

Optimize Your Process



Nuclear Power Generation



Evolving to Serve You Better

We Understand Your Challenges

You need to improve the financial performance, longevity, safety and regulatory compliance of your nuclear power operations— relicensed or new. And we can help.

As the global leader in scientific and process instrumentation, we offer an unmatched breadth of products and services, extensive geographic reach and a long history of proven operational expertise. We understand your process, we know the challenges you face and we will work with you to develop effective solutions.

Our products, branded Thermo Scientific, have been serving the nuclear power industry for decades. We are proud to put our years of experience to work for you, to help distinguish your business in an increasingly competitive global industry.

Commitment to the Nuclear Power Industry

We bring system solutions that solve today's problems while providing stepping stones to the future.

System Solutions for the Nuclear Power Industry

We can help you upgrade and standardize your systems, consolidate your engineering and procurement, trim your vendor list, lower your total cost of ownership, and enhance your profitability. Take advantage of the amazing breadth of solutions we bring to the nuclear power industry worldwide.

Stepping stones to the future

The rebirth of nuclear power is upon us with forecasts calling for numerous new plants being built globally. How can we extend the life of existing reactors and reassure the public of their safety? Can new reactor technologies generate electricity safely and competitively while providing a return to investors? Will comprehensive international safety standards be developed and agreed upon — and what impact will they have?

We are committed to working through these difficult issues with you. When you need system applications to ensure plant-wide safety or simplify maintenance through redundancy and self-diagnosis, we have the answer. When you need to upgrade your systems, we provide solutions that replace aging equipment.

We bring system solutions that solve today's problems while providing stepping-stones to the future.

