Engineering Solutions

The Right Team to Secure Operational and Engineering Excellence

Volume 3
Engineering Solutions
to Improve Plant Performance

Did you know ... AREVA offers a diverse team of engineering and hardware solutions as an extension of your team? And we understand that the real success is in an ongoing relationship — one where we work together to make the right decisions for your plant.

We combine a unique blend of engineering expertise with equipment and system knowledge, rigorous project management experience and regulatory expertise — all driven to reduce risk while saving time and money. The combination of nuclear steam supply system OEM engineering and field service capabilities with secondary-side expertise allows AREVA to deliver a total-plant perspective.

With customer-focused innovation, AREVA can deploy the technology and resources to lower your total costs and improve your facility’s performance. We pledge uncompromising support for the long haul as you realize your vision for highly reliable, high-quality and safe nuclear power.

Our Mission:
To provide the best engineering resources to deliver safe, world-class project performance, total cost certainty, and a partner committed to excellence in engineering projects.
Did you know … AREVA has launched its new Engineering Control Center?

Every day, in every part of AREVA North America, employees are focused on fulfilling our customers’ needs while achieving Operational Excellence through Safety, Quality, Performance and Delivery. In alignment with this focus, AREVA has strengthened its customer support model by developing information exchange centers, which operate 24/7/365, such as the Outage Control Center (OCC) for outage services and support and the Nuclear Parts Center (NPC) for spare parts inventory and obsolescence management. Proactively building on the years of customer success with the OCC (est. 2010) and the NPC (est. 1978), AREVA is now pleased to introduce the Engineering Control Center (ECC). The mission of the ECC is to promote the pillars of Operational Excellence with the overarching vision of becoming “one face of AREVA” for coordination and oversight of engineering services.

A single point of contact for engineering needs.

The Engineering Control Center is based in Charlotte, N.C., where AREVA has the largest nuclear engineering workforce in the area. The Charlotte region is home to more than 250 energy sector firms. Similar to the OCC and NPC, the ECC includes a dedicated customer hotline, which is monitored 24 hours a day, 7 days a week. The hotline is available for quick access by our customers, providing them with the benefit of a simple and direct method for obtaining robust technical support from AREVA’s highly skilled experts and pool of talent.

“We want to ensure our customers are provided immediate and complete resolutions to their engineering needs,” says Gary Mignogna, President & CEO, AREVA Inc. “AREVA is the only supplier that offers full plant life-cycle solutions to the nuclear industry. We are uniquely positioned with engineers knowledgeable in all aspects of plant design, analysis, licensing, and operations.”
Heshan Gunawardane
Sales Manager,
Installed Base Projects

Experience:
Engineering Services Sales,
Project Management,
Fracture Mechanics,
Stress Analysis

Did you know ... AREVA is a world leader delivering innovative and cost-effective engineering solutions for ASME Class 1 systems and components?

AREVA understands that the integrity of the NSSS is paramount to the safe operation of a nuclear power plant. Our team of experts in structural analysis, fracture mechanics and materials engineering has the unique qualifications to consistently provide innovative and cost-effective analytical approaches and solutions to NSSS challenges, with the goal of maximizing plant availability.

AREVA excels in developing creative approaches to solve any problem from the mundane to the extraordinary, regardless of the Original Equipment Manufacturer (OEM). AREVA has delivered dozens of solutions to emergent problems including Alloy 600 modifications and repairs of BMI and RVCH penetration nozzles. Our tools include advanced ANSYS finite element modeling of welding residual stress, flaw propagation and elastic-plastic stress analysis. AREVA engineered solutions to NSSS and ASME Class 1 systems and components have won NEI TIP awards in 2013 and 2014 for novel and innovative approaches.

Building on this expertise and experience, we are developing solutions in areas such as environmentally assisted fatigue and reactor vessel internals aging, which is critical for the long-term viability of plants as they enter extended operation. We combine advanced materials modeling with cutting edge three-dimensional structural, radiation transport and fluid-structure interaction modeling to assess the susceptibility of the internals to age-related degradation mechanisms.

No matter what the challenge or the original design, AREVA’s engineering staff is at the ready to engineer a customized solution for your plant.

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Division Director I&C  
Modernizations  
Experience:  
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Digital I&C  

Did you know ... AREVA is the world leader in Digital I&C focused on safety and quality, leading to the highest levels of performance?  

AREVA is the only supplier that has supported the successful licensing, engineering, procurement, installation and commissioning of a full-scope digital Safety Instrumentation and Control (I&C) Protection System in the United States. 80 TELEPERM® XS systems have been supplied or are currently on order in 14 different reactor designs across 16 countries.  

