

# 28th Annual Vendor/Contractor Profile Section

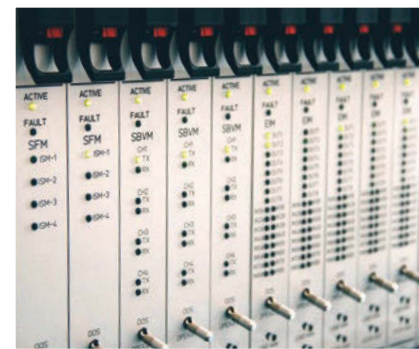
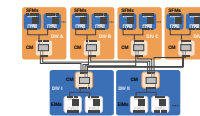
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# The Highly Integrated Protection System (HIPS) platform is a game changer

## HIPS: Forged on the Leading Edge of Advanced Reactor Ingenuity

### RPS Architecture

The scalable HIPS platform has complete architecture flexibility. It can be configured as a single channel or up to a full Reactor Protection System of four separation groups which votes into two divisions complete with physical and electrical isolation.



Paragon's HIPS platform

### Class-1E SER Approval

The HIPS platform topical report TR-1015-18653-P, Revision 0, "Design of the Highly Integrated Protection System [HIPS] Platform" was submitted in 2015 in partnership with NuScale. Rev. 1 was submitted in 2016 with NRC SER approval granted in 2017.

### Software Common Cause Failures Mitigated by Internal Diversity

### Model-Based Design

Model-Based Design provides a significant increase in the quality of the final product and a reduction of project execution costs.

It's an all-in-one environment to meet the rigorous development requirements for safety critical systems in a significantly reduced development time by integrating both the system's functional behavior and the detailed description in one project model.

HIPS Model-Based Design automates error prone and time-consuming tasks, reducing the development time associated with code and document generation, test execution, and model checks.

Additionally, simulation of the system behavior provides the ability to examine its interaction with individual components to detect errors in requirements and design early in the development lifecycle before testing on expensive hardware.

The diversity in our FPGA equipment, circuit designs, and software tools are the fundamental methods for mitigating the potential for digital Common Cause Failures (CCFs) in the HIPS platform.

The platform design uses two diverse FPGA technologies to achieve equipment diversity: one is a one-time programmable (OTP) or flash-based FPGA, with the other a static random-access memory (SRAM) based FPGA.

The overall HIPS diversity approach aligns with NRC BTP 7-19 and provides additional benefits by simplifying the holistic I&C facility design, since a separate diverse actuation system is not required to mitigate digital CCFs.

The diversity approach also provides analytical and regulatory review benefits, since additional 'best estimate' consequence analysis is not required. This ensures a more efficient regulatory turnaround and quicker system build for a higher level of confidence in meeting your project deadlines.

Today's nuclear power plant operators want safety-related systems that work for multiple decades without major upgrades. Previous generation digital I&C systems required frequent firmware updates and proved difficult to manage under current cybersecurity and regulatory constraints.

**The SER-approved HIPS FPGA platform was designed with you in mind.**

HIPS performs with robust, analog-like reliability while providing essential diagnostics to enable plants to reduce O&M costs.



The nuclear industry's most trusted supplier

865-888-6853 | [www.ParagonES.com](http://www.ParagonES.com)

### Why is field programmable gate array (FPGA) technology the right choice for your nuclear power plant?

#### SIMILAR TO DIGITAL

#### ... BUT BETTER

High reliability from comprehensive diagnostics & self-testing	✓ Deterministic – costs less to qualify
Flexible components (reconfigurable, reusable, portable logic)	✓ Reduced complexity means greater regulatory certainty
Fault tolerant	✓ No executable software
Software enhanced application development	✓ Inherently more cyber-secure
Configurable communications	✓ Resilient to component obsolescence
	✓ Isolation of independent functions (safety/non-safety) within the same system
	✓ Quicker processing time due to parallel execution of independent functions
	✓ Intuitive bypass and testability

To learn more about the HIPS Platform, visit [www.ParagonES.com/HIPS](http://www.ParagonES.com/HIPS)

# Clean Air. Blue Skies. Bright Future.

An agile nuclear company, Paragon is recognized as the industry's leading equipment and technology supplier with solutions ranging from inventory transfers to full digital safety-related I&C upgrades.

Our global team of passionate professionals is dedicated to partnering with clients to develop the safest, most reliable, and most cost-efficient solutions for the nuclear industry.



The nuclear industry's most trusted supplier

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## Aecon-Wachs has created your One-Stop-Shop for Mechanical Construction



MECHANICAL & ELECTRICAL PROJECTS



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QUALITY MANAGEMENT PROGRAM

**Aecon-Wachs, in collaboration with our parent company Aecon Nuclear, is a total solutions provider.**

We provide a full spectrum of Engineering, Procurement & Construction (EPC), maintenance and manufacturing services specifically tailored to meet the demanding requirements of the nuclear power industry.

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Whether you are designing a piping system and need to eliminate welds through pipe bending, you are replacing feedwater heaters, critical valves and pumps, or need contract supervision and labor for your outage or capital project, Aecon-Wachs has a solution to meet your demands.

**Nuclear clients appreciate our proven Safety Program, Quality Program, Weld Program and flexibility to utilize our programs and procedures OR the clients'.**

Audited by NUPIC members and NIAC members, our 10CFR50, Appendix B, ASME & ISO 9001 Programs offer you access to elite Field Service and Shop Fabrication services.



### EXPERIENCE MODIFICATION RATE (EMR)

2019 - 0.57	2020 - 0.63	2021 - 0.71
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### CORE COMPETENCIES

- Large Component Replacements
- Design, Fabricate, Install
- Turnkey Projects
- Specialty Welding & Machining
- Heat Treating, Coatings
- Lifting/Rigging
- Metrology
- Staffing

### NUCLEAR MARKETS

- New Construction
- Operating Plants
- Decommissioning
- Department of Energy
- Department of Defense
- Medicine

# Nuclear industry leader for over 50 years

The Energy and Nuclear industry has sought Teledyne Brown Engineering's support for over 56 years as a leader in providing innovative systems engineering, cutting edge technology, radiological analysis, and advanced manufacturing solutions. The company's strengths in both engineering and manufacturing, first-of-a-kind and one-of-a-kind systems and components, along with stringent quality standards, enable them to provide customers with crucial solutions.

Teledyne's Radiological laboratory performs over 60% of the environmental radiological sample analysis for the US commercial nuclear power plant fleet. It also supports international power plant

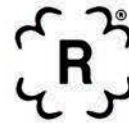
customers, decommissioning facilities and locations being remediated.

**Teledyne's Radiological laboratory performs over 60% of the environmental radiological sample analysis for the US commercial nuclear power plant fleet.**

Teledyne also possesses a laboratory that develops and manufactures extremely sensitive noble gas monitoring equipment. These systems sense the atmosphere for evidence of underground nuclear detonations in support of the comprehensive nuclear test ban treaty. This team was recently recognized by the Federal Laboratory Consortium for

Technology Transfer and won an R&D 100 award for commercializing the government laboratory prototype system for international use.

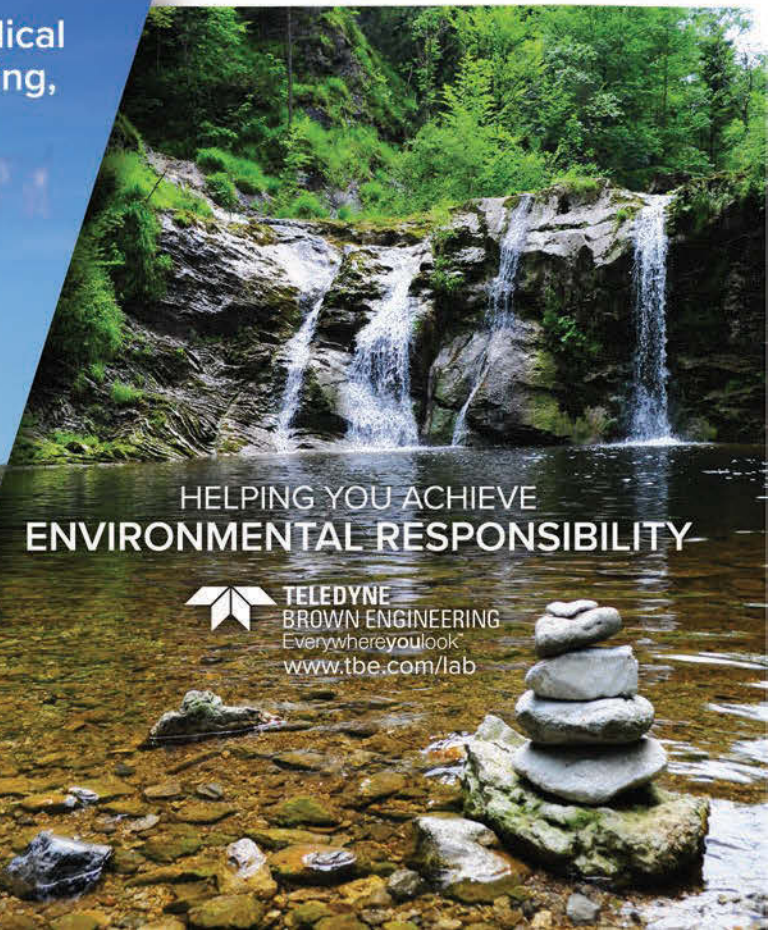
Teledyne Brown Engineering also supports projects of varied sizes for the National Nuclear Security Administration and the Department of Energy. They are involved in the development of designs and components for Advanced Nuclear Reactors including small modular reactors, micro reactors, and fusion reactors. The company has maintained a variety of ASME stamps and certifications allowing them to perform work and build systems according to nuclear industry specifications and standards.



Characterization of NORM, medical isotopes, D&D, oil and gas, mining, and nuclear applications.



Rapid Turnaround, Competitive Pricing, & Customized Reporting at Teledyne Brown Engineering's Knoxville Radiological Lab.



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### Advanced Fuel Management: Raising the standard for nuclear fuel

Today's light water reactor fleet is critical in helping meet climate initiatives and provide a constant source of low-carbon energy. In a competitive energy market, Framatome has committed to identifying and developing solutions to improve both the safety and economics for nuclear plant operators.

Framatome launched its Advanced Fuel Management (AFM) program, a subset of its PROtect enhanced accident tolerant fuel (EATF) program, focused on bringing a substantial improvement to fuel performance. The AFM program is focused on combining enrichment and burnup improvements to augment sustainability of the commercial nuclear reactor fleet. These two improvements to our most advanced nuclear fuel designs, taken together, improve fuel utilization, while increasing cycle lengths and reducing down time, creating significant value for plant operators.

**What is Advanced Fuel Management?** AFM is a globally integrated program designed to deliver fuel with higher enrichment and burnup limits. Enriching uranium oxide (UO<sub>2</sub>) above the traditional 5 wt% thresholds combined with Framatome's latest technology allow nuclear plant operators to maximize energy production. The increases in enrichment and burnup open the door to improved economic performance by extracting more cycle energy from a reactor core and reducing Operations & Maintenance (O&M) costs.

This program is built on more than 60 years of nuclear fuel experience and encompasses all aspects of the nuclear fuel cycle including enrichment services, regulatory licensing and fuel fabrication infrastructure.

**What are the benefits of this advanced fuel design?** As light water reactors begin operating past their original 40-year design life they continue to face increasing pressure to improve their plant's economic outlook. Framatome is modifying the traditional fuel pellet with enrichments so plants will have more flexibility for efficient core designs and longer operating cycles.

By extending traditional 18-month fuel cycles in pressurized water reactor (PWR) designs to 24-month cycles, operators can reduce outages and downtime. Over a six-year period, a plant operator can eliminate one outage, saving nearly \$30 million. Fewer outages also mean increased safety as the fuel handling and dry cask storage demands are reduced.

