quality and unrivaled technology leadership, the **Westinghouse SMR** builds upon the innovation concepts and advances in technology achieved in the Westinghouse **AP1000** reactor design. The most economic standalone reactor in its category, the **Westinghouse SMR** is the leading option to provide a future source of safe, secure, zero-carbon energy.

Recently, Westinghouse achieved a significant step toward making the SMR a reality, with the production of the first SMR fuel assembly. Based on operationally proven and licensed 17x17 RFA fuel, and representing millions of dollars of investment and world-class manufacturing technology, Westinghouse is the first SMR vendor to design, fabricate and test a small modular reactor fuel assembly.



*A graphical rendering of the Westinghouse SMR, which is projected to use less than 15 acres of land.*

The Westinghouse team has obtained superior experience and knowledge when it comes to safe plant design, as well as possessing exceptional capabilities to provide a turnkey product, from reactor design and fabrication all the way through fueling the core. Advancing components and system technologies that are already licensed and deemed safe by the U.S. Nuclear Regulatory Commission to a new safety level, Westinghouse's proven approach will provide licensing, construction and operational certainty that cannot be matched, with competitive economics.

As the United States Department of Energy considers the Westinghouse proposal response to the Funding Opportunity Announcement for Innovation and the acceleration of SMR technology deployment, the choice will be clear. **The Westinghouse SMR:** solving global energy needs, driving the nuclear industry's future.



[www.westinghousenuclear.com](http://www.westinghousenuclear.com)



# DRS Consolidated Controls Develops New Safety-Related Products

For more than 55 years, DRS Consolidated Controls, Inc. (DRS-CCI) has been committed to the safety of its customers. That commitment, coupled with an overall dedication to excellence, has led DRS-CCI to develop a number of products for safety-related applications at nuclear power plants.

The DRS-CCI Pressure and Differential Pressure Transmitters feature a longer product life, eliminating the need for frequent replacement and reducing the total cost of ownership. These transmitters were created in response to customer requests for products capable of withstanding more stringent environmental qualification tests. Drift and leakage errors are no longer an issue since the transmitters feature an all-welded pressure boundary and no fill fluid. Their design is based on a proven technology that DRS-CCI has been manufacturing for over 50 years.

DRS-CCI offers a number of products to meet the requirements of current and future safety-related Emergency Diesel Generator (EDG) control applications. Together with an EDG, these control systems enable safe and seamless operation of the power plant in the event of loss of offsite power. First, our PL $\mu$ S 32™ EDG Control System features a modular digital architecture that is compatible with all engine types. It is based on the highly successful PL $\mu$ S 32™ Distributed Control System that has been performing in safety-related applications at six nuclear power plants for over ten years. Second, our Digital Voltage Regulator and Digital Speed Control offer sophisticated diagnostics, advanced monitoring, and enhanced communications capabilities that are not available in traditional analog voltage regulators and speed controls. DRS-CCI is supplying these safety-related EDGs controls for the Department of Energy's Mixed Oxide Fuel Fabrication Facility.

Our Reactor Coolant Pump Speed and Phase Reference Sensors are

safety related components that monitor the rotational speed and direction of the reactor coolant pump. Their all-stainless-steel construction allows these sensors to operate continuously in the most extreme environments. Even though new plant designs often have non safety-related reactor coolant pumps, the specifications usually require safety-related speed sensors. DRS-CCI

has been chosen as the exclusive provider of the speed sensors for the Westinghouse AP1000® nuclear power plants in China and the USA.

DRS-CCI has long been known for our commitment to safety, proven record of reliability, and long-standing client relationships. Our complete set of safety-related products will ensure your facility's reliability today and tomorrow.



## Safety. Reliability. Experience.

For more than 55 years, the nuclear industry has relied on DRS Consolidated Controls for premier safety and non-safety instrumentation and control systems.

- ☀️ PL $\mu$ S 32™ Digital Distributed Control Systems
- ☀️ Pressure and Differential Pressure Transmitters
- ☀️ Reactor Coolant Pump Speed Sensors
- ☀️ Emergency Diesel Generator Controls
- ☀️ Digital Voltage Regulators and Speed Controls
- ☀️ Control Rod Drives and Controls

Learn more at [www.drs-cci.com](http://www.drs-cci.com)  
or contact us at 203.798.3030





## Critical Pump Testing for the Nuclear Industry

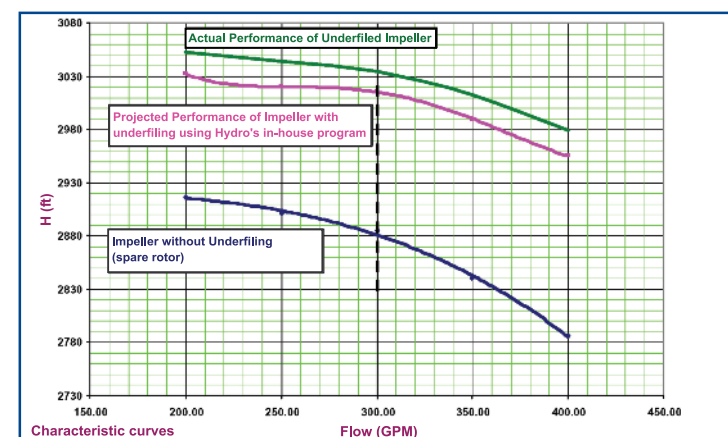
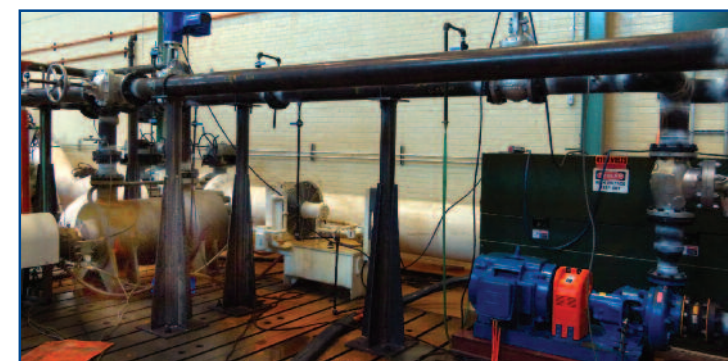
With a state-of-the-art Test Lab dedicated to the needs and requirements of the nuclear pump aftermarket, Hydro provides repair and testing services for safety related, non-safety related and code pumps. To assist your plant with regulator requirements, Hydro has the flexibility to quickly mobilize and test different scenarios.

Compliant to Hydraulic Institute Standards, Hydro can provide a range of tests, including but not limited to:

- Accident Scenarios
- Off Design Basis Scenarios
- Pump Endurance Tests
- Void Fraction Tests

To learn more about Hydro's testing capabilities or to schedule a tour of Hydro's Test Lab, contact Faisal Salman at [info@nuclearpumptesting.com](mailto:info@nuclearpumptesting.com) or call 312-399-9913.

## Proven Experience Makes All The Difference



### Air Void Testing for Safety-Related Feed Pump

Hydro's engineers performed 40 air void tests in 10 days for a nuclear power company that had to prove their Pacific 4" BFIDS auxiliary feed pump would perform its safety-related service if an air void greater than 2% passed through the pump. Hydro's Test Lab provided a live video feed of real-time performance data for the NRC to monitor. Read the full case study at [www.hydroinc.com/voidtest](http://www.hydroinc.com/voidtest).

### Performance Testing for Safety Injection Pump

Within a critical 2-week timeframe, HydroAire helped a nuclear power plant avoid de-rating by reverse engineering and rebuilding a Goulds 8-stage safety injection pump rotor. The rotor, rebuilt with engineered upgrades, was performance tested. Performance was proven at 1288lbs. pressure – 8lbs. better than the original rotor and 88lbs. above the minimum allowance. Read the full case study at [www.hydroinc.com/performancectest](http://www.hydroinc.com/performancectest).

### Endurance Testing for Service Water Pump

A 48-hour endurance test was performed for a nuclear power plant when they contacted HydroAire about conducting a research study. The power plant engineers wanted to collect data to assess how long the 1750 HP motor driving their essential service water pump could continue to operate with a deteriorating lower bearing. To learn the complete details of this research study, contact Faisal Salman at [info@nuclearpumptesting.com](mailto:info@nuclearpumptesting.com) or call 312-399-9913.



### Hydro's Worldwide Network of Pump Aftermarket Service Centers

<b>Hydro Inc.</b> Headquarters Chicago, IL 800.223.7867 <a href="http://www.hydroinc.com">www.hydroinc.com</a>	<b>Hydro East</b> Philadelphia, PA	<b>HydroTex Dynamics</b> Houston, TX	<b>Performance Test Lab</b> Chicago, IL	<b>Hydro Australia</b> Morwell, Australia	<b>Hydro Vietnam</b> Ho Chi Minh, Vietnam
<b>Hydro South</b> Atlanta, GA	<b>HydroTex Deer Park</b> Deer Park, TX	<b>Hydro Parts Solutions</b> Houston, TX	<b>Hydro Scottford</b> Edmonton, Canada	<b>Hydro Richier</b> Saint-Chamond, France	
<b>HydroAire</b> Chicago, IL	<b>Evans Hydro</b> Los Angeles, CA	<b>HydroTex Golden Triangle</b> Beaumont, TX	<b>Safe-T Hydro</b> Port Coquitlam, Canada	<b>Hydro Middle East</b> Dubai, U.A.E.	<b>Hydro Pump Services</b> Kuala Lumpur, Malaysia

Pump Services & Testing  
for the Nuclear Industry

**HydroAire, Inc.**  
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Pump Service Center  
Chicago, IL  
800.223.7867







RCS Nuclear (RCS) is a workforce solutions provider. You can leverage our proven recruitment processes for direct hire, contract staffing, and low cost payrolling services.

Founded in 1994 to support the nuclear industry, RCS has evolved into a specialized staffing and payroll services company for the Nuclear and Energy Industries. We have a tenured team of Nuclear Recruitment and Human Resources professionals located in our Charlotte, NC and Aiken, SC offices. We provide Direct Hire Recruitment, Contract Staffing and Payroll Services. At RCS we are committed to exceeding your expectations every day! Whether you are an employer or a candidate, we go above and beyond to assist you. We are responsive, professional, respectful, and effective. Our knowledge of industry trends and best practices for workforce solutions enables us to exceed your expectations. *RCS Nuclear is a trade name for RCS Corporation.*

## WHAT DOES RCS OFFER?

### Comprehensive Recruitment Capabilities for Direct Hire and Contract Staffing

- ♻ Team of experienced and certified Technical Recruiters, who are Nuclear and Energy recruitment specialists
- ♻ Proven search processes to locate and prescreen active and passive professionals for your urgent and critical hiring requests
- ♻ Recruitment of Engineers: Criticality, Electrical, Fire Protection, I&C, Licensing, Piping, Safety Analysis, Structural
- ♻ Recruitment of Project Managers, Project Controls, Planners, Schedulers, Procurement, Information Technology
- ♻ Robust database of Engineering and Technical professionals
- ♻ US and International Recruitment
- ♻ Streamlined communication for timely results
- ♻ Customized payroll services provided efficiently and at low cost to meet your needs
- ♻ Expertise with onboarding, pre-employment screening, background checks, drug testing, and per diem administration
- ♻ Nationally Accredited Staffing Firm - NAPS
- ♻ Certified by the Utility Supplier Diversity Program of the California Public Utilities Commission as a Woman Business Enterprise (WBE)



RCS Nuclear is an Equal Opportunity Employer.  
RCS Nuclear is a Tradename for RCS Corporation.

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www.rcsnuclear.com



## Digital I&C – Running Strong

As the nuclear industry embarks upon critical upgrades of the Reactor Protection and Engineered Safety Features Systems to address obsolescence, utilities are looking to AREVA for its unique expertise and field proven results.

As the world leader in Digital Instrumentation and Control Systems for nuclear applications, AREVA's focus continues to be safety and quality, leading to the highest levels of performance. Our TELEPERM® XS platform is installed or on order at 78 units at 44 separate sites in 16 countries.

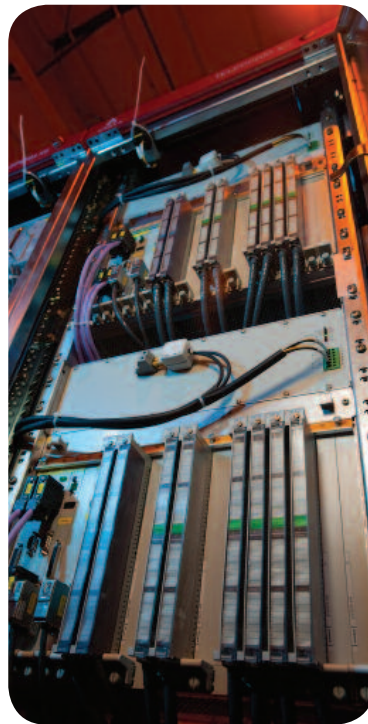
Our global continuous improvement culture means that AREVA commits to bring all of our international and domestic experience to future projects. This June was the two-year anniversary of the successful installation of the first TELEPERM® XS Reactor Protection System in the United States.

Digital Reactor Protection and Engineered Safety Features Systems allow for online monitoring, which eliminates periodic operator checks of system performance. Additionally, the upgrade automates many aspects of

periodic testing, which reduces the likelihood of unplanned manipulations due to human error. Reports can now be generated in hours instead of days reducing labor hours and cost.

With the major benefits of on-line monitoring and diagnostic capability, and the elimination of periodic operator checks of system performance, our Digital I&C system goes above and beyond, establishing AREVA as the world leader in digital instrumentation and control.

Our commitment is to continue to focus on safety and quality, leading to the highest levels of performance to deliver the results that our industry expects.







# POWERFUL SOLUTIONS

## For the Nuclear Power Industry

## SAME PLANT, MORE POWER

### Solutions in Nuclear Power Upgrading

CB&I's nuclear power uprates generate more power from operating plants, meeting growing energy demands with existing resources. We've helped our clients add more than 4,000 MW to the U.S. power grid.

With more than 30 years of upgrading experience, CB&I is unrivaled in understanding the nuclear power life cycle. No matter your need, CB&I can help you accurately identify your plant's ideal uprate capability and tailor a strategy for modifications, while meeting today's environmental and regulatory requirements.

Whether the solution is building a new nuclear plant or increasing the efficiency of an existing one, CB&I puts the power of nuclear to work for you.

**ENGINEERING, PROCUREMENT AND CONSTRUCTION  
UPGRADES, UPRATES AND RESTARTS  
LICENSING SUPPORT AND SAFETY ANALYSIS  
MAINTENANCE AND MODIFICATION  
SPENT DRY FUEL STORAGE**

A World of Solutions  
Visit [www.CBI.com](http://www.CBI.com)

As one of the largest nuclear engineering and maintenance contractors in the U.S., CB&I's diverse nuclear solutions are backed by a legacy of more than 60 years of industry leadership and an uncompromising commitment to safety. CB&I has been a pioneer in new plant design and support services to the operating fleet, supplying:

- Engineering and design
- Construction and maintenance
- Licensing
- Pipe fabrication
- Modularization
- Startup and test
- New plant services

CB&I leads the industry in power uprates, with a thorough understanding of the overall nuclear plant life cycle, including the nuclear steam supply system and balance-of-plant thermal cycle, original plant licensing bases, environmental impacts, equipment-aging impacts, margin use and regulatory requirements. With more than 70 uprate projects and studies completed, CB&I has added more than 4,000 MW to the U.S. grid.

### CB&I Highlights

- NYSE: CBI
- 60+ year legacy in nuclear industry
- 50,000 employees worldwide

With expertise in comprehensive plant support, our staff is in tune with the nature and importance of nuclear plant needs at every level. CB&I offers the most complete suite of EPC services and is one of the only providers of fully qualified designers and fabricators of tanks, piping and systems to meet the new post-Fukushima requirements. In fact, we were called upon to design, fabricate, and install the Simplified Activated Water Retrieve and Recovery (SARRY) System currently in use at the Fukushima Daiichi site.

CB&I's nuclear services start at the preliminary planning phase and continue through post-construction testing and turnover to operations. Our designs can be qualified to meet seismic, missile and other post-Fukushima considerations.



Sanmen Units 1 and 2, China

Safety remains a CB&I core value. We are proud to have one of the best safety records in the industry, having achieved a 0.01 lost-time incident (LTI) record in 2012. Our award-winning safety program promotes a culture of involvement and dedication with a goal of zero incidents for everyone involved in our projects.

### CB&I Activity Highlights

- Plant licensing bases/configuration management verification
- Plant modifications including complex and significant impact mods
- Plant evaluations for power uprates and potential degraded or non-conforming conditions
- BWR and PWR plant projects
- Plant outage and continuous maintenance support for 45 of the 104 nuclear power reactors in the U.S.
- Independent spent fuel storage installations (ISFSI)
- Decommissioning and dismantlement projects
- Buried commodities replacement (piping, tanks, etc.)
- Plant structures, systems and components evaluations
- Emergency plant support / 24-hour hotline: 617-589-7827



# NUCLEAR SOLUTIONS From Burns & McDonnell

**Burns & McDonnell is focused on providing services to the nation's operating fleet of nuclear utilities. More than 80 percent of our engineers have spent much of their careers working full-time in the nuclear fleet and have lived the nuclear culture.**

"When it comes to understanding the safety and operational culture of our nuclear fleet, we understand, we've lived it," says Glenn Neises, Chief Nuclear Officer for Burns & McDonnell. "There is no substitute for direct experience."

Burns & McDonnell has experienced engineers and project managers deployed in offices throughout the U.S. "We are

local and committed to the success of our clients wherever they are because we are familiar with their needs," Neises says.

As a 100 percent employee-owned firm, Burns & McDonnell is committed to the success of each and every project because "you are our client, both personally and professionally," Neises adds. "Ownership means we care about making sure every project is executed to perfection. Our clients notice this attention to detail.

"Burns & McDonnell has over 3,400 employee-owners working in engineering and construction services across 11 divisions. We bring a broad experience base to the nuclear industry, which results

in innovative solutions for the most complex problems," Neises says.

Burns & McDonnell has revenues of more than \$1 billion annually, half of which comes from construction projects. "We can do any size project from the smallest study to the largest design-build project," Neises says.

For more information, visit:



[www.burnsmcd.com/nuclear](http://www.burnsmcd.com/nuclear)



Supplier Partner

## NUCLEAR SOLUTIONS

For more than a century, Burns & McDonnell has engineered power generation solutions.

From modifications to new plant development, you can put our engineering solutions to work for you.

### Engineering. Integrity. Excellence.

Making our clients successful. It's what you've come to expect from Burns & McDonnell — with the nuclear experience you need.



9400 Ward Parkway  
Kansas City, MO 64114  
Phone: 816-333-9400  
Fax: 816-333-3690



Supplier Partner

*Engineering, Architecture, Construction,  
Environmental and Consulting Solutions*

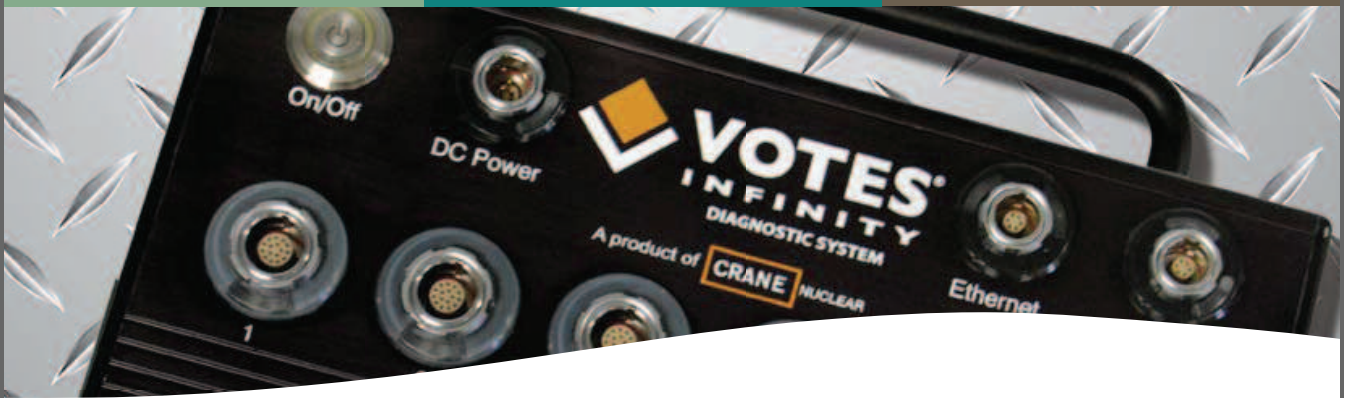
We're seeking new employee-owners with nuclear industry experience. Join our 100 percent employee-owned team and see how far you can go.

[www.burnsmcd.com/careers](http://www.burnsmcd.com/careers)

EOE



**A breakthrough in valve testing technology - reducing testing time\* up to 50%!**



- ① Light and simple to use
- ② Fast, error-free setup and analysis
- ③ Multi-valve system

[www.cranenuclear.com](http://www.cranenuclear.com)

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\*According to internal testing conducted by CRANE Nuclear. Please contact us for a free demonstration.

### Superior Support, Safe Products and Unparalleled Knowledge.

Crane Nuclear is a premier provider of valves and related services for domestic and international nuclear power plants. Its commitment to superior technology, product development, and strategic alliances makes Crane a leader in the nuclear power industry.

Crane Nuclear's first nuclear valve was manufactured in 1952, and since then nuclear power plants worldwide have come to rely on Crane for valve testing products that help ensure nuclear plant safety through the reliable performance of safety related motor-operated valves, air-operated valves, and check valves.

### Unmatched Service to Nuclear Power Plants Worldwide.

Crane's support of the nuclear power industry goes far beyond the design

and manufacturing of valves, valve parts, and valve testing equipment. The company provides total valve solutions for the nuclear power industry by offering valve development and contract services, and valve testing and repair. Additionally, Crane capitalizes on their actuator and valve repair and maintenance expertise to provide extensive project services, such as: Project Management, Planning, Engineering, Scheduling, Training, Quality Training.

### Crane Nuclear guarantees every repair.

The new century has introduced a new environment of deregulation and increased competitive demands. Crane has met these new demands with a pledge to provide superior service and technological excellence – cementing its place as the single source of valve solutions for the nuclear power industry.

### Testing Products - Industry Leading Innovation.

Crane realizes that the integrity of data depends on the strength of diagnostic equipment. That's why Crane designed the nuclear industry's first portable valve data acquisition system, and has not stopped innovating since. Every generation of valve diagnostic system designed and manufactured by Crane Nuclear has been a measurable improvement over the previous one, and the latest system is no exception.

Recently, Crane launched the VOTES® Infinity Valve Diagnostic System for AOV and MOV, followed by the system for check valves. Smaller, faster, and more accurate, Infinity is unquestionably the industry's best valve test system, supplemented by a wide range of system peripherals. The key benefit to Crane customers is the ability to efficiently isolate valve, actuator, and monitor processes to provide effective solutions in less time, with less effort, while applying fewer resources.

[www.cranenuclear.com](http://www.cranenuclear.com)



# More Than 50 Years of Industry Innovation

Few, if any, scientific arenas have seen the proliferation of man's knowledge and innovation as has the world of radiation. In little more than 100 years, mankind has learned ever more about radioactive energies since its discovery in the late 1890's. In the early part of the 20th century man's focus was centered around the atomic bomb and its immense capability for destruction. By 1945 scientific efforts were focused on propulsion and the large scale generation of electricity. In the USA, Westinghouse designed the first fully commercial Pressurised Water Reactor (PWR) of 250 MWe, Yankee Rowe, which started up in 1960.

During these early days of man's relationship with radiation a young student named Don Ludlum was at Kansas State University, learning to become an electrical engineer. After graduating KSU in the early 1950's Don Ludlum went to work in the radiological industry. In only five years, Mr. Ludlum had earned the position of Chief Engineer at the Eberline Company.

In 1961 Don Ludlum set out to begin his own radiological company, based on the principles of trust and customer care.

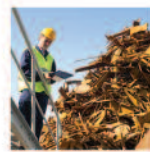
Mr. Ludlum incorporated Ludlum Measurements in 1962 understanding that it's better to have ten small contracts rather than one large one. Don Ludlum is still president of Ludlum Measurements, Inc., now a global radiation detection company located in Sweetwater, Texas. Ludlum Measurements, Inc., employs more than 500 people worldwide and has grown to become one of the leading suppliers of such equipment in the U.S. with exports reaching throughout the world.

*"It's better to have ten small contracts rather than one large one."*

Ludlum Measurements, Inc., maintains its dedication to customer care. Regardless of name or size, Ludlum Measurements, Inc., lives up to the promise to do everything possible to provide and assist its customers with the very best customized radiation detection and measurement solution for whatever their needs.

As the radiation industry has grown to become a part of our every day lives, Ludlum Measurements, Inc., has grown to provide the instruments of safety

for any and all industries that make use of radioactive isotopes. With a thorough understanding of operational mandates and regulations, Ludlum Measurements, Inc., works diligently to help companies



satisfy their respective rules and safety practices. Ludlum Measurements, Inc., continues to design and manufacture innovative instrumentation for ind-

ustries as diverse as scrap metals recycling to health and medical physics.

Science and technology will continue to push man's progress into the future. As we grow the industries that improve



our lives, Ludlum Measurements, Inc., will continue to meet the need for detection and measurement of the radiation we use every day.



telephone: 1.800.622.0828  
US & Can: 1.325.235.5494  
fax: 1.325.235.4672  
email: sales@ludlums.com

address: 501 Oak Street  
Sweetwater, Texas  
USA 79556  
web: ludlums.com

## YOU ARE INVITED!



# USER GROUP MEETING 2013



### REGISTER ONLINE NOW

Scan the following QR code (right) register online or contact register via email to: [laplace@ludlums.com](mailto:laplace@ludlums.com) (payment to be handled at Monday morning check-in)



### CONTINUING EDUCATION CREDITS

All breakout session courses have been awarded continuing education credits

### TRAINING COURSES AVAILABLE

Include **Health Physics Fundamentals** and **Use of Portable Instruments** presented by *Judson Kenoyer* of *Dade Moeller®*

### SPECIAL GUEST SPEAKERS

**Rick Whitman** (Keynote), **Mike Shepherd** DEQ Technical Sales, **Paul Dreier** PartTec Ltd VP, **Ray McPhillips** DEQ Technical Sales

### SPECIAL EVENING DINNER PROVIDED

LMI will provide transportation to and from a very special dinner at the **Children's Museum Indianapolis®**

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# VALVTECHNOLOGIES

## ZERO LEAKAGE

VALVE SOLUTIONS

### Total reliability, safety and performance.

21st century technology available now for valve solutions in vent, drain, isolation, check & control valve applications in nuclear generation

- ASME III Class 1, 2 and 3 valves
- 10CFR50 Appendix B safety related program
- ASME/ANSI Class 150-2500, 1/2 - 36"
- End connections SW/BW/ flanged/special
- Primary, secondary and auxiliary systems
- Applicable to all BWR, PWR and CANDU designs

**VALVTECHNOLOGIES**

[www.valv.com](http://www.valv.com)

For more information contact Bill Henwood: [bhenwood@valv.com](mailto:bhenwood@valv.com) | 713.860.0400

## VALVTECHNOLOGIES – SOLUTIONS FOR THE NUCLEAR INDUSTRY

### Providing the best, most-reliable nuclear industry solutions

#### With ValvTechnologies, you enjoy:

- Improved safety per NRC FLEX strategy
- Long-term reliability
- Reduced valve & operation maintenance costs
- Improved heat rate
- Energy & time savings
- Superior testing & quality
- Cobalt-free materials

#### Four-year zero-leakage guarantee

All ValvTechnologies' valves manufactured for the nuclear industry are stringently tested to meet the zero-leakage testing criteria & are backed by a four-year, zero-leakage guarantee. Every valve that we manufacture for nuclear generation comes with extensive documentation & full materials traceability including:

- CMTR – Certified Materials Test Report
- Certificate of compliance
- Individual valve test reports (not batch tested)
- Design/seismic reports
- Drawings



#### V1 – Forged & cast ball valves

- ASME/ANSI Class 150 - 2500, 1/2 - 36"
- Integral seat design
- Hard-coated seat & ball with RAM coating - Rc 70
- Blow-out proof stem
- Live loaded packing



#### Parallel Slide Gate (PSG) Bi-directional, zero-leakage isolation

- ASME/ANSI Class 300 - 2500, 6 - 36"
- Position seated easily automated
- In-line repairable
- Hard-coated trim with RAM coating - Rc 70



#### Electronic Relief Valve (ERV) Protection of safety valves

- ASME/ANSI Class 150 - 2500, 1/2 - 12"
- ASME Sec. I, V-stamp capacity certified
- Integral isolation valve available
- Easily adapted to existing controls



#### DFT® Valves – Nuclear Rated Check Valves

- In-line check valves for nuclear applications and licensed manufacturer of ASME III and safety related check valves
- ASME / ANSI Class 150 - 2500, 1/4 - 24"



#### XACTROL® Leak-free isolation & control in one

- ASME/ANSI Class 150 - 2500 1/2 - 36"
- Integral, characterized downstream seat
- Upstream disc inserts for modulation



**ThermoFisher**  
 SCIENTIFIC

## The Best Camera for Many Applications..... The Only Camera for Some!

Thermo Scientific – CIDTEC is the preeminent supplier of radiation hardened and high dynamic range scientific cameras incorporating proprietary Charge Injection Device (CID) technology for use in the most demanding imaging applications.