The I&C Products group also includes non-safety applications, such as the Digital Control Rod Drive Control System, Reactivity Measurement and Analysis System, Loose Parts Monitoring System and Flux Mapping System. AREVA and VEGA Americas are working together to provide safe, reliable and economical Spent Fuel Pool Level Instrumentation solutions to U.S. utilities.
Bill Duffett
Division Director Electrical Products

Experience:
Electrical Product Management and Electrical System Analysis, Operations and Project Management

Did you know ... The Electrical Products group provides electrical equipment to assist utilities with addressing obsolescence or to increase efficiency?

The Electrical Products group provides the nuclear industry with products including variable frequency drives, motors, electrical distribution equipment, such as breakers, motor control center replacement buckets and panel boards, and spares. AREVA has strategic alliances with Eaton and other original equipment manufacturers to provide electrical products to the nuclear industry.

Our services include commercial grade dedication, installation and service contracts.

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Did you know ... AREVA has experience in the evaluation of external flooding hazard for both new and existing nuclear power plant structures, systems and components (SSCs)?

AREVA’s experience includes in-depth knowledge of the regulatory framework, determination of flood parameters, the development and application of various flood models to assess potential impacts to SSCs, and qualification of the flood design basis for SSCs.

Most recently, AREVA has assisted utilities in their response to the Post-Fukushima Title 10 of the Code of Federal Regulations, Section 50.54 (f) (2012) Request for Information (RFI) regarding flooding hazard reevaluations at U.S. operating reactor sites. Calculations are performed to predict local intense precipitation, probable maximum precipitation, flooding on streams and rivers, dam breaches and failures, probable maximum hurricane, tsunami, storm surge, seiche, channel migration or diversion, ice-induced flooding, and a combined-effects flood. AREVA uses both deterministic and probabilistic methods to perform the reevaluations. Following submittal of the reevaluation, AREVA provides solutions for the Integrated Assessment for External Flooding for sites that exceed their existing flood design basis. AREVA stands ready to respond to your emerging flood hazard issues.

Cynthia Fasano, P.E.
Environmental Analysis Supervisor

Experience:
Post-Fukushima Flooding, Environmental Report Applications, Environmental Engineering, Air Quality/Noise

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Did you know ... AREVA provides innovative solutions for every possible BWR and PWR fuel performance challenge?

With more than 40 years of experience, we are knowledgeable in the application of fuel- and core-related NRC and ASME requirements. We offer a wide range of analytical capabilities and technology tailored to the specific needs of customers. Plus, we develop and maintain advanced codes and methods for the design and analysis of fuel.

The AREVA team can provide the full scope of product design, testing, analysis, licensing and operational support for reload cores. We also use NRC-approved codes to develop innovative in-core fuel management plans and to perform fuel cycle licensing analyses. We are able to fully support reactor operating cycle lengths ranging from 12 to 24 months as well as extended power uprates.
Did you know ... that AREVA’s integrated engineering and licensing approach results in technically robust solutions that cost-effectively meet regulatory obligations?

AREVA recently supported a customer in a complete revision of their GL 2008-01 program and associated procedures to meet the regulatory requirements regarding mitigation of gas voids in ECCS systems. AREVA also supported the customer’s disposition of existing voids providing timely and robust technical evaluations.

AREVA’s multi-discipline team consisting of expert thermal-hydraulic and structural analysts can perform complex water hammer, void transport and structural analyses in support of complete revision of the customer’s GL 2008-01 program. Based on in-depth understanding of the technical aspects and the regulatory position on gas voiding in ECCS systems, AREVA is able to develop an innovative and highly cost-effective approach that will help our customers perform quick operability determinations without needing to perform extensive computations or costly modifications. This innovative approach helps the customer meet all current regulatory obligations while giving them flexibility to reduce impact on plant and personnel.

Drawing on extensive experience in GL 2008-01 program implementation and varied plant modifications, AREVA can also recommend several enhancements to the ECCS piping system to allow for additional flexibility and operability. AREVA’s exclusive Nuclear Grade Air Trap (NGAT) solution can simplify inspection methodologies and frequencies reducing overall dose and cost associated with implementing GL 2008-01 programs.

Pavan Thallapragada
Manager, Nuclear Island Systems Engineering

Experience:
Engineering Management, Project Engineering, Systems Engineering, Component Design and Analysis

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Generic Letter 2008-01
Did you know ... Metals in and around the reactor become activated due to neutron bombardment from the fuel?