**Industry-wide effort** To disrupt the traditional nuclear fuel market, Framatome is collaborating with the entire nuclear energy industry to bring this new technology to market. This effort requires synergy between utilities, enrichment services, regulatory and licensing governance and Framatome.

**Project support** The project has also garnered support from the U.S. Department of Energy

(DOE) as the EATF and AFM programs can sustain the existing reactor fleet to help meet carbon reduction goals. Framatome and the DOE signed a \$150 million cooperative agreement in 2021 to support the industrialization of higher enriched fuel.

**Where are we today?** The multi-year effort achieved some major milestones in the past 18 months. Last year, the U.S. Nuclear Regulatory Commission (NRC) accepted for review a topical report on the application of Framatome's advanced codes and methods to operating conditions with uranium enrichments above 5 wt%. This submittal is a critical step toward introducing advanced products with increased enrichments and burnups.

Earlier this year, Framatome achieved another regulatory milestone when the NRC approved Framatome to transport fuel up to 8 wt%, ensuring once the fuel is manufactured it can be delivered to the customer.

**Path to commercialization** The incremental steps and project milestones that are required to bring this technology to market will take place over the next four years with a commitment to be reload ready in 2026. We recognize the challenges that await us, however when it comes to providing safer, more efficient nuclear fuel and fuel-related products to our customers, our commitment is unwavering.


# Unlock Your Reactor's Potential

We are raising the standard for nuclear fuel because we understand how important sustaining today's nuclear fleet is to achieving a clean energy future.

Framatome's Advanced Fuel Management (AFM) program is focused on combining uranium (U-235) enrichments above 5 wt% with higher fuel rod burnups. These two enhancements to our most advanced nuclear fuel designs improve fuel utilization, while increasing cycle lengths and reducing down time, creating significant value for you.

Nuclear energy has to be part of the energy mix for low-carbon, competitive and reliable power. With more than 60 years of expertise, we are committed to investing in safer, more efficient solutions and technologies. We are here to help you unlock your reactor's potential.

**Power on.** For the future of clean energy.

 Scan this QR code to learn more about our advanced fuel solutions.



Your performance is **our** everyday **commitment**

system|one

## Specialized Nuclear Outsourced Services and Workforce Solutions

For over 40 years, System One has provided outsourced services and workforce solutions to the nuclear power industry. Our customers include domestic utilities, government laboratories supporting the US Departments of Defense and Energy, NSSS OEMs, EPCs, and other specialty manufacturers and service providers within the industry. Our knowledge and focus have led to consistent yearly growth — making us one of the top 3 providers in the US.

**exceptional talent. specialized solutions.**

**systemone.com**

### Outsourced Services

Our services are customized to meet your complex requirements across a wide spectrum of specialized and technical capabilities including:

- Advanced Nondestructive Testing and Quality Control Inspection
- NDE capabilities include PT, MT, VT, Microwave, UT, and RT, including PAUT and computer-aided RT services via our exclusive partnership with Evisive, LLC
- QC inspection services delivered by certified personnel
- NDE, QC, CWI, and pipeline inspection training at our certified training center
- Management resources for construction and capital projects, including smart meter installation, smart grid integration services, project scheduling, and project controls



### Workforce Solutions

We design and deliver workforce solutions to meet your unique requirements for contract and permanent staff, both single placements and high-volume engagements. Our dedicated “nuke squad” team of operations staff and recruiters, coupled with advanced technologies, quickly deliver the talent required for plant operations, capital projects, new construction, repair and maintenance, refueling outage services, and plant decommissioning.

Our capabilities provide:

- Technical talent with the necessary credentials including security cleared personnel up to top-secret level
- Scale and flexibility through our Managed Staffing Program and Recruitment Process Outsourcing models driving speed and cost-savings
- Integrated talent workflow with other providers through our proprietary VMS technology to simplify the delivery process across all stakeholders

**Let System One assist you in your project requirements. Learn more at [systemone.com](http://systemone.com) or contact us at [nuclear@systemone.com](mailto:nuclear@systemone.com)**



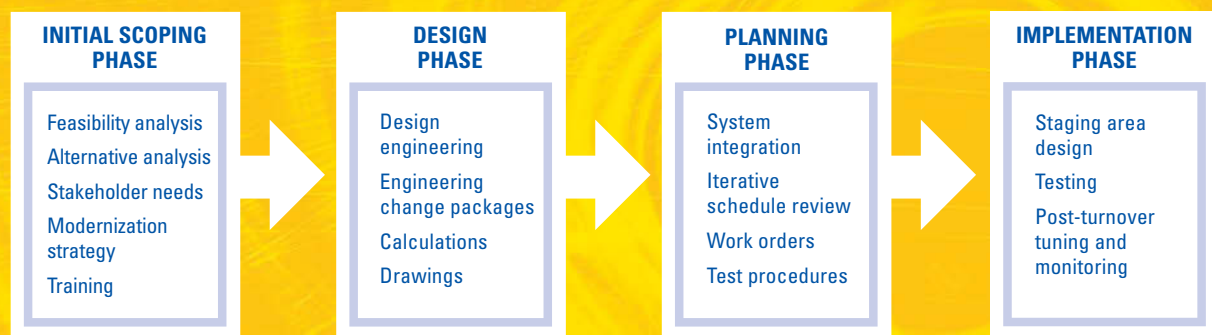
**Scan to Learn More**



# A Proven Leader in Nuclear Digital Upgrades

**For over 65 years, Sargent & Lundy has been actively involved in design and retrofit activities for nuclear units.**

We're the preeminent supplier of digital I&C services through the full digital upgrade project lifecycle and have successfully completed over 300 digital upgrade projects over the past 10 years. We understand the unique complexities of these projects and the variety of challenges our clients face in retrofit design, planning, equipment compatibility, and implementation. By leveraging our breadth of digital experience and lessons learned, we're consistently able to help clients successfully navigate these project challenges and drive projects to completion.



Sargent & Lundy is working on a rapidly growing set of consulting, technical design, and hands-on programming/system integration projects using our newly constructed I&C labs. These projects include main control room modernizations and control system upgrades that support the long-term sustainability of the U.S. nuclear fleet. When installed, our designs will enable our clients to reduce O&M costs and safely operate their nuclear assets to generate thousands of megawatts of carbon-free electricity.



#### DIGITAL I&C CONSULTING SERVICES

- Strategic digital licensing
- Requirements specifications
- Cost benefit analyses
- Digital platform selection
- Independent third-party reviews
- Human factors engineering
- Cyber security
- Training



#### DIGITAL I&C IMPLEMENTATION SERVICES

- Risk elimination
- Contingency Planning
- Configuration management
- Value engineering
- Quality planning
- Installation scripting
- Development of utility subject matter experts

# A POWERHOUSE FOR NUCLEAR POWER SERVICES

**For over 65 years, Sargent & Lundy has helped clients navigate the changing nuclear landscape.**

From traditional design services to today's evolving nuclear generation technologies and behind-the-meter solutions, we collaborate with you to execute your nuclear licensing, design, and retrofit projects with utmost quality and safety.

**We are visionaries, designers, and innovators.**

Our clients benefit from the expertise and experience of an industry leader at the forefront of nuclear technologies and climate change solutions. We readily guide our clients in harnessing nuclear power as a key source of carbon-free energy for future generations.

We're actively developing next generation designs and applications for the nuclear fleet of tomorrow.



#### TRADITIONAL NUCLEAR DESIGN SERVICES

- Engineering and design for large retrofit projects
- Digital modernization strategy
- Physical plant security upgrades
- Plant analysis and system optimization studies
- Subsequent operating license renewals (60-year → 80-year)
- Owner's engineer services
- Construction/implementation management
- Risk-informed tech spec surveillance reduction
- Dry fuel storage and decommissioning

#### NEW NUCLEAR GENERATION SERVICES

- Small module reactor (SMR), advanced reactor, and microreactor engineering and design
- Fuel fabrication facility engineering and design
- Medical isotope production facility engineering and design
- Large-scale, generation III+ reactor engineering and design
- Technology assessment, site selection, and licensing services

#### BEHIND-THE-METER/BEYOND POWER GENERATION SERVICES

- Carbon-free power for industrial applications
- Hydrogen production, storage, transport, and use
- Direct air capture
- Data processing centers

**Get to know excellence.  
Get to know Sargent & Lundy.**

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# New Look

Same focus on quality & delivery.



## Same Petersen, just better!

We are excited to show you our new logo and brand colors, but Petersen is still the reliable manufacturing partner you have always known, we've just gotten better! From NQA-1 fabrication to aerospace quality precision machining, there is no job too big or too small for Petersen to handle.

What can we build for you?

## About Precinmac

Precinmac is a leading global diversified manufacturer of high-tolerance precision machined components and fabricated products for high-requirement industries.

With eight locations in the United States and Canada, we are an ideal single-source partner for medium - high complexity projects that rely on close tolerance fabrication and precision machining.

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



# PETERSEN

A PRECINMAC Company

Petersen is a leader in advanced manufacturing - fabricating and machining specialized and high-grade containers/casks, gloveboxes, melters, reactor services, and process equipment for the nuclear industry.

Many Department of Energy projects have relied on Petersen's high-quality NQA-1 expertise, including the Hanford Waste Treatment Plant, Savannah River Site, WIPP, LANL and more. Additionally, many clean-up, demolition, and disposal projects have contracted with Petersen to produce process equipment to support the safety and proper storage of radioactive material.

## NUCLEAR GLOVEBOXES

Providing only the highest grade of nuclear glovebox equipment, our gloveboxes have been used in high-profile projects such as the Department of Energy's MOX project at the Savannah River Site, the Waste Treatment Plant - River Protection Project Vitrification facility at the Hanford, Washington State site and LANL CMRR Project. Petersen glovebox enclosures provide a safe and controlled processing and handling system for nuclear and radioactive products.

### Our gloveboxes are used in systems like:

- UPF at Y12
- Research and development
- TRU waste processing, characterization and packaging
- Radioactive material handling
- Tritium capture and processing

## CASKS

Petersen is an industry leader in the manufacturing of spent fuel containers and casks, including lead-lined casks. Spent fuel refers to nuclear fuel elements that have been used at commercial nuclear reactors but are no longer capable of economically sustaining a nuclear reaction.

This spent nuclear fuel then needs to be properly stored and properly disposed of. Companies have relied on us to produce high quality containment products for safe, reliable storage of spent fuel. Our in-house proven quality systems and experience ensure that your products are being manufactured to the highest standards in the industry.

## REACTOR SERVICES

With years of experience in commercial nuclear reactor services, Petersen is equipped to safely supply products that handle radioactive treatment needs. We continue to provide ongoing safe solutions to high-profile projects with the Department of Energy, utility, and nuclear related customers. Our planning and expertise ensure timely service, successful project implementation and execution for our clients.

## PROCESS EQUIPMENT

Petersen offers state-of-the-art facilities specializing in the manufacturing of process equipment, transportation equipment, special handling and monitoring equipment, as well as spent fuel containment containers and casks of all sizes. We also provide custom manufactured equipment for decommissioning projects.

We continue to manufacture process equipment that is used to develop and test new processes to meet the demands of nuclear facilities and technology advancements.

Our safe, customer friendly environment and experience allows the Petersen team the ability to interface and work alongside our customers' team on a daily basis as we welcome on-site support.

## Certifications

- ASME U, U2, S, R
- NQA-1
- ISO9001:2015
- NRC Subpart H of 10CFR71
- AS9100 Rev D
- AISC



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





## Westinghouse Parts Business (WPB) Resistance Temperature Detector (RTD)

Designed to meet the harsh requirements surrounding a nuclear reactor, specialized Reactor Temperature Detectors (RTDs) are utilized in containment primary loops to monitor and provide critical primary hot and cold leg coolant temperature input critical to safe plant operations. Such a crucial component requires exceptional performance to ensure accurate and timely readings.

The Westinghouse Parts Business (WPB) is introducing the next generation RTDs. This newly designed RTD is more robust than previous designs, solving a performance issue of premature failures due to high frequency vibration and also addresses an obsolescence issue since the previous design was no longer available for purchase. This RTD replacement is designed to be installed directly into existing thermowells, minimizing outage schedule impact.

