



**KINECTRICS**

# Nuclear Services

Delivering sustainable and innovative life cycle management solutions to the international nuclear industry



Kinectrics offers the full range of services needed to support nuclear utilities through each phase of a plant's life. Bolstered by robust project management and project control practices, Kinectrics offers industry leading technical expertise in design engineering, nuclear safety and licensing, major components analysis, nuclear equipment solutions, inspection and maintenance systems, and radioactive material and chemistry services.

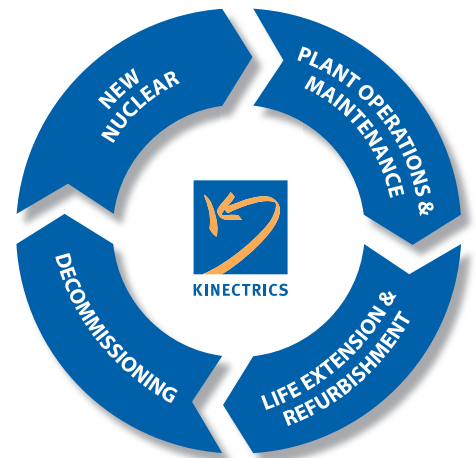
Kinectrics brings together multi-disciplinary engineering and analysis teams and dedicated laboratories to develop high value solutions for our clients' toughest problems. We collaborate closely with customers to ensure that utility assets perform safely, reliably and efficiently throughout their entire life cycle.

## SERVICES SUPPORTING ALL STAGES OF THE NUCLEAR POWER PLANT LIFE CYCLE



**Design Engineering and Sites** – Kinectrics is a Tier 1 supplier of engineering and on-site services providing consistent, cost-effective, and innovative complete solutions to clients globally, including:

- Mechanical Engineering and Stress Analysis
- Civil and Structural Engineering
- Electrical Engineering and Electrical Transient Analysis
- Instrumentation & Control Engineering
- Specialty Engineering Services – Environmental Qualification, Human Factors, Seismic, Nuclear Security, Cybersecurity, Procurement Engineering
- On-site Services – Rapid Response Engineering Team, Field Engineering, Systems Engineering, Owner's Engineering, Outage Support
- Commissioning Engineering and Return to Service Support
- Root Cause Investigations
- Project Management and Project Controls



**Nuclear Safety and Licensing** – Kinectrics is a market leader in North America in providing safety and licensing support to nuclear utilities, including:

- Deterministic Safety Analysis – Reactor Physics, Thermal Hydraulics, Fuel and Fuel Channel Analysis, Containment Analysis
- Probabilistic Risk Assessment – Level 1, 2 and 3 PRA; internal and external events including seismic, fire, flood and high wind; programmatic risk management; human reliability analysis; benefit cost analysis; hazard screening
- Nuclear Safety Assessment – Severe Accident Analysis and Severe Accident Management Guidance (SAMG), Safe Operating Envelope, Flex Modifications, Emergency Response Preparedness
- Regulatory Affairs and Licensing – Licensing strategy, SMR and new build reviews, safety case development
- Decommissioning, Environment and Health Physics
- Computer Code Development & Maintenance
- Training



**Nuclear Equipment Solutions** – Kinectrics is one of the most diverse suppliers in North America of Safety-Related parts, and can provide the following services to assist utilities with their unique parts, obsolescence and refurbishment challenges:

- Equipment Qualification, Commercial Grade Dedication, and harsh environment testing (Seismic, LOCA, MSLB, RIM)
- Reverse Engineering and replacement components
- Aging, thermal and environmental qualification



**Materials and Major Components** – Offering industry-renowned capabilities in life cycle management of major components:

- Full Life Cycle Management capabilities - fuel channels, feeders, steam generators, reactor components, piping, heat exchangers
- Condition assessment and life extension
- Rapid Response Fitness For Service (Structural Integrity Assessment) – Including advanced fracture mechanics, stress analysis, probabilistic methods.
- Rapid Response Forensic Analysis – full analytical capability for active and non-active components
- Risk based inspection and maintenance strategies/ program development.
- Corrosion assessment and testing – supported by a corrosion assessment facility
- Aging management of containment structures – concrete assessments and repair
- Warm cells, irradiated material testing and development
- Large-scale Program Management – Refurbishment/life extension programs; engineering programs such as Flow Accelerated Corrosion (FAC), in-service inspection, EQ; large-scale design engineering programs in support of plant operations and decommissioning.



**Radioactive Material and Chemistry Services** – A combination of CNSC licensed facilities and an ISO 17025 accredited laboratory that provides expert Analytical Chemistry, Nuclear Waste Management and Environmental services;

- Nuclear Waste (assessment, management, and processing)
- Decontamination and waste volume minimization
- Heavy Water Management and TRF expertise
- Tritium handling technologies
- Decommissioning planning and support
- Development of customized state-of-the art chemical processes
- Activity transport monitoring and source term management
- Radiochemistry (characterization of materials for alpha, beta, and gamma emitters)
- Petroleum Chemistry (qualification and monitoring of breakdown products)
- Conventional Chemistry (analytical testing & emergent issues problem solving)
- Toxicity Laboratory (testing of effluent waters for biological toxicity)
- Microbiology (including microbiological induced corrosion)
- Dosimetry/Bioassay lab (licensed by the CNSC under S-106)
- Medical Isotopes (target preparation, isotope separation, waste management)
- Atmospheric Emissions, Filtration, and Monitoring (measurement and compliance Testing to CSA STD N288.5-11) and field monitoring (C14, tritium)
- Personal Protective Equipment (PPE) Protection Factor Testing
- Radiation facilities management, construction, and operation



**Inspection and Maintenance Systems** – Kinectrics provides the full suite of services for the design, prototyping, development, testing, deployment and maintenance of inspection and non-destructive evaluation (NDE) systems and tooling:

- Specialize in Nuclear tool design for inspection, repair and maintenance, including
  - Failure Modes and Effects Analysis (FMEA)
  - Foreign Material Exclusion (FME)
  - Human Factors
  - Proof of concept
  - Rapid prototyping
- Extensive outage execution experience with NDE expertise.
- World class mock-up and training facilities
- Licenced Radiation Facility for tool decontamination, refurbishment and maintenance
- Complete in-house machining capability enable quick turn-around times and 24-hr support



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

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