

Calibration and Testing Services

“Powerfully Exceptional”

CALIBRATION

- ◆ **Measuring & Test Equipment**
- ◆ **Health Physics/Rad-Protection**
- ◆ **Radiologically Contaminated Equipment**
- ◆ **Rental Equipment Calibrations**
- ◆ **On-Site Services**
- ◆ **Vendor Consolidation**
- ◆ **Chell LRM Service Center**

TESTING

- ◆ **Failure Analysis**
- ◆ **Commercial Grade Testing**
- ◆ **Critical Parts Testing (PQI)**
- ◆ **Diesel Fuel, Greases, & Lubes**
- ◆ **EMI-RFI Testing & Mitigation**
- ◆ **Material Identification**
- ◆ **Radiological Hot Lab Services**

Acclaimed Web-Based Client Information Center

EXELON QUALITY

ISO 17025-2005 Accredited
ISO 9001:2008 Registered
ANSI/NCSL Z540-1
10 CFR 50, Appendix B
10 CFR 21
NQA-1
ANSI N45.2
NUPIC & NIAC Audited
24-7-365 Customer Service

www.exelonpowerlabs.com

A2LA Certificate # 2044.01/02

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CALIBRATION AND REPAIR OF MEASURING & TEST EQUIPMENT

Exelon PowerLabs® has **in-house capability** for almost every aspect of electrical and physical measurement relevant to industry and is ISO 17025 Accredited. Our operation is entirely computer based using the state of the art **LABigator®** software. Our *industry best* **Client Information Center** provides 24-hour/ 7-day access to equipment status, data, history, and Certificates of Calibration. On-site calibration services, performed at your facility, are also available. Calibrations are traceable to standards maintained by the National Institute of Standards and Technology (NIST). Specific to the Nuclear Power Generation Industry calibration of fixed contamination M&TE is also available either on-site or at our facility.

RADIATION PROTECTION EQUIPMENT

Exelon PowerLabs® provides calibration of Portable Radiation Protection and Health Physics Equipment in support of the nuclear power industry, government and municipal emergency preparedness, and emergency management agencies. Asset Management services are also available to provide immediate visibility (via Internet) of equipment status and location, across organizations and diverse groups.

FAILURE ANALYSIS

Exelon PowerLabs® provides a full-spectrum of **FAILURE ANALYSIS** services including support for root-cause-analysis. We have developed exceptional expertise in determining the cause of **electrical and mechanical equipment failure, discrete component failure, persistent maintenance problems, and metallurgical failure**. Additionally, we offer recommendations for failure prevention, repairs, material selection, and risk mitigation. Our broad experience permits us to draw upon thousands of past analyses to correctly and quickly determine cause. **FAILURE ANALYSIS** on [Radiologically contaminated components](#) is also available.

COMMERCIAL GRADE TESTING AND PROCUREMENT

Specific to the Nuclear Power Generation Industry, **Exelon PowerLabs®** offers **procurement, dedication, and testing services** for commercial grade items, including seismic, EQ, and EMI/ RFI testing. We have comprehensive chemical and material testing capabilities for electrical and mechanical components.

EMI – RFI TESTING

Exelon PowerLabs® offers an extensive array of EMI-RFI testing and mitigation services that includes Conducted and Radiated Emissions/ Susceptibility, Fast Transient, and Surge. Testing is performed in our certified 200 ft² RF-shielded anechoic room and in accordance with EPRI, MIL-STD, IEC and other requirements.

FUELS AND LUBRICANTS TESTING

Exelon PowerLabs® offers “Nuclear Safety Related” testing of **Diesel Fuel Oil**, lubricants, oils, and grease.

CALIBRATION AND REPAIR OF MEASURING & TEST EQUIPMENT

- **Air Velocity**
Pitot tubes, thermal, and vane anemometers.
- **Dimensional**
Calipers, end-measuring rods, gage blocks, thickness gages, inside-outside micrometers, bore & depth gages, optical flats, dial indicators, optical comparators, go/no-go, rings and plugs, O rings & durometer hardness, surface plates.
- **Flow Rate, Liquid and Gas**
Leak-rate monitors, mass-flow meters, orifice plates, rotometers, turbine meters, ultrasonic liquid flow meters.
- **Force**
Measurement to 500,000 lbf; Application to 350,000 lbf.
- **Humidity**
Dewpoint, ppm/ water, rH indicators and recorders.
- **Hydrometers**
Displacement, electronic.
- **Pressure**
Deadweight testers, gauges (40K psi), transducers, vacuum (1 mTor).
- **Tachometers**
Mechanical, electronic
- **Temperature**
Calibrators/simulators, indicators, recorders, RTDs, T/Cs, thermometers, IR thermometry.
- **Tensile Strength & Proof Loading**
Ropes, slings, plastics, fabrics, elastomers, line hardware, rigging crossarms.
- **Torque**
Wrenches, screwdrivers, multipliers, transducers, pneumatic, hydraulic, mechanical.
- **Weights (mass)**
Ultraclass, scales and balances
- **Optics**
Theodolites, transits
- **Underground Line-Tracing and Fault-Finding Equipment**