### Benefits of RTD Supply with Westinghouse:

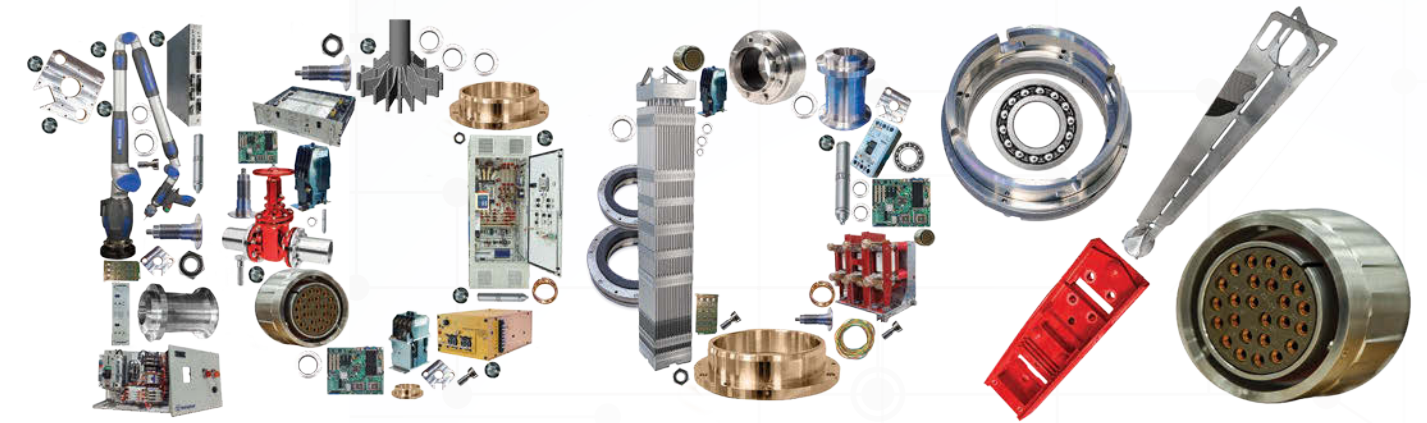
- **Part Availability:** Westinghouse will ensure that the required source of supply is maintained for maintenance and “end of qualified life” replacement requirements.
- **Ease of Replacement:** Like-for-like replacement that can be installed into existing thermowells, minimizing outage schedule impact
- **Performance:** Mitigates premature failure due to system vibration parameters
- **Part Quality:** Westinghouse has been the industry leader in qualified RTDs with extensive expertise in technical and plant installation support.

### Narrow Range Resistance Temperature Detector

The newly designed Westinghouse Narrow Range RTD was developed to withstand high vibrations to mitigate premature failures experienced in the industry.

### Wide Range Temperature Detector

The Westinghouse wide range response RTD is designed to be installed in existing thermowells and will maintain the required detection of temperature changes in the hot and cold legs of the reactor coolant loops of PWRs.



Westinghouse technology is fundamental to nearly **50% of the world's nuclear reactors**. Now, that same trusted expertise is delivering the services and parts to meet the needs of **100% of the nuclear plants across the globe**.



### From small to large.

Whether your project involves new construction or existing equipment, for a nuclear plant or a government facility, Westinghouse provides high-quality, nuclear-qualified solutions and products that meet the original design and qualification of your plant.



### Global to local.

Our cost-effective, high-quality, nuclear-grade replacement parts provide global operators of various reactor designs solutions for electrical, mechanical, and instrumentation and control systems.



### From Westinghouse's proprietary innovations to designs around the world.

Westinghouse has a rigorous commercial-grade dedication process and a robust quality assurance program for detecting and monitoring counterfeit, fraudulent and suspect replacement parts and components. And our industry-leading experts are available 24/7 to support your plant needs.

To learn how we're **shaping tomorrow's energy**, visit: [www.westinghousenuclear.com/parts](http://www.westinghousenuclear.com/parts)

Westinghouse is excited to be working with the industry on solving this issue. For more information on Westinghouse Parts Solutions visit, [www.info.westinghousenuclear.com/westinghouse-parts-business](http://www.info.westinghousenuclear.com/westinghouse-parts-business).





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UWC-Booth 206*

Barri is a MWBE staff augmentation firm with over 30 years of experience. An industry leader, we specialize in the power industry, where we provide highly skilled labor solutions for a full range of disciplines to meet our client's short and long term project and supplemental needs.

## QUALITY & EXCELLENCE

**NUCLEAR <**  
**FOSSIL <**  
**GAS <**  
**TURBINE**  
**ALTERNATIVE <**  
**FUELS**

Barri actively recruits and places professional, technical and union craft personnel for operations, maintenance, capital improvement, and other projects. Our experience over the last three decades has prepared us to be an effective partner to our clients, and our knowledge of safety, labor agreements, employment rules and regulations, together with strong labor analysis and customizable reporting capabilities will help you achieve your business goals.



For more information, contact Alex M. Dorsey,  
Pres./CEO or Jeff A. Wenger, CFO at

(623) 773-0410

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

Holtec International is a privately held technology company with operation centers in Florida, New Jersey, Ohio and Pennsylvania in the U.S., and globally in Brazil, Canada, India, Japan, Mexico, South Africa, Spain, U.K. and Ukraine. Since the 1980s, Holtec has played a preeminent role in the energy industry by developing and implementing innovative solutions to overcome technical challenges faced by its clients around the world. Pioneering the technology to expand the nuclear fuel storage capacity in the wet storage pools, Holtec has increased the storage capacity on average by over 50% at over 110 reactor units worldwide. Over 130 nuclear units worldwide rely on Holtec's technology for spent nuclear fuel storage and transportation; 70 of these are located in the U.S. Highlights of Holtec's core business focus also includes the safe and efficient decommissioning of shuttered nuclear plants; the current fleet includes Indian Point, Pilgrim and Oyster Creek. Holtec's decommissioning model includes the assumption of the entire plant including the spent nuclear fuel. Holtec's approach to decommissioning is to begin and complete the physical work of decontamination and dismantlement decades sooner than if the current nuclear plant owner retains ownership of the plant. HI-STORE, the world's first below-ground Consolidated Interim Storage Facility, is currently undergoing licensing for deployment in New Mexico. Holtec's SMR-160, a 160-Megawatt small modular reactor, will provide safe, secure, dependable, affordable and carbon-free power even in the world's most arid regions. As a major supplier of special-purpose pressure vessels and critical-service heat exchange equipment, Holtec provides

air-cooled condensers, steam generators, feedwater heaters, and water-cooled condensers. As a fully integrated supplier, Holtec possesses in-house capabilities to design, engineer, analyze, license, fabricate and construct these technologies.

**Key Facts:**

- Holtec is a vertically-integrated supplier that possesses in-house capabilities to design, engineer, analyze, license, fabricate and perform on-site construction.
- Holtec has a global presence with operation centers located in 10 countries around the world.
- Holtec's four manufacturing facilities (three in the U.S. and one in India) cover over 1 million square feet of manufacturing floor space.
- Holtec Manufacturing Division is one of America's largest exporters of capital equipment for the nuclear industry. It is also among the largest manufacturers of ASME Code components.
- Since its founding in 1986, Holtec has maintained a solid record of consistent profitability. Today, Holtec has a bonding capacity of \$500 million and an excellent credit rating.
- Holtec has been granted over 150 patents in areas of equipment design, fabrication processes and materials.
- Holtec's engineers helped develop the modern ASME Code, HEI and TEMA standards for design and construction parameters for shell and tube heat exchangers, water-cooled and air-cooled condensers.



**A Global Turnkey Supplier  
Serving the Energy Industry  
with Advanced Power Generation  
Technologies, Since 1986**

*Core Competencies Include:*

- Dry and Wet Spent Nuclear Fuel Storage Equipment
- Heat Transfer Equipment
- Engineering and Consulting Services
- Construction / Site Services
- Advanced Nuclear Power Generation (SMR-160)

**Holtec International's Vertical  
Integration Includes:**



Design

Engineering

Licensing

Fabrication

Construction

Site Installation

Decommissioning

Consolidated Interim Storage

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thermoscientific

The best imager for many applications.....  
The only imager for some!

Thermo Scientific – CIDTEC is a supplier of radiation hardened, machine vision, and scientific cameras based on the proprietary Charge Injection Device (CID) technology for use in the most demanding imaging applications.

#### MegaRAD series

- The 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. Most importantly, this capability can now be provided in either Monochrome or Color version cameras, with remote head cable lengths up to 150-meters.
- The radiation hard PPP (Pre-amplifier Per Pixel) CID imager technology allow exceptional signal to noise with sensitivity never before available with radiation hardened cameras.
- These cameras have been tested and proven in high levels of gamma radiation, and since readout is within the pixel, loss due to SETI's (single event transfer inefficiencies) is minimized.

- CID based cameras allow at least an order of magnitude improvement in operation when compared to CCD and CMOS based cameras and imagers.

#### Charge Injection Device

- The Charge Injection Device (CID) is a solid state imaging sensor with capabilities well beyond the limitations of today's consumer Charge Coupled Devices (CCDs). Like a CCD, the CID uses pixels to capture images, converting light into an electronic charge which is directly displayed on a monitor or captured digitally on computer.
- The superior resistance to radiation is a significant advantage for radiation tolerant imaging within facets of the nuclear power industry, medical, dental, and space based applications, and 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.
- Thermo Scientific - CIDTEC is the leading manufacturer of CMOS imagers using the CID pixel architecture, and supply imaging solutions to OEM's as well as end-users throughout the world.

#### In the United States:

For customer service, call 1-800-888-8761  
To fax an order, use 1-315-451-9421  
Email: sales.cidtec@thermofisher.com

#### International:

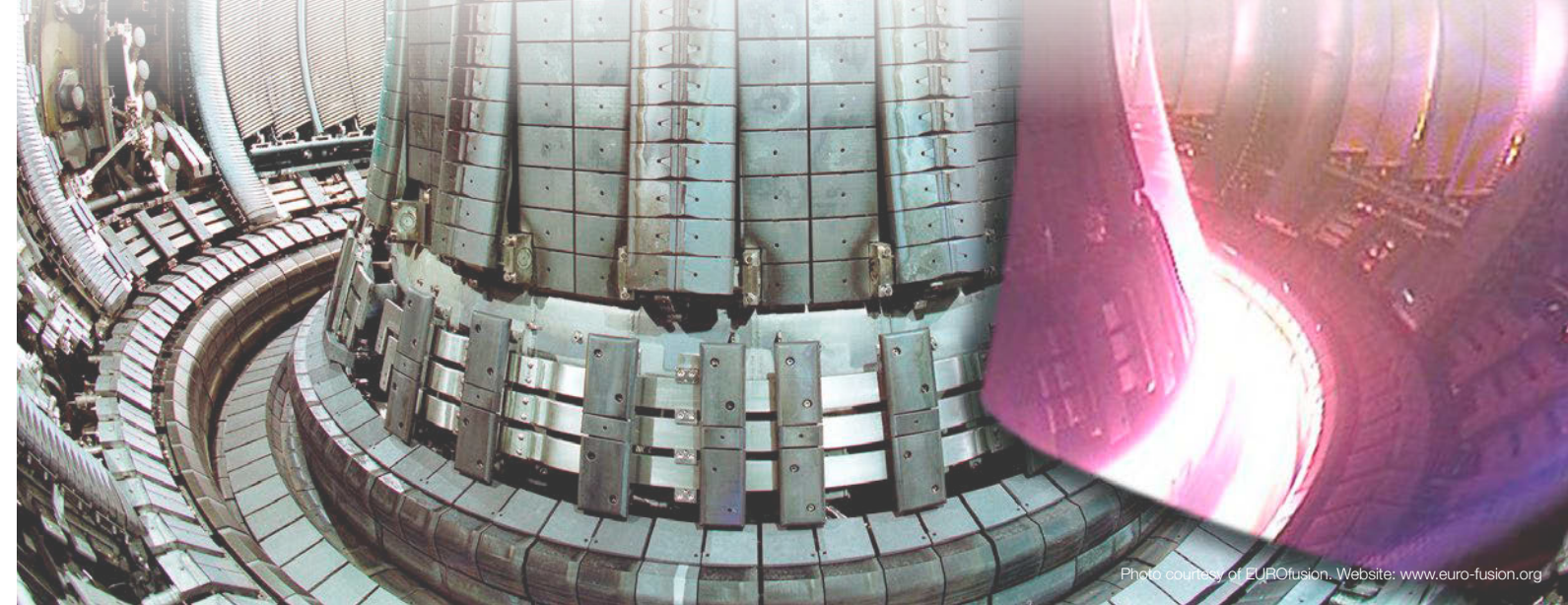
For customer service, call [01] 315-451-9410  
To fax an order, use [01] 315-451-9410  
Email: sales.cidtec@thermofisher.com