The Thermo Scientific **MegaRAD** series of cameras are capable of operating in high-dose radiation environments such as nuclear reactors, fuel inspection, hot cell monitoring, remediation, surveillance, and X-ray imaging applications.

### Charge Injection Device

The Charge Injection Device (CID) is a solid-state imaging sensor with unique capabilities that make it well suited for applications where commercially available Charge Coupled Devices (CCDs) have difficulty. Like a CCD, the CID employs pixels to capture 2-D images, converting light into electronic charge, which is in turn displayed on a monitor or alternatively captured digitally on a computer. The CID architecture is designed to specifically be resistant to radiation damage, which is obviously a significant advantage for radiation tolerant and hardened imaging applications for the nuclear power, medical, dental, and aerospace industries. In addition, the inherent anti-blooming performance of the CID ensures accurate image detail even under extreme lighting conditions.

The CID is uniquely positioned to serve the growing imaging market and the challenges for higher levels of accuracy in the radiation tolerant inspection market, as well as machine vision, scientific imaging applications. Thermo Scientific - CIDTEC is the leading manufacturer of CMOS imagers using the CID pixel architecture, and Thermo Scientific provides imaging solutions to Original Equipment Manufacturers (OEMs) as well as directly to end-users throughout the world.

### Applications

Thermo Scientific CID based video cameras and sensors provide solutions for the most demanding applications including:

- Radiation Hardened and Tolerant Video
- Spectroscopy
- UV Imaging
- Metrology
- Laser Profiling
- Medical Diagnostics
- Interferometry
- Aerospace
- Semiconductor Inspection
- Synchrotron Beam Profiling



These extremely resilient and compact video cameras are available in either monochrome or color formats with remote head cable lengths of up to 150-meters. Imagers are available in RS-170, progressive scan, and CCIR formats.

Thermo Scientific also offers intensified versions of the MegaRAD cameras for extremely low light level imaging, UV signal enhancement, and for the gating of high-speed events.

The **SpectraCAM** scientific camera series offers unprecedented dynamic range, exceeding 26-bits in some applications. These cameras exhibit low noise, excellent native UV responsivity, non-destructive readout capabilities, and user-programmable windowing capabilities. The Thermo Scientific RACID Exposure software supplies an intuitive interface to the SpectraCAM while providing the user with the desired data in a wide variety of formats at the touch of a button.

All of the Thermo Scientific CID based cameras offer unmatched anti-blooming, wide dynamic range, and UV sensitivity performance that has become synonymous with CID technology.



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## Got Radiation? See what you've been missing

The Thermo Scientific MegaRAD series of radiation hardened CID imaging cameras are capable of operating in high dose environments and provide excellent image quality to total dose levels over 100 times the tolerance of conventional solid state cameras.

- Color and Monochrome imaging to beyond 3 MegaRAD
- High resolution CID imager technology
- Small remote detachable head

Look closer at the Thermo Scientific line of radiation hardened cameras. Visit [www.thermo.com/cidtec](http://www.thermo.com/cidtec) or contact us today about new innovative imaging products.

Tel: 1-315-451-9410 • Email: [sales.cidtec@thermo.com](mailto:sales.cidtec@thermo.com)



**The world's only color rad hard camera**

Innovative Preamp per pixel CID design allows high radiation tolerance and excellent image quality even in low light conditions.

Part of Thermo Fisher Scientific

**Thermo**  
 SCIENTIFIC



## Evolving to Serve You Better

We offer nuclear power customers a broad spectrum of high-level application solutions from a single point of contact. We work to bring superior products, services and the expertise you require. Choose from a variety of instrumentation, sold under the Thermo Scientific brand, to optimize your process.

Our products and services help power producers satisfy regulatory and safety requirements. They help customers achieve maximum efficiency and profitability to meet demand while generating low cost, clean and reliable power. Our integrated solutions assist you in exceeding customers' demands while delivering peace of mind.

Integrate Thermo Scientific products throughout your power process (see Fig. 1). Look to one company that can offer you solutions with a depth of products to fit your application and your environment throughout your operations.

Want to learn how Thermo Scientific products can benefit you and your plant?

**Contact us at:**  
+1 (800) 488-4399  
ussdi.customersupport@thermofisher.com

**Visit us at:**  
www.thermoscientific.com/nuclear

- Neutron Flux Monitoring
- Data Acquisition and Monitoring
- Level and Density Measurement
- Custom Radiation Shielding
- Industrial Hygiene
- Radiation Measurement & Protection
- Water Analysis
- Laboratory Informatics
- Radiation Tolerant Imaging (Inspection and Monitoring)
- Service and Training

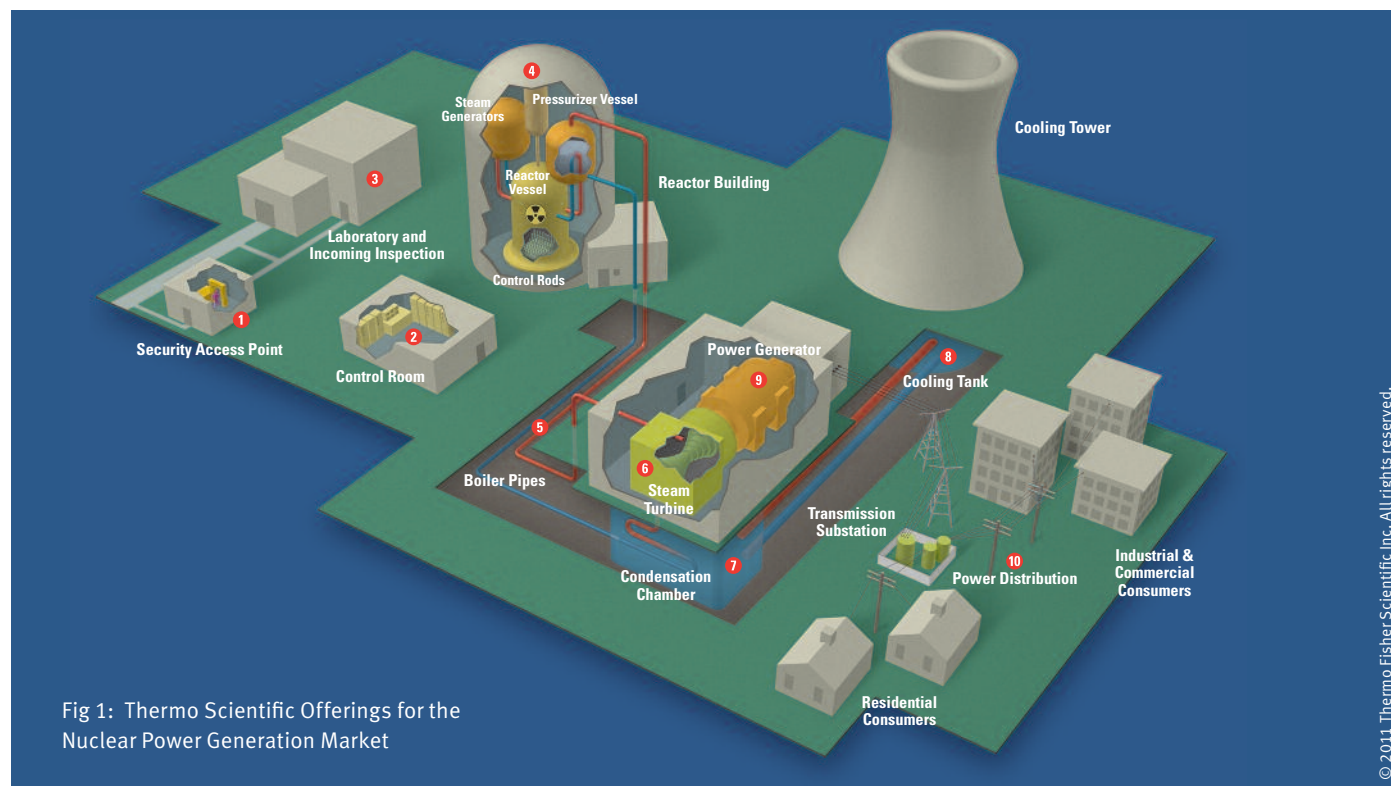


Fig 1: Thermo Scientific Offerings for the Nuclear Power Generation Market

### Thermo Scientific Products in Nuclear Power Generation

#### 1 Security Access Point

- Radiation measurement and protection monitoring

#### 2 Control Room

- Radiation measurement and protection monitoring
- Data acquisition, monitoring and management
- Alarm monitoring
- Neutron flux monitoring
- Reactor protection systems
- Audible count rate drawers
- Boron dilution monitoring
- Thermal margin monitoring
- Class IE qualified safety-related cabinets
- Class IE qualified power supplies
- LCD digital meters

#### 3 Laboratory and Incoming Inspection

- Radiation measurement and protection monitoring
- Data acquisition, monitoring and management
- Weld and alloy verification
- Informatics

#### 4 Reactor Building

- Radiation measurement and protection monitoring
- Data acquisition, monitoring and management
- Level measurement
- Radiation hardened solid-state camera (black/white or color)
- Ex-core neutron flux detectors for source range, intermediate range and power range reactor power monitoring
- Class IE safety-related post-accident qualified cable assemblies
- Audible count rate during shutdown maintenance periods
- Installed gamma area monitors
- Boric acid storage monitoring
- Water analysis monitoring

#### 5 Boiler Pipes

- Cooling water and condensate flow measurement

#### 6 Steam Turbine

- Radiation measurement and protection monitoring
- Data acquisition, monitoring and management

#### 7 Condensation Chamber

- Data acquisition, monitoring and management
- Level measurement

#### 8 Cooling Tank, Cooling Tower and Reservoir

- Data acquisition, monitoring and management
- Influent and discharge flow measurement
- Density and level measurement
- On-line water analysis

#### 9 Power Generator

- Data acquisition, monitoring and management

#### 10 Power Distribution

- Data acquisition, monitoring and management

**Thermo**  
SCIENTIFIC

## The power of one

Why have more than 150 nuclear reactors in 16 countries replaced their aging, obsolete instrumentation systems with Thermo Scientific Nuclear Instrumentation Systems? Because this innovative solution is far more reliable and less costly than any other technology available. Our NIS uses a single-fission chamber-based detector assembly to provide four separate applications in one powerful system – Source Range, Intermediate Range, Power Range, and Post-Accident Monitoring. It has a proven 40-year qualified life, eliminating the need to periodically replace shorter-lived detector assemblies. Plus, it has demonstrated high immunity to electromagnetic interference and noise, meeting stringent RG 1.180 requirements. Which explains why it's quietly revolutionizing nuclear instrumentation and being supplied to new nuclear power plants under construction in three countries.

## the work of four

- Learn more at [thermoscientific.com/nuclear](http://thermoscientific.com/nuclear) or call +1 (800) 488-4399 or +1 (858) 450-9811.



Thermo Scientific Nuclear Instrumentation System integrates four essential applications in one detector assembly.





# KONECRANES NUCLEAR EQUIPMENT & SERVICES LLC



## EQUIPMENT

With nearly a half century of nuclear crane experience Konecranes Nuclear Equipment & Services LLC is the most seasoned supplier in the industry. Our wide range of products are designed specifically for operation in nuclear applications.

## MODERNIZATIONS

We provide modernization services for all brands of cranes, hoists and material handling equipment.

- > Single failure proof upgrades
- > Crane and runway capacity upgrades
- > Duty-cycle studies
- > Planned engineered lifts
- > Diagnosis and solutions for tracking problems, abnormal rail/wheel wear and fatigue cracks
- > Control Upgrades – Variable frequency, static stepless or DC-Digital
- > Festoon system replacement
- > Integrate load cells/weight systems
- > Replace motors, brakes, magnetorques

## PARTS

- > Any OEM part for any brand of overhead crane or hoist

- > Re-engineered parts
- > Commodity and consumable parts (wire ropes, contactors, brakes, etc.)
- > Remanufactured parts (motor rewinds, brakes, etc.)

## SERVICE

We provide service for all brands of cranes, hoists and material handling equipment.

- > Outage Support – including containment work
- > Inspections
- > Repairs
- > Maintenance

## QUALITY

Our quality control program ensures that each nuclear crane and component is designed to meet or exceed all mandated standards.

- > ISO 9001 Certified manufacturing facilities
- > 10CFR50 Appendix B and NQA-1 Compliant cranes and material handling equipment
- > NUREG 0554, NUREG 0612, NOG and NUM compliant
- > AWS certified welders
- > NDE capable – In-house

**KONECRANES®**  
Lifting Businesses™

## KONECRANES NUCLEAR EQUIPMENT & SERVICES LLC

Worldwide suppliers of nuclear lifting equipment and services

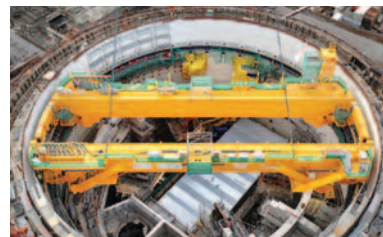
Konecranes provides every type of nuclear lifting equipment...

- > Polar cranes
- > Single failure proof cranes
- > Fuel handling equipment
- > Cask handling equipment
- > Engineered hoists
- > Standardized cranes
- > Standardized hoists & components

Plus a full range of services

**10CFR50 APPENDIX B & NQA-1 QUALITY COMPLIANT**

Toll-free: 800.261.9975  
www.konecranesamericas.com





## Quest Integrity Group Inspects Buried and Inaccessible Piping in Nuclear Plants

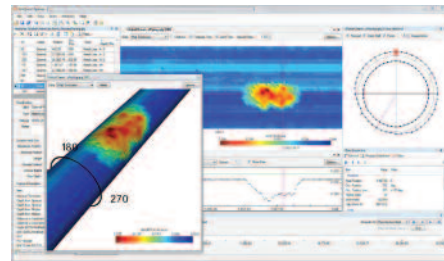
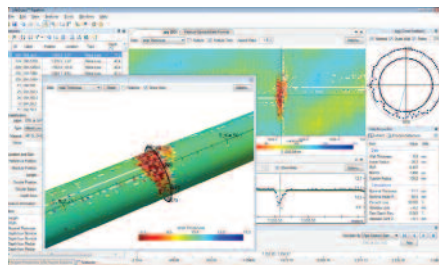
Quest Integrity Group is a global leader in the development and delivery of asset integrity management and asset reliability solutions for the power, refining and chemical, pipeline and syngas industries.

The nuclear industry focus is on inspection and assessment of buried or inaccessible piping utilizing HYDRA™, an ultrasonic-based intelligent pigging technology. HYDRA addresses the nuclear industry initiative on buried piping integrity and satisfies NEI 09-14 inspection requirements.

The tool is compact and lightweight making it easily transported into and around a plant, and since the tool is bi-directional, only one launch location is required. HYDRA navigates complex piping circuits,

providing 100% inspection coverage of the interior and exterior surfaces.

The tool detects and records wall loss damage such as pitting, corrosion or erosion, and deformations such as denting, ovality, swelling or bulging with superior accuracy. In addition to providing high quality inspection data, Quest Integrity can also conduct a full fitness-for-service evaluation per ASME FFS-1 using its proprietary LifeQuest™ Fitness-for-Service software.



HYDRA is a cost-effective in-line inspection solution for buried or inaccessible piping. The inspection results are generated and provided to the client within hours, enabling nuclear plant managers to ensure piping integrity, minimize operational and safety risk and comply with industry initiatives for inspection.

Additional information and animation can be viewed at:  
[www.QuestIntegrity.com/HYDRA](http://www.QuestIntegrity.com/HYDRA)  
 +1 253 893 7070



**Innovation Powers  
the Future.**

Focusing on the future is a key component of successful asset management. Over the years, Quest Integrity Group has invested heavily in advancing NDT technology to capture higher quality, repeatable data with increased, typically 100%, coverage. Paired with our advanced engineering assessment capabilities, our clients take full advantage of the comprehensive data gathered by our proprietary inspection tools.

The result - we provide actionable information to confidently guide future operating and nuclear asset management decisions to help power the future.



[www.QuestIntegrity.com/nn](http://www.QuestIntegrity.com/nn)  
 +1 253 893 7070

**INNOVATIVE MAINTENANCE PRACTICES IMPROVE ASSET PERFORMANCE**

The prospect of new nuclear construction is exciting, but operating nuclear plants will require diligent management of facility assets for years to come. Innovative maintenance practices will be essential to keeping plants operating safely and efficiently. For over twenty years, Underwater Engineering Services, Inc. has provided quality technical services and outage support. In 1988, UESI developed a unique approach to the underwater inspection and repair of safety related coatings that remains in use around the world. Today, UESI is working with its industry partners to develop new maintenance processes that take advantage of advances in robotic technology to

lower maintenance costs, shorten outage schedules, and reduce radiation exposure.

As the nuclear industry moves into its next phase, UESI will continue to provide the kinds of quality technical and engineering services critical to meeting regulatory and safety requirements. Our services and capabilities include:

- ASME IWE code inspections
- Underwater coating assessment and repair
- Wet welding to ASME/AWS requirements
- Diving services in the suppression chamber, reactor vessel & fuel pool
- Robotic solutions
- Intake and discharge maintenance

- Project Management
- QA Oversight
- Staff Augmentation
- Engineering Assessments
- Maintenance Program Management



Underwater Engineering Services, Inc.



**Specialized Services for the Nuclear Industry**

UESI Nuclear Services provides specialized services uniquely suited to the nuclear industry. Work can be performed under our 10CFR Appendix B Program to UESI or site procedures.

- Manned Diving & Remote Intervention
- Diving Services for RV, Fuel Pool, Suppression Pool
- Underwater Coating Inspection & Application
- ASME Section XI Code Inspections (IWE & IWF)
- ANSI & NACE Nuclear Coating Inspectors
- Condition Surveys and Asset Management
- Wet & Dry AWS or ASME Code Welding
- Nuclear Coating Experts
- Buried Pipe Coating Assessment
- QA Oversight & QC Inspection
- Project Planning & Management
- Heavy Marine Construction
- Intake & Discharge Diving Services
- Deactivation & Decommissioning



Partnerships for the New Nuclear Industry  
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A Greenman-Pedersen, Inc. Company



# HukariAscendent, Inc.

**YOUR SOURCE for Talented Engineering and Safety Professionals.**



HukariAscendent is a Service-Disabled Veteran-Owned Small Business (SDVOSB)

providing specialized engineering, technical, and professional support services to the government and commercial nuclear power, science and technology industries.

Specializing in Nuclear Safety, Licensing and Engineering, we support the nuclear industry with experts in fields covering the complete nuclear life cycle — new reactor and non-reactor facilities, operating plants, decommissioning, and demolition. HukariAscendent's proven award-winning service has provided expert, hard-to-find personnel to solve some of the industry's most difficult challenges. The HukariAscendent network provides access to over 10,000 engineers and industry professionals with multiple years of nuclear related experience, making us a recognized leader in this industry.

**For over 14 years. . .**

HukariAscendent has provided key personnel to both the DOE and NRC regulated nuclear industries. Founded on the principles of honesty, integrity, reliability, quality, and deep respect for individuals, these guiding principles serve as the base for our growth and success, and remain the heart of our ability to provide outstanding service.

When it matters most, we take great pride in knowing that each and every one of our employees embrace and stand behind our core values.

**2011 DOE SDVOSB of the Year!**

We are proud to announce that HukariAscendent has been selected as the

Department of Energy's Service Disabled Veteran Owned Small Business of the Year for 2011. This award recognizes the exceptional performance of a Service-Disabled, Veteran-Owned small

business directly facilitating the advancement of core DOE mission objectives and requirements. The award was presented to Ken Hukari, Owner and CEO of HukariAscendent, on June 27th during a ceremony at DOE Headquarters in Washington, DC.

**“Award Winning Support Services for the Nuclear Industry.”**

Steeped in over a decade of award winning service to the government and commercial nuclear industries, HukariAscendent brings unique diversity of talent and expertise for a company of our size. Many of our employees are widely recognized as subject matter experts in their field and have delivered innovative, practical solutions to some of our client's most demanding challenges.

HukariAscendent provides clients with exceptional value through innovation, cost-effective solutions and extensive professional expertise.

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*Together We're Better.*

**WHEN IT MATTERS MOST. . .**



**Who would you want to be tied to?**



HukariAscendent provides its clients with stellar technical performance as demonstrated by repeat business, exponential growth and multiple awards & nominations. HukariAscendent has also been recognized by INC. 500 as one of America's fastest growing companies. So when it comes to choosing your next career path, why not look at HukariAscendent, a company that recognizes and rewards each employee and treats them as assets, not just another number.

Any other opportunity is just another job.

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# Yokogawa

## A Trusted Industry Partner



Since 1915, Yokogawa has been helping industry to improve quality, optimize throughput, reduce energy costs and increase plant safety.

With 7200 patents and registrations resulting from constant research and innovation, and global business spanning 54 countries, we provide our customers with the control, measurement and automation technology that drives continuous improvements in their processes.

Partnered with National Technical Systems (NTS), Yokogawa offers qualified controller, data acquisition, and turn-key engineered solutions to challenging applications for many nuclear plant areas.

Yokogawa can be your single source equipment supplier for a range of monitoring, control, recording and test applications. Our extensive experience in nuclear power and product quality, reliability, and innovation will help you achieve the design goals of your next upgrade project.

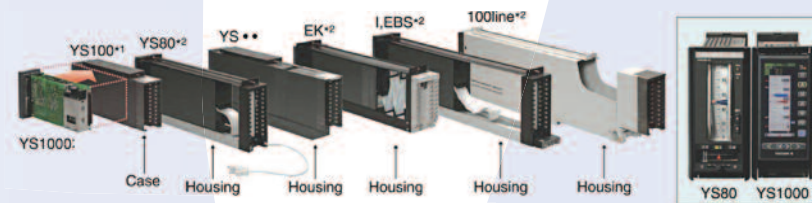


Bob,  
Another SLC has failed and parts are no longer available!  
Find a solution  
BEFORE THE NEXT OUTAGE!!!  
P.s. Need something I can trust!

Yokogawa offers a highly capable single loop controller series that are qualified for nuclear seismic and safety applications. Many utilities know the quality and reliability built into all Yokogawa control room instruments. The YS1000 Series is the perfect solution for

replacing those old, obsolete controllers in your plant. The programmable controller model provides multiple control modes as well as user mode that supports function blocks to program custom control strategies. This unit features dual CPU's for reliability as well as a hard manual backup output with hot-swap capability. Yokogawa provides a strong migration path for its legacy products.

Contact Yokogawa at 1-800-888-6400 or NTS at 978-263-3718 for more details.



### A Clear Migration Path

Yokogawa began manufacturing single loop controllers in the 1960's. Yokogawa's latest SLC, the YS1000 provides a migration path for all of its legacy models by simply removing the existing controller from the housing and replacing it with the new one.



### Class 1E Qualified

Available in commercial grade or qualified by NTS for safety & seismic applications.



# ***Nuclear Programs Fuel Major Tool & Machine's Growth***

## **Our Present...**

Since 1946, Major Tool & Machine, Inc. has been providing engineering, fabrication, machining, assembly and testing services for critical application environments. Our customer-focused philosophy, coupled with continuous reinvestment in our capabilities, facilities and employees, has enabled us to evolve with and respond to the needs of our customers. Major Tool's best value approach provides our customers with the highest quality, competitively priced build-to-print services available.

Major Tool provides unsurpassed levels of capability and quality assurance. Maintaining over 500,000 sq. ft. of environmentally controlled manufacturing space under roof, Major Tool offers extraordinary capacity. Our continuous reinvestment in capital equipment allows us to provide prototype through production forming, welding, machining, assembly and testing services to meet the wide range of application specific shape, size and

configuration hardware required by the nuclear industry.

Our ability to execute this full spectrum of manufacture has allowed Major Tool to successfully participate in many critical government, industry and academia sponsored fission and fusion programs.

Our extraordinary capability, capacity and experience are driven by our commitment to quality assurance. Major Tool maintains ASME N, NPT, N3, NS, U and U2 certifications. Our Quality Assurance System is audited to ASME NQA-1, and is NRC 10CFR50, 10CFR71 and 10CFR72 compliant.

## **Your future...**

It is bright on the nuclear energy horizon. Major Tool is committed to our future, your future, and the future of our generations by championing the growth of nuclear energy and the safe, successful remediation and disposal of radioactive waste.

We are well positioned to usher in the

next generation of nuclear science and technology, and we will continue to apply all our resources and knowledge to provide our customers the quality critical hardware necessary to meet tomorrow's demanding nuclear requirements.

Nuclear power plant upgrades, next generation power plants, naval nuclear, radwaste transportation and disposal casks, canisters and tooling, fuel fabrication, magnetic and inertial fusion, and government, industry and academia supported energy sciences initiatives are all areas where Major Tool applies our hardware manufacturing expertise.

We look forward to the bright future that nuclear energy provides us all.

*For more detailed information, or to schedule a visit to Major Tool & Machine, contact Hans Lissman at (317) 917-2621 or by email at [hlissman@majortool.com](mailto:hlissman@majortool.com), or Joel Manship at (317) 917-2619 or by email at [jmanship@majortool.com](mailto:jmanship@majortool.com)*

## **Over 500,000 square feet of world-class nuclear capabilities.**

**At MTM, we provide hardware solutions to nuclear fuel cycle challenges.**

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- Fuel fabrication
- Commercial nuclear power
- Naval nuclear power
- Next generation fission and fusion systems
- Nuclear materials transport and storage
- Reprocessing, reuse, and remediation

**How can we help you?**



*We know nuclear ... front to back.*

**MajorTool.com**  
[sales@majortool.com](mailto:sales@majortool.com)  
 317.634.9420



MTM's Quality Assurance Program is compliant to NQA-1, 10CFR50 Appendix B, 10CFR71 Subpart H, 10CFR72 Subpart G

# SEAFAB METALS COMPANY: Pouring Quality into Every Nuclear Cast

## What do the U.S. Navy, the U.S. Army Corps of Engineers, and the Department of Defense have in common?

Each depends on Seafab Metals Company (Seafab) for safety.

Since the days of World War II, Seafab has provided lead-based castings to safely store and protect nuclear materials used in both the energy and defense industries. Every casting has passed industry testing, ensuring product quality.

The secret to Seafab's success is rooted in the company's longtime dedication to customer service, collaboration and quality control.

"Because of our experience and 100 percent success rate, engineers and project managers will ask us for insight on projects even before they open the project for bidding," said Bill Wold, Seafab general manager.

"By pinpointing areas that could potentially cause structural issues down the road, and walking customers through refinements, we improve the integrity of each cast," added Wold.

Taking collaboration a step further, Seafab works with customers to custom design each cast (keeping intellectual property confidential) and helps customers coordinate on-site gamma scanning to confirm products meet necessary standards. Seafab also ships finished products coast to coast.

"From the beginning of our process, to the very end, our dedicated nuclear management team offers premium quality and flawless execution," added Wold. "We've even recast products for customers after casting from competitors failed testing."

## Seafab delivers trusted nuclear protection, along with:

- Custom lead castings of up to 125,000 pounds.
- Thorough record keeping, such as heat records, lot traceability, and pour procedure, to streamline product certification for customers.
- An onsite metallurgical lab that maintains chemical analytical control on all raw materials.
- The most consistent service in the industry — Seafab has logged 14 years without a lost-time accident.
- Material that is denser than concrete, yet takes up less space. Lead also

provides shock absorbency in earthquake zones.

Other Seafab products include sheet lead for roofing; lead shielding used to block sound waves and x-rays; lead anodes for electrowinning; bullet materials; and specialty extruded shapes.

Seafab is part of the Western Hemisphere's largest integrated lead producer, The Doe Run Company.

## To obtain a quote, contact:

Jami Clay  
Sales Administration Manager  
Seafab Metals Company  
1112 VIP Boulevard  
Casa Grande, AZ 85222  
(800) 426-7082  
www.seafab.com

# Precision Pours. Premium Quality.

**Seafab Metals Company**  
pours custom lead castings to safely store and transport nuclear materials. Any shape. Any size.

With more than 150 years of collective experience, Seafab Metals Company has earned our reputation for quality and service. Our custom lead products safely shield and protect nuclear materials, and pass gamma scanning.