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CALIBRATION AND REPAIR OF MEASURING & TEST EQUIPMENT

- **Analog and Digital Meters; Multimeters**
Volts, amps, watts, ohms, phase, frequency, clamp-on, etc.
- **Resistors, Capacitors, Inductors**
Decade boxes, single range, fixed value.
- **Relay and Circuit-breaker Test Sets**
Powertech, Jodice, MultiAmp, EIL, GE, Oden, Baker, etc.
- **Time and Frequency**
Oscilloscopes, spectrum analyzers, function /pulse generators, strobe tachometers, counters, TDR's, frequency voltmeters, attenuators, distortion analyzers, timers, filters, RFI detectors, RF signal generators and oscillators (50 GHz), probes, Radar (IFF equipment), etc.
- **Calibrators**
High accuracy multimeter calibrators, control loop calibrators, field calibrators, vibration, sound level, etc.
- **Recorders**
Simple analog, microprocessor-based, multifunction data, DAT, line disturbance analyzers, oscillographs, temperature, data acquisition, etc.
- **Vibration**
Low frequency analyzers, including the OM-6 specification, shakers, accelerometers
- **Valve Diagnostic Equipment (V.O.T.E.S. and MOVATS)**
- **Sound Level Meters and Calibrators**
- **Light Intensity Meters**
Visible, UV, IR
- **Primary Devices**
Resistors, Std Cells, High Acc'y Multimeters, Watt-Hour Standards
 - Single comparison, regression analysis, drift
- **High Voltage Dividers, Sources, Meters, Electrostatic**
To 150 KV
- **Power Supplies, Meggers and Ductors, Film Densitometers, EMF Measuring Devices**

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RADIATION PROTECTION EQUIPMENT

Exelon PowerLabs® provides calibration of Portable Radiation Protection and Health Physics Equipment in support of the nuclear power industry, government and municipal emergency preparedness, and emergency management agencies. Calibration capabilities include:

- **Homeland Security / Civil Defense Field Survey Meters**
- **Ion Chambers**
- **Geiger-Mueller Counters**
- **Alpha, Beta Gamma, X-Ray Probes, Detectors, and Counters**
- **Telescoping Radiation Detectors**
- **Count Rate Meters**
- **Alpha, Beta Bench Counters**
- **Air Sampling Equipment / Pumps**
- **Area Radiation Monitors**
- **Pencil Dosimeters**

Additional Services in support of RP / HP Equipment Calibration include:

- **In-house repair facility**
- **Procurement of New or Replacement Equipment**
- **Pick-up/ Delivery (local)**
- **A Web Based Client Information Center that provides:**
 - ✓ **Calibration Status**
 - ✓ **Calibration Certificate archival and retrieval**
 - ✓ **Calibration Due Date Tracking**
 - ✓ **Connect customer groups and manage shared inventories**

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COMPONENT FAILURE ANALYSIS

Exelon PowerLabs provides a full line of electrical, mechanical, material, and metallurgical **component failure analysis**. Our engineers work with you to understand your equipment/ component problem and our investigation is tailored to assist you in getting to the root-cause of the failure and optimizing equipment performance and reliability.

Using a broad spectrum team approach, we offer recommendations for failure prevention/ mitigation, repairs, material selection, and corrosion prevention. Our experience includes access to decades of retrievable failure reports.

Example: Electrical component failures can be caused by a multitude of interacting mechanisms. Mechanical components of switches, relays, and motors can bind due to alignment, fretting, or friction. Heat can degrade or destroy insulators, coil windings and solenoids. Chemical interaction can form corrosion products on contacts, connectors, batteries, and capacitors.

Let us help you define what the causal factors are in order to formulate an appropriate remedy.