Find out more at [thermofisher.com/cidtec](https://thermofisher.com/cidtec)

**ThermoFisher**  
SCIENTIFIC

thermoscientific

Got radiation?  
See what you've been missing



Imaging in radiation environments just got easier

With superior capabilities for operating in radiation environments, the MegaRAD cameras provide excellent image quality well beyond dose limitations of conventional cameras, and are well suited for radiation hardened imaging applications



**MegaRAD3 produce color or monochrome video up to 3 x 10<sup>6</sup> rads total dose**



**MegaRAD10 produce color or monochrome video up to 1 x 10<sup>7</sup> rads total dose**



**KiloRAD PTZ radiation resistant camera with Pan/Tilt/Zoom**

#### In the United States:

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To fax an order, use 1-315-451-9421  
Email: sales.cidtec@thermofisher.com

#### International:

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Email: sales.cidtec@thermofisher.com

Find out more at [thermofisher.com/cidtec](https://thermofisher.com/cidtec)

**ThermoFisher**  
SCIENTIFIC

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# NAC International Poised to Address New Challenges

As the nuclear energy industry supports zero-carbon goals and advanced reactors move towards deployment, NAC is ready with solutions that build on our 50+ year history of providing transportation, packaging, storage, and fuel cycle consulting and information.

## Unrivaled Transport Capabilities

With 30+ years transporting spent fuel and other nuclear materials in

our fleet of NAC-LWT casks, NAC has proven experience and technology to develop new designs for transporting fuels for advanced reactors. With shielding, lifting, and securing options, our OPTIMUS® line of packages maximizes flexibility and lowers customer costs while transporting varied contents, from RH TRU and spent fuel to LLRW, CH TRU and MLLW.

## NAC LPT— Packaging Solutions for Radioactive Waste and More

NAC LPT offers best-value technical strategies and plans for logistics, packaging, and disposal, delivering equipment from a fleet of IP-1 intermodal containers, IP-1 gondola railcars, and ABC railcars for LLRW and hazardous material shipments. Our experts provide impartial, comprehensive waste management plans for government and commercial projects.

## Spent Fuel Storage Systems

MAGNASTOR® is NAC's high-capacity (37 PWR or 89 BWR fuel assemblies) workhorse for spent fuel storage, with flexibility to be tailored for each site's spent fuel offloading requirements. Used at both decommissioning and operating nuclear plant sites, this system offers demonstrated loading efficiency to increase personnel safety and reduce cost and risk. Our team recently completed loading of a 37 PWR system in record time. NAC has delivered over 700 transportable spent fuel storage systems worldwide, with industry-leading system designs and packaging solutions.

## Nuclear Fuel Cycle Expertise to Address Client-Specific Needs

NAC offers insightful and current training seminars, reports, and analyses on subjects important to the nuclear industry. Our internationally recognized network of industry experts combines worldwide industrial experience with global reach, detailed market analysis capabilities, and deep technical expertise. NAC's nuclear material control and accountability services and products support governments and nuclear facilities with customized tools for tracking, accountancy, obligations reporting, and safeguards. NAC's Reporter® system has been selected by international companies and government agencies.

# DEPENDABILITY



STORAGE | TRANSPORTATION | CONSULTING

## MAGNASTOR® MEANS PROVEN, RELIABLE ULTRA-HIGH CAPACITY USED FUEL MANAGEMENT

For over 50 years, NAC International has been a trusted partner for fuel cycle management solutions and consulting.



### CONTACT US:

George Vaughan, Vice President of Business Development  
T: 770.447.1144 | gvaughan@nacintl.com



**MIRION**  
TECHNOLOGIES

## Mirion Technologies provides products and services for a wide range of radiation safety, measurement and scientific purposes.

Mirion solutions are employed in advanced space, technology and research applications as well as to secure critical facilities, protect people from radiation exposure and limit the spread of contamination.

Our organization is comprised of over 1700 talented professionals, passionate about delivering world class products, services, and solutions to our customers.

From our operating facilities across North America, Europe, and Asia, Mirion Technologies offers products and services in **6 key areas**:

- Health Physics
- Radiation Monitoring Systems
- Spectroscopy
- Characterization
- Dosimetry Services
- Sensing Systems

### Sensing Systems Division

The Sensing Systems Division, maker of IST and IST-Conax range of products, offers a range of operational safety and non-safety radiation monitoring equipment, including in-core and out-of-core detectors and electrical penetrations. This equipment is used by power generation establishments to ensure the safe and efficient operation of their facilities. In addition, Mirion manufactures the associated electronics, temperature sensors, thermocouples, special purpose valves, connectors, cable/ connector assemblies and electrical conductor seal assemblies.

The entire Mirion team is dedicated to providing a new standard of solutions for our customers in nuclear facilities, military and civil defense agencies, hospitals, universities, commercial, state

and national laboratories, and other specialized industries.

For more information about our wide range of products and services visit: [www.mirion.com](http://www.mirion.com).

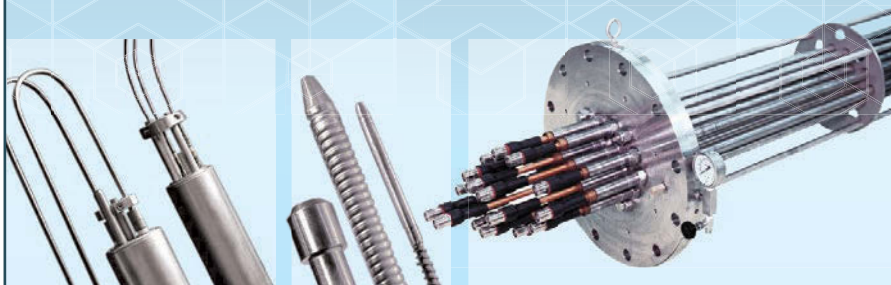


**MIRION**

TECHNOLOGIES SENSING SYSTEMS DIVISION

## Operational Safety & Non-Safety Radiation Monitoring Equipment

### Out-of-Core Detectors, In-Core Detectors & Electrical Penetrations



*Proven quality SOLUTIONS to meet your requirements*

Sensing Systems Division  
315 Daniel Zenker Drive  
300 IST Center  
Horseheads, NY 14845 USA

Phone: 607-562-4530  
FAX: 607-562-4482  
Email: [ist@mirion.com](mailto:ist@mirion.com)



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# Over 40 Years of Nuclear HVAC Experience

SSM Industries has over 40 years experience designing, qualifying, fabricating and installing HVAC ductwork and equipment in DOE facilities and Nuclear Power Plants around the world.

Our Quality Program has remained in step with the latest industry requirements and can support your NQA-1, ASME AG-1, 10CFR50 Appendix B requirements. Our fabrication personnel have been trained, qualified and maintain certifications in accordance with ASME and AWS

Let us work with you on all of your HVAC needs. From custom retrofits to new plant build, we are the HVAC solution that you have been looking for.



## 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

## 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

For more information please contact:  
**Matt Gorman** [mgorman@ssmi.biz](mailto:mgorman@ssmi.biz)  
3401 Grand Avenue, Pittsburgh, PA 15225  
412-901-1467 cell/text  
412-777-5101 office



(412) 777-5101 • [ssmi.biz](http://ssmi.biz)

# Nuclear HVAC fabricator

**SSM Industries, Inc.** entered the nuclear industry over forty years ago as the metal fabrication division of Schneider Power, based in Pittsburgh, Pennsylvania

**THE POWER DIVISION OF SSM** Industries Inc. provides design, qualification, fabrication, and installation support to the global nuclear market. Over \$250 million of safety and non-safety related HVAC ductwork and components have been designed, tested and fabricated in our facility for use in nuclear power plants. We have supplied safety related equipment to most commercial nuclear power plants in the United States, as well as Europe and Asia.

SSM has performed complete HVAC fabrication and installation at seven nuclear power plants in the United States, and we have fabricated and supplied complete HVAC equipment scopes for nuclear power plants worldwide. These scopes include all dampers (bubbletight, tornado, manual, fire/smoke), fans (vaneaxial, centrifugal) and various components such as louvers, supports, grilles and registers.

Our nuclear qualified product line extends from the fan to the diffuser, and all HVAC products in between. In addition, we work with many plants to customize and perform commercial grade dedication activities.

One recent project for a European plant included designing, qualifying and fabricating a vaneaxial fan to replace an obsolete Reactor Containment Cooling Fan. With

our experience and our partners we can find solutions for your obsolete equipment.

SSM is committed to being your source for solutions, world-class products and exceptional service. We are committed to supporting any needs you have whether big or small. We believe in integrity and customer commitment in all that we do.

SSM maintains a complete ASME NQA-1 and 10CFR50 Appendix B Quality Assurance Program. SSM is listed in the NUPIC database as a pre-qualified vendor to supply Safety Related HVAC equipment and services, including the commercial dedication of components fabricated by others, to all commercial nuclear plants. ■

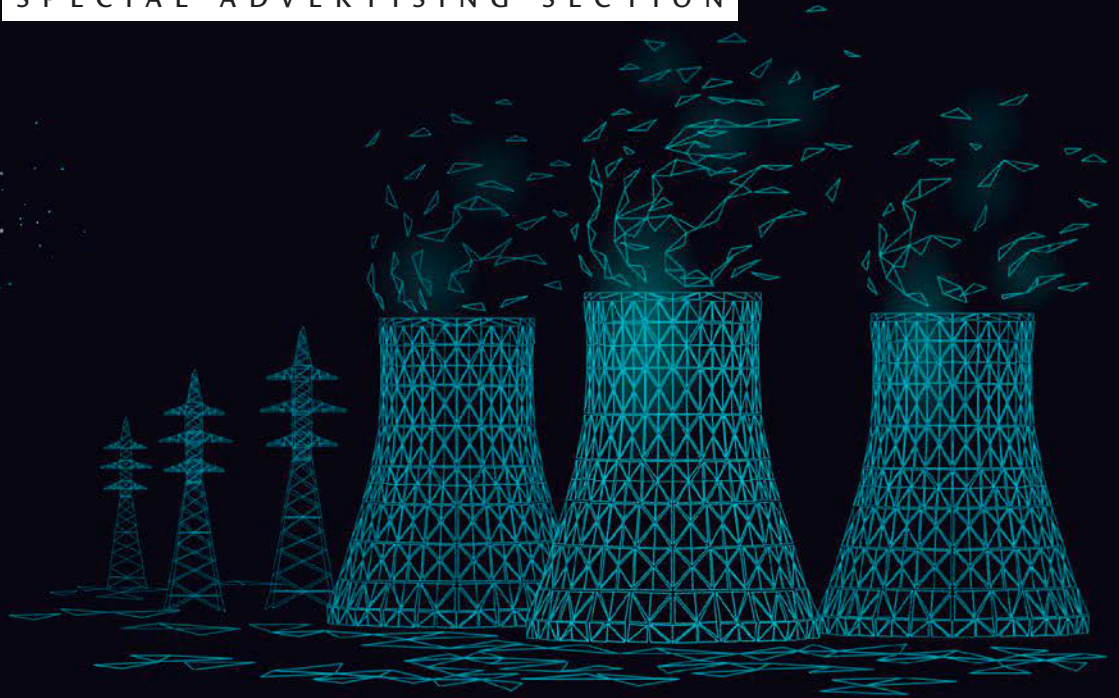


SSM INDUSTRIES, INC.  
3401 Grand Avenue, Pittsburgh, PA 15255, USA  
E: [mgorman@ssmi.biz](mailto:mgorman@ssmi.biz)  
W: [www.ssmi.biz](http://www.ssmi.biz)

Top row: **Truckload of duct for Vogtle 3 & 4**  
Bottom row (from left to right): **48 inch round Safety Related Bubble Tight Damper**

**Safety Related Bubble Tight Damper with undermount actuator**  
**Safety Related Vaneaxial Fan undergoing performance testing**





See us at the ANS Utility Working Conference, Drop by booth #501

August 7 – 10 | Marco Island, FL



## Powering the Nuclear Fleet with Artificial Intelligence

New to the scene in 2016, but already trusted by over half the BWRs in the U.S. domestic fleet, Blue Wave AI Labs is an AI-centric, industry-focused innovator with main headquarters at Purdue Research Park in West Lafayette, IN.

