Core Design, Core Monitoring and Safety Analysis
ARCADIA® Code System with Graphical User Interface

Efficient, flexible core design and reliable operation of pressurized light water reactors

Background
Safety demonstration, fuel management and operation of nuclear power plants are facing a more demanding economical and regulatory environment. In this context it is vital to apply the latest codes and methods to improve margin management while meeting new safety requirements and securing operational flexibility.

Technology for your needs
ARCADIA® stands for flexibility, reliability and accuracy.

The basis for this is our unique qualification database that covers a wide range of parameters, like:

- Proprietary measurements at labs and research facilities
- Special measurements at reactors supplied with AREVA fuel worldwide
- An extensive set of measurements covering slow and fast reactor transients in a variety of reactor types

A comprehensive user environment integrates all ARCADIA® components and facilitates the handling of the code system.

Capabilities
- ARCADIA® covers numerous engineering activities from nuclear fuel assembly design to safety analyses
- Integrated code system for consistent steady-state and transient evaluations
- Full core 3D pin-by-pin neutronics, thermal-hydraulics and thermal-mechanical analysis
- Coupling with thermal-hydraulic system codes like CATHARE-2 and S-RELAP5 to enable industrial use of advanced methodologies

Flexibility
ARCADIA® allows a more flexible operation of your plant. Load follow operation and even end-of-life scenarios can be described better, thanks to an extended nuclide chain, up-to-date nuclear data and an advanced xenon model.

Reliability
ARCADIA® gains reliability by using first principle physics. This reliability allows the optimization of your fuel cycle costs. It covers high burnup applications, demanding core designs, including MOX and ERU applications and advanced burnable absorber designs. State of the art CRUD evaluation can be performed with dedicated modules.

Accuracy
Reactor analyses with ARCADIA® allow realistic modeling assumptions and maximize the accuracy of core models.
**ARCADIA® Main Components**

**APOLLO2-A: Versatile spectral code**
Advanced 2D multi-assembly lattice physics for
• Nuclear fuel assembly design
• Reflector modelling
• Generation of nuclear data for ARTEMIS™

**ARTEMIS™: Powerful core simulator**
3D nodal core simulation with pin-power reconstruction and microscopic depletion
• Thermal-hydraulic subchannel code COBRA-FLX™ integrated
• Full core pin and sub-channel wise steady-state and transient neutronic and thermal-hydraulic evaluations
• Direct coupling to established plant system codes CATHARE-2 and S-RELAP5

**ARGOS™: Online core monitoring system**
Complete and consistent core monitoring and operation strategy generation
• Adaptable to specific customer needs
• Designed for use with ARTEMIS™; use of other core simulators is supported as well

**LADON™: Comprehensive user environment**
Management of complete analyses, providing
• Templates and tools for automation to increase efficiency and avoid input errors
• Detailed result evaluation and visualization – from tables to 3D core view

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**Your benefits at a glance**

• Optimization of plant utilization, gain of margins and extended operational flexibility due to high accuracy and reliability
• Meeting current and emerging safety requirements, as ARCADIA® allows minimizing unrealistic assumptions and maximizing accuracy
• Improved margin management due to the fully consistent description of steady-state and transient application modes
• AREVA provides plant specific ARCADIA® implementation and customer training to consider your specific needs

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**AREVA NP**
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