- **Electrical Components**
 - Circuit breakers, switches, relays, switchgear
 - Electronic devices, circuit boards, capacitors, power supplies, batteries
 - Solenoids, high-voltage cable, fuses
 - Motors, transformers, meters
- **Mechanical Components**
 - Pumps, valves, cylinders
 - Insulation, ThermoLag, wiring/ cabling
 - Heat Exchangers
 - Lifting devices, chain, cable, springs
- **Metallurgical**
 - Boiler tube, piping, condensers, welds, structural members; tensile and hardness testing; Failure Simulations
- **Material**
 - Filters, gaskets, O-rings,
- **Process Instrumentation and Controls**
 - Transmitters, controllers, D-P cells, Pressure/ Temp equipment, HVAC, Sprinkler heads
- **EHC System Services**
 - Fully functional GE Mark 1 Turbine Control system on-site
 - Failure Analysis of your circuit boards and other components
 - Card testing, repair, burn-in, exchange service

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COMMERCIAL GRADE ITEM DEDICATION TESTING

Exelon PowerLabs can provide technical assistance during your dedication process and help develop a Dedication Package based on our broad industry knowledge, test plan viability, and access to hundreds of critical characteristics.

- **Material Verification of Elastomers, Plastics, and Alloy Composition of Metals**
 - O-rings, v-rings, drive belts, valves, tubing, bushings, stems, bearings, seals, plugs, "tube plugs", gaskets, fasteners, diaphragms, terminals, fiberglass sleeving, check valves, connectors, lock sets, tapes, hose clamps, impellers & shafts, foam rubber.

Material verification is determined by Infrared Spectrometry, Optical Emission Spectrometry, Energy Dispersive X-ray Analysis, or Optical Microscopy.

- **Electrical Testing**
 - Terminal blocks and boards, fuses, power supplies, transmitters, scalers, resistors, capacitors, transistors, diodes/rectifiers, relays, switches and assemblies, circuit-breakers, potentiometers/ rheostats, fusible links, cable assemblies, connectors, temperature devices, indicating lamps, timers, motors, solenoid valves, tapes.

Power testing, insulation resistance, AC/DC dielectric, burn-in, ageing, life-cycle

- **Hydrostatic Testing**
 - Pressure regulators, check & relief valves, gauges, needle and ball valves.
- **Dimensional Verification**
 - O-rings, v-rings, bearings, fasteners, tapes, seals, tube plugs, other geometric shapes.
- **Physical Testing**
 - Pressure, force, flow, torque, weight, air velocity, humidity, seismic.
- **Chemical Contaminants**
 - Coatings, paints, epoxy, sealants, tapes, boric acid, alcohols and solvents, and adhesives. (GE NEDC31735P, NRC Regulatory Guide 1.36)
- **Chemical Characteristics**
 - Lubricating & insulating oils, greases.

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EMI – RFI TESTING

- EPRI TR-102323 Rev 02
 - MIL-STD-461E
 - IEC-61000-4-4 & 61000-4-5
 - Susceptibility (Radiated & Conducted) Tests
 - Emissions (Radiated & Conducted) Tests
 - Surge Immunity Tests
 - Electrical Fast Transient Tests
 - Exclusion Zone Determination
 - Tests to 1 GHz
 - Test report documents all results
 - Web access to test reports and searches
 - 10CFR 50 Appendix B Quality Program
 - Radiological Hot Lab
 - NUPIC/ NIAC Audited
 - Experienced staff in the Nuclear Power Industry
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- Please visit our website for a complete list of our services.
www.exelonpowerlabs.com



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FUELS AND LUBRICANTS TESTING

- **“Safety-Related” Nuclear Plant Diesel Fuel Analysis**
ASTM D975, Oxidation Stability, etc.
- **Grease Analysis**
Drop Point, Cone Penetration.
- **Lubricating Oil Analysis**
Viscosity, Total Acid #, Total Base #, Moisture, Wear Metals (Fe, Cu, Zn, Pb, Sn, Cr, Al), Ferrography, Rust Preventing Characteristics, Emulsion Characteristics.
- **Insulating Oil Analysis**
PCB, Color, Interfacial Tension, Moisture, Total Acid Number, Dielectric Constant, Power Factor.
- **Insulating Oil Gas Analysis (Dissolved and Head Space)**
Hydrogen, Oxygen, Methane, Acetylene, Nitrogen, Carbon Monoxide, Ethane, Ethylene, and carbon Dioxide.