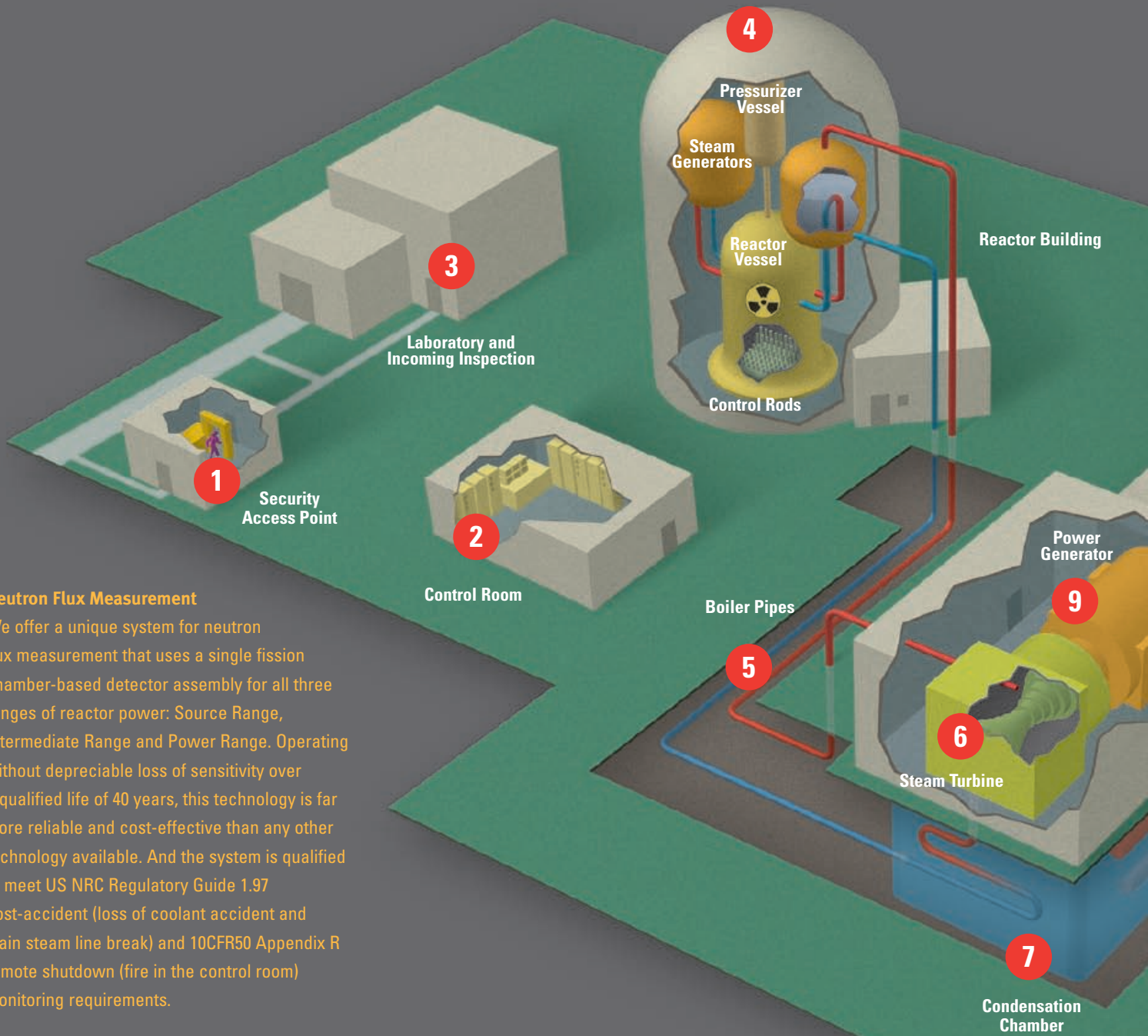
A single point of contact

In the past, you focused on instruments, and you might have relied on a dozen companies for sales and service. Today we recognize that your needs go beyond instruments to application and system solutions.

Take advantage of the growing breadth of our solutions for nuclear power. We bring a single source for nuclear power applications expertise, installation, training, and post-sales support with a single set of terms and conditions. A single place to take your questions—Thermo Fisher Scientific.