### Expect More. Every Pour.

- We collaborate with you throughout the process to ensure the shielding integrity of each cast.
- Our dedicated nuclear management team has completed high-quality lead pours up to 125,000 pounds.
- We accommodate on-site gamma scanning and ultrasonic testing to ensure products exceed commercial and government standards.

For nuclear protection you can trust, choose **Seafab Metals Company**.



**800-426-7082**  
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A subsidiary of the western hemisphere's largest lead producer, The Doe Run Company.





# Siempelkamp

Nuclear Services

## Products and Services for Nuclear Power Plants

Countries such as Finland, China, Russia, Great Britain, France and the USA count on nuclear power and will increasingly secure their energy demand through a new generation of low CO<sub>2</sub> emission nuclear power stations. Siempelkamp's nuclear technology business unit meets the highest safety standards all over the world with products and comprehensive services for the life cycle management of nuclear facilities. The basis: well over 40 years of experience in nuclear technology and many successfully completed projects distinguish Siempelkamp as a recognized partner for operators of nuclear plants. Siempelkamp Nuclear Services, Inc. headquartered in West Columbia, SC, has provided this comprehensive support to the nuclear power sector in the US for more than 25 years.

### High quality and field-proven technology

Siempelkamp business units supply customers with products and services that ensure the secure operation of nuclear facilities. With our highly qualified and experienced engineers and project managers Siempelkamp is well equipped to deliver to the exacting requirements of customers by providing solutions to new challenges. Customer confidence is reinforced by our world class delivery record that continuously demonstrates our attention to safety and quality and to the provision



of effective field-proven technology operated by highly experienced staff.

### Nuclear portfolio

The supply and operation of components and equipment around the reactor are a core competence of our business. Furthermore, Siempelkamp is setting new milestones in the extension of the service life of nuclear power plants through analyses and calculations together with the retro-fitting of components and equipment. Last but not least, decommissioning of nuclear facilities provides confidence of the ability to successfully manage the complete nuclear power lifecycle. Our employees supporting nuclear facility decommissioning are the most experienced specialists in the dismantling and disassembling of nuclear reactor vessels, internals, and large components worldwide. Their innovative ideas combined with practical and cost effective equipment designs for reliable mechanical segmentation guarantees exceeding customer requirements and meeting the highest levels in safety and quality.

### New and Operating Plants

- Engineering
- Stud Turning and Tensioning Tooling
- Stud Cleaning Devices
- Refueling Machines
- Cranes (Polar and Refueling)
- Lifting Devices
- Sealing Heads
- H<sub>2</sub> Recombiners
- Waste Handling Facilities

### Life-time Support

#### Information Technology

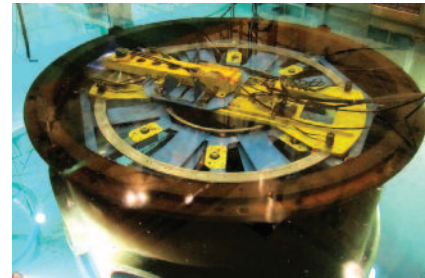
- Process Information Systems
- Turbine Generator Diagnostic Systems

#### Consulting

- Nuclear Physics

#### Operational Support

- Engineering
- Modernization of Components
- Assembly, Start up
- Services



### Decommissioning / Waste Management

#### Decontamination / Decommissioning

- Project Planning and Execution
- Cost Estimating
- Engineering
- Specialty Mechanical Segmentation Tooling
- Abrasive Wire Cutting

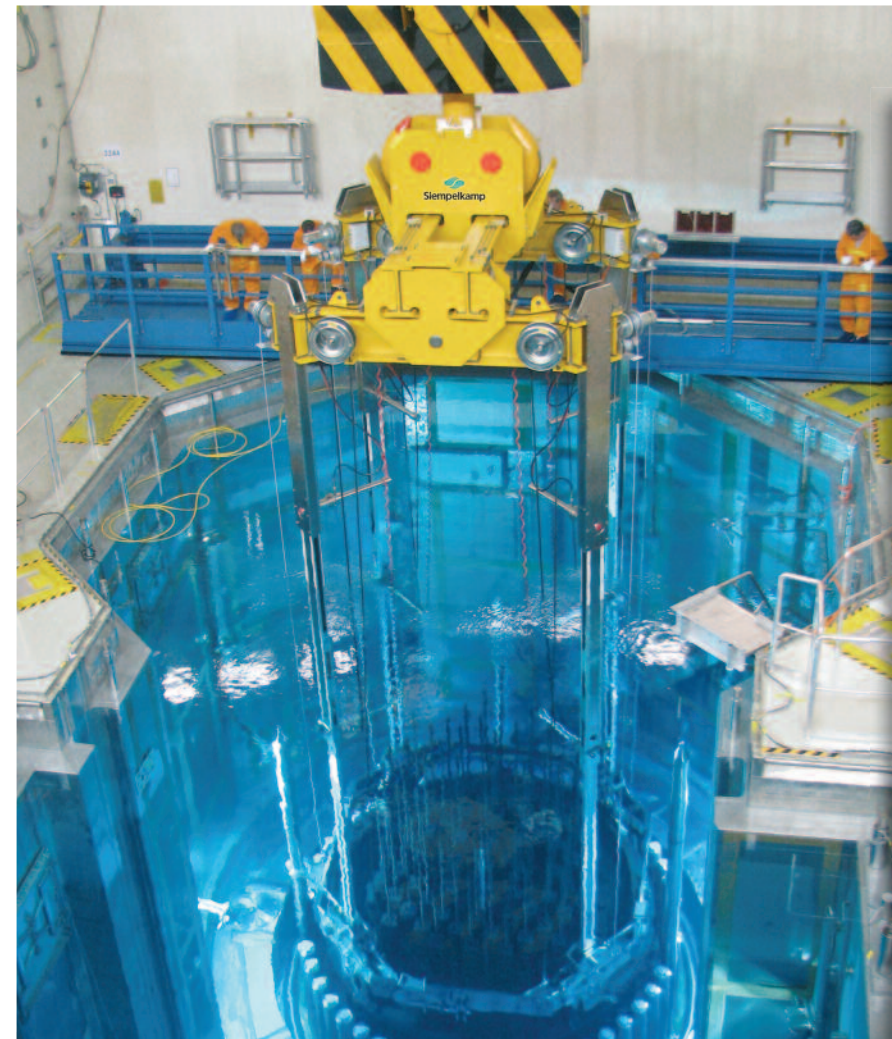
#### Equipment for Waste Handling

- Hot Cell Technology
- Remote controlled Handling Equipment
- Containers

### Contact us and learn more about:

**Siempelkamp Nuclear Services, Inc.**  
3229 Sunset Boulevard Suite M  
West Columbia, SC 29169  
Phone: 803.796.2727  
Fax: 803.939.1083  
steve.garner@siempelkamp-sns.com

[www.siempelkamp-sns.com](http://www.siempelkamp-sns.com)  
[www.siempelkamp.com](http://www.siempelkamp.com)



Engineering

### Components and Services Worldwide

Siempelkamp is your partner for the planning, manufacture, supply and life-time support for a highly reliable range of equipment including: refuelling machines, core internal and reactor head lifting devices, stud turning and tensioning tooling, cranes incl. polar, H<sub>2</sub> recombiners, waste handling facilities etc. for operating plants and new build.



## Products and Services for Nuclear Power Plants

Compliance with the highest requirements in safety and quality in the nuclear sector is our business. We supply services, equipment and life-time support within the nuclear power industry. Our extensive know-how and experience over many years forms the basis for our successful delivery.

Get more information about our innovative nuclear technology:

Steve Garner  
T: 803.796.2727  
C: 803.422.1322  
steve.garner@siempelkamp-sns.com



[www.siempelkamp-sns.com](http://www.siempelkamp-sns.com)



# Siempelkamp

Nuclear Services



## Chatham Steel: A story of excellence spanning nearly a century.

For nearly a century, Chatham Steel has built a reputation for excellence in quality, service and responsiveness. In that time, they have also developed a highly efficient network that includes service centers throughout the southeast.

Chatham maintains an extensive inventory of products, giving customers immediate access to carbon, alloy, stainless steel, and aluminum. Inventory includes plate, bar, sheet, tube, pipe, beams, channels, angles, grating and specialty products. As a subsidiary of Reliance Steel and Aluminum, Chatham also has reliable access to even the most difficult-to-find products and materials. Because of the company's large inventory and processing capabilities, it is able to help many of its customers reduce their costs of operation by processing and delivering products on an as-needed basis.

With industry needs constantly changing and evolving, Chatham has continued to invest in facilities, products, state-of-the-art processing

equipment and information systems to serve all of its customers' needs. The company's culture emphasizes training, teamwork and continuous improvement. With advanced equipment, technology, creativity and expertise, Chatham is able to deliver customized solutions on time and on budget, something that is rare in the nuclear industry.

Chatham Steel's collaborative relationships help its partners meet their unique challenges. The company prides itself on being a RARE partner to all of its nuclear customers. Chatham defines RARE as:

- **Responsible** –A company that believes outstanding service should co-exist with adherence to the most stringent safety and quality standards. A partner that delivers safety-critical materials on time and within budget.
- **Accountable** –A single-source supplier that provides complete documentation and unparalleled accountability.
- **Reliable** –A proven track record of almost 100 years of reliable service.

- **Effective** –A partner that offers exceptional quality and service, and provides the most effective solutions.

Chatham understands and adheres to the safety-critical standards of the nuclear industry. The following represents the company's commitment to quality assurance and safety: member of NIAC, audited and compliant to ASME; NQA-1, 10CFR50 Appendix B and 10CFR Part 21 (Savannah and Durham Divisions); ASME Section III, NCA 3800; Quality System Certificate (QSC #665, Durham Division); value added operations (burning, forming, drilling, sawing) are certified under ASME QSC/MO; ISO 9001:2008 (All Divisions).

Chatham Steel has proven that it is the nuclear industry's new and better option for supplying safety-critical materials.

For more information on Chatham Steel, visit them online at [www.chathamsteel.com](http://www.chathamsteel.com) or call **1-800-869-2762** and ask for one of their nuclear sales specialists.

**Responsive, Accountable, Reliable, Effective**

# RARE refinement.

**Providing safety-critical steel products to the nuclear industry.**

With 98 years of business behind our name, we don't deliver anything short of responsive, accountable, reliable and effective service for our customers.

At Chatham Steel, our nuclear facilities can offer over 20,000 tons of inventory that can be dedicated to meet safety-critical requirements. This extensive inventory, combined with our RARE services and our commitment to on-time delivery, are what has earned us our reputation for excellence in the metals service industry. That is what we believe to be refinement at its best.

Find out more about our extensive inventory of carbon and stainless steel products and processing services, call **1-800-869-2762** and ask for a nuclear sales specialist, email us at [nuclear@chathamsteel.com](mailto:nuclear@chathamsteel.com) or visit us online at [www.chathamsteel.com](http://www.chathamsteel.com).



**Chatham Steel**

c o r p o r a t i o n

C A R B O N • S T A I N L E S S • A L L O Y



ASME Quality System Certificate (QSC) applies to Chatham Steel's Durham, North Carolina location. ISO 9001:2008 accreditation applies to all Chatham Steel locations. Safety-critical steel products provided to the nuclear industry come from our Durham, North Carolina and Savannah, Georgia locations. A member of the Reliance Steel and Aluminum family of companies.





# We're Fluor Corporation. Taking on tough challenges for more than 100 years.

Fluor is a global leader in engineering, procurement, construction, maintenance, and project management. Active across six continents, we work with governments and multinational companies to design, build, and maintain many of the world's most complex and challenging projects.

We're a solutions-based company with the technical expertise and financial strength to meet the most difficult assignments. Fluor is known as a company that is reliable, delivers projects on time and within budget, has an outstanding safety record, and adheres to the highest ethical standards. Our proven track record of overcoming engineering and environmental challenges has earned us the reputation of being dependable and resulted in well-established client relationships. Our contributions and achievements stimulate economic expansion and improve the quality of life for millions of people around the world.

For the past 60 years, Fluor has provided EPC&M services to the nuclear industry. In the U.S., Fluor designed three nuclear power plants, constructed ten nuclear power plants and supported construction on another ten nuclear units during the 1970s and 1980s. Fluor expanded its services in the 1990s at many of the operating commercial nuclear plants in the United States by providing major capital modification and maintenance services with

more than 90 million hours worked. Our past and ongoing commercial experience includes the maintenance, modification, and related operating plant support services for 90 nuclear reactor units. All of this work was performed in accordance

with the rigorous requirements of 10CFR50. Fluor currently supports the nuclear industry with full service EPC&M capabilities for nuclear new build projects, operating plant modifications, and operations and maintenance (O&M) services.

## BUILDING THE NEXT GENERATION OF NUCLEAR

For more than a century, Fluor has placed a strong emphasis on employee education and development. Our employer – employee synergy enables Fluor to assist clients with sound strategic innovation, implementing unique solutions that save money and meets regulatory requirements. Additionally, Fluor's Subject Matter Expert Protege program provides a platform for long-term succession planning and accelerated growth for Fluor employees and our clients. Active in the global nuclear community, Clay Smith and his proteges are sharing knowledge and driving innovation in the industry. [www.fluor.com](http://www.fluor.com)

*Visit Clay and the Fluor team at the 2013 Power-Gen conference booth #3901 in Orlando, Florida.*



**Fluor's Power Business:**  
Renewables, Alternate Technologies,  
Fossil Generation, Nuclear, Transmission,  
and Operations & Maintenance.

# FLUOR®





## Doosan HF Controls leads the way in responsive I&C solutions to US and International plants.

Doosan HF Controls headquartered in the Carrollton, Texas USA is an I&C solution provider that has supplied and serviced Instrumentation and Control (I&C) systems to American and international clients for over 50 years across the fossil and nuclear markets. Doosan HF Controls has become a major nuclear supplier as it expands its business portfolio.

For example, Doosan HF controls has become the major supplier of nuclear I&C to the Korean nuclear program, supplying nearly 90% of I&C for Korean Hydro and Nuclear Power company's most recent new build programs. Our mid-sized company is a huge plus when your plant needs experienced, responsive solutions and service. Our quick response times allow us to assess your needs and recommend build and install I&C solutions. Our experienced field service team and extensive training capabilities will assure a successful installation with committed robust long-term technical support.

### NRC Approved Plant Controls

Doosan HFC achieved an important milestone when the U.S. Nuclear Regulatory Commission (NRC) approved the Doosan HF Controls **HFC-6000** product line for safety applications in early 2011. This accomplishment provides potential customers with the highest level of confidence in the licensability and success of upgrade projects. Our company maintains a 10CFR50 Appendix B quality assurance program, so you can rest assured that our systems meet or exceed NRC standards.

This NRC approval of the **HFC-6000** system gives mature plants a new path towards safe operation with modern controls, providing American and international companies with clean, reliable electricity into the future. We also received approval from the Korean nuclear authority, KINS, as further confidence in the nuclear integrity of our platform. Outside of the nuclear market, **HFC-6000** Safety Control System is qualified for mission critical or safety control systems, such as in utilities, petrochemical and pulp and paper mill industries. We have a Triple Modular Redundant (TMR) version of **HFC-6000** having SIL 3 certification from TUV Rheinland and SIL 2 certification for Double Modular Redundant (DMR). These approvals give Doosan HF Controls the flexibility to address your diverse I&C solution needs.

### FPGA Integration

As I&C technology evolves, HFC continues to move its platform forward. FPGA Safety applications are being integrated into our newest technology. FPGA technology is already used in most of our current modules and we continue to expand its use where it makes sense. Such an approach in our field proven system, with the flexibility and scalability your systems demand, makes HFC a good choice for fault tolerant, state of the art class 1E safety grade systems which are back fit capable or available for new system installs.

### Nuclear Systems Deployment

With over five decades of innovation and manufacturing of control systems in hundreds of installations around the world, gives us the expertise in the deployment of Plant I&C (both for nuclear safety and non-safety systems). Our current **HFC-6000** platform is a flexible and modular design that allows it to be utilized for a variety of nuclear plant I&C solutions. Some of our current products are:

- Reactor protection system (reactor trip and ESFAS)
- Emergency diesel generator load shedding and sequencing
- Qualified display and processing systems or post-TMI control room applications, such as ICCMS
- Safety-grade Sequence of Events (SOE)
- Plant-wide control systems
- Automatic seismic reactor trip systems
- Control rod drive control systems
- Radwaste control systems

Our customers benefit from the experience of real world, reliable solutions to all your critical needs. For more detailed information, or to have our experienced engineers develop a detailed proposal complete with conceptual system arrangement drawings, equipment lists, and technical configuration data all in accordance with specifications provided.

#### Contact:

**John A. Stevens VP Engineering**  
**John.Stevens@doosan.com**  
 Call 866-501-9951 or visit  
[www.hfcontrols.com](http://www.hfcontrols.com)



# HF CONTROLS

## COMPLETE CONTROL

### COMPLETE DESIGN CONTROL

Our engineering department has extensive control systems design and development experience. We are capable of providing engineering services such as logic conversions, detailed documentation services, graphics generation, and more.



## COMPLETE SOLUTIONS

### COMPLETE CONTROL ROOM SOLUTIONS

We offer complete process control and automation solutions. Our current HFC-6000 platform is a flexible and modular design that allows it to be utilized for a variety of nuclear plant I&C solutions.



## COMPLETE SUCCESS

### COMPLETE ROBUST LONG-TERM TECHNICAL SUPPORT

HF Controls provides comprehensive field and training services to keep maintenance and operations staff updated and knowledgeable about our control systems. Call us today and let our experienced engineers give you a complete system proposal in accordance with your specifications.



CALL US AT 866 501 9954

[www.HFCONTROLS.com](http://www.HFCONTROLS.com)

SCAN FOR MORE INFO







## Shaping the future

### Solving the new challenges of the nuclear world



AMEC is a global provider of sustainable engineering, consultancy and construction services for the nuclear industry.

[amec.com/nuclear](http://amec.com/nuclear)

AMEC is a leading supplier of consultancy, engineering and project management services to our customers in the world's oil and gas, mining, clean energy, environment and infrastructure markets.

follow us



## Integrated assessments: the next stage in post-Fukushima evaluations

In March 2012, two years after the tragic earthquake and tsunami in Japan that crippled its nuclear power industry, US licensees submitted the flooding hazard re-evaluations for the first third of US operating nuclear plants to NRC for review. Evaluations for the remaining US plants will be due in March of each of the next two years. One of the critical questions to be answered by these hazard evaluations is whether the maximum flood level developed using current practice and methodologies is enveloped by the maximum flooding level used in the original plant design and licensing.

For plants where the reevaluated flood level exceeds the current design basis floods under some flood-causing mechanisms, licensees must perform an integrated assessment. This integrated assessment must evaluate the effectiveness of the plant's flood protection and mitigation capability under all modes of expected plant operation, over the entire duration of the flood condition. This assessment is meant to also consider whether specific vulnerabilities may arise during normal and full-power configurations as well as other modes of operation or configurations where flood protection may be bypassed or defeated for maintenance or refueling activities.

In November 2012, the NRC published new regulatory guidance (JLD-ISG-2012-05) for performing the Integrated Assessment for External Flooding at nuclear power plant sites. This guidance was developed with considerable input from the nuclear plant licensees, the Nuclear Energy Institute and other stakeholders. It fulfills the requirement of the 50.54(f) letter that licensees perform an integrated assessment of their plant to identify vulnerabilities and actions to address them.

The NRC provided further guidance in December 2012, limiting the scope of the integrated assessment for scenarios where 1) the only portion of the reevaluated flooding hazard that was unbounded resulted from local intense precipitation or 2) it can be demonstrated that permanently installed and passive flood protection produces reliable protection with a margin under the reevaluated hazard level. As many as one-half of the nuclear power plant sites may need to complete and submit an integrated assessment of flooding for review by the NRC.

The stated regulatory purpose of the Integrated Assessment is to:

- (1) evaluate the effectiveness of the current licensing basis under the reevaluated flood hazard
- (2) identify plant-specific vulnerabilities due to external flood hazards
- (3) assess the effectiveness of existing or planned plant systems and procedures to protect against flood conditions and mitigating consequences for the entire duration of a flooding event.

Performing an integrated assessment requires combined technical experience in flooding mitigation, plant design and operation and probabilistic risk assessment.

AMEC is currently working with a licensee to develop a prototypical integrated assessment using the NRC guidance and close coordination with the NRC staff. Integrated assessments for other plant sites have been deferred, so that lessons from the interactions among the licensee, its consultants and the NRC staff can be incorporated into the preparation of these subsequent assessments.

#### AMEC at a glance

- FTSE 100 company
- 29,000 employees in 40 countries
- Annual revenues over \$6.6 billion
- Ranked in top of its sector in the Dow Jones Sustainability Index since 2004
- US Green Building Council Member







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**U**nderwater Construction Corporation (UCC) is the leading global underwater service provider specializing in nuclear dive services. In 2012, UCC is proud to have safely completed more than 90% of the world's nuclear dive projects that required experienced nuclear divers. For 2013, UCC is on track to meet or exceed our 2012 levels. During the most recent US Spring Nuclear Outage Season, UCC employees supported 21 of the 30 nuclear plants performing refueling outages.

UCC boasts an exceptional safety record, unmatched in-water experience and a 200+ dive team. This experience and commitment to safety has recently earned them prestigious service awards from two of the world's largest nuclear OEMs. These awards are a testament to the long standing tradition of success and reliability UCC has provided to the global nuclear industry for the past 40 years.



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## Custom Solutions For Custom Challenges

by Frank Harris

In a world of growing mass-production and "one size fits all" offerings, true custom manufacturing and assembly companies can be hard to find. For the nuclear industry with its unique requirements, this is especially true. By its very nature, "one size" often doesn't fit the needs of the nuclear power industry. Trying to force the problem to fit the solution rather than fitting the solution to the problem is costly, time consuming, and typically yields sub-optimal results. Serving this constant need for custom solutions to the custom challenges the nuclear industry faces has been at the core of Nutherm International, Inc.'s business for over thirty years.

"We are strictly focused on safety-related applications," Nutherm's President Tom Sterbis explained. "Since our founding in 1979, Nutherm has specialized in supplying safety-related electrical equipment to the nuclear industry.

From system design through qualification, assembly, and commercial grade dedication, our thirty plus years of experience provide a deep reservoir of institutional knowledge. That knowledge and experience, combined with our commitment to quality, allows us to create innovative solutions that meet both the technical and regulatory requirements unique to the nuclear industry."

In combining its innovative practices of custom-made products and offering expertise that extends across the spectrum of modern-day energy needs, Nutherm has been working for more than thirty years to achieve one mission: creating solutions. There are new solutions to old problems as well as old solutions to new problems. From evaluating customers' needs to quality testing the completed product, each project receives individual attention and focused commitment of resources from an experienced staff. Controls and equipment designed or dedicated at Nutherm meet the most stringent safety-related standards, including harsh and mild

environment qualifications, commercial grade dedication, EMI/RFI testing, seismic testing in Nutherm's Dynamic Laboratory, and specified tests and inspections that cater to customer needs.

"As facilities age, legacy designs become obsolete, and the regulatory environment evolves, the need for replacements or upgrades continues to increase," Mr. Sterbis continued. "Nutherm's long history has allowed us to accumulate an impressive list of custom designs. It is fairly common when we get an inquiry for us to be able to link the new problem to a solution we had developed on a previous project. With our constantly growing library of over 8000 qualified parts and extensive experience solving similar problems, Nutherm is uniquely positioned to offer the solutions our customers need."

Nutherm's combined technical expertise and Quality Assurance program have made it a leader in developing safety-related products for the nuclear industry around the world.





**Nutherm**  
International, Inc.  
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SENIOR MANAGEMENT  
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Automated Engineering Services Corp.  
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Office Phone: (630) 615-3518 (Direct)

dreggett@aesengineering.com

[www.aesengineering.com](http://www.aesengineering.com)

**“Our single focus - nuclear power - allows us to respond to our clients needs quickly, applying our deep-rooted knowledge base to come up with the most viable solution. That’s why we forge long standing relationships with our clients, and why they keep coming back to us.”**

—A.V. (Doc) Setlur, President  
Automated Engineering Services Corp.

**ACHIEVING RESULTS**

Focused on responsiveness. On experience. On innovation. It is the culmination of all these things that sets us apart. It’s what helps us achieve confidence and trust from our clients.

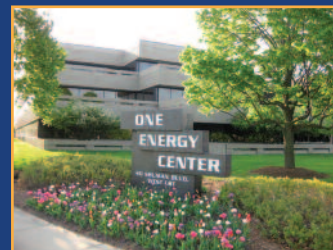
We put our energies into solving complex problems in the nuclear power industry and it shows. We bring the experience and know how that can only be formed through our collective knowledge and client engagement.

Our engineers know how to ask the right questions, and how to listen. As a result, we have established a level of credibility with our clients through intensive engineering and management solutions.

For three decades, we’ve provided powerful engineering, technical, regulatory, and operational support services to nuclear power utilities and power plants. We strive to continually reward the trust each client places in us; a trust we believe we have earned through dedicated, responsive, and cost effective service.

**EXECUTION**

- Consistent –
- Predictable –
- Efficient –



*AES Corporate Office*

**CURRENT PROJECTS**

- Fukushima/FLEX Projects
- Tornado Missile Protection
- Seismic Evaluations & Flood Protection
- NFPA-805/Fire Protection Mods
- EPU Related Analyses/Mods/ Program Upgrades
- Buried Piping Solutions
- Cyber & Physical Security
- Digital Upgrade
- Dose Reduction Initiatives

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THE SOLUTIONS



# GENERATING SOLUTIONS

## Our Top 10 Nuclear Services

Your customers count on you for the energy that powers their lives. And you can count on Structural Integrity for solutions that will help you keep the power flowing for years to come.

There are many ways we can help your plant be its best:

- ① **BWR and PWR Internals** programs, evaluations and inspections
- ② **Run/Repair/Replace Decisions** including component operability/JCO support
- ③ **Fatigue Management** including analysis and monitoring
- ④ **Seismic Re-evaluation** to address post-Fukushima issues
- ⑤ **Underground Pipe & Tank Integrity** program development, data management, inspections, evaluations and monitoring
- ⑥ **Materials and Corrosion** evaluation to assist in root cause evaluation
- ⑦ **PWSCC/Alloy 600 and IGSCC** mitigation and repairs
- ⑧ **Vibration** analysis and instrumentation
- ⑨ **Nondestructive examinations** using state of the art equipment and techniques
- ⑩ **License Renewal** programs and support

### Our Toolkit

Structural Integrity's leading-edge tools and techniques – many developed by our own experts – navigate the most challenging conditions to provide precise, accurate assessments of material condition. Our sophisticated tools allow us to easily organize and manage massive amounts of data to assess and address material condition.

### Our Team

Our team includes respected, responsive professionals who play an active role in industry organizations. Our experience can shed light on the most stubborn system and component issues – and we aren't afraid to get our hands dirty. Besides full-scope support, third-party reviews and regulatory interface support are other ways to leverage us.

For a fresh perspective, get the facts from Structural Integrity. We'll bring unmatched talent and technology – and lessons learned from around the world – to your most critical plant issues.

**For insight and innovation, Structural Integrity is your one-stop-shop.**

Go to [www.structint.com/nuclear-news](http://www.structint.com/nuclear-news) to learn more about our "Top 10" as well as our many other services.

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**CELEBRATING**  
**30**  
**YEARS**  
**1983-2013**



**Petersen Inc.** has been the industry leader in custom steel manufacturing for the nuclear industry for decades. How? By creating solutions to difficult problems and helping our customers meet their high demand project timelines by producing high quality products efficiently and in-budget.

**HISTORY**

Petersen Inc. of Ogden, Utah opened its doors in 1961 and has been manufacturing products for industries worldwide since that time. For 51 years Petersen Inc. has been the company to go to when custom fabrication, design engineering, and field installation are required for difficult projects. Over the years we have become the industry leader in our field of expertise.