As a manufacturer of fuel for a global market, AREVA maintains state-of-the-art computer codes to calculate the amount of radioactivity in these metal components. This Neutron Activation Analysis uses a combination of codes to accurately quantify and normalize radionuclide distributions to support many applications from power upgrades to reactor vessel internals characterization. Characterization of these reactor components retrieved during outages or stored in the Spent Fuel Pool may also be used to support transportation (49 CFR 173) or disposal (10 CFR 61).

As a leader in plant decommissioning, AREVA’s Neutron Activation Analysis capability supports a variety of tasks from site characterization to reactor internals characterization. Reactor internals characterization includes 10 CFR 61 classification to support segmentation and packaging as well as the optimization of GTCC storage on the site’s ISFSI. AREVA has accurately performed these analyses for operating and decommissioning plants for over 35 years.

Neutron Activation Analysis

Daniel Torres
Engineer IV, Fluence and Radiation Analysis Group

Experience:
Fluence Analysis, Radiation Analysis, Activation Analysis, Helium and Isotope Production, dpa Analysis, Core Neutronics, Criticality Licensing, Configuration Management, Decommissioning Procedures

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BWR Products & Services

CHEMISTRY
- Chemistry and Radiochemistry Laboratory Services
- Chemistry and Radiochemistry Training
- Chemistry Regime and Operational Changes Impact Assessment
- Cobalt Reduction Campaign Strategies
- Coolant Chemistry Data Assessment
- Corrosion Product Behavior and Intruded Chemicals Evaluation
- Crud Build-Up-Related Risk Assessment and Crud Scrape Analyses
- Deposit and Resin Analyses
- Metallurgical Examination of Irradiated Hardware
- Root Cause and Failure Analysis
- Startup and Shutdown Chemistry
- Water Chemistry Consulting Services

COMPONENT REPAIR & REPLACEMENT
- Access Hole Cover Repair
- Core Shroud Repair
- Core Spray Pipe Repair
- Environmental Lab Testing
- Jet Pump Repairs
- Materials/Mechanical Lab
- Nozzle Overlays
- Quality Programs & Accreditation
- Reactor Head and Vessel Flange Repair
- Reactor Vessel Internal Repairs
- Steam Dryer Modifications
- Stub Tube Repair
- Seismic/Vibration Testing
- U.S. Technical Center

CYBERSECURITY
- Cybersecurity
- Cybersecurity, Advanced

ELECTRICAL PRODUCTS
- Emergency Diesel Generators
- Fire Protection – Full-Scale Fire Testing Services
- Fire Protection – Passive Features
- Low and Medium Voltage Switchgear
- Low Voltage Air Circuit Breaker Reconditioning and Spare Parts Support
- Low Voltage Breakers
- Medium Voltage Vacuum Breakers
- Molded Case Circuit Breakers
- Motor Control Centers & MCC Bucket Replacements
- Panelboards
- Remote Power Racking Device
- Reverse Power Connection Equipment for Post-Fukushima Generators
- Starters, Relays, Contactors
- Training and Field Services
- Transformers
- Variable Frequency Drives

ENGINEERING
- AC System Analysis Expertise ETAP
- BOP System Capacity Additions and Enhancements (ex. Traveling Water Screens)
- BOP Systems Evaluations and Upgrades
- Cybersecurity
- Cybersecurity, Advanced
- Computational Fluid Dynamics
- Dynamic Seismic Analysis
- ECCS Blockage Turnkey Solutions (Analysis, Testing, Systems Evaluations, and Margin Recovery)
- Engineer of Choice
- Fire Protection - Breaker Coordination Services for NFPA 805
- Fire Protection - DATATRAK Software Solutions for Fire Protection Compliance
- Fire Protection - Design Services
- Fire Protection - Engineering
- Fire Protection - Fire Alarm Solutions
- Fire Protection - Hazards Analysis
- Fire Protection - Modeling and Emergency System Response
- Fire Protection - NFPA 805 Program Maintenance
- Fire Protection - PRA Program Implementation
- Fire Protection - Safe Shutdown Services
- Hardware Engineering and Tooling Design
- I&C Logic, Pre-operational and Startup Testing Support
- I&C System Engineering
- Life Extension
- Maintain Steam Generator Integrity and Optimize Performance
- Materials and Structural Analysis
- Modification, Repair and Tooling Engineering
- NSSS System Engineering
- Performance Engineering (Power Uprates)
- Piping and Structural Support Engineering
- Radiological and Environmental Analysis
- Reactor Vessels Internals Engineering
- Risk Analysis
- Transient and Accident Analysis System Engineering