INSTRUCTIONAL CLASSES TO PLANT PERSONNEL

- Basic Metallurgy
- Failure Analysis
- Welding Processes

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OUR MAJOR CUSTOMERS

NUCLEAR POWER

Arkansas Nuclear One (Entergy)
Braidwood (Exelon)
Brunswick (Progress Energy)
Byron (Exelon)
Calvert Cliffs (Constellation Energy)
Clinton (Exelon)
Comanche Peak (Luminant)
Cooper (NPPD)
Davis-Besse (First Energy)
Dresden (Exelon)
Duane Arnold (NextEra Energy)
FitzPatrick (Entergy)
Indian Point Energy Ctr (Entergy)
Juliette Metrology (Southern Co)
Kewaunee (Dominion Nuclear)
LaSalle (Exelon)
Limerick (Exelon)
Millstone (Dominion Nuclear)
Nine-Mile Pt (Constellation Energy)
Oyster Creek (Exelon)
Palisades (Entergy)
Palo Verde (APS)
Peach Bottom (Exelon)
Pilgrim (Entergy)
Point Beach (Wisconsin Electric)
Quad Cities (Exelon)
River Bend (Entergy)
Seabrook (NextEra Energy)
South Texas Project (STP)
St. Lucie (FPL)
Susquehanna (PPL)
Three Mile Island (Exelon)
Turkey Point (FPL)
Vermont Yankee (Entergy)
VC Summer (SCG&E)
Wolf Creek (Wolf Creek Nuclear)
Xcel Energy
Beta Laboratories
GE Hitachi Nuclear
TVA Central Labs
United States Enrichment Corp.
Westinghouse Toshiba

MANUFACTURING, PHARMACEUTICAL, AEROSPACE, TRANSPORTATION

ABB
Alcoa
Aluminum Shapes
Areva Framatone
Argonne National Laboratories
ATK (Alliantech)
Avtech Corp.
Bath Iron Works
BF Goodrich Aerospace
Bio-Tek Instruments
Blodgett-Ovens (Maytag)
Boeing Company
Bombardier
Compunetix
Conroy Engineering
Corning
Curtiss Wright Flow Control
Direct Radiography
Eaton Aerospace
Emerson Process Management
Fluke Corp
Garber Scale
Gerhardt
Holtec International
Husky Injection Moldings
KTA-Tator
Lonza Pharmaceutical
Mini-Circuits
Moog
Mylan Technologies
New York Police Department
Parker Hannifin
Pfizer Pharmaceutical
Pratt and Whitney
Savannah River
SGT
SKF Actuators
TYCO
Vapor Stone Rail Systems
Velan Valve
Wyeth Pharmaceutical

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About Exelon PowerLabs, LLC

Exelon PowerLabs, LLC, a wholly owned subsidiary of Exelon Generation, operates at **four (4) locations nationwide**. Our Plattsburgh, NY and Madison, PA facilities specialize in Calibration; our Wilmington, IL facility specializes in Failure Analysis and Component Testing; while our Coatesville, PA location provides all services. The Quality System is 10 CFR50 Appendix B and is ISO 9001:2008 Registered. Exelon PowerLabs is also ISO 17025:2005 Accredited. Please visit our web-site for up-to-date scope (A2LA Certificate # 2044.1/2).

Operating since 1911, **Exelon PowerLabs** consists of degreed and PMEL trained technicians, and engineers who are recognized for their high expertise and dedication. With an extensive investment in laboratory test equipment, we annually process **over** 70,000 calibrations, perform **over** 300 failure investigations, and test **over** 900 components and products. Through the years, we have evaluated or tested **over** 3,000 different components, products, and equipment.

Doing Business with Exelon PowerLabs

One of the many advantages of selecting Exelon PowerLabs as your calibration or testing supplier is the benefit of having a single organization capable of supplying all or most of those needs. This minimizes the number of suppliers you need to deal with, manage and audit; and assures a consistent level of quality. Our exceptional breadth of ISO 17025 Accreditation also sets us apart.

In addition our powerful **Client Information Center** provides client configurable access to a host of web-enabled features, which include real-time access to status, reports, and data; current and historical invoices; current pricing for your quoted instruments; calibration and testing history; and approval requests for repairs or scope changes. E-mail notification of calibration out-of-tolerance conditions are sent instantly and are fully accessible. Also on the Client Information Center you can communicate with your Customer Care Specialist (CCS) via a secure action tracking system.

Most importantly a CCS will be assigned to help you derive the greatest benefit from your relationship with PowerLabs. To submit a request for proposal or to discuss options prior to submitting a request, I urge you to contact us through one of the people below.

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