We are pioneering the use of AI and machine learning in nuclear power operations to provide more accurate projections and deeper insights. Our physics-constrained process leverages existing plant data to help reclaim unnecessary design margin and reduce operational challenges during the fuel cycle.

### Meet our Interns

**Gautham Vinod**, Mechanical Engineering PhD student, Purdue University. Gautham is currently working to quantify model uncertainty and build new levels of trustworthiness into our AI.

**Rizki Oktavian**, Nuclear Engineering PhD student, Purdue University.

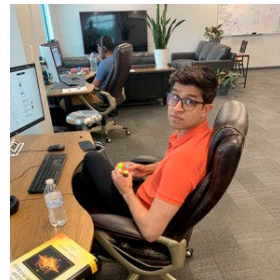
Rizki is using artificial intelligence to improve the accuracy and speed of real world full-core simulations.

**Maniesha Singh**, Nuclear Engineering PhD student, Purdue University.

Isha is developing economic models linking fuel costs with reload batch size, enrichment, and cycle length for BWRs.

**Shuo Wang**, Engineering and Technology Master's student in AI, Purdue University.

Shuo is using AI and natural language processing (NLP) to classify incident reports to identify problem components from unstructured data.



Gautham warming up with his Rubik's cube before running a new model.



Rizki getting ready for his PHYSOR 2022 presentation. **Congrats** on the award for best paper at the ANS student conference!!



Shuo practicing real world gradient descent!



Isha, speeding to the office!



# Deepen, Optimize, Deliver. It's all about the future of clean energy.

A new energy landscape is taking shape. Power generation customers are focused on elevating plant performance which is an integral component to staying competitive in the emerging clean energy future. They are looking for new ways to optimize existing generation assets, align with new advanced technologies and designs, and integrate with renewable power sources to achieve these goals.

GSE's mission is to deliver advanced engineering and flexible workforce solutions that support nuclear power as being critical to clean energy production and overall decarbonization of the power industry.

Our solutions get the results you need. To reduce costs, improve performance, gain efficiency, reduce overhead, coordinate staff and leadership, fill gaps in knowledge or personnel, and realize opportunities for capitalization. We are your time-tested partner, committed to doing what's best for your station.

## Deepen Your Existing Assets.

Maximizing power production is instrumental in helping facilities face current competitive pressures and find cost savings. We partner with our customers to actively explore, evaluate, and develop new solutions that optimize their core strengths and support their goals.

## Optimize Using New Technology.

As we focus on clean energy production, GSE is ready to aggressively extend capabilities through a customized approach. Integrating our new technologies with existing plant requirements, alignment with deployment of advanced reactor designs and coordination with other renewable power sources will help customers achieve decarbonization of the grid by 2035.

## Fill Operational Gaps Fast.

GSE Workforce Solutions division meets your operational needs with the right people and skills to run smoothly. Our placement experts identify solutions and talent that address workforce gaps and support your staff development goals.

GSE supports all phases of a station's life cycle, from problem evaluation and conceptual design, to budget, planning and controls, to engineering, implementation and close out. Our work helps optimize performance with powerful analytic programs that spot weaknesses and opportunities, and help to generate more energy, reliably and efficiency.

### GSE select services and products include:

- Design Engineering Services
- Simulation Systems & Application
- Thermal Performance Optimization
- Engineering Program Expertise
- Specialized Consulting
- Nuclear Training Courses & Accreditation
- Staff Augmentation

If you need it, we can do it. There's a GSE solution for your every operations need. [www.gses.com](http://www.gses.com)

Delivering Advanced Engineering & Workforce Solutions That Matter.



## Plant Performance Optimization

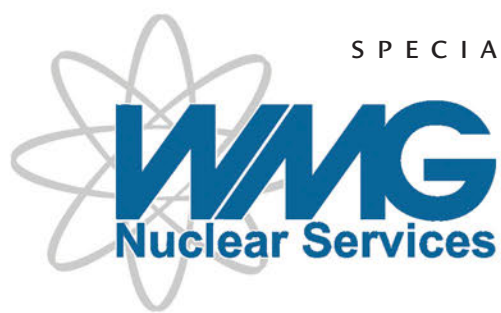
*Improve ROI, Efficiency & Performance*

- Engineering modifications and design
- Simulation: Training, Testing, Scenarios
- Engineering program applications
- Thermal performance solutions

## Technical Staffing & Training

*Over 50 Years of Power Expertise*

- Flexible workforce solutions
- Fill your project and staffing needs fast
- Comprehensive training programs
- Extensive network of professionals



16 Bank Street  
Peekskill, NY 10566  
914.736.7100  
info@wmginc.com  
www.wmginc.com

## Recognized Leader in Radwaste Management

Helping you succeed for over 40 years

### PROFILE SUMMARY

Founded in 1979, and headquartered in Peekskill, New York, WMG provides the nuclear industry with professional nuclear engineering, waste management and software services. Anchored by our industry standard RADMAN™ Suite software for radioactive shipments, WMG has continued to provide innovative solutions to the industry's most complex challenges.

### ENGINEERING

We pride ourselves as being the industry leader in providing defensible characterization and classification results.

We have the experience to know which analysis tool is appropriate for any shielding calculation.

We apply 200+ years of collective staff nuclear industry experience in our approach to solving unique waste management challenges.

We are an experienced designer and supplier of packaging that is compliant with the applicable NRC and DOT regulations.

### SHIPPING SUPPORT

As the average age of utility personnel continues to rise, the resource pool of qualified radioactive waste managers and shippers is shrinking. WMG's Subject Matter Expert (SME), ProShipper™ and Shipping Command Center support services bring a practical solution to filling gaps in a utility's radwaste workforce.

Customers can opt for on-site or off-site shipper support as appropriate to fit operational needs.

WMG's broad spectrum of experience provides our clients with a reliable and efficient resource to help manage their most challenging radioactive waste issues. We have the expertise to ensure projects are completed.

### SOFTWARE

WMG is committed to providing the best possible solutions for our customers' software needs. Our trusted solutions have been the industry standard for over 40 years. Our RADMAN™ Platform is utilized at nearly every U.S. nuclear power station, many radwaste processors, disposal facilities, government labs, state agencies and other industry supporting businesses.

The RADMAN™ Platform is now more powerful with the integration of the RADMAN™ Enhanced Accuracy Characterization, or REACH™ Detector System. Waste characterization just got easier - discover the difference with REACH™

To this day, through decades of industry and regulatory changes, the RADMAN™ Platform is still the standard and remains the only NRC approved application for the characterization of radioactive material.

### TRAINING

WMG has been training industry technicians and professionals for over 30 years. Each course is delivered to the student by seasoned and highly experienced shippers.

Our courses, both standard and customized, are comprehensive, structured and meet the training requirements established by NRC IE Bulletin 79-19 and 49 CFR Part 172, Subpart H. Our courses can be taught at the client's facility, or at regional locations.

### TRUST

Trust is fragile. It is difficult to earn and easy to lose. As our industry has evolved, companies have come and gone, yet WMG continues to thrive, in large part because of the trust our clients have in our capabilities. Our success is entirely dependent upon your success.

Recent years have put increased pressure on our industry, and we are all asked to do more with less in the name of survival. Experienced professionals are retiring from the industry and in many cases, this process knowledge and expertise isn't being replaced.

As a proud, independent, family-owned small business, specializing in software, engineering, characterization and management of radioactive material, our employees have always been our greatest asset. Our employees are recognized experts in the industry and highly respected by clients, competitors, regulators and industry groups for their capabilities and experience.

Even with all of the new challenges we face, our mission of providing excellence in radioactive waste management through service, innovation, value and integrity remains unchanged, and more important than ever.

Allow us the opportunity to earn your trust and we will show you what it means to have a partner in the industry that is just as committed to your success as you are.

Sincerely,  
Kevin Tuite  
President and CEO  
WMG, Inc.

Service... Innovation... Value... Integrity...



# Recognized Leader in Radwaste Management

## Helping you succeed for over 40 years

### ABOUT OUR COMPANY

WMG provides the nuclear industry with professional nuclear engineering, waste management and software services. Anchored by our industry-standard RADMAN™ Suite software for radioactive shipments, WMG has continued to provide innovative solutions to the industry's most complex challenges.

### WHY CHOOSE US

As our industry has evolved, companies have come and gone, yet WMG continues to thrive, in large part because of the trust our clients have in our capabilities.

### GET IN TOUCH

16 Bank Street, Peekskill, NY 10566  
914.736.7100  
www.wmginc.com  
info@wmginc.com



### ENGINEERING

We apply 200+ years of collective staff nuclear industry experience in our approach to solving unique waste management challenges.



### SOFTWARE

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### SHIPPING SUPPORT

WMG's broad spectrum of experience provides our clients with a reliable and efficient resource to help manage their most challenging radioactive waste issues. We have the expertise to ensure projects are completed.

Service... Innovation... Value... Integrity...

# BROKK®

**Q: So how can you perform challenging, heavy duty, D&D work in Hazardous environments at nuclear sites in complete safety?**

**A: Well if you are familiar with BROKK remotely operated machines, you will know that over the past 40 years more than 10,000 BROKK machines have**

been deployed worldwide in the most hazardous of environments. Furthermore, you may also be aware that there have been no injuries incurred by operators using BROKK equipment deployed on some of the most challenging projects at nuclear sites worldwide.

We can all appreciate the significant negative impact to a project if there is an injury, a near miss, exposure to radiation or exposure to hazardous materials for any individuals engaged on the project. This negative impact may go beyond the project, to the overall site, even to the industry itself. The use of BROKK remotely operated

equipment keeps the operators at a safe distance from the hazardous workforce avoiding the possibility of injury or exposure.

## BROKK Features and Benefits

An important advantage of BROKK equipment is high productivity, so safer does not mean slower. Very powerful tools are rapidly deployed by the BROKK machines to complete work effectively and to help bring projects in ahead of time and under budget.

BROKK offers hundreds of standard and custom designed tools and attachments for our machines to ensure that the best tools for the job are always available.

With these multiple attachment choices, compact size, ease of maneuverability and an intuitive control system, BROKK is now established as the nuclear industry standard for safe, powerful, reliable, rugged, high performance, remotely operated equipment. Our unmatched 40 years of deployment experience and the lessons learned from this have been incorporated into our latest generation of equipment. Many upgrades and improvements have been made to continually improve the performance of our equipment based on direct feedback and our extensive operational experience.

Innovative BROKK features such as our "NQH" auto-tool change interface avoids any operator radiation exposure on projects requiring multiple tools and a variety of functions to be performed by a single machine. Vision systems, additional radiation hardening and auto recovery systems are also available as integrated machine options where required.