FUEL
- ATRIUM™ 10 Fuel
  - Improved Flow Guard
- ATRIUM™ 10XM Fuel
  - 3rd Generation Flow Guard
- ATRIUM™ 11 Fuel

FUEL SERVICES
- Crud Sampling Fuel Rod/Fuel Channel
- Fuel Assembly Re-Channeling
- Fuel and Fuel Component Inspection and Repair:
  - IRIS
  - Reconstitution
  - Recage
- Fuel Channel Characterization
- Fuel Leak Detection by Sipping and Ultrasonic Testing
  - In-Core
  - Mast
  - Vacuum Canister
- Post Irradiation Performance Examinations
- Specialty Tools and Products
- Ultrasonic Fuel Cleaning
- Visual Inspection
FUEL ENGINEERING
- Enhanced Option III™
- Fuel Engineering Services
  - Advanced Fuel Designs
    i. Mechanical Systems Design
    ii. Fuel Rod and Fuel Cycle Designs
  - BWR Methods Development
  - Collaboration and Technology Transfer
  - Core Monitoring System
  - Fuel Vendor Transition Support
  - Licensing Analyses
  - Operational Support
- Power Uprates
- POWERPLEX III – Core Monitoring Software
- POWERPLEX-XD Core Monitoring Software with XEDOR™ Risk-Informed PCI Management Tool

FUEL-RELATED MANUFACTURING SERVICES
- Manufacturing Engineering Services
- Component Fabrication Machining
- Product Development Testing Facility (PDTF)
  - Scaled Hydraulic & Flow Visualization Test Facility
  - Portable Hydraulic Test Facility
  - Fuel Cooling Test Facility
- Power Uprates
- POWERPLEX III – Core Monitoring Software
- POWERPLEX-XD Core Monitoring Software with XEDOR™ Risk-Informed PCI Management Tool

INTEGRATED PROCUREMENT SOLUTIONS
- Commercial Grade Dedication
- Environmental Testing and Thermal Aging
- Inventory Warehousing
- Material Analysis Capabilities
- Procurement Engineering
- Seismic and Vibration Testing
- Testing and Qualification

INSTRUMENTATION AND CONTROL
Safety Instrumentation and Control
- Digital I&C Upgrades (TELEPERM® XS)
- RVLIS Upgrades - TELEPERM®

Non-Safety Instrumentation and Control
- Digital Control Rod Drive Control System
- Electronic Equipment Restoration
- Flux Mapping Systems
- Local Power Range Monitors (LPRMs)
- Loose Parts Monitoring
- Reactivity Measurement and Analysis System
- Spent Fuel Pool Level Instrumentation

I&C Instrumentation
- ASCO Pressure/Temperature Switches
- Control Relays, Pushbuttons, and Control Switches
- Starters, Contactors, Overload Heaters

MECHANICAL PRODUCTS
- Conquest - Eliminate Acoustic Resonance
- Cooling Tower Optimization
- Filtered Containment Venting System
- Heat Exchangers
- Hydrogen Recombiners
- Passive Autocatalytic Recombiners
- Passive Cooling
- Particle Separator
- Pumps and Cable Life Extension (Novinium)

MONITORING SYSTEMS
- EMPATH 2000
- Meggitt Containment Atmosphere Monitoring Systems (CAMS)
- UltraCheck Diagnostic Group
- UltraCheck A System
- UltraCheck C System
- UltraCheck L System
- UltraCheck M System
- UltraCheck RV System
- UltraCheck SPT & TST System

MOTORS, DRIVES, DIAGNOSTICS & PARTS
- EMPATH (Motor Diagnostics)
- Limitorque Motors, Actuators, Parts
- Motors (Electric) - Jeumont Electric, Reliance and Siemens
- Total Motors Solutions
- Motor Parts
- Motor Refurbishment
- Variable Frequency Drives (VFDs)

NON-DESTRUCTIVE EXAMINATION (NDE)
- Core Shroud UT
- Core Spray Pipe UT
- HawkEYE Remote Steam Dryer Visual Inspection Systems
- In-Vessel Visual Inspection (IVVI)
- ISI and FAC Inspections
- Jet Pump Beam UT
- Jet Pump Diffuser Inspection
- Jet Pump Diffuser UT
- Reactor Vessel Nozzle and Safe End UT
- Reactor Vessel UT

RADWASTE SOLUTIONS
- Cartridge Filters
- Disposable Media Filters
- ResinTech - Ion Exchange Resins and Products

PUMPS
- AREVA Inc. Pumps & Motors
- Condensate Pump Refurbishment
- HPCS Auxiliary Motor Services
- On-Site RRP Motor Modifications
- Reactor Recirculation Pump Motor Refurbishment
- SW Motor Refurbishment
BWR Products & Services