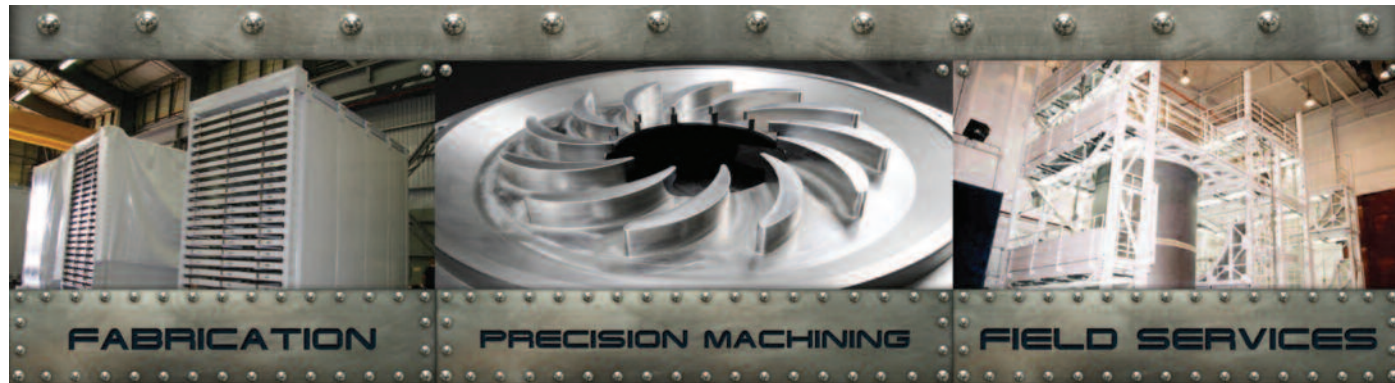
Petersen Inc. has been chosen as a partner in high-profile projects such as the Department of Energy's Hanford Waste Treatment Plant, Savannah River MOX facility, WIPP, ZION, and others.

The Petersen Inc. fabricated Melters will be the heart of the Hanford Waste Treatment Plant which, when operational, will be the world's largest chemical radioactive waste

treatment plant, located on the US Department of Energy's Hanford site in southeastern Washington. Up to 53-million gallons of radioactive waste will be processed through the Melters.

Petersen Inc.'s participation in the Department of Energy's MOX Services project at the Savannah River Site is constructing storage components, structural, mechanical, and electrical subassemblies, as well as Gloveboxes and associated equipment for the facility which converts weapons grade plutonium into fuel for electricity generating power plants.

Petersen Inc. is a major supplier of containers for many industries including Nuclear, Aerospace, Commercial, Petrochemical, and is proud to be a part of the clean-up of waste generator sites around the country, helping to make it a cleaner and safer environment for future generations. Petersen Inc. fabricates RLC's, SWB's and TDOP's for Washington TRU-Solutions at the Department of Energy's WIPP site which allows us to provide storage containers of various sizes and specifications to anyone who purchases them through Washington TRU-Solutions.



**Nuclear Projects**

- Dry Fuel Storage Cask
- IP Container
- Standard Waste Box
- Standard Large Box
- Glovebox
- Process Equipment
- Melters
- Material Handling Equipment

**Certifications**

- ASME NQA-1
- ISO9001-2008
- NRC Subpart H of 10CFR71

**Locations**

- Utah
- Idaho

**CGD In-house Test Lab**

Petersen Inc. took the industry lead by working hard, providing the best solutions to difficult issues, and providing customers with the highest quality products the industry has ever seen; on-time and within budget. Call us.



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NQA-1

ISO9001-2008

Dry Fuel Storage

Casks

IP Containers

Standard Waste

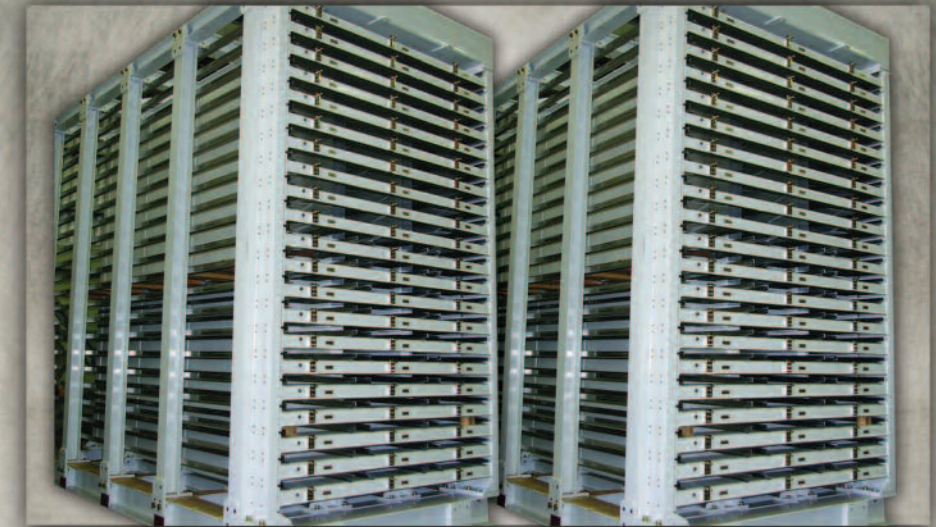
Box

Standard Large Box

Glovebox

Process Equipment

**Petersen Inc. Doing it Right for over 50 Years!**



Petersen Inc. is currently supporting the DOE Prime Contractors with Gloveboxes, Pellet Storage Units, Rod Storage Racks, and other miscellaneous equipment that demands the highest quality in the industry. That's what they get from Petersen Inc. and that's why Bechtel, WTS, Shaw Areva and others contract with us. Scan the QR code to go to our website and get a glimpse of why our customers want Petersen Inc. as a strategic partner.

If you need high quality products, great customer service, and products that are on-time and within budget, call the fabricator that the largest companies in the U.S. trust with their products – Petersen Inc.

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Utah-Idaho





Founded in 1973, Team Industrial Services is the worldwide leader in minimizing equipment and asset downtime, providing on-line maintenance, inspection and repair. We provide critical services to our customers that enable them to maintain and operate their facilities and equipment in a safe and productive manner.

Our line of specialized industrial services includes bolting/torquing, concrete repair, emissions control, exchanger services, field machining, fitness for service, heat treating, hot tap/line stop, isolation test plugs, leak repair, manufacturing/engineering, mechanical integrity, NDE/NDT inspection, specialty welding, turnkey tank program, valve insertion, and valve repair.

We employ only the best, most qualified technicians to ensure each and every job is completed to the highest standards every time. Our quality management system requires ongoing technical training for all personnel. Additional training and documentation are required based on specific technical job requirements.

In addition to our services, Team's ISO-certified engineering design and manufacturing facilities provide

the highest quality pipe repair, leak sealing and hot tapping hardware, sealants and related products. A company-wide commitment to quality control, safety and quick response drives the manufacturing of all Team products 24/7/365.

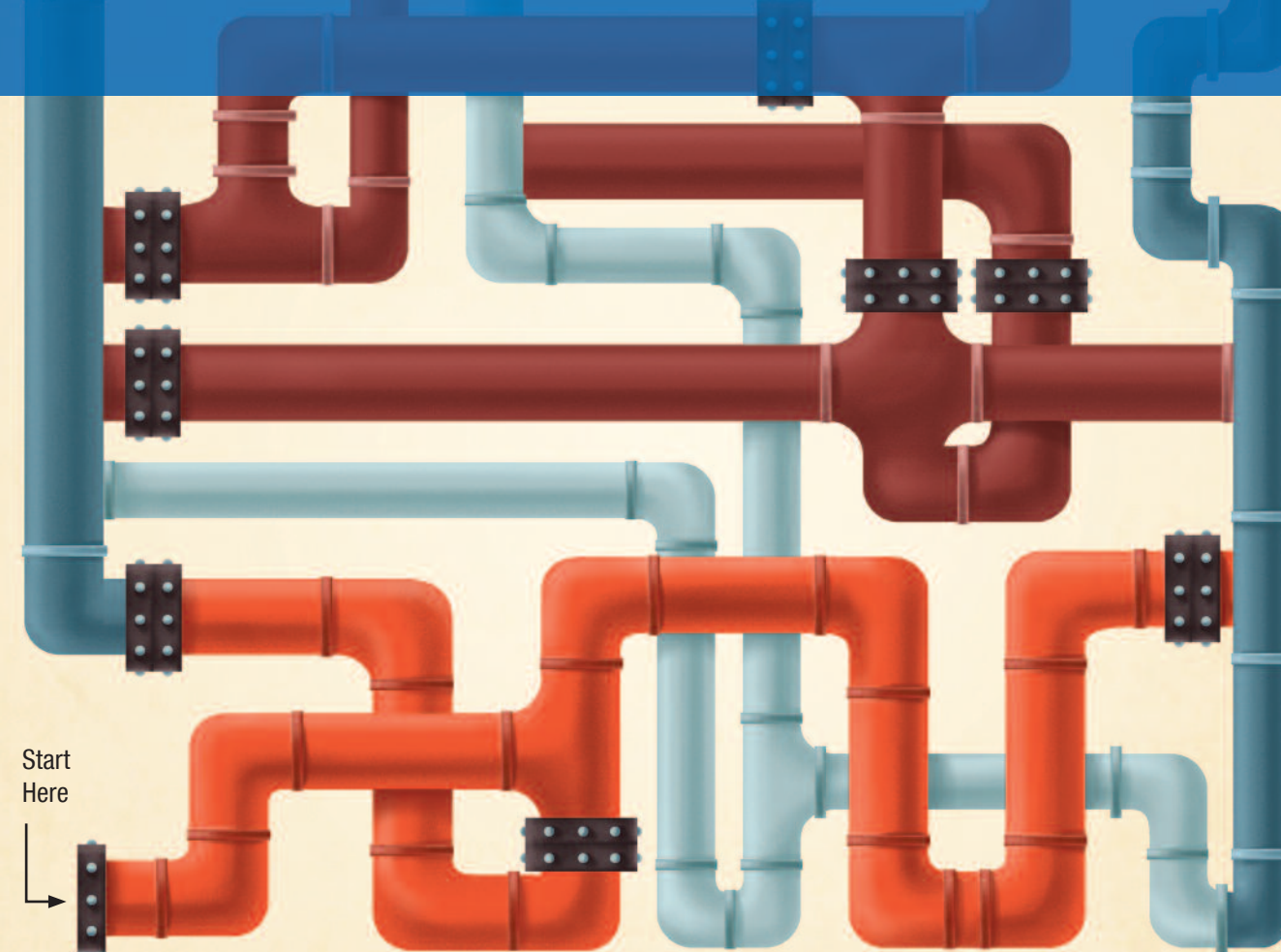
In our 40 years of experience in inspection, maintenance, repair, and compliance, we've come across a variety of unique business and industry challenges. We provided solutions for each of these challenges, which we then utilized to better our team, better our services and better our processes. Whether our customers are working on a capital expansion project in a nuclear power plant, planned maintenance in a paper mill, emergency repair to a mining massive loader assembly, or a scheduled turnaround in a refinery, more than likely one of our technicians has performed similar work in a similar situation.

Our customers have grown to count on Team when the going gets tough. However, we approach any project, big or small, with the same intensity to ensure each job is completed safely and to the highest standards every time. That is why HSE&S and quality are the core driving forces

behind everything we do at Team. We maintain management systems and documented work procedures designed to assure compliance with all applicable laws, regulations and internal requirements, as well as to facilitate the continuous improvement of our processes, products, and personnel. Our highest priority at Team is the safety of our employees, clients, and other contractors. We are committed to safety excellence and strive daily for Zero injuries and incidents.

Today, we are rapidly growing our global footprint across a wide range of industries - with service locations in five continents. We recognize that our global success is ultimately measured by our customers' trust and confidence, which can only be earned through continuing outstanding service. Team's trained and certified technicians are available worldwide 24/7/365. From single part repair to turnarounds and shutdowns - planned or unplanned - Team has the training, experience, technology and know-how to deliver high-quality maintenance, inspection, and testing services anytime, anywhere.

## Follow the maze to the end.



When it comes to a facility's maintenance schedule there is no end. Planned maintenance is integral in any asset management program to ensure safe operations and to maximize uptime. Team provides a number of services to assist with scheduled maintenance. We have the flexibility and resources to provide maintenance services throughout the world - according to your schedule.

TEAM experts are available 24 hours a day, 7 days a week, 365 days a year. Call TEAM today: **1-800-662-8326**

### TEAM Services

- |                      |                           |
|----------------------|---------------------------|
| Bolting/Torquing     | Manufacturing/Engineering |
| Concrete Repair      | Mechanical Integrity      |
| Emissions Control    | NDE/NDT Inspection        |
| Exchanger Services   | Specialty Welding         |
| Field Machining      | Turnkey Tank Program      |
| Fitness for Service  | Valve Insertion           |
| Heat Treating        | Valve Repair              |
| Hot Tap/Line Stop    |                           |
| Isolation Test Plugs |                           |
| Leak Repair          |                           |

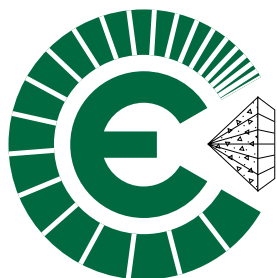




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SERVICES CORP.

“NUCLEAR”

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From superabrasives to shears, Cutting Edge has been deploying innovative cutting tools since 1997. Our CEO & founder, Tim Beckman, helped pioneer diamond wire sawing for removal of bioshield walls in 1983 (HB Robinson SGRP).

We provide design, fabrication & field services for wire saws, pole saws, wall saws, core drills & robotic devices.

- BROKK Robotic Concrete Demo
- SGRP Containment & Bio Openings
- Large Diameter & Deep Hole Drilling
- Water Powered Cutting Tools
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REACTOR DOME REMOTELY CUT



HOT CELLS WIRE SAWED FLUSH TO FLOOR





## Pioneering Passive Fire Protection Systems in the Nuclear Industry for More Than Three Decades

PCI Promatec offers an unmatched library of products and designs qualified to meet the rigid standards of fire safety in the nuclear industry, from the development of our own line of penetration seals to the acquisitions of other industry leaders, including Bisco/Brand, ICMS, and Techsil.

We offer qualified systems for fire, pressure, radiation, security and flood seals. Additionally, through our exclusive agreement with 3M, we have qualified 1-3 hour electrical raceway fire barrier systems that fully comply with the most rigid USNRC requirements.

Our NQA-1 Quality Assurance program has passed the rigorous audit process of NUPIC every year since its inception. Our Target Zero safety program is the best in the industry.

As a wholly-owned division of Performance Contracting Group (PCG), we offer financial stability as "One of the Top 10 Specialty Contracting Firm in the USA," as ranked by *ENR Magazine*.

Our core staff averages 25 years experience in nuclear passive fire protection, making PCI Promatec "the authority" in this industry.

Our customer base includes the majority of nuclear plant owners in the USA, DOE, and a number of international utilities in Asia and Europe. In an average year, we do business with over 50 facilities with services ranging from technical support to full turnkey contracts. With contracts successfully completed from \$1,000-\$20,000,000, no job is too large or too small.

If you have a need, we have a solution. Call Mike Jordan at 281-933-7222, email PCI Promatec at [info@promatec.com](mailto:info@promatec.com) or visit us on the web at [www.promatec.com](http://www.promatec.com).



## Your Complete Source for Passive Fire Protection Products and Services For More Than 30 Years!

Installation                      Engineering  
 Project Management          Quality Assurance  
 Training/Certification        Fire Test Support

- Fire, pressure and radiation penetration seals
- 3M Interam™ flexible fire wrap systems for Appendix R circuit protection, fully qualified to USNRC Letter (GL) 86-10, Supplement I
- Fire, blast, moisture, and impact-resistant wall systems for zone separations and other applications
- Nuclear-dedicated greases, lubricants, compounds and other chemicals by Dow Corning® and others

Our innovative passive fire protection solutions are the nuclear industry standard, installed in 100+ facilities worldwide.

**281-933-7222** [www.promatec.com](http://www.promatec.com)







The Only Source of Knowledge is

# Experience

- Albert Einstein



## **BCP** Engineers & Consultants

Proudly Supporting Nuclear Industry Growth Since 1981

**Experience** and Innovative Solutions are what make BCP Extraordinary

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**Staff Augmentation Support**

**Cyber Security CDA Assessments and Governance**

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## Transco Products Inc.

Transco Products Inc. designs, manufactures and installs products and services that enhance the safety, security and efficiency of nuclear power plants. Best known for its reflective metal insulation system, Transco has been providing proven solutions to the nuclear power industry for more than 50 years. With products and services installed in over 150 plants, including every plant within the United States, Transco has the largest installed capacity in the world.

### REFLECTIVE METAL INSULATION



Transco, the industry's most trusted provider for insulation, designed its system around proven testing, installation experience and lessons learned from decades of successful projects. This translates into valuable outage time and dose savings during critical outage windows and reliable thermal performance over the life of the plant.

*Transco's RMI is ideal for:*

- GSI-191 Fiber Reduction
- Steam Generator Replacements
  - New Plant Construction
- Ongoing Maintenance/Outage Support
  - Extended Power Upgrades

### ECCS SUCTION STRAINERS



The Transco team, made up of the industry's most trusted solution providers, has supplied the most ECCS strainer solutions to nuclear power plants around the world over the past five years. Transco, along with its strategic partners, will evaluate your plant conditions and tailor a solution that ensures long term ECCS reliability.

*Transco's Cartridge Advantages:*

- Lightweight & Cost Effective
- Simplified Field Assembly
- Superior Performance across the full spectrum of debris loads

### PASSIVE FIRE PROTECTION



Transco offers a full-line of qualified products and designs for sealing electrical, mechanical (stationary and moving pipe), and structural penetrations in architectural, fire, flood, ventilation, and/or radiation boundaries in addition to a full range of qualified raceway fire barrier and radiant energy materials.

*Transco's Fire Protection Line:*

- Latest test standards for fire and flood
- Simplified Installation & Consistent Quality
- Materials and designs that bound all common configurations

# TRUST - EXPERIENCE - PROVEN SOLUTIONS

Building Excellence In Service, Delivering Energetic Solutions



Transco's problem solving and rapid response ensures  
your plant receives quality solutions  
**ON TIME, EVERY TIME.**



# Fairbanks Morse Engine

**Supporting the nuclear industry yesterday, today and tomorrow**



an EnPro Industries company

Fairbanks Morse Engine is the leading supplier of emergency diesel generator sets (EDGs) to the nuclear power industry. Our EDGs are designed, manufactured, and tested in Beloit, Wisconsin in compliance with NRC requirements. With over 100 generator sets currently in nuclear service, next generation plant operators can look to our proven track record: delivering reliable power, onsite service support, factory-direct engineering services, and OEM replacement parts.

Our leadership role in nuclear standby power dates to the earliest development of the technology. When the U.S. Navy needed diesel generators to support the emerging nuclear fleet, they turned to Fairbanks Morse Engine. As the first generation of nuclear plants came online in the 1960s, our Opposed Piston EDGs were chosen based on their performance under the Navy's rigorous operating conditions. Nuclear construction peaked in following decades, and the Fairbanks Morse Colt-Pielstick engine line entered service at plants throughout North America. Currently, over 60% of U.S. nuclear owner/operators depend on Fairbanks Morse for standby power.

With the next generation of nuclear plants

expected to generate electricity for 50 years or more, the industry is looking for a proven engine manufacturer to build EDGs that will meet demanding NRC requirements and last for the life of the plant. Our engines are manufactured in accordance with USNRC Regulatory Guide 1.9, 10 CFR 50 Appendix B, IEEE344, IEEE323, IEEE387, NQA-1, and ASME Section III, Class 3. Additionally, we maintain a



commercial-grade nuclear dedication program audited by NUPIC. Dozens of satisfied plant operators take advantage of our OEM replacement parts, onsite service support and factory-direct engineering services.

For more information about our role in the future of the nuclear power industry, visit us online at [fairbanksmorse.com](http://fairbanksmorse.com).

## Our EDGs are proven in places where normal is anything but

Six 18-cylinder FM/ALCO 251 diesel engines provide emergency backup power at the Diablo Canyon Nuclear Plant.



That's why more than 100 of our emergency diesel generator (EDG) sets safeguard US nuclear reactors, ready in seconds to supply critical emergency power, backed with factory direct service and world class engineering. Trust the proven leader.

*Legendary Power. Driving the Future*



an EnPro Industries company



# American Crane & Equipment Corporation

## COMMITTED TO THE NUCLEAR INDUSTRY

American Crane & Equipment Corporation, a privately held U.S. company with headquarters in eastern Pennsylvania, is proud to be celebrating its 40th year of business! Since 1972, American Crane has been one of the most innovative manufacturers of high quality specialty lifting equipment for nuclear applications. The design and manufacture of custom equipment, with special attention to the rigorous standards of nuclear quality assurance, has been the company's primary business focus.

American Crane's conceptual design for single failure proof cranes provides up to 350 tons capacity with the ability to meet requirements for design and manufacture of higher capacities through 1,000 tons. By successfully providing the majority of single failure proof crane upgrades for dry spent fuel storage in the United States, American Crane has proven its expertise in supplying equipment for the nuclear industry.

The SAFLIFT™, one of American Crane's patented products, is used for dry spent fuel processing operations. The SAFLIFT™ eliminates seismic stack-up stability risk and reduces ALARA concerns when transferring the canister to the cask. Extensive experience with nuclear power plant requirements has enabled American Crane to meet its customers' specifications and schedules. Over the years, customers have included nuclear utility businesses, Department of Energy sites and laboratories, military facilities, and aerospace companies.

American Crane has made other significant investments to meet the nuclear industry's demand for high quality cranes and next generation equipment design. For instance, to accommodate the demands of the specialty lifting equipment market, American Crane has increased its operations and work force to include three locations near Philadelphia, PA. This manufacturing expansion and increase in highly skilled labor has the scalability to meet future market demands.

As a supplier to the nuclear industry, American Crane has maintained a Quality Assurance Program since 1996 that meets both 10 CFR 50, Appendix B, and ASME NQA-1 standards. American Crane's quality program has been audited by commercial nuclear utilities, NUPIC, and DOE contractors.

Entrust your future crane needs to one of the nuclear industry's most innovative and committed leaders.



SAFLIFT™

SINGLE FAILURE PROOF TROLLEY

### KEYS TO AMERICAN CRANE'S NUCLEAR SUCCESS

- Resumé of Completed Projects
- Company-Wide Focus on Nuclear
- NRC Licensing Experience
- Mature Appendix B QA Program
- In-house Engineering Staff
- Extensive Seismic Background
- Sufficient Manufacturing Capability

### LOCATIONS DOUGLASSVILLE, PA

- Corporate Headquarters (107,000 sq.ft.)
- Service, Parts & Standard Crane Division (20,000 sq.ft.)

### LESTER, PA

- Manufacturing Support Division (100,000+ sq.ft.)

### PRODUCTS & SERVICES

- Custom Cranes and Material Handling Equipment for Most Applications Including Nuclear, DOE Aerospace, Explosion Proof, and Single Failure Proof
- Standard Pre-Engineered Industrial Cranes
- Full Line of Industrial Hoists
- Specialized Equipment Including Bridge Maintenance Travelers
- Lift Beams and Grapples
- Field Service Support

### ENGINEERING

- Mechanical and Machine Design
- Structural Design and Analyses
- Dynamic Modeling and Seismic
- Failure Modes and Effects Analyses
- AutoCad, MathCad, Solidworks, SAP2000, and ANSYS
- Complete Control System Design
- Remote Systems
- Automated Systems
- Software Development including Real Time Graphics
- Complete Licensing Success with NRC
- Support for 50.59 Evaluations

### MANUFACTURING

- State-of-the-Art Material Preparation
- Certified Welders per AWS D1.1/AWS D14.1
- In-House Electrical Panel Building Shop
- UL508 Certified Panel Shop
- Machine Shop with CNC Capability
- One of the Largest Boring Mills in the Northeastern United States (X=30', Y=14', Z=5')

### SERVICE

- Load Testing up to 200 Tons
- On-site Support
- Product Support
- Outage Support
- Retrofit and Upgrades
- Inspections
- Resident Technicians for Continuous Site Support
- Training

### SPARE PARTS

- Dedicated Spare Parts Group
- Parts available for American Crane and other OEM's equipment.
- Authorized Stocking Distributor of AL-Vac, Budgit, CM, Chester Hoist, Coffing, Gorbelt, Little Mule, Munck, Shaw-Box, YALE & more.
- Custom Fabrication for Unique Parts
- Nuclear Safety Related Crane Parts
- Engineering Support
- In-House Machining

### QUALITY ASSURANCE

- 10 CFR 50 Appendix B/NQA-1 Quality Program for Nuclear Projects
- NUPIC Audited
- Welding controlled to AWS D1.1 or D14.1
- SNT-TC-1A Qualified NDT Personnel
- Graded Controls Based on Customers' Requirements
- In-House Non-Destructive Testing

# POWERFUL INNOVATION PROVEN EXPERIENCE

Lifting Experts  
for more than

40 YEARS



Your complete source for specialized  
Nuclear Material Handling Solutions  
for current plant needs and the next  
generation of nuclear power plants.

From complex custom equipment to standard equipment, components and parts, American Crane can meet all your material handling needs. Visit our new online catalogue at [Store.AmericanCrane.com](http://Store.AmericanCrane.com) for comprehensive online parts and standard equipment featuring Al-Vac, Yale, Shaw-Box, Budgit, Little Mule, CM, Chester Hoist, Coffing Hoist, Munck and more.

### SERVICES:

- ▶ Nuclear Quality Custom Equipment and Components (10 CFR 50 App. B & NQA-1)
- ▶ QA Program & Testing (10 CFR 50 App. B and NQA-1)
- ▶ Engineering Solutions including Seismic Analysis & Design
- ▶ In-House Manufacturing & Machining
- ▶ Installation, Site Services, Outage Services & Parts
- ▶ Upgrades & Rebuilds of Our Equipment & OEMs

YOUR CRITICAL LIFT EXPERTS

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# SPX Provides Critical Nuclear Valve Solutions

SPX has been engineering and manufacturing valves for the nuclear industry for over 40 years through its Copes-Vulcan brand, which provides technical solutions for a variety of nuclear applications including feedwater, steam dump, pressurizer spray, reactor coolant, sampling, service water, and safety injection valves.

SPX has developed a proven, comprehensive line of globe valves which are available for standard to severe duty applications. Body configurations include angle, three-way and straight through, and can be cast or forged depending on the customer's needs. SPX boasts one of the largest selections of control valve trims available in the nuclear market,

with designs ranging from general service port throttling trims to Raven™, a stacked disc, velocity control trim.

Additionally, SPX also offers field service technicians and technical support and has been actively providing refurbishments and upgrades of existing equipment to help utilities reduce their maintenance costs and support power updates.

As a global company, SPX manufactures critical components for the nuclear industry including: plate heat exchangers, filters, dryers, purifiers, valves, pumps, cooling towers and system installations tools.

## CERTIFICATIONS

The National Board of Boiler and Pressure Vessel Inspectors awarded the prestigious NR Stamp to SPX for its Copes-Vulcan brand, allowing qualified personnel to repair other manufacturer's valves, in addition to their own.

The SPX facility in McKean, Pennsylvania, was also recently re-certified by the American Society of Mechanical Engineers for the ASME N and NPT stamps. This operation is also independently certified for ISO9000.

## ABOUT SPX

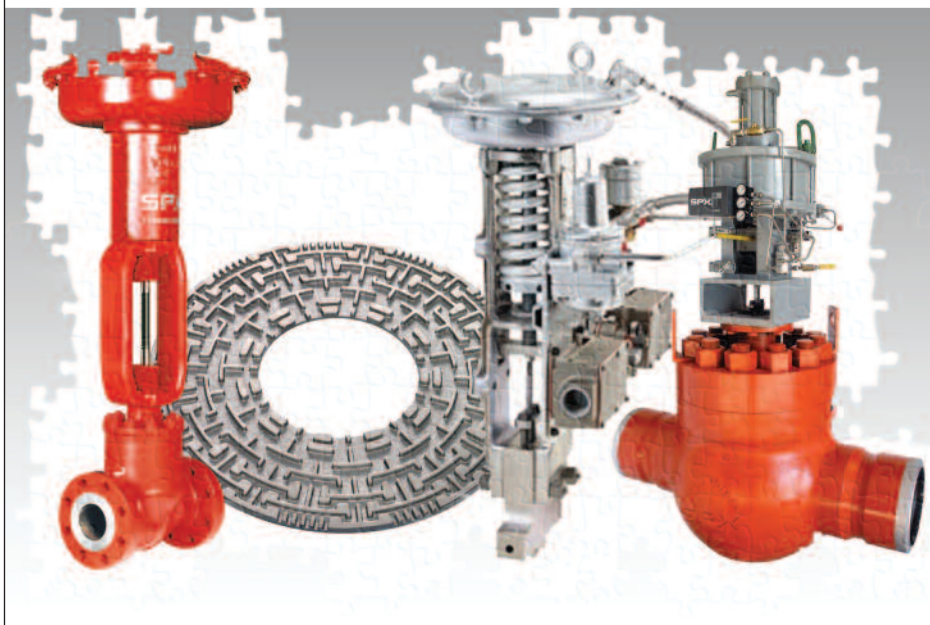
SPX Corporation is a Fortune 500 multi-industry manufacturing leader that provides its customers with highly-specialized, engineered solutions to solve critical business issues. SPX products and technologies play an important role in the expansion of global infrastructure to help meet increased demand for power and energy and support many different sources of power generation, including coal and natural gas, nuclear, solar and geothermal. SPX manufactures and markets products, components, services and technologies that are integral to meeting today's challenges and tomorrow's needs.