## BROKK Technical and Customer Support

BROKK has a dedicated internal Special Engineering Group to assist our customers in defining the best overall solution to meet the project goals. We continue to provide ongoing technical support for all of our customers after equipment delivery, through the duration of the project. We stock a full range of spare parts which are typically shipped out the same day as they are requested. We also provide on-site technical support and certified operator training at the customer's site(s) as needed.

## BROKK Custom Design and Special Applications

The BROKK Special Engineering Group can also develop custom designed machines and custom designed attachments where needed for special projects. We have a proven track record of successfully working with our customers to develop and deploy application specific solutions.

For more information Contact Tony Marlow  
Tel: (505) 699 8923, email: [tony.marlow@brokkinc.com](mailto:tony.marlow@brokkinc.com)  
[www.brokk.com](http://www.brokk.com)

## Over 10,000 machines deployed

TUNNELING  
CONSTRUCTION  
MINING  
NUCLEAR  
PROCESS  
CEMENT



## Extraordinary power and reliability for extraordinary jobs.

**Some projects require a special solution.** Brokk offers a unique and well proven combination of equipment, design, engineering and technical support for the most challenging projects at nuclear facilities.

Brokk is the industry leader for safe, rugged, reliable, heavy-duty, remotely operated equipment and with 8 available base machine options, there is a Brokk machine size available to suit each application without compromise.

Brokk machines are available with many standard options including vision systems, radiation hardening, auto tool change, auto recovery capabilities and more. They can also be customized and fitted with additional special options as needed for specific customer projects

Brokk also offers hundreds of standard and custom designed tools and attachments for our machines. With our standard quick change attachment interface or our optional fully remote tool change interface, a single Brokk machine can perform multiple tasks in hazardous environments with the operator always working in complete safety.

Now add to that over 40 years of Brokk deployment experience, our in-house engineering and technical support staff, on-site training and after sales support and you can see that Brokk provides comprehensive support to our customers who are working on very challenging projects.

For more information Contact Tony Marlow Tel: (505) 699 8923, email: [tony.marlow@brokkinc.com](mailto:tony.marlow@brokkinc.com)

Original Demolition Power™

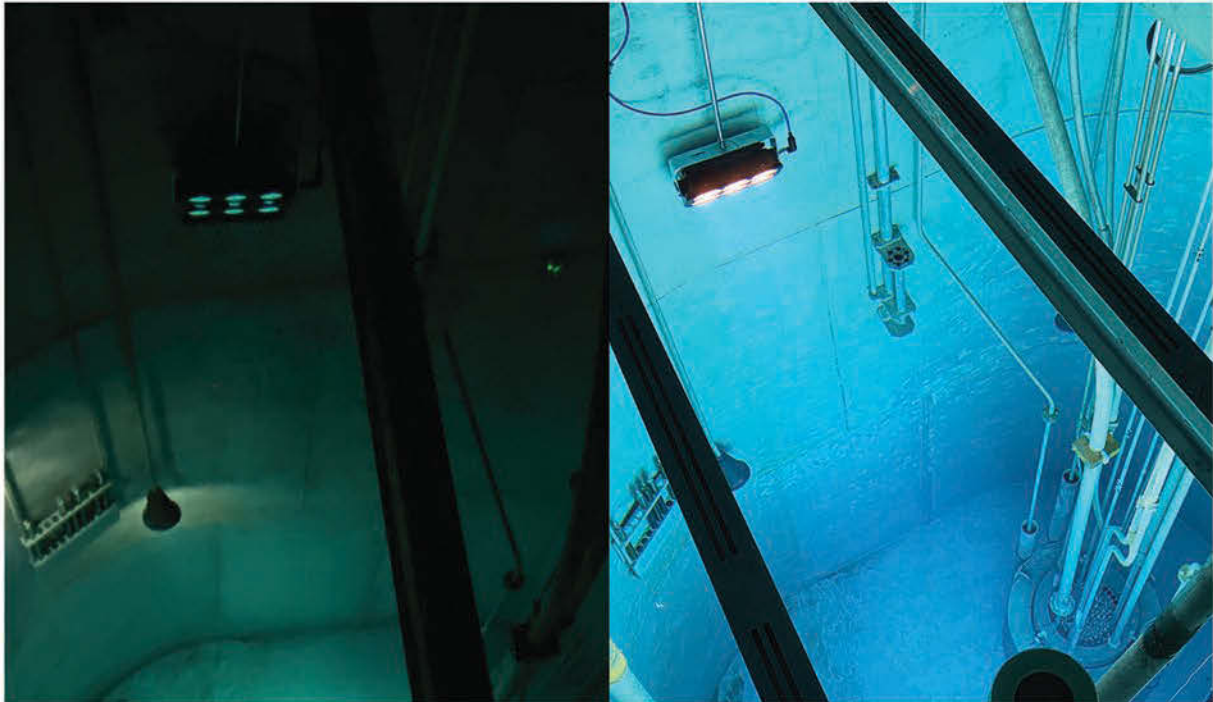
# BROKK®

# Innovating Nuclear Lighting for Five Decades

BIRNS has been a trusted leader in the development of powerful and unique lighting technologies since the 1970s. Over the years we've lowered nuclear power plant operating costs and increased safety by illuminating the toughest jobs in the plant—from reactor cores, fuel pools and hallways to polar crane high bays and mezzanine low bays. Every BIRNS floodlight, Emergency Light Fixture, drop light and bay light is designed to exceed industry requirements, perform efficiently, minimize radwaste, and improve productivity and safety.

## The difference is like night and day...

That's what we're hearing from our customers using the new BIRNS Lumena-6™ LED floodlight. The 85,000 lumen BIRNS Lumena-6 is an advanced, brilliant underwater LED system that reduces nuclear fuel handling costs and enhances safety by bringing daylight visibility to a range of pools inside containment. This plug-and-play lighting solution offers flexibility and simplicity, featuring an integrated onboard water cooled power driver, so a single mains power outlet is all that is needed on the surface. It features an 80,000 hour lamp life and ultra-high efficiency reflectors, with either spot or flood options.



BIRNS' Quality Management System is  
ISO 9001:2015 Certified;  
NRC 10CFR50, App. B Compliant

**BIRNS**®

High Performance . . .  
Under Pressure®

www.birns.com





# F&J SPECIALTY PRODUCTS, INC.

*The Nucleus of Quality Air Monitoring Programs*



## Company Profile

High Volume Air Samplers



World Calibrator



Light Weight Low Volume Air Samplers



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 implements technology driven solutions to simplify the data collection and data analysis process for the benefit of its customers.

F&J is a certified ISO 9001 and ISO 17025 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.

### INTRODUCTION OF OUR PRIMARY BUSINESS

#### Air Flow Calibration Instruments

- High Level - World Calibrator Series - PC Interfaceable Series/User Customizable - The ultimate in end-user customization
- Mid Level - Compact Digital V.2 Series
- Level One - Mini-Calibrator Series

#### Common Features Include:

- Correction of Flow Rates and Volumes to a Reference T and P
- Optional correction to Ambient T and P
- Digital display of Flow, Temperature and Barometric Pressure
- Selection of Engineering units for measured and calculated parameters

### TRADITIONAL AND ADVANCED TECHNOLOGY AIR SAMPLING SYSTEMS

- High Level - Global Air Sampling Systems - The ultimate in end-user customization, data management and report writing features
- Mid Level - Digital Flow Meter Systems - Automation of the air sampling process
- Level One - Analog Systems

#### Common Features Include:

- Rugged, Reliable and Electrically Safe
- Technology Options to match regulatory requirements
- Pricing Options to match budgets



# F&J SPECIALTY PRODUCTS, INC.

*The Nucleus of Quality Air Monitoring Programs*

## F&J Advanced-Technology Instruments



**World Calibrator**  
VFD Version  
± 1% F.S. Accuracy  
PC Interfaceable



**DF-ABM50-75L-20Li**  
Indoor/Outdoor  
Emergency Response Air Sampler



**HV-1V.2**  
Portable  
High Volume Air Sampler



**DF-ERHV-DT**  
High Volume Emergency Response  
Air Sampling System  
(8" x 10" Filter)



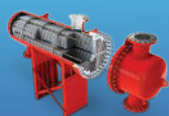
**Filter Holders**  
Plastic, Stainless Steel, Aluminum



**Personal Air Samplers**

# Solutions for obsolete nuclear components

THROUGH OEM PARTNERSHIPS



Heat Exchangers



Greer Accumulators



Pumps & Motors



Valves



Tanks & Vessels



Strainers

With extensive capabilities, we deliver custom solutions for a wide variety of products and mechanical components for the most demanding nuclear applications.

[energysteel.com](http://energysteel.com) | [sales@energysteel.com](mailto:sales@energysteel.com) | (866) 261-3772

energy)steel

## Energy Steel: Committed to the needs of the nuclear industry since 1982

Backed by 40 years of experience, Energy Steel supports nuclear equipment supply around the globe through high-quality products and OEM parts, engineering services, repairs, and on-site support.

We carry certifications in ASME N, NPT, NA, NS, U and NBIC R and NR, and we specialize in safety-related/ASME Section III products that span a wide range of sizes and applications.

### Heat Exchangers

Our extensive knowledge and experience includes custom design, repairs, and performance evaluation reporting. We can supply **Graham** heat exchangers.

### Pumps & Motors

We have expertise in sealed and sealless pumps and motors for the most complex nuclear applications. We can supply **Crane** and **APV Gaulin** pumps.

### Greer Accumulators

We are the authorized manufacturer of Greer Bladder Accumulators – the most reliable on the market today. They improve system efficiency with dependable performance and service life.

### Valves

We offer commercial-grade, safety-related, and ASME Section III valves, including new and replacement units, for a wide range of nuclear applications. We can supply **WKM** valves.

### Tanks & Pressure Vessels

From lube oil tanks to water separation tanks, we tackle all types of vessel projects at nuclear facilities.

### Structural Supports

We provide precision fabrication of structural supports of any size, including engineered solutions and build-to-print custom fabrication.

### Filters & Strainers

We offer a range of filters and strainers that protect your equipment, including Simplex, Duplex and Y Type. We can supply **Zurn** strainers.

### Specialty Components

Our wide range of innovative solutions includes spent fuel canister components, custom valve bodies, straining elements, fasteners, and studs.

### Heritage Products

We specialize in the refurbishment and replacement of obsolete parts, such as heat exchangers, pumps, valves and filters. We offer custom fabrication solutions, design services, performance evaluation reporting, design verification and re-rating.

energy)steel





**WHO WE ARE**

Accelerant Solutions has been assisting its nuclear power industry clients, both in the US and internationally, since 2003, with managing important projects to achieve operational excellence in nuclear power. Today, we maintain working partnerships with 24 of the 28 American utilities that operate nuclear power plants.

**Training**

You can rely on us for training program design and optimization, knowledge retention programs, lesson material development and upgrades, enhanced learning tools, training program compliance assessments, crew resource management diagnostics and workshops, and supplemental instructor staffing.

We have a team of experienced and highly qualified supplemental nuclear power technical experts to assist and mentor personnel in plant leadership, operations, engineering, training, maintenance, work management, and performance improvement.

**Compliance**

We work with regulatory compliance and enforcement recovery, new plant start-up readiness assurance, procedure creation and validation, computerized procedure systems, event investigations, corrective action program design, and safety culture diagnostics and improvements.

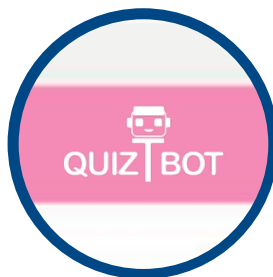
Accelerant Solutions is uniquely equipped to meet the unique needs of any industry or company wanting to achieve operational excellence.