Thermo Scientific in the Nuclear Power Process

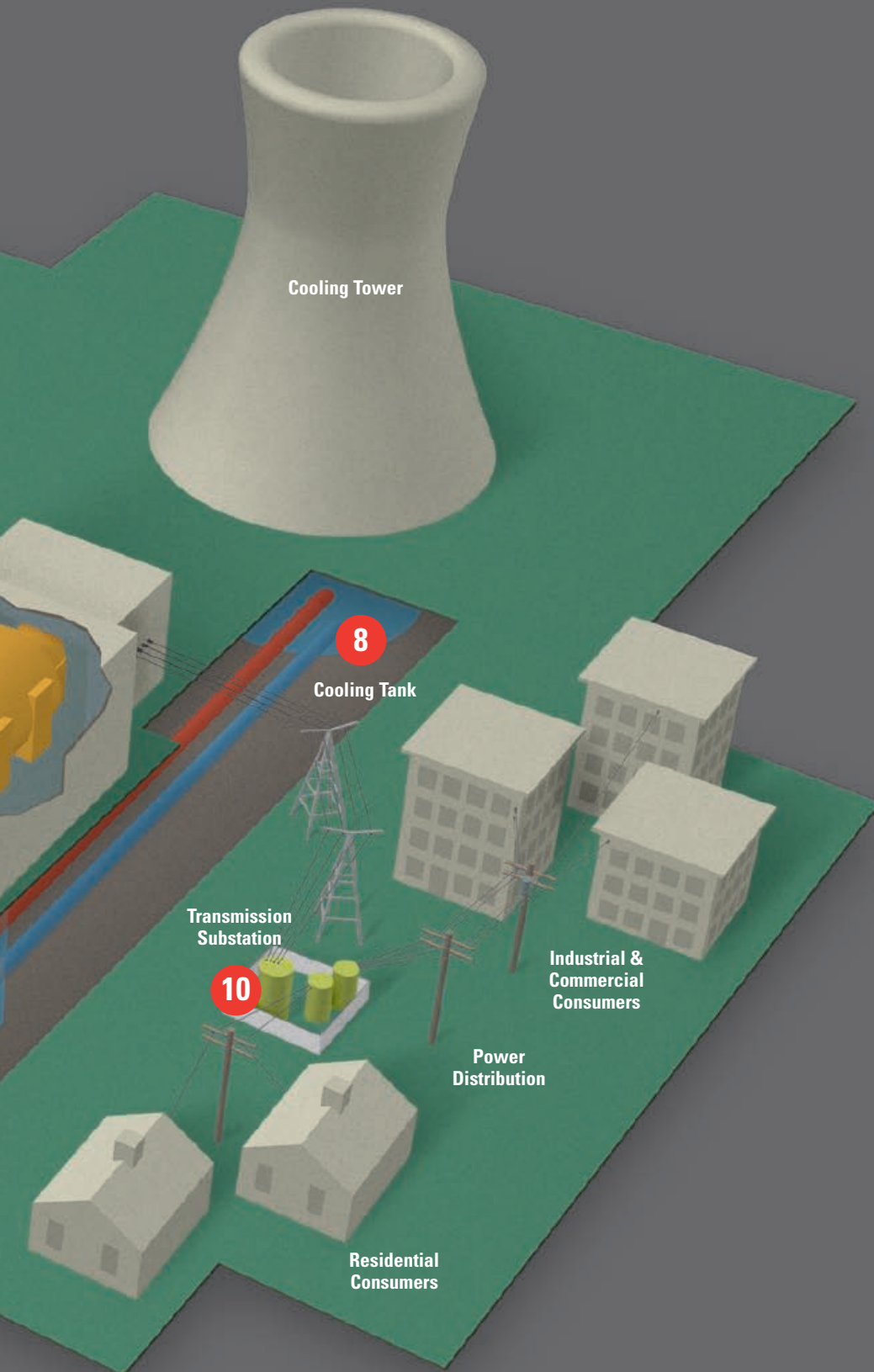


Neutron Flux Measurement

We offer a unique system for neutron flux measurement that uses a single fission chamber-based detector assembly for all three ranges of reactor power: Source Range, Intermediate Range and Power Range. Operating without depreciable loss of sensitivity over a qualified life of 40 years, this technology is far more reliable and cost-effective than any other technology available. And the system is qualified to meet US NRC Regulatory Guide 1.97 post-accident (loss of coolant accident and main steam line break) and 10CFR50 Appendix R remote shutdown (fire in the control room) monitoring requirements.

Pebble Bed Modular Reactor

We are contributing to the Pebble Bed Modular Reactor (PBMR), the internationally owned project currently being managed out of South Africa. As part of this contribution, we have developed two new systems, a Burn-Up Measurement System and an Activity Measurement System for the reactor's Fuel Handling and Storage System. We also have been selected by PBMR to design and supply all of the ex-core neutron flux measurement systems for this advanced generation IV reactor.



1. Security Access Point
 - Radiation measurement and protection monitoring
2. Control Room
 - Radiation measurement and protection monitoring
 - Neutron flux monitoring
 - Reactor protection systems
 - Audible count rate drawers
 - Boron dilution monitoring
 - Thermal margin monitoring
 - Class 1E qualified safety-related cabinets
 - Class 1E qualified power supplies
 - LCD digital meters
3. Laboratory and Incoming Inspection
 - Radiation measurement and protection monitoring
 - Laboratory Informatics: LIMS and CDS
 - Weld and alloy verification
4. Reactor Building
 - Radiation measurement and protection monitoring
 - Radiation hardened solid-state camera (black/white or color)
 - Ex-core neutron flux detectors for source range, intermediate range and power range reactor power monitoring
 - Class 1E safety-related post-accident qualified cable assemblies
 - Audible count rate during shutdown maintenance periods
 - Installed gamma area monitors
 - Water analysis monitoring
5. Boiler Pipes
 - Cooling water and condensate flow measurement
6. Steam Turbine
 - Radiation measurement and protection monitoring
7. Condensation Chamber
8. Cooling Tank, Cooling Tower and Reservoir
 - Influent and discharge flow measurement
 - Density and level measurement
 - On-line water analysis
9. Power Generator
10. Power Distribution

Thermo Scientific Products

We advance technology to the next level through research and development of new products and expanding the application of existing technologies to new products. We have the depth, breadth, and power to bring system solutions across your operation from one company.