We transform ideas into powerful solutions to help our customers meet their goals, overcome business challenges and thrive in a complex, always-changing marketplace.

For more information, visit [www.spx.com](http://www.spx.com).

**SPX**  
WHERE IDEAS MEET INDUSTRY

100 YEARS OF  
INNOVATION



WHERE VALVE SOLUTIONS COME  
TOGETHER FOR THE NUCLEAR INDUSTRY

SPX is finding innovative ways to help the world meet its ever growing demand for power by providing a broad range of high-quality, custom-engineered systems and components for the power, process, and nuclear industries.

Copes-Vulcan, an SPX brand, has been engineering and manufacturing valves for the nuclear industry for over forty years, and is an unsurpassed innovator in control, isolation and rotary valves. SPX's extensive line of valve types, actuation, trims, and engineering expertise allows us to provide you with the best fluid handling solutions. Contact SPX to find a complete range of engineered solutions for your specific power generation application.

To learn more visit [www.spx.com](http://www.spx.com)

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**> Copes-Vulcan®**





# The GEL Group INC

## Nuclear Services



NUPIC Approved  
 Chemistry  
 Radiochemistry  
 Radiobioassay  
 RETS-REMP Support  
 10CFR61 Waste Characterization  
 Certified in Over 25 States  
 Supporting over 50% U.S. and Canada Nuclear Power Plants  
 Secure Web Access to Data  
 Consulting Services



Groundwater Modeling  
 Air Effluent Modeling  
<sup>14</sup>C Gaseous Measurement  
 Groundwater Assessment and Remediation  
 Isokinetic Flow Evaluation  
 Indoor Air Quality Studies  
 REMP Program Support  
 Stack Testing  
 Hydrographic and Land Surveying  
 Geophysical Services

## Innovative Analytical and Environmental Services

Headquartered in Charleston, South Carolina since 1981, The GEL Group, Inc. provides streamlined solutions to the nuclear industry. From laboratory analysis and engineering, to geophysical services, GEL can save you time and resources and develop solutions and data that you can trust.

### GEL Laboratories, LLC

GEL Laboratories, LLC offers one of the widest arrays of chemistry, radiochemistry, and radiobioassay services available in any single facility in the United States. In addition, GEL's quality program is one of the most highly audited programs in our industry. GEL Laboratories' clients include over 50 US Nuclear Power Plants.

GEL provides the nuclear industry with comprehensive chemistry and radiochemistry services including:

- NUPIC audited and approved laboratory
- NQA-1 programs
- Fully MARLAP compliant data packages
- Fully interactive "Web Based" sample management, data assessment and cost tracking system
- Environmental REMP-RETS analytical support
- Rad-Waste analytical support as required under 10CFR61
- Bioassay for plant personnel

- Plant atmosphere testing for C-14 as required by NRC REG Guide 1.21
- Fast sample turnaround times for waste and analytical chemistry samples

**For more information please contact:**

Robert P. Wills, RRPT  
 robert.wills@gel.com  
 office: (843) 556-8171  
 cell: (843) 906-5929

### GEL Engineering, LLC

GEL Engineering, LLC offers environmental and engineering services for both interior and exterior operations and environments at nuclear facilities. These services include environmental support, engineering support, stack testing, and land and hydrographic surveying.

GEL also develops unique testing methods to assist facilities with creating programs specific to their plant's needs including isokinetic flow evaluation and <sup>14</sup>C measurement.

GEL's <sup>14</sup>C measurement method includes direct measurement and analysis of <sup>14</sup>C samples. This sample collection and analysis protocol allows for differentiation and quantitation of organic and inorganic forms of <sup>14</sup>C and can accommodate a wide range of <sup>14</sup>C activities. GEL provides on-site sample collection from gas

decay tanks, containment atmospheres, and other discharge vents and stacks for <sup>14</sup>C effluent samples. The samples are then transported to the GEL Laboratory for analysis. This turnkey service allows utilities to adequately support the reporting requirements of RETS/REMP programs.

GEL has successfully performed these services for many plants across North America which have produced very favorable dose modeling data.

**For more information please contact:**

Jim Posda  
 james.posda@gel.com  
 office: (843) 769-7378  
 cell: (843) 697-2199





# F&J SPECIALTY PRODUCTS, INC.

*The Nucleus of Quality Air Monitoring Programs*

## Company Profile

F&J endeavors to ensure its air flow measurement instruments are accurate, reliable and maximize automation for the convenience of the air sampling specialist.

F&J has a standard business strategy to implement current technology in the development of air sampling and air flow calibration instruments.

F&J combines advances in hardware and software technologies to simplify the data collection process for the benefit of its customers.

F&J is a certified ISO 9001 air sampling instruments provider whose contributions to air sampling design ensures the air sampling specialist has the best tools to meet the ever increasing regulatory challenges in a limited manpower environment.



# F&J SPECIALTY PRODUCTS, INC.

*The Nucleus of Quality Air Monitoring Programs*



AC/DC Air Sampler



Lightweight ~ 15 lbs  
Maintenance free  
Portable, Reliable  
Flows to 150 LPM



Emergency Response  
AC/DC Air Sampler



Breathing Zone  
Low Volume Air Sampler



Tritium Collection  
System



Emergency Response  
Beta CAM



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Ocala, FL 34472  
USA



**Contact:**  
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# Holtec International: a global leader in power generation technologies and nuclear waste management.

Holtec International provides engineered equipment and services under 10CFR50, 10CFR71, and 10CFR72 regulations and IAEA standards (where applicable) to nuclear plants around the world. Holtec prides itself on the substantial number of awarded turnkey contracts wherein Holtec engineers, manufactures, and installs the equipment and associated systems with an undivided responsibility for completion.

Holtec is a proven innovator that continually discovers how to stay a generation ahead. Holtec essentially invented the ultra-high-density wet storage technology during the '80s and is credited with pioneering Multi-Purpose-Canister (MPC) technology in the '90s (Holtec was the first in the U.S. to license and manufacture systems that employ the MPC technology). The technical staff employed by Holtec formulates innovative solutions to operational and technological problems. The company secures, on average, five patents each year. Our most recent innovation is the HI-STORM FW, which is uniquely

designed to maximize storage capacity and heat load, minimize occupational dose, permit storage of severely deformed or canisterized fuel, and to be extremely resistant to deleterious flood and wind. The HI-STORM FW basket is manufactured entirely from METAMIC®-HT. This advanced material provides structural support, neutron absorption, enhanced heat transport, and is low weight. The basket is configured to hold either 37 PWR assemblies (MPC-37) or 89 BWR assemblies (MPC-89), in addition to VVER 440, VVER 1000, or RBMK fuel types. Holtec is also proudly licensing the first underground storage system, HI-STORM 100U, which is essentially impregnable to the post-9/11 terrorist threats. In addition to wet and dry systems for managing spent nuclear fuel, Holtec also provides custom engineered steam surface condensers, feedwater heaters, and safety related heat exchangers designed by Holtec's Power Plant Component Division (PPCD).

Holtec's vertical integration allows control over quality, schedule, and cost

and provides customers fully integrated solutions. Holtec Manufacturing Division is a wholly-owned plant in Pittsburgh, Pennsylvania with over 450,000 sq. ft. of manufacturing space, 400 tons of lift capacity, state-of-the-art machinery and all needed ASME nuclear and non-nuclear stamps (N1, N2, N3, NDT, etc.). At the end of 2008, Holtec expanded its manufacturing capabilities with the purchase of two aluminum manufacturing plants in Ohio and the purchase of METAMIC® LLC (now Nanotec Metals Division or NMD). With these acquisitions, Holtec expects to synergize the ongoing R&D work in powder metallurgy at NMD and the manufacturing savvy of the Ohio plants to develop and offer a new generation of supermetals to users in need of advanced materials.

Holtec International is headquartered in Jupiter, Florida with the technology center located in Marlton, New Jersey. Holtec has operational centers around the globe. To learn more about Holtec, call Joy Russell at 856-797-0900 Ext. 655.

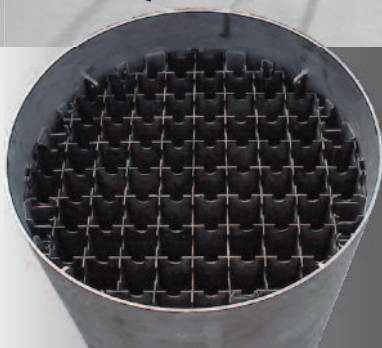
## A Generation Ahead By Design

[www.holtecinternational.com](http://www.holtecinternational.com)



- ✿ WET & DRY STORAGE EQUIPMENT FOR SPENT NUCLEAR FUEL
- ✿ HEAT TRANSFER EQUIPMENT FOR NUCLEAR PLANTS
- ✿ MANUFACTURING OF SAFETY SIGNIFICANT CAPITAL EQUIPMENT

- ✿ INNOVATIVE SOLUTIONS TO OPERATING PROBLEMS
- ✿ ENGINEERING CONSULTING IN CRITICALITY, THERMAL HYDRAULIC, RADIOLOGICAL AND STRUCTURAL DISCIPLINES
- ✿ SITE CONSTRUCTION & LOADING SERVICES



**HOLTEC**  
INTERNATIONAL

555 Lincoln Drive West · Marlton, NJ 08053  
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# hydratight®

## Improving Safety, Service and Standards

Hydratight's expertise in the complex and changing world of nuclear power generation means we provide safe, fast, accurate and reliable solutions to all your critical assembly needs.

- World leader in maintaining plant productivity
- Nuclear-trained on-site technicians
- State-of-the-art equipment including speciality tensioners, machining equipment and portable boring bars
- On-site bolting and machining services
- Tools available for sale or rental

To find out more visit  
[hydratight.com/nuclear](http://hydratight.com/nuclear)



## One Company, Total Support, Complete Solutions

For more 30 years, Hydratight has provided world-class bolted joint solutions to the nuclear industry, setting international standards in joint integrity for its customers on a global scale.

Hydratight's activities range from the design and manufacture of products for sale and rental, to training, software development and the provision of on-site services carried out by competent and experienced technicians. Hydratight's people are the key to its success, working closely with customers to ensure a total understanding of their requirements.

### What makes Hydratight different?

Hydratight plays a leading role in the multifaceted and demanding world of nuclear power, providing services to improve safety and cost effectiveness in a competitive industry.

The nuclear power industry demands leak-free joints and as such has adopted a 'right first time' philosophy. Hydratight provides solutions to nuclear contractors and to help them achieve

ALARA objectives, and has led the way in meeting the needs of nuclear plant facilities through their range of specialist products and services.

### Hydratight's Reactor Pressure Vessel (RPV)

The newest addition to the Hydratight range, the Self Contained Tensioner (SCT) tensioner brings greater safety, reduced manpower and shorter downtime to a critical task.

Reactor Pressure Vessels (RPV) are rarely opened, but when they are speed, accuracy and safety are critical requirements. The third generation RPV stud tensioning system, with a self-contained tensioner (SCT) system delivers on all. Both the single and two stage design SCT delivers fast results, with pressurisation times of less than 45 seconds. The accuracy of the SCT is tremendous at +/- 1 bar at 690 bar maximum pressure. In addition, safety is enhanced using the SCT with minimized RAD exposure and a variety of safety features built in.

### Hydratight milling machines

In less than five months, Hydratight tested and delivered the world's largest OD mounted clamshell for use on cutting and prepping a giant steam

generator. The MM180 is sizeable, with a 4.57m diameter, but also flexible for quick adjustments between cutting, bevelling, counter, boring, align boring and flange facing. 72 of the patented Hydratight precision ground bearings support the machine with 28 locator pads offering concentricity adjustments.

### Hydratight Multi-Stud Tensioning (MST) systems

Hydratight's MST systems are capable of simultaneously tensioning every single stud in a joint. By designing the MST in segments, the operator is able to quickly and easily connect each segment to the joint and link them together to provide same time loading. The MST provides a very accurate and fast closure system with applications on pumps, valves and steam generators.

Hydratight is a critical supplier of on-site machining equipment and nuclear qualified technicians for a variety of nuclear machining projects. Hydratight application solutions include, steam generators, reactor coolant pumps, and HP turbines.

Visit: [hydratight.com/nuclear](http://hydratight.com/nuclear)



## ENERCON Ranked in Top 3 in U.S. for Nuclear Engineering Firms by ENR

ENERCON is a leading provider of licensing, environmental, and engineering services in support of new nuclear power plant deployment programs including siting, technology selection, owner's engineer, and diverse technical services for new nuclear power plants. On behalf of U.S. utility clients, ENERCON has written license applications for the siting, construction and operation of numerous NPPs, and has also performed a variety of other related strategic consulting services.



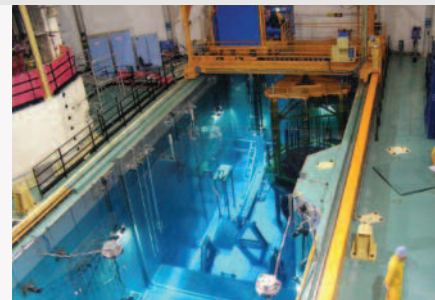
ENERCON has provided extensive support to clients in completing studies to select potential nuclear power plant sites, evaluating a broad range of issues and requirements associated with proposed plant locations including seismic and geotechnical design issues, access to water, population and demographics, ecology, access to transmission and rail corridors, and public acceptance.

ENERCON has performed engineering analysis, assessments and evaluations, and prepared system designs and modification packages, as well as provided licensing support and third party reviews for approximately 75% of operating U.S. NPPs.



As the first generation of commercial nuclear power plants ages, ENERCON has supported clients' efforts to obtain regulatory approval for the life extension of their plants.

ENERCON is a leading provider of detailed design engineering of security systems for the commercial nuclear fleet.



ENERCON performs a broad range of sophisticated safety analyses encompassing thermal hydraulics, finite element, criticality safety, transport, and radiological dose analyses.

ENERCON provides clients with support in the areas of Radiological/Health Physics and Emergency Preparedness, as well as Decommissioning and Site Remediation focused on facility characterization and demolition, environment and hazardous waste clean up, and license termination.



# Excellence—Every project. Every day.



## Cost Effective Solutions.

Sometimes the challenges facing the operation of a nuclear power plant can seem difficult and challenging. This is especially true when events outside a plant's design occur, like those experienced in Japan which resulted in the need for new and additional plant design, operation and engineering evaluations.

As our customers know, when you work with ENERCON, you're getting the most experienced, capable and motivated team available. Simply put, we will find a way to overcome any obstacle. We have been providing engineering, licensing, environmental, and technical services to U.S. and International nuclear fleets for over a quarter of a century and recently, have led industry initiatives in the completion of FLEX Coping Strategies, External Flood Hazard Analysis, Seismic Evaluation, Tsunami Hazard Assessments and DC Electrical Extended Station Blackout, Electrical Cooling and Water Availability Analyses.

At ENERCON, we have developed a reputation for innovative thinking, uncompromising excellence and unmatched responsiveness. We empower our people to create and implement strategies that often lead to more efficient, streamlined solutions. With 27 offices nationally and internationally, and over 1,400 professionals, we have the capability to take on the most substantial projects.

Let one of our professionals in offices across the country and abroad, provide the support your project needs.



# ENERCON

Excellence—Every project. Every day.



# ENERCON

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**Corporate Headquarters:** Atlanta. **Other locations:** Albuquerque, Ann Arbor, Baton Rouge, Birmingham, Chicago, Dallas, Denver, Duluth, GA, Germantown, MD, Houston, Humble, TX, Kansas City, Northern New Jersey, Oakland, Oak Ridge, Oklahoma City, Orlando, Pittsburgh, Sacramento, San Clemente, Tampa, Tulsa, Washington, DC, Wilmington, DE. **International:** Abu Dhabi, Belgium. [enercon.com/locations](http://enercon.com/locations) for details.



## WHAT WE DO

RussTech Language Services, Inc. specializes in technical, legal, and commercial language support for more than 100 languages and dialects worldwide. RussTech provides:

- Translation
- Interpretation
- Transcription
- Proofreading
- Consulting
- Glossary Development
- Negotiation Support
- Desktop Publishing

## WHAT SETS US APART

Unlike many translation companies, every RussTech translator and editor is a native speaker of the targeted language, and all draft translations are edited by a second linguist. Our language experts are able to offer 24-hour on-call support

for clients traveling internationally, as well as social courtesy training on best practices for your international business exchanges.

## PROJECT MANAGEMENT

RussTech specializes in managing large and complex translation projects, distinguished by our ability to produce consistent terminology and style across multiple documents. As our client, you will have your own dedicated project manager who works specifically to meet your individual language support needs.

## QUALITY GUARANTEED

RussTech stands behind our commitment to unparalleled customer service and dedication to every project. As a woman-owned small business with more than 15 years of experience, we guarantee you will receive the very best language support at a competitive price.



## WE KNOW NUCLEAR

RussTech Language Services specializes in providing **translation** and **interpreting** support for the nuclear sector.

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- Regulations
- Spent Fuel Storage
- Second Line of Defense
- Nuclear Security Culture
- Dual-use Technology

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Engineering, Project Management  
& Quality Assurance Experts

Revolutionary Heavy Lift &amp; Transport



When PSC was founded in 1986, its focus was post-tensioning surveillance. Today, the company is a sophisticated engineering innovator and trustworthy partner capable of solving an array of nuclear plant challenges. PSC leverages the experience and knowledge of its in-house engineering experts, project managers, quality assurance staff, union ironworkers, pipefitters and fabricators to help nuclear plants overcome staffing shortfalls, maintenance dilemmas and heavy lift and transport needs.

"PSC is proud to have served the nuclear power plant community for nearly 30 years. Our customers know and trust us, and we're excited to introduce more plants to all that we provide," said Christopher Cox, P.E., PSC's Vice President.

"Based on PSC's proven track record, customers have high expectations of us, and we often exceed them," said Tommy Morrison, Director and Senior Project Manager. In fact, PSC removed, cleaned and replaced 1,200 nuts, washers and bolts in containment with **no drops**; completed a large scale plant project **five days ahead of schedule**; and replaced a reactor coolant pump with **zero lost time accidents** and zero OSHA recordable injuries.

One of the industry's best-kept secrets is PSC's offering of revolutionary heavy lift and transport solutions. PSC's **Self-Propelled Modular Transport (SPMT) 600** is ideal for moving large pieces of equipment into small spaces. It has

a lifting range of 14¾ stroke, a minimum height of just 30¾ inches, and a payload of 67.5 tons per unit. The SPMT can be configured to meet your needs by coupling multiple trailers end-to-end or side-by-side. Also, the SPMT can be transported in a standard 20-foot container to eliminate the need for special permits.

When lifting smaller loads in tight spaces, plants can significantly reduce their project costs by using a **knuckle boom crane** instead of a large one. Our fleet features custom configurations to fit specific needs. While based in Chicagoland with a cutting-edge fabrication and storage facility in Arkansas, PSC's people, products and engineering solutions travel around the U.S. Call PSC now at 479.264.6867.

### PSC saved plant \$2 million!

PSC believes that the best ideas are born from a fresh perspective that strives to directly benefit the customer's bottom line. PSC's out-of-the box response to an ordinary RFP initially saved one nuclear plant \$2 million in repair costs, and the plant is projected to save another \$1.5 million in future costs over the next 20 years. Find out how PSC accomplished this feat by reading the case study at [www.pscnuclear.com](http://www.pscnuclear.com)



Discover all PSC has to offer at [www.pscnuclear.com](http://www.pscnuclear.com) or call 479.264.6867



## A World Leader in Nuclear Qualified Instrumentation



Weed Instrument Company, d/b/a Ultra Electronics Nuclear Sensors & Process Instrumentation has supplied nuclear qualified temperature and pressure measurement instrumentation and fiber optic networking equipment for more than three decades. Over 80% of all North American reactors rely on Weed Instrument temperature sensors for critical reactor coolant monitoring. Our nuclear qualified pressure transmitters are used for monitoring and controlling pressure in critical and high radiation environments in power plants. The company has vast experience in all of the leading reactor technologies, including PWR, BWR, CANDU (PHWR), and ABWR.

The nuclear quality system complies with 10CFR50 Appendix B, 10CFR21, ANSI N45.2, ASME NQA-1, ASME NCA3800 and CSA Can3-Z299.1. In addition, the company expects to obtain N and NPT stamps from ASME to work on pressure boundary instrumentation and other products in 2013.

Instrument qualifications have been performed and certified to IEEE-344 (seismic) and IEEE-323 (environmental) standards. Recently qualified temperature instruments have also been qualified to RCC-E and RCC-M standards. Our Metrology Laboratory is certified for Calibration to IEC17025. The company has an experience list of 113 nuclear power units in 16 countries. Weed Instrument continues to address the needs of existing nuclear plants through obsolescence and replacement products, new instrument designs and qualifications, and plant life extensions affecting end of life equipment and analog to digital interface equipment faced by busy I&C departments.

The company designs and manufactures its harsh and mild environment nuclear products from its location in Round Rock, Texas, USA. The current product line includes RTDs, thermocouples, thermowells, temperature transmitters, absolute, gauge, and differential pressure transmitters, and fiber optic data links and contact closures. Products designed and built for reactor island, turbine island, and balance of plant applications.

## Now There's a Choice In Nuclear-Qualified Differential Pressure Transmitters



Model  
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We deliver critical measurements

### Our DTN2070 Pressure Transmitter Is Specifically Qualified for Use In Gen III+ Plants.

Designed for harsh nuclear environments, our Model DTN2070 Pressure Transmitters are Class 1E qualified to IEEE 323-1974 and IEEE 344-1987. They contain only analog electronics, utilizing a diaphragm isolated direct coupled strain gauge pressure sensor capsule. The transmitters are built to meet the most stringent environmental requirements of Gen III+ reactors for harsh operating environments and post accident monitoring applications inside containment. Suitable as a replacement or to satisfy diverse technology requirements in existing power plants.

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- Advanced thin film metal strain gauge sensor technology
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# The Quality Nuclear Power Support You Can Count On

## Our Quality Commitment

Quality is the centerpiece of the value and service we provide to our clients. It is infused in our people, our programs, our processes, and our practices. We believe that it is the quality of our deliverables that ultimately delivers our projects within budget and on schedule.

## Our Power Focus Commitment

We've been thinking power... exclusively for over 120 years. We think that's a rather firm commitment to maintaining our focus on what we do best.

## Our Leading Expertise Commitment

Key to our ability to produce quality deliverables is the leading engineering, design, analysis, and project management know-how that we maintain current through our highly experienced staff and extensive state-of-the-art applications. And, of course, we are the company that always manages to get it done.

## Our Nuclear Commitment

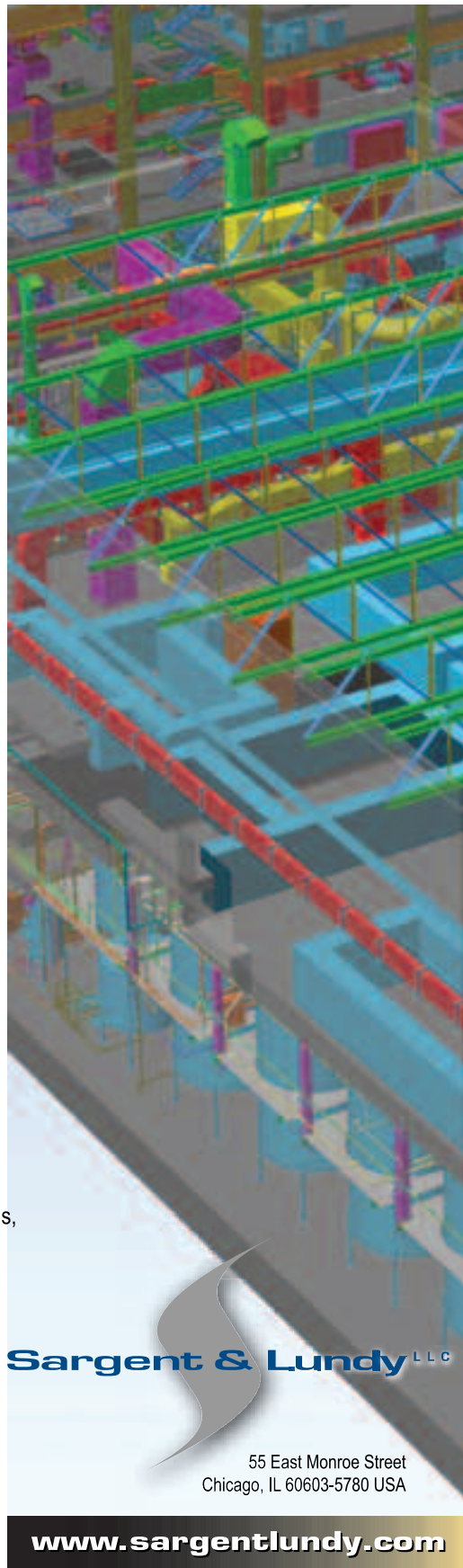
Nuclear power clients have been a primary part of our power focus since 1954, pretty much when it all started. Nuclear clients have good reason to have confidence in our capabilities, not only from our quality, expertise, and focus, but also from knowing we will be here for them when needed with what they need, as we have been for more than 50 years. Owners enlist our broad support as their preferred engineer and rely on our expertise for specialized problem-solving. Our on-going and recent activities encompass emerging issues, leading edge initiatives, and nuclear plant design and licensing activities such as:

- Post-Fukushima assessments and initiatives
- Digital controls and adjustable speed drive replacements
- New plant engineering, Combined Operation License preparation, Owners Engineer, and early site permit preparation
- Design Basis calculation reconstitution, piping systems vibration analysis, and plant/equipment test optimization

That's in addition to our extensive on-going engineering, design, and analysis for nuclear station owners for diverse projects including:

- Modifications and performance improvement
- Outage and restart support

**To discuss your specific needs, contact Bob Schuetz  
at 312-269-6630**



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- ✓ Immediate access to great nuclear talent
- ✓ Integrated managed staffing and quality solutions
- ✓ A team who knows the industry inside and out



With System One, you don't have to choose.

### We're experts in nuclear.

When it comes to contingent workforce management solutions, System One has the experience you need – more than 30 years of it, in fact. We help nuclear utilities, service providers and OEMs address resource issues, assure compliance and get work done.

From startup and commissioning to vendor management and outage support, System One covers the full production lifecycle.

### Choose the right partner.

Onsite or in the field, we combine high quality with rapid response to support a full range of recruiting needs and quality solutions.

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### Services

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- Operations & Maintenance
- Engineering
- Technology Implementations & Development
- Emergency & Outage Support
- Plant Condition Assessments
- Asset Management Strategies
- Quality Assurance & Quality Control
- Field Inspection
- Nondestructive Testing

## Smart, Seamless Contingent Workforce Management

*System One customizes nuclear solutions for complete coverage.*

System One helps nuclear firms address critical challenges, including:

- workforce planning and recruiting
- safely maintaining infrastructure
- adopting and integrating the smart grid.

### Much more than a technical staffing firm

For more than 30 years, nuclear has been the core of our business. Specializing in staff augmentation, managed staffing and VMS technology, System One offers fully-integrated energy solutions.

### Building the future

We provide project management and resources for construction and capital expenditures. In addition to hands-on design-build support, System One specializes in owners' representation.

### Condition assessments

We provide asset management to support critical decisions about maintenance, repair and upgrades.

- **Quality Assurance & Quality Control:** for key projects and ongoing programmatic support
- **Field Inspection:** in-house and mobile with integrated lab services
- **Nondestructive Testing:** NDE services across diverse methodologies

*System One combines the flexibility to address short-term resource issues and the innovation to help nuclear firms plan for the future.*

### Rapid response outage support

Every year System One provides hundreds of specialized professionals

to support shutdown activities, all with complete procedural integrity.

### Professional engineering support

System One delivers professional engineering support (mechanical, electrical, structural, I&C, environmental and more) across a full range of critical plant systems and components.

### Optimizing your platform

System One helps utilities prioritize and integrate smart grid technology investments.

### Choose the right partner.

Take the guesswork out of nuclear solutions with System One.

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**MIRION**  
TECHNOLOGIES

Mirion Technologies Sensing and Imaging Systems Divisions, featuring IST™ branded products, are present in a majority of the worldwide power generation facilities.

Mirion Technologies offers products with a range of operational safety and non-safety radiation monitoring equipment such as its IST, IST-Rees, and IST-Conax Nuclear® brands.

### Sensing Systems Division

The Sensing Systems Division, maker of the IST and IST-Conax range of products, provides the nuclear power industry with in-core and out-of-core detectors and electrical penetrations. In addition, Mirion manufactures the associated electronics, temperature sensors, thermocouples, special purpose valves, connectors, cable/connector assemblies and electrical conductor seal assemblies.