**Innovation**

Our innovation techniques transfer knowledge and lower attrition using simple content management that works. We explore and utilize cutting edge technology such as artificial intelligence, virtual reality, and cloud-computing assist to enhance the human experience and reduce the time required to update and revise training material. The automation of menial tasks reduces cost, eliminates errors, and empowers your team members.



**INNOVATION** Your trusted partner for training platforms and technologies, performance improvement, and SAT-based training programs.



Visit [discoveraccelerant.com/innovation.com](http://discoveraccelerant.com/innovation.com) to learn more.



## Ludlum Measurements: Leading the way since 1962

Ludlum Measurements, Inc. (LMI) has been a designer and manufacturer of quality radiation detection equipment for the Health Physics Industry for almost 60 years. Through the years the health physics industry has grown and expanded into many different industries, including the oil and new and recycled metal industry, university and medical research labs, as well as the traditional market, which includes local, state, and federal agencies. With this growth in the industry, the line of products LMI offers has grown as well.

LMI's primary manufacturing facility in Sweetwater, Texas is fully integrated and offers customers a full line of products and services, including custom instrument design and manufacturing. They also offer repair and calibration services for their own products, as well as many of their competitors' products.

After leaving Eberline Inc. in 1961, Don Ludlum, the company's founder, looked around West Texas for a community to start his business. While not initially on his list of towns to consider, a chance stopover due to bad weather led him to Sweetwater. He ended up choosing Sweetwater for many reasons, but most

importantly for its open and welcoming attitude. It also offered many things he needed for his small company.

His first manufacturing plant was located at 1210 Broadway where the company operated until they outgrew the facility and relocated to their current location at 501 Oak Street in 1975.

From then on, the company has continued to grow, leading them to now own 11 different subsidiaries that not only cater to many different companies with an extensive number of products and services, but to cater to LMI competitors as well. LMI also prides themselves on insourcing a very large percentage of their components used in manufacturing their product lines.

The following timeline provides an overview of the various acquisitions over the years:

- 1992: acquisition of ADIT, a photomultiplier tube designer and manufacturer
- 1996: formation of Eljen Technology, a developer and manufacturer of organic plastic scintillators
- 2000: formation of West Texas Molding, an injection molding company
- 2007: acquisition of ET Enterprises (formerly Electron Tubes), a designer and manufacturer of photomultiplier

tubes based in the United Kingdom

- 2010: formation of Ludlum Wind, a product line that specializes in wind turbine components
- 2011: acquisition of Protean Instrument, a designer and manufacturer of high performance alpha-beta sample counting systems
- 2012: acquisition of Plowden & Thompson / Tudor Crystal, a manufacturer of glass and glass products based in the United Kingdom
- 2018: acquisition of 2B Technologies, a designer and manufacturer of portable instruments for air monitoring, environmental and industrial applications
- 2020: acquisition of Ludlum GmbH (formerly James Fisher Nuclear GmbH), a designer and manufacturer of contamination and clearance monitoring systems based in Germany
- 2021: formation of Ludlum Systems, the distributor and service provider for Ludlum GmbH products in the United Kingdom

Ludlum Measurements is a true entrepreneurial success story. From its meager beginnings in the kitchen of Don Ludlum's family home in 1962, it has grown into a leading provider of radiation detection equipment worldwide.



# Ludlum

Measurements, Inc.

can now monitor you from head to toe!



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# Serving America's nuclear power generators

U<sub>3</sub>O<sub>8</sub> | Conversion | Feed | Enrichment Services | Enriched Uranium Product Storage | Transport | Uranium Procurement | Next Generation Fuels



## UUSA is the only domestic uranium enrichment facility in the US and North America.

Utilizing leading centrifugal technology, UUSA provides uranium enrichment, storage and management services.

UUSA is perfectly positioned to be the supplier of choice to provide the enrichment services that are needed to support the nuclear industry's efficiencies, advancements, and innovations in fuel production.

Located in Eunice, New Mexico, UUSA is a strategic national asset to the US.

The National Enrichment Facility employs more than 220 local people of whom a quarter are veterans.

UUSA became operational in 2010 and was the first new nuclear build project in the US for nearly thirty years. It was also the first facility to be licensed, built and operated under a Nuclear Regulatory Commission (NRC) combined construction and operating license.

UUSA delivers energy that powers 6% of US electricity needs. Its current annual capacity of 4.8 million Separative Work Units represents roughly one-third of US demand for uranium enrichment. UUSA's capacity is licensed to increase depending on market demand.

UUSA is advancing the next generation of nuclear technologies and fuels as an important part of achieving greater efficiencies within the industry and making a valuable contribution to decarbonisation goals. We have the knowledge and experience to play a leading role in this area, which will provide an enhanced service for our customers and wider benefits for society.



e: [communicationsuusa@urengo.com](mailto:communicationsuusa@urengo.com)  
[uusa.urengo.com](http://uusa.urengo.com)

# TEI COMMITTED TO AMERICAN EXCELLENCE IN DESIGN & MANUFACTURING

Thermal Engineering International (TEI), a Babcock Power company, has been a leading supplier of heat transfer technology for power generation, oil, gas and chemical industries since 1916 and a trusted partner to the nuclear industry since 1964. The innovator of notable “firsts” — including the introduction of advanced MSR technology for the early nuclear plants — the company continues to seek new products and methods to improve daily operations and to position the industry for the future.

TEi offers a full range of cutting-edge solutions from designing, manufacturing and installation of new systems to engineering consulting and equipment upgrades. With a product lineup comprised of MSRs, SMRs, feedwater heaters, steam surface condensers, condenser modules and heat exchangers for a wide variety of applications, TEi has placed a key priority on highly demanding and large nuclear projects. We are proud to manufacture our heat transfer equipment in the USA.

As part of its commitment to excellence in quality manufacturing and service support for domestic customers, TEi maintains a state-of-the-art manufacturing facility equipped with sophisticated tooling for fabricating the multiple vessels associated with heat transfer equipment.



TEI's Joplin Facility

Occupying twenty acres of land in Joplin, Missouri, TEi's in-house fabrication plant and has been expanded with state-of-the-art overhead cranes with 200 tons of lifting capacity, railroad loading and unloading access. The addition provides the extra footprint required to accommodate the 'Supertanker' MSR designs and provides TEi with a secure facility to house the expertise and quality of workmanship needed to build this equipment.



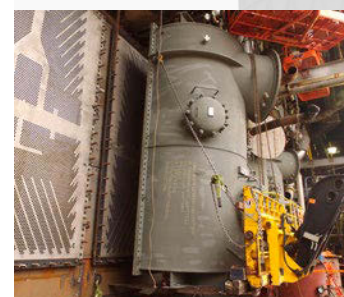
Feedwater Heater Fabrication



Condenser Fabrication MSR Supertanker Shell Fabrication

“Because manufacturing in the US requires a higher standard than other areas of the world, we are proud to be able to meet and exceed that demand for excellence while having served and supported America’s infrastructure for over 100 years,” states Ken Murakoshi, President and CEO of TEi.

This commitment to high standards also extends to TEi’s Los Angeles-based design teams, who have the unique capability to provide integrated product engineering, resulting in single-point responsibility for design and manufacturing. This single source approach means these turnkey capabilities, including consulting and engineering, remain in-house under one company — providing a highly optimized and efficient workforce to a streamlined customer experience.



A BABCOCK POWER COMPANY

## NUCLEAR SOLUTIONS

Heat Transfer Equipment for Nuclear Power Stations  
for Over 65 Years

TEi is a leading Supplier of Heat Transfer  
Equipment for SMRs

- Oil-to-Salt Heat Exchangers
- Feedwater Heaters
- Condensers
- Moisture Separator Reheaters
- Shell & Tube Heat Exchangers

TEi Provides Skid Packages Including System  
Design & Instrumentations

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Technology & Experience to Support Your Needs!

[www.babcockpower.com/tei](http://www.babcockpower.com/tei)



Compressor Intercooler

MSR

MSR

Feedwater Heater

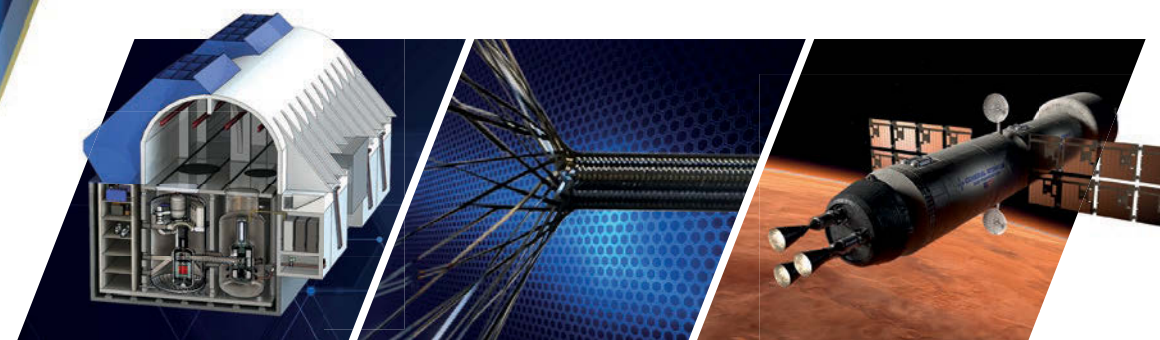
# RADIATION MONITORING SYSTEMS

## FOR A LIFETIME OF SERVICE

Since 1965, we have designed and manufactured qualified radiation monitoring systems with the highest level of quality, reliability, and conformance to safety standards.

We continue to support every system we deliver, with a proven history of uninterrupted customer service for more than five decades and counting.

When you need us, we'll be there.



# ADVANCING NUCLEAR TECHNOLOGIES

## TRANSFORMING THE FUTURE

We continue to be an industry leader in the development of nuclear technology solutions and materials that will offer clean, efficient energy production to support the growing demand for safe, reliable power on Earth and in space.

- Advanced Reactor Technologies
- Accident Tolerant Fuel
- Space Nuclear Power and Propulsion





# ROS

REMOTE OCEAN SYSTEMS

A LEADER IN NUCLEAR INSPECTIONS

**REMOTE OCEAN SYSTEMS** is a leader in the design and manufacture of reliable, radiation-tolerant lighting and inspection systems for fuel pool and reactor visual inspections since 1975. Our product line includes rad hard cameras, high intensity pool lighting and high accuracy, robust pan & tilt positioners. Our cameras offer high resolution and high-definition output with optical zoom for close-up inspections. We offer both stationary pool lighting with LED or high-pressure sodium lamps plus LED drop lights. Our new CEX-HD Inspection System combines a high-definition camera with dual LED lights for brilliant, HD images and includes a compact, state-of-the-art IC-Link Controller that features system



*New compact design IC Link Control Box includes self-monitoring feature and connects to a USB Joystick for fast, easy and accurate camera control.*

diagnostic capability and links to a joystick for precise control over zoom, focus and exposure as well as control of lighting and camera operation. Remote Ocean Systems offers a fully staffed engineering department to help with your special inspection requirements.

## THE ROS ILLUMINATOR™

*A Lightweight LED Droplight for Fast, Spot-on Inspections*

This new ROS economical nuclear droplight produces 30,000 lumens of high-intensity LED light and comes standard with a 100-foot cable. The lightweight design enables fast and easy positioning and the light head is field serviceable with changeable LED arrays and multiple tilt angles available.



*For more information on the ROS Illuminator™ Contact: [sales@rosys.com](mailto:sales@rosys.com) or Visit: [www.rosys.com](http://www.rosys.com)*



**ROS**  
REMOTE OCEAN SYSTEMS An ISO-9001 Company  
SYSTEMS SOLUTIONS SERVICE

Headquarters – San Diego, CA USA  
Phone: (858) 565-8500  
Email: [sales@rosys.com](mailto:sales@rosys.com)  
[www.rosys.com](http://www.rosys.com)

# Valcor: Designer and Manufacturer of High Quality Flow Control Devices

Valcor Engineering Corporation designs and manufactures valves for nuclear, aircraft, space, industrial, and scientific applications. Since 1951, Valcor's involvement with supplying components for difficult applications with high-pressure, flow, temperature, and vibration under extreme environmental/seismic conditions has been continually expanding. Today, Valcor manufactures over 100,000 solenoid valves and other fluid system components per year!