These pages can only hint at the breadth of Thermo Scientific core technologies – neutron flux monitoring, chromatography, elemental analysis, electrochemistry, Doppler, informatics, lasers and photonics, mass spectrometry, microanalysis, molecular spectroscopy, X-ray fluorescence, gamma detection, microwave, ultrasonic, and more.

This breadth of technologies gives rise to a multitude of product applications – within our core capability of radiation monitoring and protection, for example, we offer survey instruments, counters, detectors, dosimeters, area monitors, aerosol monitors, automated contamination monitors, gateway monitors, TLD readers, multi-channel analyzers, software for networking and survey mapping, and more.

Each application solution has a depth of products for the precise fit, from the simple to the sophisticated. In detectors alone, we offer alpha, beta, gamma, and neutron scintillators, plus smart probes and detectors for neutrons, GM contamination and GM dose rate. When it comes to analysis, detection, measurement, and control, we have a solution to fit your application and your budget.



Neutron Flux Monitoring System

All of our Thermo Scientific Neutron Flux Monitoring Systems have demonstrated high immunity to electromagnetic interference and noise, and employ modern, proven electronics for high reliability and low maintenance. We manufacture 40-year qualified life 1E Safety-Related source, intermediate (wide) and power range neutron flux monitoring systems that are qualified to meet U.S. NRC Regulatory Guide 1.97 Post Accident Monitoring Requirements.



Level and Density Meters

We offer highly reliable full-service level detection systems using gamma or ultrasonic technologies providing you with flexible options. The Thermo Scientific award winning level sensors offer low maintenance non-contacting, non-intrusive level monitoring for a variety of applications.

We also feature density meters to meet the various needs of the power generation market. Our density meters provide non-contacting and inline precision density measurement.





Radiation Detectors

Our diversified product line is in use at nuclear facilities and research centers around the world. Our radiation measurement offerings include everything from detection and identification instrumentation to real-time dosimetry data systems, monitoring systems and remote data acquisition systems.

Our personnel monitoring systems are used throughout the world to ensure the safety of nuclear workers. The PM-12 gamma portal monitor is a microcomputer-based radiation detection system which provides a rapid and sensitive indication of personnel contamination.

The SAM12 Small Articles Monitor

The SAM12 Small Articles Monitor replaces the complexity of using hand-held probes to monitor small articles for gamma-emitting radionuclides. The Thermo Scientific RadEye family of hand-held portable radiation monitors can be also used as an area monitor within your facility.



Ultrasonic Flowmeters

Thermo Scientific non-invasive Doppler and transit time ultrasonic flowmeters meet the demands of all your flow measurement needs. Thermo Scientific ultrasonic flowmeters fit a broad range of applications. Thermo Scientific flowmeters feature easy installation, high noise tolerance and accuracy within 1% of velocity. Inline and insertion turbine flowmeters are also available for steam, gas, and liquid flow measurement.

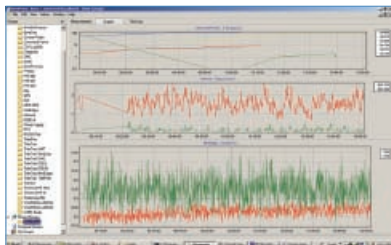


Water Quality Analyzers

The Thermo Scientific line of Orion online water monitors meets your application needs for pure water purification, boiler water control, condensate, and effluent applications. Low level sodium, pH, conductivity, dissolved oxygen, calcium hardness, silica, high & low level chloride, ammonia and chlorine measurements are critical to reducing turbine corrosion. The Thermo Scientific Orion ionplus[®] Sodium Monitor incorporates patented technologies with outstanding performance to exceed all turbine sodium monitoring standards.

Radiation-Hardened Cameras

We manufacture a line of proven radiation-hardened color and monochrome cameras for reactor monitoring, vessel inspection, waste monitoring, accelerator experiments, hot cells, ALARA programs, and other applications which require imaging in radiation environments. The Thermo Scientific CID camera is the only truly radiation-hardened solid state camera available. Capable of imaging in high, medium, and low dose rate environments, the MegaRAD series of CID based cameras operate to total dose levels of over 100 times what conventional solid state cameras can tolerate.