**REFUELING & OUTAGES**
- Fuel Movement
- In-Vessel Visual Inspection (IVVI)
- In-Vessel Control Rod Blade Exchange
- In-Vessel Fuel Cell Maintenance
- In-Vessel LPRM Exchange
- In-Vessel Maintenance
- Refuel Floor Management
- RPV Disassembly/Reassembly
- Steam Dryer Remote Visual Inspections (ID & OD)

**UNDERVESSEL**
- Control Rod Drive Exchange
- Control Rod Drive Rebuilds

**VALVES, ACTUATORS, PARTS & DIAGNOSTICS**
- Anderson Greenwood Crosby (Yarway) Valves
- ASCO Hydramotor® Actuators and Parts
- ASCO Hydramotor® Training Program
- ASCO Pressure/Temperature Switches
- ASCO Solenoid Valves (Nuclear and Commercial)
- Fluid Sealing Products (LATTY)
- Limitorque Actuators, Parts, and Motors
- Nuclear Grade Air Traps
- Powell Valves
- UltraCheck Valve Diagnostics
- Valve Enhancement Program
- Valve Packing Monitoring Device
- Velan Valves

**CHEMISTRY**
- Benchmark Testing Service
- Chemical Cleaning of Nuclear Steam Generators
- Chemistry and Environmental Services Laboratory
- Chemistry and Radiochemistry Laboratory Services
- Chemistry and Radiochemistry Training
- Component and System Chemical Cleaning
- Component and System Chemical Decontamination
- Consumable Materials Co-op Database
- Corrosion Evaluation and Management
- Deposit Analysis and Characterization
- Deposit Minimization Treatment (DMT)
- Heat Exchanger Services
- High-Efficiency Resin Analysis Service
- Metallurgical Laboratory Services
- Operational Chemistry Evaluation
- Portable Membrane Separation Technology
- Portable Volume Reduction Systems
- Preventive Maintenance Cleaning
- Preventive Maintenance Optimization
- Root Cause and Failure Analysis
- Startup and Shutdown Dose Reduction
- Structural Electrosleeve
- Thin Electrosleeve
- Water Chemistry Consulting Services

**COMPONENT REPAIR & REPLACEMENT**
- Environmental Lab
- Alloy 600 Material Degradation Services
- EMPATH 2000
- Materials/Mechanical Lab
- Metrology
- Metrology - High Precision Measurement Surveys
- Metrology - Component and Pipe Replacement Support
- Metrology - Accurate 3-D Models of As-found Conditions
- Metrology - Underwater Surveys in Support of Used Refuel Equipment Upgrades
- Quality Programs & Accreditation
- Presurizer
- Presurizer Heater & Instrument Nozzle Replacements
- Reactor Vessel Head
- Remote-Controlled In-Pipe Manipulators
- RV & RV Head Repairs & Modifications
- Seismic/Vibration Lab
- Service Structures
- Small Bore Nozzle Repairs
- Specialized/Remote Machining and Welding - Inlays
- Specialized/Remote Machining and Welding - Onlays
- Specialized/Remote Machining and Welding - Overlays
- Steam Generator
- U.S. Technical Center
- Valve Services

**CYBERSECURITY**
- Cybersecurity
- Cybersecurity, Advanced

**ELECTRICAL PRODUCTS**
- Emergency Diesel Generators
- Low and Medium Voltage Switchgear
- Low Voltage Air Circuit Breaker Reconditioning and Spare Parts Support
- Low Voltage Breakers
- Medium Voltage Vacuum Breakers
- Molded Case Circuit Breakers
- Motor Control Centers & MCC Bucket Replacements
- Panelboards
- Remote Power Racking Device
- Reverse Power Connection Equipment for Post-Fukushima Generators
- Starters, Relays, Contactors
- Training and Field Services
- Transformers
- Variable Frequency Drives

**ENGINEERING**
- 3D CADD Services
- AC System Analysis Expertise ETAP
- Advanced Reliability Technical Services
- Analytical Modeling of the Electrical Power Distribution System
- Component Replacement - ASME Code Certification
- Component Replacement - Design Specifications
- Component Replacement - Installation Modification Packages
- Component Replacement - Stress Analysis
- Computational Fluid Dynamics
- Cybersecurity
- Cybersecurity, Advanced
- Design Studies and Assessments
PWR Products & Services