### Imaging Systems Division


The Imaging Systems Division is a global provider of highly specialized closed circuit camera systems used for inspection and surveillance in difficult and hazardous environments, supplying cameras for all stages of the nuclear life cycle, from construction through operation, to decommissioning and waste management. Our products are used in nuclear power plants, nuclear reprocessing plants and waste management facilities. The IST-Rees™ product line also includes a wide range of accessories, such as lighting attachments and positioning devices, that allow operators to carry out a variety of monitoring and inspection tasks. From small, low-cost cameras to high performance viewing systems, the Imaging Systems Division provides an imaging solution for the nuclear market.

### Mirion Technologies

For more than 50 years, our products and services have helped to ensure the safe and efficient operation of nuclear facilities. Our customers rely on our solutions to protect people, property and the environment from nuclear and radiological hazards. Mirion's strength stems from its five divisions: Sensing

Systems, Imaging Systems, Health Physics, Dosimetry Services and Radiation Monitoring Systems. Our products and services include: dosimeters; contamination & clearance monitors; detection & identification instruments; radiation monitoring systems; electrical

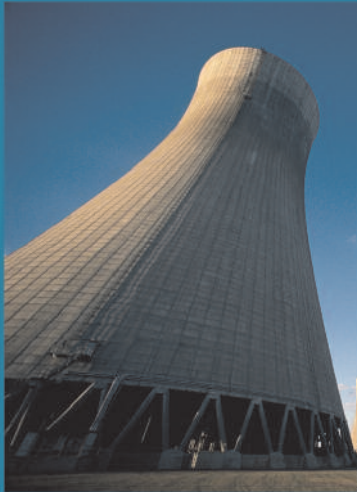
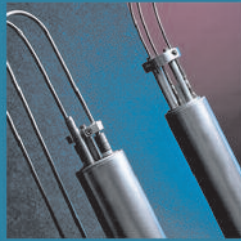
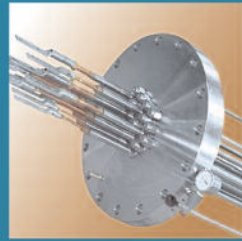

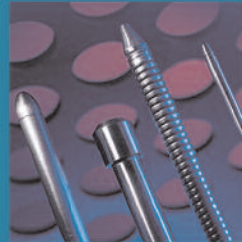



penetrations; instrumentation & control equipment and systems; dosimetry services; imaging systems; and related accessories, software and services. For more information about our products and services visit: [www.mirion.com](http://www.mirion.com).



**MIRION**  
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by Schneider Electric

## Providing in-depth expertise for nuclear projects: GUTOR supplies Class 1E systems

GUTOR Electronic LLC, a Schneider Electric company, is pleased to announce contracts with Westinghouse Electric Company to supply Class 1E battery chargers, inverters and voltage regulating transformers for four AP1000® reactors currently being built in the United States.

Serving the nuclear market for the last 30 years:

- GUTOR battery charger and inverter systems installed in over 100 reactors in 20 countries
- Contracts for 51 new build commercial reactors in the last 12 years
- Multiple contracts for QL1 systems for US DOE sites
- Dedicated nuclear industry team
- 10CFR50 Appendix B, 10CFR21 and ASME NQA-1 compliant

For many years a leading supplier of industrial UPS systems to the oil and gas sector, GUTOR

has become a leader in the fossil and nuclear power sectors as well. GUTOR systems are highly regarded for their performance and reliability in critical industrial applications.

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## LONGEVITY

NAC is approaching a half-century of comprehensive experience in the design, licensing and deployment of technologies to manage the most radioactive contents on Earth.

## ECONOMICAL INNOVATION

When your project requires packaging or transportation of challenging nuclear materials (including greater than class C (GTCC) waste, high level waste and spent nuclear fuel), NAC provides you innovative solutions with a commitment to nuclear packaging excellence – offering risk-mitigating, ALARA-friendly, and operation-enhancing solutions. NAC's project objectives put safety, economic value and business integrity at the forefront of our solutions. This commitment to excellence has been exemplified with the development and implementation of the MAGNASTOR® (Modular, Advanced Generation, Nuclear All-purpose Storage) system, the first licensed and delivered multipurpose spent fuel dry storage technology that accommodates 37 PWR or 87 BWR spent fuel assemblies, exhibiting superior economics, safety and dose-reduction on a per-assembly basis.

## TRANSPORT EXCELLENCE AND ASSURANCE

Because of our immense worldwide spent fuel transport experience, NAC is able to incorporate unique operational and licensing features into our multipurpose storage systems, which assures licensing and transportability. In fact, NAC is the first vendor to submit a transport license application to the NRC for the ultra-high capacity category of multipurpose canister systems. MAGNASTOR's transport package, MAGNATRAN™, is well-ahead in the licensing queue, assuring early availability.

## BUILDING ON OUR LEGACY

NAC's legacy of facilitating efficient management, transport and disposition of challenging nuclear materials is evident at nuclear sites worldwide. With the important role nuclear power plays in meeting increasing global energy needs, the safe packaging, storing and transportation of nuclear materials is more vital than ever before. Casting its progressive innovation strategy, NAC

will continuously develop and license economical technologies to safely manage the nuclear fuel cycle in order to support a sustainable nuclear future.

## For more information, please contact:

George Vaughan  
 Vice President Sales  
 404-775-5045  
 gvaughan@nacintl.com



THE SKILLS AND EXPERIENCE TO DELIVER NUCLEAR EXCELLENCE

When you need an experienced team with a proven process for the design, licensing and deployment of innovative technologies to store, transport and manage nuclear materials, including high level waste, you can count on NAC International Inc. and its nuclear excellence.

NAC is an industry-leading provider of engineering and dependable nuclear fuel management solutions for nuclear facility operators, nuclear fuel cycle companies and government agencies.

Trusting on its proven transport cask systems and nuclear fuel cycle experience, NAC has supported more than 200 customers worldwide, covering a diverse project portfolio from its headquarters in Atlanta to offices in London.

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# TAP EXPERIENCE — TO — IMPLEMENT NRC FUKUSHIMA REQUIREMENTS

On March 12, 2012 the Nuclear Regulatory Commission (NRC) issued the first regulatory requirements for the nation's operating reactors based on the lessons learned at the Fukushima Dai-ichi nuclear accident in Japan.

"Since then Black & Veatch has been helping clients respond to these regulatory requirements," said Matt Lee, Black & Veatch Director of Operating Plant Projects. "Black & Veatch has the capability, experience and understanding to help you respond to these criteria thanks to our Construction and Operating License application (COLA) work. Our large, complex project experience means we can help reduce risk in project

execution, provide better project management and help you ensure safe, reliable nuclear power for future generations."

To help you meet the new NRC criteria, Black & Veatch conducts seismic and flooding analysis and walkdowns, provides hardened containment vent solutions.

"We'll carefully and methodically ensure what needs to be appropriately addressed with the right level of prioritization, while minimizing impacts to plant operations," said Lee.

Black & Veatch is currently supporting GE-Hitachi with an existing hardened vent system on the Lungmen Nuclear Plant in Taiwan,

**"OUR LARGE, COMPLEX PROJECT EXPERIENCE MEANS WE CAN HELP REDUCE RISK IN PROJECT EXECUTION, PROVIDE BETTER PROJECT MANAGEMENT AND HELP YOU ENSURE SAFE, RELIABLE NUCLEAR POWER FOR FUTURE GENERATIONS."**

which is designed to U.S. standards. "Using this experience, we will help clients meet the revised hardened vent order from the NRC to ensure highly reliable operation of hardened vent systems during severe accident conditions."

With more than 60 years of experience in the nuclear energy industry, from studies to major plant modification, design to procurement and construction, Black & Veatch is a one-stop shop to meet safety, security, reliability and cost-effective requirements.

"With Black & Veatch you get experience and certainty," said Lee. "Your challenging, complex project will be completed on time on budget, with no surprises."



The Lungmen facility features Advanced Boiling Water Reactor technology, and when both units are completed, will be rated at 2,700 megawatts.



# Experience & Certainty

**Know the end result is success ... from the start.**

From day one, you can expect your challenging nuclear project to be completed on time, on budget, with no surprises. From design concepts to detailed seismic and flood analyses – for both operating plants and new build – Black & Veatch delivers with reliable, disciplined, tested processes that have earned clients' vote of confidence, time and time again.

**We're building a world of difference. Together.**

Learn more at [bv.com/nuclear](http://bv.com/nuclear)



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# The Key to Your Success: The Error-Free Zone<sup>SM</sup>

Founded by well-respected nuclear industry expert Dr. Chong Chiu in 1987, Performance Improvement International's mission is to create a safe and Error-Free<sup>SM</sup> nuclear industry. To achieve this goal, PII has developed and deployed unique, innovative technology that reduces and eliminates unwanted errors and equipment failures for its clients. In fact, over the past 25 years, 100% of US nuclear facilities, and many international facilities, have chosen PII to help them reduce their event rates.

The value of an event-free, injury-free, and loss-free operation cannot be overstated. In addition to the toll in human capital, the financial cost of such errors can be calculated in the millions of dollars. An error- and event-free operation brings peace of mind both to your employees and their families, as well as to your accounting department and shareholders.

Is an error- and event-free operation achievable, or merely a pipe dream?

PII has done intense R&D in Error-Free<sup>SM</sup> technology over the past ten years

to answer that question. This research has given PII a clear understanding of what it takes to make an organization Error-Free<sup>SM</sup>. PII's approach is unique among those offered by other companies, in that it can be implemented with little to no additional operational burden to you or your organization. After all, any error-reduction technology is only as good as an organization's ability to easily and successfully deploy it. **Our data show that if PII's Error-Free<sup>SM</sup> technology is implemented and followed, organizations can expect a complete elimination of the given error, with zero future recurrence.**

Some of the industry's biggest names place their confidence in PII. For example, the world's largest nuclear operating complex, DNMC, the world's largest construction company, CPNEC, and the world's largest nuclear component OEM (AREVA), have all recently selected PII to implement its advanced Error-Free<sup>SM</sup> operations technology for their organizations. Our approach applies to all kinds of jobs and organizational

structures with some cultural adaptation. The technology benefits every person in an organization, from outdoor construction workers, power plant operation and maintenance crews, engineers, project managers, to the executive manager in the board room.

PII was trusted and selected by your peers to solve four of the most perplexing problems recently encountered by the US nuclear industry: the causes of SONGS SGR tube wear (2013), CR-3 containment delamination (2009), Davis-Besse shield building lamination (2011), and the DC Cook turbine failure (2007). The little-publicized insights and lessons learned from these investigations are invaluable, and have been firmly incorporated into PII's Error-Free<sup>SM</sup> technology.

**No other company offers what PII can.** Our Error-Free<sup>SM</sup> technology is 99% preventive, 1% corrective, built on the foundation of error-reduction techniques we developed between 1994-2000, at more than 80% of US nuclear facilities. We combined this direct field experience with intense research of more than 80,000 cases and 1,600 focused job observations between 2000 – 2010 to quantify factors affecting various types of errors under a broad range of conditions. The resulting technology could quantitatively predict where, when, and how injury-causing, operating, and loss events will occur. And although the technology has a solid, data-driven foundation and is more effective than ever before, it is simpler to apply and easier to understand at all operational levels.

The best news is that it won't take 6-10 years for your organization to become Error-Free<sup>SM</sup>. We can confidently say that in just one to two years, your company can enjoy the benefits of an Error-Free<sup>SM</sup> workplace: increased safety, better morale, more efficient operations, and reduced costs.

Don't let errors and events continue to drain your workforce and bottom line. Visit our website at [piionline.com](http://piionline.com), or call us today, to find out how our technology can help your company become a better, safer place to work.

## O&P ISSUES? EQUIPMENT PROBLEMS? PII is Your Single-Source Solution.



When your company faces complex O&P or equipment problems, Performance Improvement International is your one-stop resource for proven results. PII's team of industry experts can guide you in resolving your most complicated issues. What's more, we offer what no other company can: our **NO-RECURRENCE ASSURANCE**.

PII is uniquely qualified to address even the most difficult challenges. Over 25 years, we've amassed the largest, most comprehensive database of more than 7,000 O&P and equipment failure modes. Hundreds of leading companies turn to PII because we solve the complex cases, more than 5,000 to date. **And we do so without a single recurrence of the initial problem.** PII's team of experts is deployed at enterprises large and small, bringing our knowledge to bear on the industry's most challenging situations. We can do the same for you.

From root cause analysis to equipment failures to integrated event investigations, PII can help you solve the difficult problems. Visit our website or call us today for more information on our full range of expert, consulting, and training services.



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Chong Chiu, Ph.D.  
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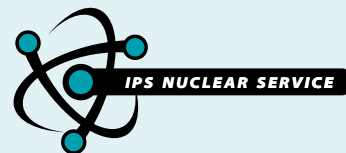


# Rewinding a 13.8 kV, 93,000-lb. motor is easy —

Finding a service partner that has completed multiple quality audits based on the NUPIC checklist is the hard part



IPS has years of experience repairing safety- and non-safety related nuclear motors up to 13.8 kV and weighing over 93,000 lbs.



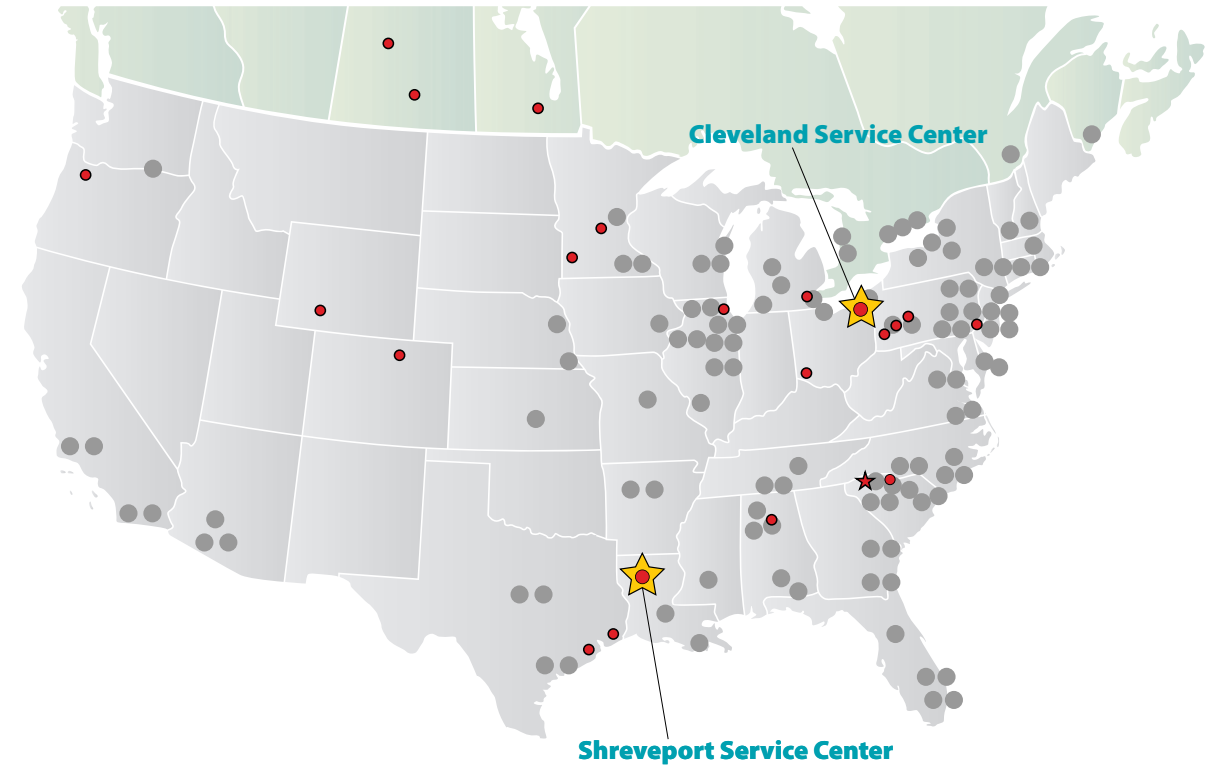
- Multi-location 10CFR50 Appendix B and 10CFR21 programs
- Unified Safety, Quality and Lean culture
- Engineered insulation systems to 15 kV
- In-house coil manufacturing up to 15 kV
- IEEE 429 underwater AC Hi Pot to 13.8 kV
- Experienced field service department
- Decontamination services and contaminated equipment repair available
- Dedicated motor storage facilities



To learn more about IPS Nuclear Services and our motor test and repair process, contact Tony Oubre, IPS Nuclear Services Project Director, at 864.451.5600 or nuclear@ips.us.

[www.ips.us/nuclear](http://www.ips.us/nuclear)

## Nuclear Service Coast-to-Coast



★ IPS Nuclear Repair Centers ● Nuclear Reactors ● IPS Regional Service Centers



IPS nuclear repair centers in Cleveland and Shreveport have dedicated clean rooms for winding and repairing nuclear motors, applying best practices for Foreign Material Exclusion (FME).

IPS offers safety and non-safety related nuclear motor repair services, including radiologically contaminated motors, through its Cleveland and Shreveport nuclear repair centers. Both locations comply with applicable federal regulations and nuclear standards, including 10CFR50 Appendix B and ANSI N45.2, as well as 10CFR21.

The IPS Nuclear Services Quality Assurance Program offers one standard for safety, quality and repairs at both service centers, allowing IPS to service utilities with multiple

nuclear power plants to the same standards and specifications from either service center. The IPS Cleveland and Shreveport nuclear repair services are accessible through any of the eighteen IPS regional service centers coast to coast.



[www.ips.us/nuclear](http://www.ips.us/nuclear)



Our VPI and B-stage coils are manufactured in our environmentally-controlled clean room, using our automated taping process and CNC spreader to ensure uniform tape application and precise duplication of coil geometry.





**Over 40 Continuous Years as a Nuclear Safety Related Fabricator**

SSM Industries, Inc. (formerly Schneider Sheet Metal) is the largest Safety Related HVAC designer / fabricator / supplier / installer in the United States. SSM entered the nuclear industry over forty (40) years ago as the metal fabrication division of Schneider Power.

The Power Division of SSM Industries Inc. provides design, qualification, fabrication, and installation support to utilities in today's nuclear market. Over \$100 million of safety and non-safety related HVAC ductwork and components has been designed, tested and fabricated by our existing personnel at our facility. We have supplied equipment to virtually every Commercial Nuclear plant in the United States, as well as Nuclear Plants worldwide.

SSM Industries fabricates and installs an average of over 5 million pounds of ductwork a year. 80% of that ductwork is for close tolerance, high quality and regulated applications such as Commercial Nuclear Power Plants, Department of Energy (DOE) facilities, laboratories and hospitals.

Our nuclear qualified product line extends from the fan to the diffuser, and all the HVAC products in between.

Together with Westinghouse and Chicago Bridge and Iron we were part of the design team responsible for completing the AP 1000 HVAC Duct and Support system in the Containment Building.

We are currently providing HVAC equipment and design support for the 4 new units under construction @ the Vogtle and V. C. Summer sites

SSM maintains a complete 10 CFR 50 / NQA-1 (including all Supplements) Quality Assurance Program. SSM is listed in the NUPIC data base as a pre-qualified vendor to supply Safety Related HVAC equipment and services, including the commercial dedication of components fabricated by others, to all of the commercial nuclear plants in the United States.

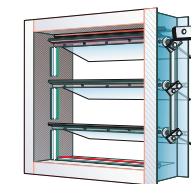
**SSM INDUSTRIES, INC.**  
 3401 Grand Avenue  
 Pittsburgh, PA 15255  
 Phone: (412)-777-5101  
 www.ssmi.biz



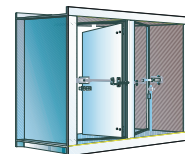
**Engineered HVAC & Specialty Metal Fabrication Products, Systems and Site Services for Critical or Safety Related Applications.**

**• HVAC SYSTEM COMPONENTS**

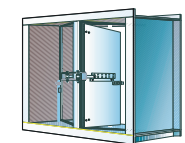
- ☑ Access Doors
- ☑ Actuators: Electric & Pneumatic
- ☑ Air Handling Units
- ☑ Charcoal Adsorber Units
- ☑ Dampers:
  - ☑ Backdraft
  - ☑ Balancing
  - ☑ Bubble-Tight
  - ☑ Control: Manual, Electric & Pneumatic
- ☑ Diverter
- ☑ Fire & Smoke
- ☑ Guillotine
- ☑ HELB
- ☑ Isolation
- ☑ Tornado
- ☑ Variable Frequency Drives
- ☑ Ductwork & Supports
- ☑ Fans: Axial & Centrifugal
- ☑ Filters & Filtration Units (incl. HEPA)
- ☑ Flexible Connections
- ☑ Grilles, Registers & Diffusers
- ☑ Housings
- ☑ Heat Exchangers
- ☑ Cooling Coils
- ☑ Louvers
- ☑ Plenums
- ☑ Sleeves



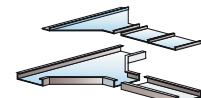
RELIEF / BACKDRAFT DAMPER



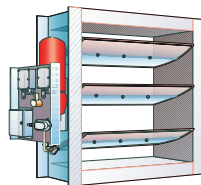
TORNADO DAMPER



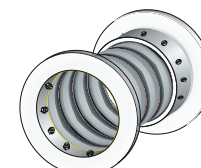
HELB DAMPER



CABLE TRAYS AND COVERS



ISOLATION DAMPER

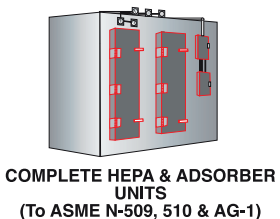


FLEX CONNECTION

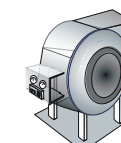
Grilles, Registers & Diffusers

**• SPECIALTY FABRICATIONS**

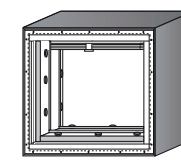
- ☑ Angle Rings
- ☑ Cable Trays & Covers
- ☑ Control Cabinets
- ☑ Doors: Access, Heavy-Duty & Blast
- ☑ Equipment Bases
- ☑ Filter Boxes
- ☑ Fire Barriers: U. L.-Rated, 3 Hour
- ☑ Glove Boxes
- ☑ Sealed Enclosures
- ☑ Seismic Supports
- ☑ Cooling Coils
- ☑ Heating Coils
- ☑ Heat Exchangers
- ☑ Tanks



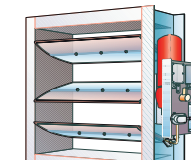
COMPLETE HEPA & ADSORBER UNITS (To ASME N-509, 510 & AG-1)



COMPLETE FAN ASSEMBLIES (To ASME N-509, 510 & AG-1)



INTERNAL EXPANSION AIRFLOW RATED 3hr FIRE DAMPER



CONTROL DAMPER

**• RADIATION SHIELDING**

- ☑ Doors & Barriers
- ☑ Penetration Seals

**• MATERIAL PROCESSING**

- ☑ Material Bins, Tanks & Chutes
- ☑ Ladders & Sorting Platforms

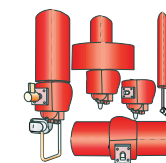
**➤ SERVICES ◀**

- ☑ Field System Walk downs
- ☑ Engineering Support
- ☑ Installation Supervision & Craft
- ☑ Component and Total System Testing, Adjusting & Balancing
- ☑ Commercial Dedication of client selected Equipment or Components as well as Stock Materials & Supplies
- ☑ Duct Layout and Design

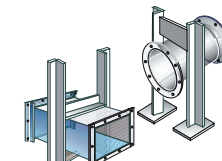
Complete Seismic & Environmental Qualifications

1E Qualified

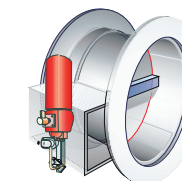
Complete 10 CFR 50 Appendix B NQA-1 Q/A Program



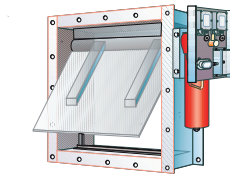
Actuators Pneumatic, Electric, & Electrohydraulic ("fail safe")



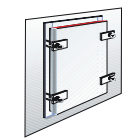
DUCTWORK & SUPPORTS



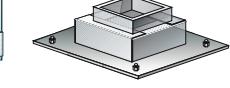
BUTTERFLY DAMPER



BUBBLE - TIGHT DAMPERS (Class 0, ASME AG-1)



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Developing a dosimetry and radiation calibration laboratory with the many components that a project of this magnitude entails can be a daunting experience. So many details, large and small, must be taken into consideration. What equipment is required to meet your goals? Is your current facility adequate for the new equipment? Will the project require a new building or modification of an existing facility? What is the best way to design the laboratory to maximize effectiveness and minimize costs? Will your plan for the laboratory achieve the required goals?

Hopewell Designs is the expert in developing dosimetry and calibration laboratories offering everything you need from the initial assessment to the completed project to ongoing maintenance, service, and support.

Radiation calibration equipment and services is Hopewell Designs' major product line and primary focus and has been since we began operations in 1994. In that time, we have installed more than 300 irradiator systems and have helped numerous customers' design, build, and equip complete radiation calibration laboratories. Our staff has extensive expertise and experience in all aspects of calibration programs from building and shielding design, irradiator design, dosimetry programs, training, to calibration procedures and QA programs. Our turn-key approach saves you the time-

consuming headache of managing numerous vendors by streamlining the project into a seamless and efficient process with a single destination for every aspect of the project.

Hopewell Designs is the leader in automated computer controlled irradiator systems. Our simple-to-use automated control software manages and monitors all aspects of the irradiator including exposure rate selection, source exposure, alignment bench positioning, safety systems and electrometer measurements. With complete integration of all components, the irradiator operates as a single automated system and increases efficiency, accuracy and reliability. Manual and electronic control systems are also available.

Hopewell Designs equipment has the quality, precision and accuracy to support your dosimetry and instrument calibration programs. We design and manufacture everything to the highest standards providing you with robust and reliable equipment that does exactly what you need it to do. If you need a modification to one of our original designs, or need a total custom design, we have the expertise and the engineering staff to fill that requirement.

Once equipment is installed, laboratory programs and procedures must be fully implemented before the laboratory can begin

providing calibration services. Hopewell Designs can help in the development of quality assurance programs, instrument calibration procedures, and database tracking programs. We can assist with irradiator calibrations and with establishing traceability to a primary standard. We also provide services to help with accreditation and compliance with standards such as ISO 17025.

Our goal at Hopewell Designs is not only to provide our customers with the best equipment, service, and support available but to make that process as simple and efficient for you as possible. Your assigned project manager will supervise every detail of your project as well as provide you with important information, status updates and answer any questions you may have as the project progresses. With a single point of contact, as opposed to a long list of vendors to manage, you can be assured of a simpler, more manageable project, fully integrated equipment that works seamlessly together, and a team of experts who are working to make your goals a reality.

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# ERROR-FREE PERFORMANCE PROFILE

A major southeastern nuclear generating facility turned to Tri Tool Thermal Services<sup>SM</sup> (TTTS) to provide personnel and equipment for the turnkey replacement of degraded piping during a recent refueling outage.

The subject piping was part of the plant feedwater system and was targeted for replacement due to the flow accelerated corrosion (FAC) effect over several years of operation.

The scope consisted of the removal/replacement of two separate 16" spools of carbon steel piping positioned between feed water control valves and manual gate valves. The replacement piping spools were 16" OD x .844 minimum wall thickness and a type P22 material grade, and required preheat @ 350° F.

Once mobilized, TTTS was required to complete weld testing and build an exact mock-up of the subject weld joint that was then subjected to multiple Non-destructive Examination (NDE) processes, including phased array ultrasonic testing.

## Tri Tool Service Advantages...

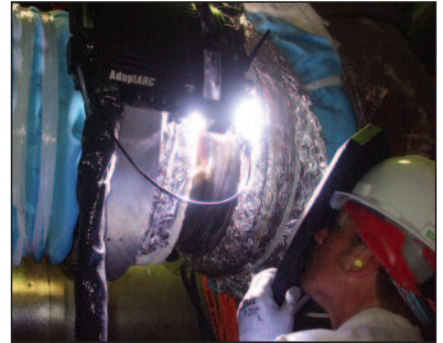
Tri Tool Thermal Services used Tri Tool 616 RBL Clamshells to sever existing piping for removal. Once the piping was removed, a Tri Tool 214B single point end prep machine was used to produce precision J-preps for automatic welding. Weld joint alignment was within +/- .010".

TTTS and the utility chose to deploy Tri Tool's new AdaptARC<sup>®</sup> automatic orbital welding system to complete the welds. The TTTS welding team utilized the AdaptARC<sup>®</sup> weld system in the GTAW mode to produce a high quality root pass, hot pass, and the subsequent fill passes for completion of the critical piping welds.