Valcor Engineering originally started out in the aircraft and space industries. Applications include both commercial aircraft and space components to major programs. We have also supplied hydraulic, fuel and pneumatic solenoid valves, APU shut-off valves, pressure and flow regulators, and pressure vessels for military programs including naval nuclear, fixed wing, rotary and unmanned aircraft.

In 1970, Valcor expanded and began designing and manufacturing high quality flow control components to the nuclear industry, with most activity centering on solenoid operated valves and regulators. Within Valcor, the Nuclear Group is structured as one of three integral corporate business units, which allows us to focus very clearly to develop, design and produce products for the nuclear industry worldwide, and be extremely responsive to individual customer needs. Our business is split approximately 50/50 between the domestic and international markets.

Most of our products are either ASME "N" stamped process valves for various fluids (including hydraulic fluid applications), or Class 1E air pilot valves for pneumatic actuators. There are also many special designs within our installed base of well over 15,000 "N" stamped units. Our products range in application from reactor coolant pressure boundary isolation to cryogenic, liquid sodium and marine (nuclear navy) services. These products generally are less than 4" NPS, and are used extensively in both domestic and international nuclear programs.

We have also signed license agreements and other supply arrangements with well-known former suppliers to the nuclear marketplace to manufacture and supply their unique nuclear product lines:

a. Hoke Inc. (Cresskill, NJ) for the supply of instrument isolation valves and manifolds

b. Circle Seal Controls (Corona, CA) for the supply of inline check valves and solenoid valves.

c. Fox Valve (E. Hanover, NJ) for the supply of cavitating venturis and eductors

These relationships have greatly expanded our supply capability beyond our traditional ASME Section solenoid valves.

In 2020, Valcor underwent a highly successful ASME re-certification audit for our "N", "NPT" and "NS" certification/stamps. We are excited that this

renewal now extends to welded piping systems, subassemblies, and component supports, and pressure vessels. This, in turn, opens significant new markets to us for the supply of complete systems, such as skid-mounted process packages requiring an extensive degree of installed instrumentation components.

For more information on our products and services, please visit [www.valcor.com](http://www.valcor.com), call us at (973) 467-8400 or email us at [nuclear@valcor.com](mailto:nuclear@valcor.com).



- ▶ Constructed to meet the requirements of ASME Section III
- ▶ Products include safety and non-safety SOVs, PRVs, orifices, venturis and eductors
- ▶ Qualified to ASME QME-1, IEEE-323, 344, 382 and Reg Guide 1.180
- ▶ Supporting new builds and existing plants worldwide



Valcor Engineering Corporation

Contact us to learn how Valcor can help meet your specific flow control needs

[www.valcor.com](http://www.valcor.com) | (973)-467-8400 | [nuclear@valcor.com](mailto:nuclear@valcor.com)

## Virtual Reality (VR) Training Experiences Provide Real Training Results

Operating nuclear plants in a safe and compliant way requires almost perfect employee performance; and perfection requires practice. That is why nuclear energy providers spend millions of dollars a year on training.

The best possible nuclear training site is the actual plant environment, absent the hazards and radiation, but that is impossible. As a result, plant operators typically have to rely on mock-ups that generalize environments or simulators of specific items or sections of a facility.

Oberon Technologies' VR (Virtual Reality) Training courses are turning the impossible into a reality by providing safe and cost-effective training alternatives that look authentic and engage multiple senses, providing a more genuine learning experience. These fully immersive environments can realistically represent the entire plant or exact equipment so trainees can work through real-world scenarios and unexpected hazards in a safe, risk-free training experience as often as needed. By incorporating VR into your training programs, you can now save millions on training instead of spending millions and risking even more.

### Learning Benefits of VR Training

Oberon's fully immersive, interactive training solutions bring realistic virtual environments to your organization. Because VR utilizes sensory memory techniques, knowledge retention rates are dramatically increased and neither trainees nor equipment is placed at risk. A recent 2020 PWC study reports that employees completed VR training programs 4 times faster than in-person training and 1.5 times faster than e-learning. In addition, VR training resulted in retention rates of up to 80% one year after training, compared to 20% just one week after traditional training.

### ROI of VR Training

Research shows 30-70% is the average company's savings when they switch to virtual [remote] training. This includes costs related to technology, travel, and transportation, as well as productivity loss experienced by students taking time away from work.

Read about more eye-opening statistics and let Oberon Technologies help calculate your potential savings.

[www.oberontech.com/roi](http://www.oberontech.com/roi)

### Find out what Industry Leaders already know

"Exelon's VR training environment allows the technicians to practice in a safe environment, increasing their proficiency so they may perform work effectively while also reducing exposure when repairs are needed."

—Marvin Burdick, *Corporate M&T Training Manager, Exelon*

VR reduces mockup building and storage costs, but also more closely matches a real environment both in scale and surroundings. "Your brain is convincing you that you are in that location."

—Jonathan Scruggs, *Vice President of Non-destructive Examination Solutions, Framatome*

VR is seeing "huge, huge uptake" among nuclear operators.

—Kevin Lee, *Senior Regulatory Policy Officer, Canadian Nuclear Safety Commission (CNSC)*

Read the full white paper  
[www.oberontech.com/whitepapers](http://www.oberontech.com/whitepapers)



[www.oberontech.com/vr-training](http://www.oberontech.com/vr-training)

## Creating Virtual Worlds that Deliver Real Training Results

- FME
- PPE
- Lock Out Tag Out
- Hazard Recognition
- Walkdowns



## Making Virtually Anything a Reality

Building hyper-realistic Virtual Reality environments for limitless training experiences

# High-Performance Nuclear Covers and Tarps



## GRIFFOLYN® CONTAINMENT PRODUCTS

For more than 65 years, Reef Industries, Inc. has manufactured high-performance polyethylene laminates and composites of unmatched quality and value, like the Griffolyn® plastic shipping covers. They provide exceptional protection during transit or long-term storage. They are crafted from high-strength materials that have long provided the rugged durability necessary to effectively protect your investments during shipping and storage and are manufactured to handle the most demanding service and harshest environments.

### Multiple Applications

- Contaminated Equipment Covers
- Plant Dividers
- Dust Partitions
- Scaffolding Tarps
- Fire Retardant Covers

### Features

- UV stabilized
- Anti-Static
- Fire Retardant
- Reinforced & Lightweight
- Corrosion inhibitors
- Heat shrinkability
- Custom Fabrication
- FME area protection

9209 Almeda Genoa Road,  
Houston, Texas 77075  
P: 800.231.6074  
W: [reefindustries.com](http://reefindustries.com)  
E: [ri@reefindustries.com](mailto:ri@reefindustries.com)

### Reduce costs & improve scheduling

Our products are fabricated to help you with maintenance and outage protection, contamination control, and reliable storage. These high-quality plastics can be produced with specialized properties including fire retardancy for safety applications, low contamination for critical equipment, and are incinerable to reduce the volume of radwaste.

From lightweight to heavy-duty products, Reef Industries can meet your requirements with a material specifically tailored for your application. Griffolyn® equipment covers provide durable protection year-round and are available in standard sheet configurations or custom fabricated designs.

For more information, please visit [reefindustries.com](http://reefindustries.com) or call toll free 1.800.231.6074.

**CELEBRATING 65 YEARS**  
1957 REEF INDUSTRIES, INC. 2022

**SAVE YOUR ENERGY.**  
GRIFFOLYN® can help with Plant Maintenance & Outage Management

NFPA 701 CERTIFIED • FME PROTECTION • ON-SITE STORAGE  
NO DELAYS IN OUTAGES • OUTDOOR TRANSPORTATION  
STOCK ROLLS READILY AVAILABLE • HOT WORK AREAS



## Upgrade to 3M™ Versaflo™ Respirator Systems

Baker's Dozen Deal - From January 2nd, 2022 through December 31st, 2022

For every purchase of 12 qualifying Versaflo kits and assemblies, 3M will send you one free system of equal or lesser value at no cost to you.

The terms are simple. Maximum limit of 12 free systems per end-user. Work with your 3M Personal Safety Division Safety Specialist to determine the right product and redeem qualifying free goods. Don't know who that is? You can find this information at [3M.com/FindPPERep](http://3M.com/FindPPERep). Qualifying purchase confirmation is necessary and will be required for redemption.

TR-300+ Ready to Use Kits	TR-600 Ready to Use Kits	TR-800 Ready to Use Kits
 <p>TR-300N+ ECK Easy Clean Kit</p>  <p>TR-300N+ HIK Heavy Industry Kit</p>  <p>TR-300N+ HKS/HKL Healthcare Kit</p>	 <p>TR-600-ECK Easy Clean Kit</p>  <p>TR-600-HIK Heavy Industry Kit</p>  <p>TR-600-HKS/HKL Healthcare Kit</p>	 <p>TR-800-PSK Paint Spray Kit</p>  <p>TR-800-ECK Easy Clean Kit</p>  <p>TR-800-HIK Heavy Industry Kit</p>
TR-300+ PAPR Assemblies	TR-600 PAPR Assemblies	TR-800 PAPR Assemblies
<p>TR-304N+ PAPR with Easy Clean Belt and High Capacity Battery</p> <p>TR-306N+ PAPR with High Durability Belt and High Capacity Battery</p> <p>TR-307N+ PAPR with Easy Clean Belt and High Capacity Battery</p> 	<p>TR-613N PAPR with High Durability Belt and Standard Battery</p> <p>TR-614N PAPR with Easy Clean Belt and Standard Battery</p> <p>TR-616N PAPR with High Durability Belt and High Capacity Battery</p> <p>TR-617N PAPR with Easy Clean Belt and High Capacity Battery</p> <p>TR-614-HK PAPR with Easy Clean Belt and Standard Battery</p> 	<p>TR-813N PAPR with Heavy Duty Belt</p>  <p>TR-814N PAPR with Easy Clean Belt</p> 

To learn more, contact your 3M Sales Representative

Interested in learning more about Versaflo PAPRs? Check out [3m.com/versaflo](http://3m.com/versaflo)

3M reserves the right to modify or terminate this program at any time without prior warning. For official rules, contact your local 3M Personal Safety Representative.

**Personal Safety Division**  
 3M Center, Building 235-2W-70  
 St. Paul, MN 55144-1000  
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## Upgrade to 3M™ Versaflo™ Respirator Systems

Versaflo 6 Pack – January 2nd, 2022 through December 31st, 2022

With a purchase of 6 qualifying 3M Versaflo kits or assemblies, 3M will send you one of the following choices at no cost to you. Please see page one for a list of qualifying Versaflo kits and assemblies.

Max limit to one product choice per end user.

S-Series Headtops		M-Series Headtops		Filters and Cartridges	
# of Free Cases	Product Number	# of Free Cases	Product Number	# of Free Cases	Product Number
2	S-133L-5	1	M-206	1	TR-6710N-5
2	S-133S-5	1	M-207	1	TR-3712N-5
2	S-533L	1	M-305	1	TR-6590N
2	S-533S	1	M-307	1	TR-6820N
2	S-433L-5	1	M-405	1	TR-6510N
2	S-433S-5	1	M-407	1	TR-6530N
1	S-103L-20			1	TR-6320N
1	S-103S-20			1	TR-6360N
1	S-403L-20			1	TR-6350N
1	S-403S-20				
1	S-605-10				
1	S-607-10				
1	S-707-10				
1	S-805-5				
1	S-807-5				



Still not convinced the Versaflo PAPR is for you and your environment? Check out [3m.com/versaflo](http://3m.com/versaflo)

\*This offer is subject to certain conditions and availability. For official rules contact your 3M Personal Safety Division Safety specialist. You can find out who that is at [3M.com/FindPPERep](http://3M.com/FindPPERep).

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