- Engineer of Choice
- Engineering Programs:
  - Emergency Planning
  - Environmental Qualification
  - Maintenance Rule
  - Motor Operated Valve
  - Quality Assurance
  - Radiation Protection
  - Security
- Testing Program including:
  i. Containment Leak Testing
  ii. Initial Testing
  iii. ISI/IST
  iv. Pre-Service Inspection/Testing
  v. Reactor Vessel Material Surveillance
- Training Program including:
  i. Non-Licensed Operator
  ii. Reactor Operator Requalification
- Environmental Health & Safety Training
- Equipment Surveillance Optimization
- Fire Protection - Breaker Coordination Services for NFPA 805
- Fire Protection - DATATRAK Software Solutions for Fire Protection Compliance
- Fire Protection - Design Services
- Fire Protection - Engineering
- Fire Protection - Fire Alarm Solutions
- Fire Protection - Hazards Analysis
- Fire Protection - Modeling and Emergency System Response
- Fire Protection - NFPA 805 Program Maintenance
- Fire Protection - PRA Program Implementation
- Fire Protection - Safe Shutdown Services
- Health & Safety Services
- I&C and Electrical Systems Reliability and Obsolescence Management
- Infrastructure Protection Services
- I&C Engineering
- License Renewal Services
- Modification, Repair and Tooling Engineering
- Performance Engineering (Power Uprate)
- Piping and Structural Engineering
- Reactor Component Modification/Repairs
- Reactor Vessel Internals Aging Management Solutions (FEATS)
- Reactor Vessel Internals Engineering
- Refueling Tooling Development
- Resolution to GSI-191
- Seismic Analysis
- SG Asset Management
- SG Condition Monitoring & Operational and Degradation Assessments
- SG Emergent Engineering Evaluations
- SG Flow Induced Vibration, Structural, and Closure Analyses
- SG Hardware Qualification
- SG Thermal Hydraulic Analysis
- SG Tube Integrity Engineering
- Software V&V Services
- System Engineering
- Used Fuel Management
- Used Fuel Storage Services
- FUEL
  - Advanced Cladding and Structural Material MS8®
  - Fixed In-Core Detector Monitoring System
  - GAIA PWR Fuel Assembly
  - HARMONI™ Rod Cluster Control Assemblies
  - HTP: Robust Technology

FUEL SERVICES
- Crud Sampling Fuel Rod/Fuel Channel
- Fuel and Fuel Component Inspection and Repair:
  - ALFRED
  - Anti-Fretting Clips
  - FREDA
  - IRIS
  - Reconstitution
  - Recage
  - SCORE
- Fuel Leak Detection by Sipping and Ultrasonic Testing
  - Mast
  - Ultrasonic Testing
  - Vacuum Canister
- Post Irradiation Performance Examinations
- Specialty Tools and Products
- Ultrasonic Fuel Cleaning
- Visual Inspection

FUEL ENGINEERING
- ARGOS™ – Core Monitoring System
- CRUD Risk Assessments
- FIDMS – Core Monitoring System
- Fuel Engineering Services:
  i. Advanced Fuel Designs
  ii. Fuel Rod and Fuel Cycle Designs
  - PWR Methods Development
  - Collaboration and Technology Transfer
  - Criticality Analyses
  i. Fuel Storage and/or Shipping Containers & Casks

FUEL-RELATED MANUFACTURING SERVICES
- Manufacturing Engineering Services
- Component Fabrication Machining
- Product Development Testing Facility (PDTF)
  - Scaled Hydraulic & Flow Visualization Test Facility
  - Portable Hydraulic Test Facility
  - Fuel Cooling Test Facility
- Seismic Testing
- Mechanical Testing
- Critical Power Testing
- Uranium Storage and Management
- Cylinder Washing and Recertification
- Uranium Recovery Services
  - Fresh Fuel Download
  - Hard Scrap
  - Sludge
  - Soil
  - Ash

ii. Fuel Storage Racks
- Reactor Engineering Analysis and On-Site Support
  i. Core Monitoring
  ii. Startup Physics Testing
  iii. Technology Transfer & Training
    1. Computer Codes
    2. Site Engineering Services
    3. Technical Training
- Structural and Seismic Analyses
  i. Component Design Structural Analysis
  ii. Seismic & Dynamic Analysis
  iii. Special Applications
  iv. Structural Analysis
- POWERTRAX – Core Monitoring System
- Power Uprates
PWR Products & Services

- Lagoon Remediation
- Analytical Analysis Services
- LSS Training / Certification

INSTRUMENTATION AND CONTROL
Safety Instrumentation and Control
- Digital I&C Upgrades (TELEPERM® XS)
- RVLIS Upgrades - TELEPERM®