All welds were subject to several NDE processes, which again included phased array ultrasonic testing. All welds were examined before and after Post-weld Heat Treatment (PWHT) and deemed acceptable for service.

The nuclear site management praised

TTTS for an error-free project performance, done on time and on budget.



A critical weld in a nuclear power plant being performed with Tri Tool's advanced AdaptARC<sup>®</sup> multi-process GTAW/GMAW/GMAW-P/FCAW welding system.

Call for more information on how Tri Tool contract machining, welding, and project management services can assist you with your most demanding project requirements.

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## Dedicated to the Nuclear Power Industry

Energy Steel & Supply Co. supplies qualified material, component replacement, and new construction fabrication to all of the ASME Section III certifications. Customers rely on Energy Steel and Supply Co. to meet their critical timelines and provide the correct materials and components to keep their Nuclear Power Plants running.

## Power and Experience

Energy Steel has a history in nuclear power that spans over 4 decades and a proven ability to deliver. This company holds accreditations in every segment of the business and stands prepared for the current and emerging needs of the nuclear industry.



The Energy Steel & Supply quality assurance program is highly regarded within the nuclear power industry and complies with the following:

- ASME Section III Division 1, 2 and 3
- NCA 3800
- NCA/WA 4000
- 10 CFR Part 21
- 10 CFR 50 Appendix B
- ANSI N45.2
- NQA-1
- Canadian Standard Z-299
- MIL-I 45208A
- MIL-Q-9858A

Energy Steel stocks a complete warehouse of ASME/ASTM tested material that is ready for use and can be delivered quickly.



## New Construction and Project Update

- The Sanmen Nuclear Power Plant (NPP), currently under construction, is located in the Maotoushan peninsula in Jiantiao, of Sanmen County in the Zhejiang Province of China.
- Plant Vogtle Units 3 & 4 located near Waynesboro in eastern Georgia
- V.C. Summer Nuclear Station Units 2 & 3 in Jenkinsville, SC
- The Krško Nuclear Power Plant in Slovenia
- TVA Wats Bar Unit 2, located near Spring City, TN

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Energy Steel & Supply Co. has exclusive teaming agreements with many Original Equipment Manufacturers and therefore makes it possible to reliably acquire a wide variety of brand name components and product lines. The company has expanded its facility, equipment, fabrication capabilities and personnel to accommodate the scope and variety of the legacy parts it manufactures. Examples of these items are condensers, filters, heat exchangers, motors, pressure vessels, pumps, strainers and replacement electrical items. For a complete listing of partnerships, visit the website at [www.energysteel.com](http://www.energysteel.com).



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First-in-class Critical Application Machining and Custom Equipment Fabrication for the commercial nuclear power industry has made **Energy Steel & Supply Co.** the supplier of choice. Our success and sustainability within the industry is testament to a deeply-rooted commitment to achieving the objective no matter the size or scale of the project.

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Nuclear experience makes an infinite difference. With that experience comes attention to detail. With attention to detail comes predictability, capability and excellence. At Oregon Iron Works, Inc., (O.I.W.) we build first-class hardware, on time, as promised, with more than 2,000,000 manhours of production logged under nuclear Quality programs. Vast capabilities, combined with our strict Quality Assurance program, means we consistently deliver the oversight and detailed documentation the world's most critical customers demand. When it must be right, it must be O.I.W.

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ASME NQA-1 • 10 CFR PART 50, APP B

Oregon Iron Works, Inc. (OIW) is an Oregon corporation founded in 1944 and has been under its current ownership and management since 1975. OIW's facilities are equipped with state-of-the-art manufacturing and fabrication equipment.

### DIVERSITY FUELS THE FIRE

We continue to invest in capital expansion such as this new 8-meter, 5-Axis Horizontal Boring Machine. While other companies have struggled to survive in these tough economic times, OIW continues to grow and expand our capabilities. New machine capabilities, robotic welding cells, and facility improvements continue to help us serve industries as diverse as major bridge construction, water control equipment for the Army Corps of Engineers and specialty products for the Nuclear industry. This diversity gives us the experience to help our customers with out-of-the box solutions to a wide variety of problems while maintaining class leading Quality standards.



### Innovate.

When the product demanded a high quality, vacuum tight, distortion free weld, OIW evaluated virtually all weld processes to produce parts correctly the first time. We developed specialty robotic weld procedures and techniques that precisely control the welding arc to minimize distortion and assure defect free results. Unique robotic programming techniques eliminated the need for precise positioning of the parts allowing fast set-up times with disparate products. The unique properties of this process allow us to maximize production and Quality benefiting everyone.



### Fabricate.

No product is too big or too small for OIW. Our state of the art fabrication facilities regularly turn out products weighing from 100 lbs. to 1,000 tons in all metals including Stainless, Carbon and specialty alloys. Our customers can rely on our experience to build it right the first time, as promised.



### Integrate.

When the product demands fabrication, machining, and integration into a complete operating piece of machinery, OIW is the right choice. Our experienced craftsmen integrate sophisticated products for the Marine industry, the Nuclear supply chain, Commercial products and critical launch support equipment for the Aerospace industry.



**OREGON IRON WORKS, INC.**  
SMALL COMPANY SERVICE ... BIG COMPANY CAPABILITIES

Innovate. Fabricate. Integrate.



## With Miller Pipeline, the leaks stop here.

Whether it's circulating water or safety related piping, Miller Pipeline has a cost effective solution that can be installed quickly and professionally. The flagship of Miller's service offerings in nuclear power plants has been our internal joint sealing product, WEKO-SEAL®, which is used to provide corrosion protection from brackish water or terminate troublesome leaks at joints.

The WEKO-SEAL is a cost effective solution that provides outstanding long-term results in part because of the installation techniques we use when placing them. Their design and the physical properties of the seal itself, which is made from a flexible EPDM (Ethylene Propylene Diene Monomer) rubber compound is held in place with hydraulically expanded stainless steel retaining bands that ensure a bottle tight installation.

The WEKO-SEAL® is installed via man-entry in pipelines with penetration

distances in excess of 1,000 feet. The WEKO-SEAL comes in a variety of widths but can also be used for continuous coverage of any distance through our Sleeve/Seal capabilities.

In addition to the WEKO-SEAL, we offer a cured-in-place pipe (CIPP) that is used to reline an existing pipeline of virtually any size or configuration.

The resins used in our CIPP can be designed to meet specific service requirements. Whatever the need might be, or whatever product used, our technicians work closely with staff engineering personnel to formulate and execute all desired outage objectives.

For over 25 years, Miller Pipeline has served the nuclear industry by providing inspection services, coating repairs, ultrasonic testing, internal joint sealing corrosion prevention, maintenance, video inspection and pipeline cleaning, pipe relining and replacement and

more. Miller Pipeline is an industry leader in a number of various trenchless technologies which ensure little to no disruption to above ground facilities or operations. All of Miller Pipeline's technicians are confined-space trained and certified to comply with all requirements of 29CFR 1910.146 Federal OSHA's Permit Required Confined-Space Regulations. Our technicians can quickly gain unescorted access and are able to perform all required activities with short notice.

At Miller Pipeline we understand the stress of refueling outages and view our role as an extension of plant personnel to achieve assigned tasks, on time and in a professional and safe manner.

For additional information regarding Miller Pipeline please visit our website at [millerpipeline.com](http://millerpipeline.com) or call us at 800-428-3742.



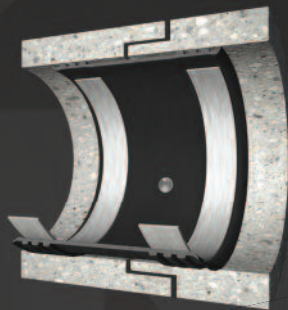
# Miller Pipeline

The industry's leader in internal joint sealing.

[millerpipeline.com](http://millerpipeline.com)

### Specialized Outage Services:

- WEKO-SEAL® Internal Joint Seal
- CIPP Installations
- Pipeline Assessment Services
- Certified Coating Applications
- Corrosion Prevention/Maintenance
- UT Testing
- Video Inspections
- Detailed Inspection Analysis



Cross section model of WEKO-SEAL®

Contact a representative in your area.  
Call 800.428.3742 or email [info@millerpipeline.com](mailto:info@millerpipeline.com)



## WORTHINGTON ACQUISITION OF WESTERMAN STRENGTHENS U.S. MANUFACTURING OF UF6 CYLINDERS

**Worthington Industries, a diversified metal processing company and manufacturer of tanks and cylinders, announced in 2012 it acquired Westerman Companies. The acquisition adds to Worthington's footprint in the energy industry and supports growth for the company's offering of UF6 cylinders and other nuclear power plant component products.**

### ABOUT WORTHINGTON

Worthington Industries was founded by John H. McConnell, a young steel salesman, who saw an opportunity for custom processed steel. He purchased his first load of steel by borrowing \$600 against his 1952 Oldsmobile and founded Worthington Industries in 1955.

Following several years of growth in steel processing, Worthington purchased a small cylinder facility in 1971, which formed the cornerstone of what is today Worthington Cylinders, a global manufacturer of pressure vessels and related products. Led since 1996 by John P. McConnell, the founder's son, Worthington Industries leads the diversified metal processing industry with a focus on the Golden Rule, valued employees, stability and innovation. The company's strategic growth plan has resulted in 12 acquisitions in the last three years, several of which are rooted in Worthington's expertise of manufacturing

cylinders and tanks for highly regulated markets.

### SUPPORTING ENERGY MARKETS: WESTERMAN NUCLEAR

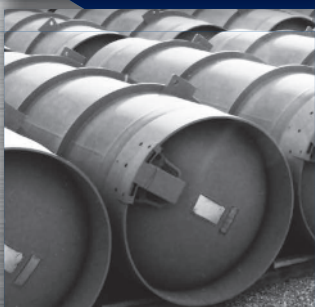
Worthington expanded its energy portfolio by acquiring **Westerman Companies** in September 2012, adding to Worthington's capabilities and experience of the oil & gas and nuclear sectors. One of the divisions acquired was **Westerman Nuclear**, the world's largest producer of enriched uranium hexafluoride (UF6) storage and transportation cylinders for the nuclear industry, and the only manufacturer in North America.

Westerman was founded in 1909 and has manufactured products for the nuclear market since 1986. In addition to serving nuclear markets, Westerman carries the distinction of being the oldest continuous manufacturer of oil and gas wellhead equipment in the Appalachian region, offering planning, design engineering and

precision manufacturing to both oil & gas and nuclear markets.

### STRENGTH IN MANUFACTURING SYNERGIES

The acquisition adds to Worthington's footprint in the energy industry, and supports growth for the company's offering of UF6 cylinders and other nuclear power plant products. Worthington seeks to strengthen U.S. manufacturing of UF6 cylinders, and will complement Westerman's proud tradition of supporting U.S. private and public sector needs, including Westerman's historic role in manufacturing the UF6 cylinders used in the Megatons to Megawatts program. Combined with the heritage of Westerman Companies, Worthington is proud to serve the nuclear industry, supporting the nuclear fuel cycle with enriched uranium storage & transportation cylinders, radioactive waste containers and custom power plant components. For more information, call 1.800.338.8265.



- Nuclear Subassemblies
- Radwaste Containers
- Material Certifications
- Reactor Components
- Pressure Vessels
- Heat Exchangers

	NA, N, N3, NS NPT, PP, U	ISO 9001:2008, NQA-1 10 CFR 50 APPENDIX B ASME SECTION III & VIII	
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Formerly  **Westerman Nuclear**

PHONE **800-338-8265** WEB [www.worthingtoncylinders.com](http://www.worthingtoncylinders.com)



# Supporting the US and International Nuclear Industry for more than 50 years.

## Custom Safety Chillers



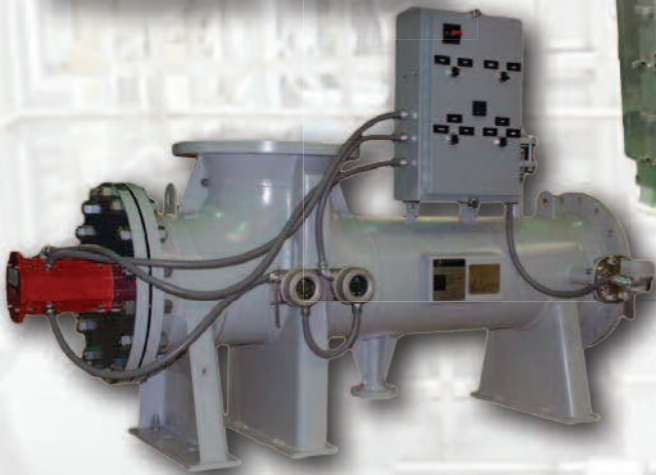
## Blast Doors



## Air Handling Units



## Pressure Vessels



## Ellis & Watts Global Industries, LLC

4400 Glen Willow Lake Lane

Batavia, Ohio 45203 USA

Tel: +1-513-752-9000 Fax: +1-513-752-4545

[www.elliswatts.com](http://www.elliswatts.com)

## About Us

Ellis & Watts was founded in 1952 as a designer and manufacturer of special purpose heating, ventilation, and air conditioning (HVAC) equipment. Since then, we have developed a broad capability in heat transfer, air treatment, and environmental control systems. Our equipment operates every day in hundreds of commercial fossil and nuclear power plants; industrial facilities; military facilities; and DOE/DOD project sites, in the United States, Europe, and Asia. We specialize in designing customized HVAC systems and components that meet the stringent requirements for military, medical, and nuclear industries.

Since 1952, our approach and dedication to quality, reliability, and service have remained constant. We are committed to proven problem solving techniques and traditional HVAC design methods that exceed our customer's requirements.

We have been involved with the design of next generation nuclear plant HVAC equipment for AP1000, and others.

For existing plants, we design HVAC equipment replacement solutions that match existing interfaces, space, power, and performance requirements.

## Manufacturing

With over 175,000 square feet of manufacturing space under one roof, we have the ability to manufacture the HVAC equipment that we design. Our in-house capability includes: sheet metal; welding to ASME BPVC Section IX and AWS; fabrication; electrical assembly; piping; and painting. With a total lifting capacity of 40 Tons, we can fabricate large pressure vessels, and assemble chillers at our facility.

Our capability for fabricating pressure vessels includes: ASME BPVC Section VIII "U" and "UM" Stamps, and ASME BPVC Section III "N", "NPT", "NS", and "NA" Stamps.

## Engineering better HVAC equipment since 1952.

### Engineering

Engineering is the focal point of the Company, and our greatest strength. Our veteran engineers participate in the Codes and Standards that contribute to our industry including: ASME Boiler & Pressure Vessel Code Section III, ASME Boiler & Pressure Vessel Code Section VIII, ASME Code for Nuclear Air & Gas Treatment (AG-1), ASME Board on Nuclear Codes & Standards.

We design HVAC systems and components to the requirements of ASME Code for Nuclear Air & Gas Treatment AG-1, and qualify our equipment to the requirements of IEEE-323, IEEE-334, and IEEE-344. Our capabilities include seismic/structural analyses using Finite Element Analysis, 2D/3D CAD drawings, reliability analyses, thermal design, P&IDs, flammability analyses, radiation effects analyses, mean time between failure (MTBF) analyses, and many others.

### Quality Assurance

Our ASME NQA-1 compliant quality assurance system meets nuclear industry requirements. We also meet the requirements of NUREG 0800, 10 CFR 50 Appendix B, and 10 CFR 21. For non-safety applications, we have an ISO 9001 Certified Quality System.

For pressure vessels, we have quality assurance systems meeting ASME BPVC Section III and VIII.

### Testing

Our HVAC equipment is tested to ensure performance in environments that include: high ambient, low ambient, electromagnetic interference, salt spray, rain, humidity, seismic, and radiation. We have in-house testing capability for sound; power; and full/part load performance at 50Hz and 60Hz. We also perform software dedication to IEEE 7-4.3.2 and verification and validation (V&V) to the requirements to IEEE 1012 and EPRI 106439.



## Ellis & Watts Global Industries, LLC

4400 Glen Willow Lake Lane  
Batavia, Ohio 45103 USA  
Tel: +1-513-752-9000  
Fax: +1-513-752-4545

[www.elliswatts.com](http://www.elliswatts.com)

## Products

We engineer and fabricate custom equipment. Our past Safety and Non-Safety Related products include:

- ❖ Air Cleaning Units
- ❖ Air Conditioning Units
- ❖ Air Filtration Units
- ❖ Air Handling Units
- ❖ Chilled Water Units
- ❖ Condensing Units
- ❖ Doors for Blast, Pressure, and Radiation Shielding
- ❖ General Area Room Coolers
- ❖ Local Air Coolers
- ❖ Recirculation Fan Coil Units
- ❖ Class 1E Qualified Motors
- ❖ Dampers for Fire, Smoke, Isolation, Backdraft, and Tornado
- ❖ Electric Unit Heaters
- ❖ Fan/Motor Assemblies
- ❖ High Pressure Blowers
- ❖ Heat Exchangers
- ❖ Humidifiers / Dehumidifiers
- ❖ Louvers
- ❖ Pressure Vessels to ASME BPVC Section III and VIII



# SLINGS TO THE MAX

Slingmax® Rigging Solutions is a technology and marketing company, associated with the best companies in the rigging business inside and outside the USA.

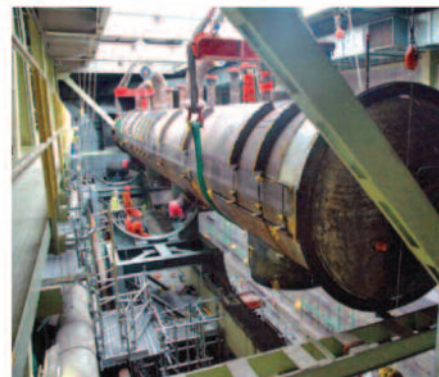
The Slingmax® family of products includes the Twin-Path® brand in synthetic slings and the CornerMax® brands for cut protection for synthetic slings. Our Gator-sling™ brands are well-known multi-part wire rope slings.

Our technology results in a competitively priced product line that is far ahead of any competition. Our built-in sling inspection and safety features are not available anywhere else. And this technology is backed up by the most extensive testing program in the sling industry. Our policy of continuous improvement is well documented.

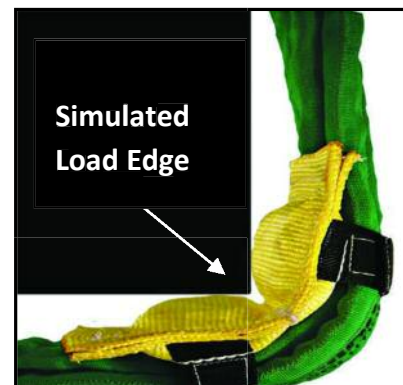
Here are some important features of our products.

- **Check-Fast® overload indicator built-in to Twin-Path® slings**
- **K-Spec® fiber is the longest lasting composite fiber for slings**
- **Rifled Cover™ technology for consistently strong slings**
- **Repairable at over 40 locations worldwide**

The Power of... **SLINGMAX®**



## Cut Protection Pads for Synthetic Slings



CornerMax® Pad

Washington River Protection Solutions in Richland, Washington prepared a report for the U.S. Department of Energy (DOE) entitled **“Synthetic Sling Failure – Evaluations and Recommendations”**. In this document, 12 accidents caused by the cutting of synthetic slings are investigated. The report also provides recommendations to prevent similar recurrences.

Slingmax® offers two cut protection products, CornerMax® Pads and CornerMax® Sleeves. Both were recognized in the document as the only sufficient cut protection pads on the market today. The following quotes are excerpts from the original document.\*



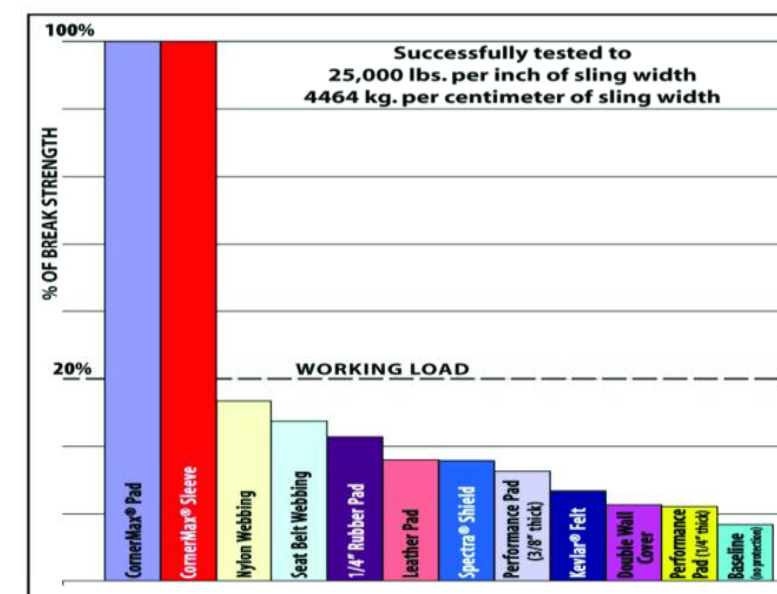
CornerMax® Sleeve

*“Too many accidents have occurred because “abrasion resistant” protection devices were used in cases which required “cut resistant” protection devices.”*

*“A high majority of sling protection device manufacturers on the market do not supply information on the effectiveness of their products. Without this information, a blind decision is ultimately being made in hopes that the chosen protection will not fail.”*

*“There are four major manufacturers of sling protective devices. Of these, only one company offers protection specifically designed to prevent the sling from being cut, along with testing information and a maximum rated load for which the sling protection would work.”*

Slingmax® CornerMax® cut protection devices have been engineered and tested for a rating of 25,000 lbs. per inch of sling width. Take the “guesswork” out of your rigging protection by specifying CornerMax® Pads and CornerMax® Sleeves. For more information on CornerMax® cut protection products please visit [www.slingmax.com](http://www.slingmax.com)



\*Full Report: <http://www.osti.gov/bridge/servlets/purl/966779-KTqxAi/966779.pdf> (RPP-RPT-42583, Rev. 0, pg. 3, 4)



# Battery Testing: Doing It Right.

## Internal battery problems can be detected by increased internal cell resistance.

In today's demanding environment, battery performance cannot be taken for granted. The cost of failure makes the cost of testing insignificant, especially in large enterprises, where even a momentary power outage could result in millions of dollars in losses. Battery testing increases power system reliability, optimizes battery life, and provides savings by reducing maintenance costs. Testing detects problems by measuring the internal resistance of each cell or module in the system. The resistance of a cell is a proven, reliable indicator of a battery's state of health. This method is matched only by true battery capacity testing. However, capacity testing requires specialized equipment and taking the batteries offline.

## Identifying problems early increases battery system reliability.

The importance of battery testing is well documented, and battery users must understand why batteries fail and what influences battery life; otherwise, a sound decision in selecting a testing device for

the application cannot be made. Internal battery problems can be detected by an increase in internal cell resistance. This testing method provides early indications of several problems, including sulfation, grid growth, corrosion, dry out and manufacturing defects. The right battery testing system will significantly improve battery system reliability while providing a continuing return on investment. By using internal cell resistance measurement as part of your quarterly battery maintenance program, your approach will change from reactive to proactive. The Alber Cellcorder CRT-400 is the industry's most popular hand held battery resistance tester. Designed to meet IEEE standards for battery testing, this next generation resistance tester offers USB memory and Bluetooth technology.

The Cellcorder records three critical parameters: cell voltage, internal battery resistance, and intercell resistance. Its Bluetooth technology lets you hear status in noisy environments, and it features six newly designed, rugged probe choices and jaw options for all battery types. The Cellcorder's easy to use Battery Analysis

Software, with a variety of report options, and Alber's patented internal resistance method will ensure you'll detect the early signs of battery degradation before problems escalate. To learn more about your DC system and ensure its performance, Alber offers a two day, noncommercial seminar on properly and safely installing, maintaining and testing your battery system. You'll learn how to better maintain your battery system and stay up to date on the latest standards. The Stationary Battery Basics seminar covers industry standards, equipment and methodologies and offers 1.6 CEU's at course completion. Alber also organizes the annual, three day Battcon Stationary Battery Conference, the world's leading conference and trade show for stationary battery users. Whether you're a professional in the data center, UPS, power station, electrical, telecom, utility, government, petroleum, or nuclear industry, if you maintain or service mission critical operations, you'll find Alber products and service will exceed your expectations. From portable test equipment and permanent monitoring installations, custom-tailored installation and service, to education and training, Alber is the most experienced and respected name in the battery monitoring industry.

# TRUST

## YOUR SYSTEM TO THE BATTERY TESTING EXPERTS.

**B**attery failures are a leading cause of system performance problems and downtime. That's why you need Alber testing solutions. From Alber battery monitors, diagnostic systems and hydrometers to



capacity and resistance testers, our products enable you to identify weak cells before failures happen.



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954.623.6660

[sales@alber.com](mailto:sales@alber.com)

# Alber

## Trust Your Batteries™



# Industry Leading Activities in Digital Controls

Hurst Technologies has achieved an industry-leading position in replacing the governor controls for turbine-driven auxiliary feedwater (AFW) pumps, based on its staff's pioneering work at Callaway and Wolf Creek nuclear plants.

The AFW system supplies cooling water to the steam generators under emergency conditions, or whenever the main feedwater system is unavailable. Typically consisting of two motor-driven pumps and one steam-turbine driven pump, the AFW system must be on constant standby and fully operable.

**Example, background.** Terry Turbine Corp provided electronic governor controls for single-actuator steam turbines used in high-pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), and auxiliary feedwater (AFW) systems for Terry CCS, GS, and ZS frame steam turbine drives.

The main components for the governor controls were made by Woodward Controls (now part of General Electric). Most of the systems were comprised of an electric governor-magnetic (EG-M), the ramp generator signal convertor (RGSC), and the electric governor - remote (EG-R) matched to a remote servo to drive the steam turbine governor valve stem.

These parts (new) have not been manufactured by Woodward since the late 1980's. Parts refurbishment has all but ceased as original components become unavailable. Dresser-Rand Corporation purchased the Terry Turbine Company and has OEM and design basis authority for the Terry Turbines. Dresser-Rand offers a new digital control system to replace the original Terry supplied system.

Hurst closely monitors recent plant events with both the new digital control systems and the old control system failures. If your plant is facing similar issues, put our industry leading experience to work for you. Contact Darrell Cooksey at 979-849-5068 or [darrellc@hursttech.com](mailto:darrellc@hursttech.com).

Darrell delivered a presentation on the practical aspects of AFW governor controls replacements at the Electric Power Conference, including developing a specification, defining the scope of change, equipment and vendor selection, design considera-

tions, testing (especially prior to the factory acceptance test), and training. You can view the presentation at [www.hursttech.com](http://www.hursttech.com).

## SETPOINTS WORKSHOP

Mark your calendar for January 21-23, 2014. Hurst will host and conduct a nuclear industry workshop, training and benchmarking opportunity on setpoints and uncertainties. Attendance is free of charge for qualified utility personnel.

Utility engineers and/or supervisors who own setpoint programs or are responsible for developing uncertainty calculations, setpoint program regulatory compliance or setpoint-related operability determinations will want to participate in this workshop.

**The first session (1 1/2 day duration)** — Workshop and Benchmarking will comprise primarily of utility presentations and a roundtable discussion segment. Topics expected to be covered are:

- TSTF-493 application experiences
- Setpoint programs, including personnel qualifications and training

- Application of INPO Engineering Program Guide EPG-01
- Application of graded approach
- Indication uncertainties
- Calculation management
- Use of software tools
- ISA SP67.04 committee activities

**The second session (1 day duration)** — Practical Basic Training Class—will be a tutorial on setpoints and uncertainties and will use several example calculations to demonstrate how uncertainties are calculated and applied. This class is intended for utility engineers new to the world of setpoints and uncertainties or experienced engineers that simply need a refresher.

Hurst has been an industry leader in the area of setpoints and uncertainties for over 24 years. Please join us to take advantage of what Hurst has to offer, share your experiences, and learn about the successes and challenges at other utilities. Contact Bill Sotos at [bills@hursttech.com](mailto:bills@hursttech.com) or by phone at 979-849-5068.



**HURST**  
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I & C Strategic Planning  
Configuration Management  
Project Management  
Setpoint Calculations

**SAVE THE DATE: JANUARY 21 - 23, 2014**

**Workshop, Training, and Benchmarking  
on Setpoints and Uncertainties**

(visit [www.hursttech.com](http://www.hursttech.com) to learn more)







# Emerson Process Management raises the bar with the Rosemount 3150 Series of Nuclear Pressure Transmitters

The new series seamlessly replaces the Rosemount 1150 Series with improved performance

Pressure measurement is mission-critical in nuclear power plants, and for 40 years the Rosemount 1150 Series of nuclear safety related pressure transmitters has been an industry standard. The Rosemount 1153 was the first pressure transmitter on the market qualified to both IEEE Std. 323™-1974 and IEEE Std. 344™-1975, and together with the Rosemount 1152 and the Rosemount 1154, continues to be one of the most popular model families in nuclear plants around the world.