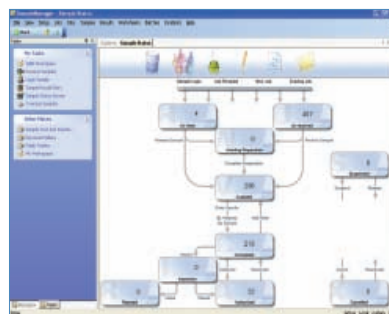


Remote Monitoring Software

The Thermo Scientific ViewPoint[™] remote monitoring software platform provides real-time personnel and area monitoring

during routine and outage operations in nuclear power plants. The system provides users the ability to centrally process and analyze instrument/detector data, and to integrate detectors from the Thermo Scientific portfolio as well as third-party vendors. ViewPoint enables increased efficiency and optimization of operational management by integrating personnel, area, and process monitoring for radiation data into a single application.

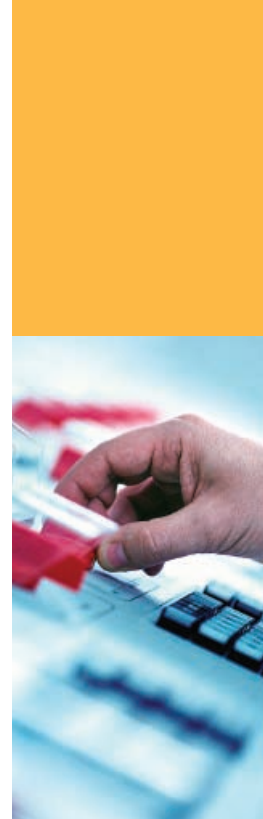
ViewPoint also provides a single comprehensive solution for radiation emergency planning needs by combing the data from remote sensors into a real-time overview, supporting command-and-control decision-making.



Informatics

Our comprehensive informatics solutions (LIMS, CDS and spectroscopy software) allow you to integrate your laboratory data with online process data to create an enterprise wide information system. This results in complete visibility to all aspects of plant performance, allowing you to maximize efficiency and ensure optimal plant availability.

Thermo Scientific SampleManager LIMS (Laboratory Information Management System) makes it easy to compare process and production data against specifications and regulatory standards. SampleManager has a bidirectional feed to integrate with instrumentation, MES and ERP systems across the enterprise to effectively capture, store and report on the information. It also supports ISO (17025 and 1400) compliance.



Product Support



Service and Training

Your operations will benefit from a comprehensive service offering including installation and maintenance, calibration, training and repair, aimed to reduce down time and keep your process working. We offer multiple levels of product support agreements and repair services to meet the needs of your operation around the globe. We offer field service repair or depot repair on many of our products with options that fit your budget and your deadline.

We offer a comprehensive selection of training options to help you increase productivity by optimizing the use of your products and expanding the skills of your operators. You can receive hands-on instruction in your plant or one-on-one instruction at our training facilities in the U.S., Europe, or Asia. Courses typically cover basic operation, theory, calibration, and routine user level maintenance, but can include circuit board level troubleshooting and certification, if required. Our spare parts are designed specifically for your Thermo Scientific system, and we make it easy for you to secure replacements by maintaining offices around the world that respond quickly to your phone or online request.



Going Beyond

We host an annual Thermo Scientific neutron flux monitoring system (NFMS) users' group meeting in San Diego, California. This is the perfect opportunity to network with fellow colleagues and discuss your operational experiences with Thermo Scientific neutron flux monitoring systems. Participate in an optional training class and bring any circuit theory, installation or maintenance related question to our experienced field engineer trainers. The agenda includes a round table discussion, break-out sessions, presentations from users concerning operational experiences and presentations regarding many issues of concern to our users. Your knowledge and feedback will be valued by other members of the group and by Thermo Fisher Scientific. Our objective is to provide you with information and training that is directly applicable to your success with our neutron flux monitoring systems and successful operation of your plants and reactors. The information provided in the seminar is ideally suited for both system engineers and I&C technicians and supervisors who work with our equipment on a regular basis. We are confident that you will find the meetings productive and your visit valuable.

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