Non-Safety Instrumentation and Control
- Digital Control Rod Drive Control System
- Electronic Equipment Restoration
- Flux Mapping Systems
- Local Power Range Monitors (LPRMs)
- Loose Parts Monitoring
- Reactivity Measurement and Analysis System
- Spent Fuel Pool Level Instrumentation

I&C Instrumentation
- ASCO Pressure/Temperature Switches
- Control Relays, Pushbuttons, and Control Switches
- Starters, Contactors, Overload Heaters

INTEGRATED PROCUREMENT SOLUTIONS
- Commercial Grade Dedication
- Environmental Testing and Thermal Aging
- Inventory Warehousing
- Material Analysis Capabilities

- Procurement Engineering
- Seismic and Vibration Testing
- Testing and Qualification

LINER
- Adhesive Rehabilitation, Reactor Cavity - Dry Method
- Adhesive Rehabilitation, Used Fuel - Underwater Wet
- Leak Detection (Underwater & Dry Solutions)
- Reactor-Cavity Liner Inspection & Repairs

MECHANICAL PRODUCTS
- Conquest - Eliminate Acoustic Resonance
- Cooling Tower Optimization
- Filtered Containment Venting System
- Heat Exchangers
- Hydrogen Recombiners
- Passive Autocatalytic Recombiners
- Passive Cooling
- Particle Separator
- Pumps and Cable Life Extension (Novinium)

MONITORING SYSTEMS
- EMPATH 2000
- Meggitt Containment Atmosphere Monitoring Systems (CAMs)
- UltraCheck Diagnostic Group
- UltraCheck A System
- UltraCheck C System
- UltraCheck L System
- UltraCheck M System
- UltraCheck RV System
- UltraCheck SPT & TST System

MOTORS, DRIVES, DIAGNOSTICS & PARTS
- EMPATH (Motor Diagnostics)
- Limitorque Motors, Actuators, Parts
- Motors (Electric) - Jeumont Electric, Reliance and Siemens
- Total Motors Solutions
- Motor Parts
- Motor Refurbishment
- Variable Frequency Drives (VFDs)

NON-DESTRUCTIVE EXAMINATION (NDE)
- AIDA - Steam Generator Automated ET Data Analysis System
- Bare Metal Visual Exams (Lower & Upper Head)
- BMI Nozzle and J-Weld Examination
- BOP and FAC Inspections
- Control Rod Guide Tube Inspection - CRGT Tool
- Deposit Mapping
- DM Piping & Nozzle Weld Exams
- Foreign Object Tracking System (FOTS)
- Head Examination and Repair
- Manual & Automated ISI Exams
- Modeling and Simulation (Inspection Design & Qualification)
- Multi-Functional Underwater Inspection System SUSI
- Nozzle Examinations With NPM
- RPV, BMN & RVCH Nozzle Exams
- Steam Generator Inspection and Repair (RANGER)
- Thermographic Techniques (Passive, Flash, Vibro and Laser Thermography)
- Vessel Examinations

NSSS PARTS & ASME CODE
- Critical Plant NSSS Spares
- Pressurizer Heaters

PUMPS
- AREVA Inc. Pumps & Motors
- AREVA/ASCO Hydromotor Parts & Services
- Field Service Support on Pumps, Motors and Seals
- Motor Internals Video Inspection
- New Component Replacement
- Primary & Auxiliary Motor Refurbishment
- Primary & Auxiliary Pump Refurbishment
- Pump & Motor Asset Management Services
- Reactor Coolant Pumps & Motors
- Total Motor Solutions
- Vibration Analysis

RADWASTE SOLUTIONS
- Cartridge Filters
- Disposable Media Filters
- ResinTech - Ion Exchange Resins and Products

REFUELING & OUTAGES
- Advisory or Turnkey Services
- Blind Flange
- Cavity Decon
- Control Room, Tool Repair and Maintenance
- Core Verification
- Crane Operations
- CRD (Replacements and Maintenance)
- Fuel Handling and Fuel System Maintenance
- Fuel Pool Cleanup
- In-Core Detector and Seal Table Services
- In-Site 360
PWR Products & Services
- In-Vessel Visual Inspection (IVVI) SUSI Robot
- Integrated Head Assembly Support
- New Fuel Receipt
- Other Support Such as Crane Operators, FME, Decon
- Outage Optimization
- Outage Optimization Preparation Assessment
- Pool to Pad Services
- Reactor Services Tool Refurbishment
- Reactor Vessel Disassembly / Reassembly
- Reactor Vessel Head Penetration Inspection Services
- Reactor Video Services
- Refueling Advisory Project Management and Outage Services
- Refueling Equipment Maintenance & Support
- Refueling Equipment Upgrades
- Refueling Existing Equipment Modifications
- Refueling Floor Management
- Refueling New Equipment Replacement
- RVCH Component Replacement
- Thimble Tube Cleaning
- Training Services
- Used Fuel Movement