And now you can have the proven safety and performance of the Rosemount 1150 Series while taking advantage of the latest technological innovations to operate your plant even more confidently. Introducing the Rosemount 3150 Series of Nuclear Transmitters, the culmination of extensive, continued investments in improved core sensing technology, electronics design and overall transmitter performance. The series upholds a tradition of unmatched product quality in nuclear sensing and leverages the dependability, functionality and performance levels that you expect from Rosemount solutions.

	2013	2014	2015	2016
 Rosemount 3152 Rosemount 1152	Now Available	Apr. 2014	Last Shipments <sup>2</sup>	
 Rosemount 3153 Rosemount 1153B	Now Available		Apr. 2015	Last Shipments <sup>2</sup>
 Rosemount 3154 Rosemount 1154H Rosemount 1154 Rosemount 1153D	Now Available		Apr. 2015	Last Shipments <sup>2</sup> Last Shipments <sup>2</sup> Last Shipments <sup>2</sup>
 Rosemount 3159 Rosemount 1159	Available Dec. 2013		Apr. 2015 <sup>1</sup>	Last Shipments <sup>2</sup>

Note 1: ● = Target date of last orders based on availability of the Rosemount 3150 replacement.  
 Note 2: Timing of discontinuance is subject to parts availability. Emerson reserves the right to limit order quantities and shipments during the transition period as necessary to best serve all users.

## INDUSTRY-LEADING PERFORMANCE

The performance of the Rosemount 3150 Series is unsurpassed in the industry.

- Reference Accuracy: ±0.2% of Span
- 20 Year Qualified Life at 120°F
- Drift: ±(0.1% of URL + 0.1% of Span)\* for 30 months
- Temperature Effect: ±(0.15% of URL + 0.6% Span)\* / 100°F
- LOCA/HELB Peak up to 435°F
- Radiation up to 112 Mrad TID
- Return to reference accuracy after seismic activity up to 8.5g ZPA

\* For most pressure ranges/calibrations

## IMPROVED SENSOR TECHNOLOGY

With Emerson's patented floating capacitance sensor design, you can improve transmitter performance and reliability and extend calibration and maintenance cycles.

## IMPROVED QUALIFICATION PEDIGREE

You can depend on reliable and accurate performance of the Rosemount 3150 Series in critical current and future safety applications because Emerson's extensive, robust testing meets higher qualification test profiles which envelope those of the legacy Rosemount 1150 Series. The transmitters have successfully completed fully sequential qualification test programs per IEEE Std. 323 and IEEE Std. 344. Versions are also available tested to meet RCC-E-2002 and KTA 3505-2005 standards for use in countries where those standards are used to license plants.

## FULLY ANALOG ELECTRONICS

100% analog, the Rosemount 3150 Series does not use microprocessor-based electronics. This analog design improves security and reliability and helps the operator reduce risk. With no digital parts or connections, you have the ultimate in cyber security. In addition, the Rosemount 3150 Series provides superior radiation tolerance. With consistent, reliable performance even in the harshest environmental conditions, the Rosemount 3150 Series minimizes your exposure to risk factors like software verification & validation (V&V), and evolving regulatory requirements.

## IMPROVED CAPABILITIES FOR HARSH ENVIRONMENTS

With the Rosemount 3150 Series, you can operate confidently in critical safety applications. The transmitters are designed to operate in environments from mild to severe or harsh for both legacy and Gen 3 reactor technologies.

## ELECTROMAGNETIC COMPATIBILITY

The Rosemount 3150 Series meets both USNRC Regulatory Guide 1.180 Rev 1 and EN 61326.

## SCOPE OF THE CHANGEOVER

Designed as "drop-in" replacements for the Rosemount 1150 Series transmitters, the Rosemount 3150 Series has the same process connection dimensions, electrical connections, and mounting bracket hole dimensions as its predecessor.

All Models in the Rosemount 1150 Series, including the Rosemount 1159 remote diaphragm capillary system, will ultimately be superseded by the improved Rosemount 3150 Series.

## TRANSITION SCHEDULE

The chart above shows the schedule for replacement of each member of the Rosemount 1150 Series with the new Rosemount 3150 Series models.

## GET ALL THE DETAILS ONLINE

To make sure you select the best model for your plant, check out the product comparison tool at [www.RosemountNuclear.com](http://www.RosemountNuclear.com). With it you can make model-by-model comparisons on qualification levels, design basis event profiles, EMC qualification tests performed, normal operating performance and physical and functional specifications. You can also find help with your equivalency documentation.

As always, Emerson stands ready to assist you with timely technical support and will continue to dedicate our organization to supporting your nuclear qualified measurement needs for the life of your plant.



To move forward safely, I must address my plant's obsolete equipment. I need to be confident that I'm transitioning to a robust, long-term replacement.

# YOU CAN DO THAT

**ROSEMOUNT®** Run safely and reliably by transitioning to the Rosemount 3150 Series of 100% Analog Nuclear Pressure Transmitters. In your nuclear facility, safety is non-negotiable. You have years of confidence in world-class technologies such as the Rosemount 1150 Series of Pressure Transmitters. Emerson has made certain that your migration to the Rosemount 3150 Series gives you the same confidence, performance and safe operation you have come to expect. Visit [www.RosemountNuclear.com](http://www.RosemountNuclear.com) to obtain product documentation.



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EMERSON. CONSIDER IT SOLVED.™



# FLEX SOLUTIONS

SAFEGUARDING OUR COMMUNITIES

Victaulic delivers innovative mechanical solutions for joining pipe and hose without the need for power tools. Safely and Quickly.

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- › Aluminum
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- › PVC
- › FRP
- › Hose



Visit us on the web:  
[victaulic.com/FLEX](http://victaulic.com/FLEX)

THE WORLD LEADER IN PIPE JOINING SOLUTIONS



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## Victaulic Pipe-Joining Systems Provide Ideal FLEX Solutions

Victaulic mechanical pipe-joining systems can help ensure safety and security at nuclear energy facilities as part of a FLEX strategy by providing quick and easy-to-install temporary systems for the transport of cooling water, air and other utility services. Victaulic offers mechanical joining systems for stainless steel, carbon steel, aluminum, HDPE, and PVC pipe, as well as hose assembly products. Benefits of these systems include ease and speed of installation, safe installation, and low total installed costs. Read on for more details about the mechanics and benefits of Victaulic pipe-joining systems.

### Grooved Mechanical Pipe Joining

The concept of joining pipe with bolted mechanical couplings originated during World War I for rapid deployment of fuel and water lines to Allied forces. Today, the Victaulic grooved mechanical pipe-joining system is used in mission-critical applications in the power generation, oil and gas, chemical, mining, water and wastewater treatment, military and marine industries, as well as commercial building and fire protection.

A grooved joint consists of four elements: grooved-end pipe, a gasket, coupling housing, and nuts and bolts. The pipe groove is made by cold forming or machining a groove into the pipe ends. A gasket encompassed by coupling housing segments is wrapped around two pipe ends, and the key sections of the coupling housing engage the grooves. The bolts and nuts are tightened with a socket wrench or impact wrench. In the installed state, the coupling housing encases the gasket and engages the grooves around the circumference of the pipe to create a leak-tight seal in a self-restrained

pipe joint. The Victaulic system features grooved couplings, fittings, valves and accessories to form a complete piping system.

Victaulic grooved couplings featuring installation-ready technology come pre-assembled and are simply pushed onto a grooved pipe end, joined by a second pipe end, and the bolts and nuts are tightened down. Installation-ready couplings are able to create rigid or flexible joints. Rigid couplings are designed to “fix” the joint in its installed position, preventing linear, angular and rotational movement at the joints. Flexible couplings are designed to allow controlled linear and angular movement at each joint, which can accommodate thermal expansion and contraction, deflection, seismic movement, and routing of the system over uneven ground.

Victaulic grooved piping systems are up to 10 times faster to install than welded systems, and up to 6 times faster to install than flanged systems. One joint can be easily completed with no special tools and no specialized labor in just a few minutes. No flame is required to assemble a grooved joint, eliminating fire and fume hazards and reducing risks to personnel and property. In addition, metal-to-metal bolt-pad contact provides confirmation of proper assembly.

The Victaulic grooved pipe-joining system is ideal for stainless steel, carbon steel, aluminum and PVC pipe.

### Plain-End Joining System for HDPE

For joining HDPE, Victaulic developed a line of plain-end couplings. These couplings consist of three parts: the coupling housing, gasket, and nuts and bolts. Instead of engaging into grooves, Victaulic HDPE couplings feature integral razor-like “teeth” inside the housing that bite into and grip the outer diameter of the pipe around the pipe’s circumference.

The joining process is similar to that of grooved couplings, with the exception of the grooving process: plain-end HDPE pipe segments are abutted, and the gasket is positioned over the joint. The coupling housing segments are placed over the gasket and tightened with a wrench. With no pipe-end preparation necessary and half as many installation



steps, Victaulic HDPE couplings offer a much faster joining method than the heat-fusion process. Installation does not require special equipment or tools or a remote power feed; the system can be assembled using a standard wrench.

### Aquamine System for PVC

The Victaulic Aquamine line of reusable PVC pipe-joining products is the fastest, easiest, most economical method for joining PVC pipe for water services. Aquamine components—including pipe, couplings, fittings and valves—are joined by inserting a spline into the groove pre-cut in each product. Special tools and equipment are not required for installation. The ease of assembly and disassembly enables Aquamine products to be reconfigured and reused as needed.

### Hose Assembly

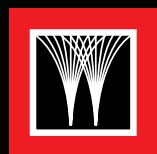
Victaulic hose assembly products provide a lightweight, easily installed connection for IDPS, TPT, FSSP and RIFTS systems. These products, including hose nipple assemblies and hose repair assemblies, quickly and easily join hose to a grooved-end Victaulic piping system, Victaulic fittings and valves, and provide hose-to-hose connections and hose repair.

### Summary

Providing unmatched assembly speed, coupled with safe, simple installation that eliminates the need for special tools and specialized labor, Victaulic mechanical pipe-joining systems can help nuclear power plants simplify the implementation of FLEX approaches for the delivery of cooling water. Contact us today to learn more about our innovative piping technologies by visiting [Victaulic.com/FLEX](http://Victaulic.com/FLEX).







# WorleyParsons

resources & energy

**Balancing 100 years of power experience, resources and solid engineering practices, we successfully service more than 60 nuclear units to support projects of all sizes and in all phases.**

Global nuclear service provider specializing in:

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- Owner's Engineer
- D4/Decommissioning Services
- Established Fukushima Initiatives in both the US and EU Generation
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[www.worleyparsons.com](http://www.worleyparsons.com)

## Global nuclear capability... delivered locally.

# 18

nuclear units  
Engineer of Record

# 165

global offices

# 40,400

personnel

### Industry leader for over 50 years

Pioneers in the nuclear industry for more than 50 years, WorleyParsons continues to contribute to the success of the New Build nuclear power business, while maintaining focus on developing long-term relationships to maximize the performance of our customers' assets. Currently, our nuclear customer base spans throughout North and South America, Europe, Asia, the Middle East, and Africa and includes nations new to the nuclear industry such as Poland, Egypt, Jordan, and Turkey.

### Global nuclear capability, delivered locally

With a presence in over 40 countries and project experience on four continents, WorleyParsons provides local delivery of global capabilities through our proven internal workshare process. Our Nuclear organization is a globally-linked unit providing high-quality engineering and project delivery from three regional hubs:

- Reading, Pennsylvania: providing services for the USA region and supporting other projects worldwide
- Toronto, Ontario: serving our CANDU customers
- Sofia, Bulgaria: focusing on Europe, Africa, Russia, Former Soviet Union (FSU), Middle East, and Asia

These hubs fully embrace the WorleyParsons business model of worldwide cooperation; functioning seamlessly on every project, under the guidance of the WorleyParsons Global Nuclear Organization. We ensure consistent delivery to our customers by using WorleyParsons' common tools, systems, processes and unique approaches.

By providing services at the local level, we have the site-specific requirements and regional knowledge necessary to deliver a tailored, high-quality, responsive product. At the same time, our local offices draw upon our vast global resources and experience to ensure our customers' needs are met. We select the hub with the most appropriate competencies and the most suitably qualified people to deliver the best product, independent of geographical location.

### Investing in the future through Nuclear New Build

WorleyParsons' extensive experience, in support of new nuclear power plant projects, dates back to the mid-20th century. We participated in the design and construction of the first commercial nuclear power plants in the USA, Japan, Korea,

and Slovenia. Since then, we have been involved in the successful construction and commissioning of 18 nuclear power units throughout the world, totaling over 11,100 MWe. Drawing from this experience, WorleyParsons has become a respected consultancy, engineering and project management services provider currently engaged in multiple new nuclear projects worldwide.

WorleyParsons promotes the investment in Nuclear New Build by supporting Egypt, Jordan, Bulgaria, Slovakia, Poland, Turkey, Ukraine, and Armenia in the development of their nuclear programs.

### Building long-term relationships through Nuclear Improve

Nuclear *Improve* is WorleyParsons' core business focused on the delivery of major upgrades and maintenance projects, project portfolio management, and support services for operating nuclear power plants. We tailor our *Improve* services to the needs of our customers' individual sites to ensure smooth and efficient operation of their nuclear facilities, thus helping them gain a return from costly initial investments.

WorleyParsons' involvement in Nuclear *Improve* dates back to the first generation nuclear plants and has significantly increased its importance with aging operating plants in the USA, Canada, Latin America, Europe, and the countries from the Former Soviet Union (FSU). Today, Nuclear *Improve* is within 50% of WorleyParsons nuclear revenue and is regarded as a strategic component for growing the company's nuclear business.

The backbone of our success with our *Improve* customers has always been our ability to maintain long-standing relationships with the ultimate goal of sustaining their assets and improving business performance. Our focus on customer alliances and long-term relationships facilitates understanding and alignment of each other's interests and expectations; creates an environment where specialist skills are developed and effectively utilized; and maximizes the use of each organization's strengths. We are proud of our long-term partnerships with our valuable customers:

- 30+ years with SCE&G – VC Summer
- 30+ years with Krsko NPP
- 30+ years with Exelon – TMI, Unit 1
- 30 years with PPL – Susquehanna
- 20 years with TVA
- 20 years with Kozloduy NPP
- 15 years with Ontario Power Generation

### Unparalleled technical capability throughout full lifecycle of plant

WorleyParsons' services cover the full lifecycle of nuclear facilities from conception and licensing to design, construction, start-up, and into operation and decommissioning. Thus, our nuclear business is organized around three main business lines: Nuclear New Build, Nuclear *Improve* (operational and maintenance support), and Nuclear D4 (Decommissioning, Deactivation, Decontamination, and Demolition). WorleyParsons offers unmatched capability in areas that are central to success in nuclear plant design, construction and operation, including:

- Nuclear infrastructure and localization inclusive of high-end consulting, regulatory and financial services
- Development of feasibility studies and financial assessments
- Site and technology selection and site characterization services
- Bid document preparation, review, and contract negotiations
- Environmental impact statements
- Consulting, licensing support and Owner's Engineer services in all phases of development
- Design and design review services
- Construction management and construction supervision services
- Safety analyses development and review including hazard assessments, accident analyses, full probabilistic risk assessment, emergency management support, etc.
- Plant lifetime assessment, safety upgrading and power uprate program implementation
- Plant decommissioning programs, development and implementation
- Spent fuel and radioactive waste management strategies

### Post-Fukushima Response

WorleyParsons takes a leading role in the application of the post-Fukushima lessons learned, establishing a renewed focus on the primary considerations related to the management of aging and the long term safe operation of a nuclear plant and reassessment of the plant's capabilities and margins.

With our extensive scope of experience and relevant involvement in issues impacting the nuclear industry, WorleyParsons remains one of the few global companies with the capability and track record to execute large capital nuclear projects from conception through operation.



## Expert Nuclear Support / Unique Facilities

The Kinectrics group comprises expert teams of highly-qualified experienced professionals providing comprehensive capabilities for the nuclear industry and OEMs supplying the plants.



Kinectrics' Nuclear Products and Engineered Services, Generation Life Cycle Management, Environmental Technologies and Electrical / Mechanical Testing business areas deliver broad-based services from fully-equipped, accredited facilities and on site, to help clients improve plant performance and reduce costs.

### A History of Excellence

Kinectrics has earned an international reputation for excellence in supporting the commercial nuclear power industry since its introduction over 50 years ago. In 2012, Kinectrics celebrated 100 years of service to the electricity generation industry.

### Kinectrics Facts

- Over 400 staff in North America
- 30% of staff hold doctorate level degrees
- 60% of staff have a technical, science or engineering degree, many at master's level
- Over 25 independent test facilities and labs and, field inspection services
- Central facilities = 300,000 sq. ft.
- Over 150 clients in North America and worldwide

Candesco, Division of Kinectrics, provides complete nuclear regulatory and licensing support, high quality decommissioning planning and cost estimating, as well as many other specialized engineering and operations services for the nuclear industry.

### Kinectrics US Inc.

Based in Cincinnati, Ohio, Kinectrics US Inc. provides expert local support in Equipment Qualification (EQ) and Commercial Grade Dedication (CGD) for the existing nuclear fleet and new build throughout North America, incorporating our team's long-established experience with US standards and regulations.

### Kinectrics US / New Key Alliances

Kinectrics US continues to advance and expand its engineering, testing and certification services through industry alliances worldwide. Organizations currently working jointly with Kinectrics to provide specialized technical support for nuclear include the following.

Kinectrics US has teamed with **Pump & Motor Works (P&MW)**—a complete manufacturing facility—to provide a single convenient resource for the qualification and refurbishment of safety and safety-related pumps and motors. P&MW complements the capabilities of Kinectrics US in the ability to customize, redesign and reverse engineer machinery for specific applications. P&MW is the exclusive distributor of Parsons Peebles motors in the USA.

Combined services are now available from Kinectrics US and **Structural Integrity Associates** in support of cable aging management program development and implementation, including risk ranking, walk down support, prioritization and field testing of cables, as well as trending of results.

**Systems Technology Inc.** works with Kinectrics US to provide a range of services in safety-related breaker refurbishments.

Working with Kinectrics US, **Engineered Solutions Inc. (ESI)** brings proven capabilities in all aspects of electrical and Instrumentation and Control (I&C) engineering and modifications—complemented by complete start-up testing, implementation, and commissioning support.



I & C Cable Test

ESI's operations-oriented electrical and I&C design expertise and testing services are backed by in-depth working knowledge of power systems.

### Superior Test Capabilities

Kinectrics offers clients superior flexibility and redundancy in advanced equipment, component and materials testing

capabilities, including comprehensive cable aging management programs.

Kinectrics' unrivalled equipment qualification facilities include test chambers of various sizes, and the ability to run multiple post-accident tests while simultaneously conducting HELB / LOCA tests.



LOCA Test

Our team can assess asset and component condition and remaining life, find, dedicate and qualify replacement parts, and test / qualify, or reverse engineer, components for use in nuclear plants. Kinectrics' EQ and CGD specialists have qualified thousands of safety-related and mechanical components.

Kinectrics' EQ facilities are equipped to test any type of mechanical, electrical, instrumentation, and control equipment of virtually any size. Kinectrics has a wide range of test chambers available from 3'D x 5'L (horizontal orientation) to 4'D x 10'H (vertical orientation). Kinectrics also has the capability to design and build custom test chambers to suit the specimen and test requirements.

For seismic qualification Kinectrics' Random Input Motion (RIM) table has a maximum payload of 5000 lbs. and is specifically designed to test line-mounted valves and actuators. The Kinectrics

RIM table meets all IEEE sine sweep, sine beat requirements, including Hard Rock High Frequency (HRHF) tests. The RIM table design functions put less stress on customers' test samples during qualification, optimizing the potential for sample survival through the arduous RIM test requirements.



RIM table for seismic testing



## GENERATING SUCCESS—FOR 100 YEARS

Kinectrics is celebrating 100 years of success in providing advanced technical expertise to the electricity generation industry.

For nuclear, our unique engineering and testing capabilities include complete outage support, inspection and equipment qualification, nuclear plant chemistry and many other industry-accredited services.

- Life Cycle Management and Plant Life Extension
- Genuine Nuclear Parts and Equipment Qualification
- Inspection and Maintenance Systems and Services
- Materials Characterization and Forensic Analysis
- Plant Chemistry and Nuclear Waste Management
- Regulatory Affairs and Licensing
- Decommissioning Planning and Risk Management



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# Integrated System Simplifies Decontamination

One of the many challenges in decontaminating and cleaning worksites, where potentially hazardous or even radioactive materials have been present, is the equipment. Floor and wall scrubbers, vacuum and suction units, and high-pressure power washers take up valuable storage space when not in use, and can be too bulky and laborious to use efficiently. Enter the Kelly II.

The Kelly II Multi-Function Decon and Vacuum System utilizes a space-saving design to combine the four separate pieces found in the original Kelly Unit. In consolidating the pump, suction/vacuum, pressure washer, and HEPA filter into one unit, Container Products Corporation can offer a more compact, more maneuverable, more economical solution to surface decontamination. As an all-in-one de-

contamination solution, the Kelly II allows users to tackle multi-surface decontamination jobs with more efficiency than was previously possible.

Each Kelly II unit ships with an Aluminum IP-1 Shipping and Storage Container. A ramp-style door opens to reveal the Kelly II, as well as guide tracks that make loading and unloading the decontamination unit easy. Internal tie-down hooks and a container bottom built to accommodate forklifts and skytracks round out the protective storage cabinet and shipping container.

Since the Kelly II also includes the tools necessary for proper decontamination and cleanup, a second aluminum IP-1 storage chest with removable casters, specifically designed to hold the necessary hoses, wands, scrubbers, and sprayers, is included.

All Kelly II units feature stainless steel construction for easy cleanup and added corrosive resistance, easy-roll casters, and an integrated operator control panel. The control panel places a power disconnect, emergency shutoff, individual on/off switches, and a photohelic gauge and alarm within easy reach in a high-visibility area on the front of the Kelly II. Hose connections and manual controls for water pressure are located at the rear of the unit.

Performance-wise, the Kelly II offers a 5 hp, 3.2 gpm, 2,500 psi high pressure pump, a floor cleaning rate of up to 20 square feet/minute and a pump transfer rate of 14 gpm. The 20 hp Power Products Rad-Vac suction/pumping unit has a .3-micron HEPA filter, keeping the workplace contaminant-free.



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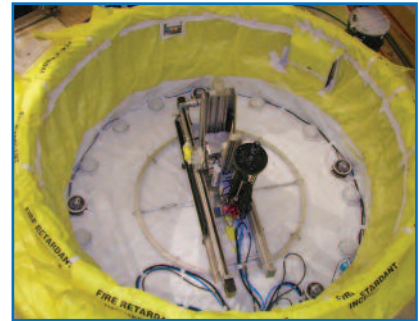
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## Fukushima Revisited by NRC EA-12-051 (SFP)

Recently, the NRC has issued directive EA-12-051 addressing the reliability of spent fuel pool (SFP) monitoring to try to prevent another disaster similar to the Fukushima NPP in Japan last March 2011. Inasmuch as we have no control over mother nature's strength, we can only design the best product with the available technology. The seismic at Fukushima was ~9.1, what if the next is 10+?

Before Fukushima 2011, but after the Chernobyl and Three Mile Island mishaps, we completed the design and test of our new triple redundant controller (model TRC) specifically to monitor/control three independent and isolated signals, such as recommend by the NRC EA-12-051 directive. The TRC monitors 3 isolated signals from 3 independent sensors and is powered by 3 separate power sources. The TRC compares the signals against themselves and to a deviation limit (configurable). The majority rules! If any channel differs from the other two or any of them is out of set Hi-Lo limits, the TRC will take corrective action such as alarming, disabling the disagreeing channel, enabling DAC, relays, changing colors, etc., and serially transmitting (date and time) data to DCS/SCADA via USB, 485 or Ethernet. In addition, the TRC has a uSD for data logging!

If directive EA-12-051 requires two distinctive monitors, our new technology 100% loop powered LPD Series or the externally powered HI-Q Series would meet those requirements. All series are available in the industry standard panel-mount EPRI TR-102323 (EMI/RFI), IEEE standard 344 (seismic) compliant cases designed to meet Class 1E requirements.

To meet EA-12-051, the LPD series, which is 100% loop powered, could be used and would add another safety feature not available in the industry until now. It automatically detects input signal failure and flashes its digital display (dead loop) and transmits serially a distress message. This message flashes for about 20 seconds after signal failure (no power!). In addition, any of the other 3 series comply with the new mandate (to have distinctive and independent monitors), since all series use different firmware and hardware.

So, there is no need to tap on the stuck needle or ignore it, the LPD will tell you if the signal (or instrument) failed and it will transmit the message serially.

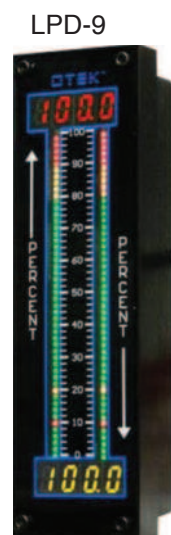
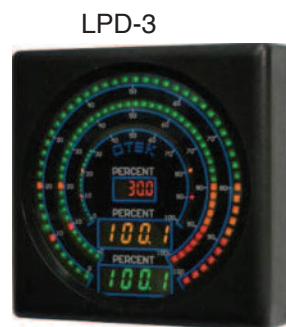
The parasitic loop powered LPD series (<60mW) would be the best choice, since EA-12-051 requires a stand-alone power supply dedicated exclusively to power the monitors of the SFP. The 4-20mA current loop has no distance limitations (depending on the power supply) and can power the transmitter in the SFP and the LPD in the control room.

The New Technology will be on display at the ANS Conference August 11-14th at the AZZINLI booth. If you don't see it at the conference, call us to schedule an on-site demonstration.



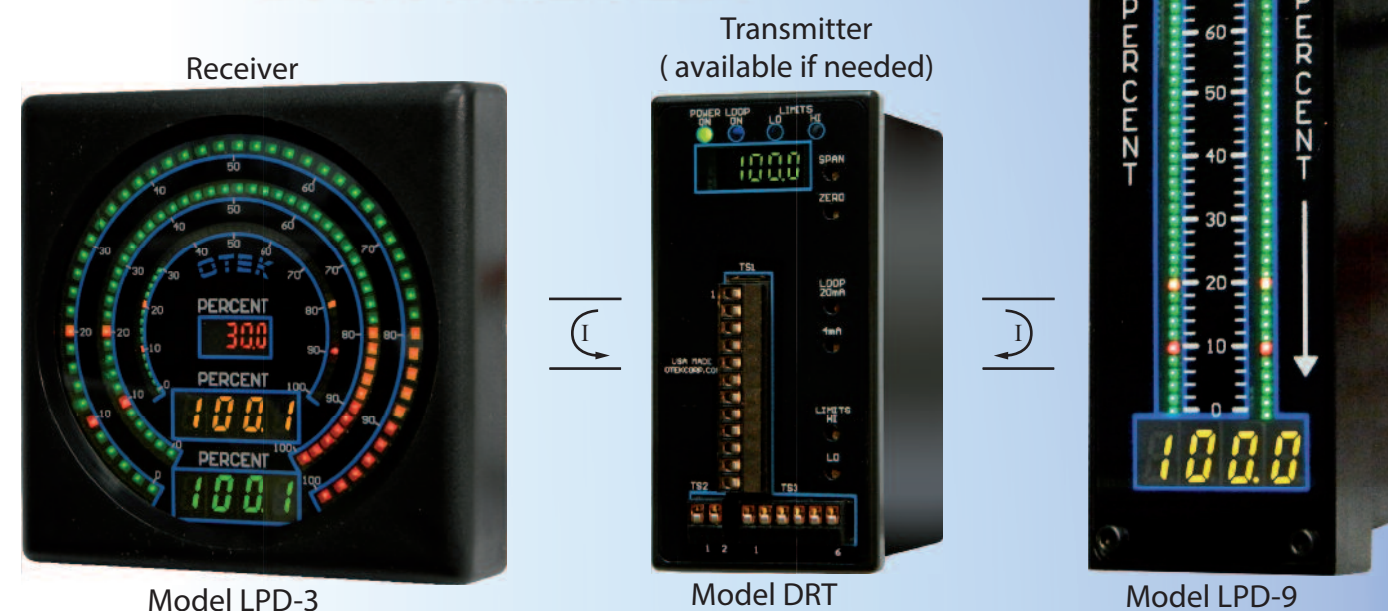
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