STEAM GENERATOR SERVICES
Primary Side Activities
- Eddy Current Data Acquisition, Data Analysis & Data Management
- Flange Facing of Gasket Seating Surfaces
- In Situ Pressure Testing
- Manway / Closure Removal, Installation & Machining

Secondary Side Activities
- Foreign Object Tracking System
- FOSAR
- Inner Bundle Flush (IBF)
- Mobile Acquisition Trailer
- Upper Bundle Flush (UBF)
- Visual Inspections
- Water Lancing

Steam Generator Engineering
- CMOA
- Deposit Mapping
- Nuclear Grade Air Trap (NGAT)
- Tube Integrity & Analysis

VALVES, ACTUATORS, PARTS & DIAGNOSTICS
- Anderson Greenwood Crosby (Yarway) Valves
- ASCO Hydromotor® Actuators and Parts
- ASCO Hydromotor® Training Program
- ASCO Pressure/Temperature Switches
- ASCO Solenoid Valves (Nuclear and Commercial)
- Fluid Sealing Products (LATTY)
- Limitorque Actuators, Parts, and Motors
- Nuclear Grade Air Traps
- Powell Valves
- UltraCheck Valve Diagnostics
- Valve Enhancement Program
- Valve Packing Monitoring Device
- Velan Valves

Used Fuel and Radwaste Storage and Transportation
AREVA TN
- Ancillary Equipment
- Civil/Structural Design of the ISFSI Including:
  - ISFSI Site Layout
  - ISFSI Site Backfill, Grading and Drainage
  - Heavy Haul Path Evaluation Including Buried Utilities
  - Seismic Soil-Structure Interaction (SSI) Analysis of the Reinforced Concrete ISFSI Pads
  - Design of the ISFSI Storage Pads and Approach Aprons
- Civil/Structural, Electrical, and Fire Protection Design of the ISFSI Equipment Building
- Design, Fabrication, and Licensing of Used Fuel and Radioactive Waste Management and Transportation Systems
- Electrical, I&C, and Security Design of the ISFSI and Protected Area Expansion Including:
  - Electric
  - Power
  - Grounding
  - Lighting
  - Temperature Monitoring
  - Security Systems
- Engineering for Upgrades to the FB Cask Handling Crane for Compliance with NUREG-0554 and NUREG-0612
- Evaluation of the Fuel Building as Required to Support Used Fuel Dry Storage
- Feasibility Studies, Specification and Development
- Geotechnical and Geophysical Evaluations
  - ISFSI Site and Haul Path
  - Soil Exploration and Testing
  - Ground Penetrating Radar (GPR)
- Horizontal Storage Module - HSM/H/HSM-HS
- Hose in Hose Piping
- ISFSI Fabrication Oversight Support
- NUHOMS® 32PTH/32PTH Type 1 Dry Shielded Canister
- NUHOMS® 37PTH Dry Shielded Canister
- NUHOMS® 61BTH Dry Shielded Canister
- NUHOMS® 69BTH Dry Shielded Canister
- NUHOMS® EOS 89BTH Dry Shielded Canister
- NUHOMS MP197HB Transport Cask
- NUHOMS® OS-200 Transfer Cask
- NUHOMS® Transfer System
- NUHOMS Radwaste Containers
- Plant Modifications and ISFSI Implementation
- Pool to Pad Services
- Project Management, Licensing, Security System, Quality Assurance
- RAM Cask Plus
- Standard Lifting Yoke
- Structural, Thermal, and Nuclear Analysis and Drafting of the NUHOMS® System
- TN-LC, A Type B(U)F Transport Package
- Turnkey Services (Engineering, Construction, Operations)
- Uranium Slurry Container
As a world leader in nuclear power, AREVA in North America (AREVA Inc.) combines U.S. and Canadian leadership to provide utilities with proven expertise and uncompromising dedication to safety in every stage of the nuclear fuel cycle, reactor design and construction, and operating services. AREVA also invests in renewable energies to develop, via partnerships, high technology solutions. Through the complementary nature of nuclear and renewables, AREVA’s nearly 5,000 U.S. and Canadian employees contribute to building tomorrow’s energy model: Supplying the greatest number of people with energy that is safer and with less CO₂.

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