framatome

FIDMS

PWR Core Monitoring System

Efficient, centralized core performance system provides better data and saves time

Challenge

Monitoring the reactor core and related activity is a crucial part of a plant's safety, efficiency and performance overview. Reviewing and analyzing data from the past, in real time and for future use is not always available and is frequently decentralized and complex, causing loss of time and budget as well as increased human performance events and errors. Plants need monitoring systems that are safe, reliable and automated, yet improve assessments and predictions for better efficiency.

Solution

Comprehensive Support

Framatome's FIDMS core monitoring system continues in the tradition of our successful POWERPLEX system for BWRs and POWERTRAX system for PWRs by providing core performance overview — past, present and future — simplifying and centralizing data collection. FIDMS ensures time and cost savings, increases plant efficiency and reduces human performance events.

FIDMS is a comprehensive system supporting B&W plants, designed to assist personnel in performing core monitoring and other required reactor operational calculations. FIDMS provides the utility with automatic online core follow calculations that give operators an instant assessment of real-time core safety limits. The system tracks past and present plant operation and predicts future requirements for full and partial power maneuvering along with required technical specification compliance calculations for shutdown margin and estimated critical conditions. The Operating Strategy Generator (OSG) predicts future operating conditions by specifying the desired combination of boron, rod positions, offset conditions and core power versus time for power maneuvers.
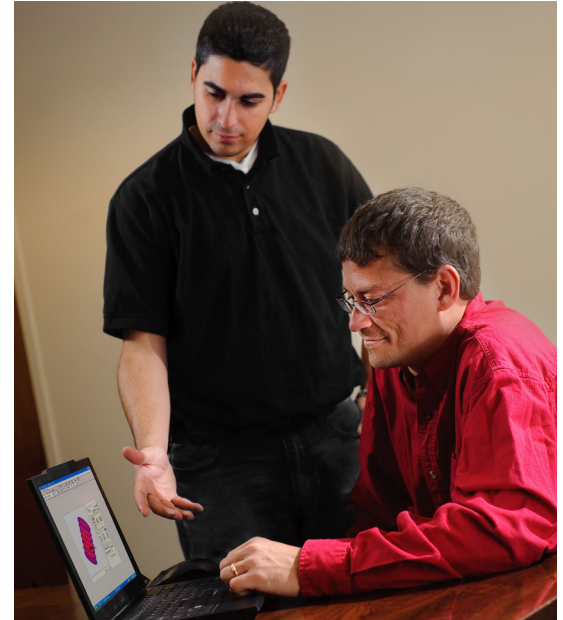
Customer benefits

- Thermal limits compliance automatically monitored
- Flux maps taken and processed during "near" transient conditions
- Quick assessment of explicit core power distribution resulting from planned plant maneuvers
- Improved Estimated Critical Predictions (ECPs)
- Reduction in time to return to full power
- Reduction in errors, condition reports and human performance events
- Reduction in boron processing load through optimized power maneuvers
- Information regarding reactor conditions

## Your performance
is our everyday commitment

FIDMS also allows users to:

- Satisfy core surveillance requirements
- Process fixed incore detector data
- Perform excore-incore detector calibrations
- Perform startup estimated critical condition calculations (with follow-up actual startup critical conditions)
- Consolidate core-follow functions (isotopics tracking, core parameter trending, reactivity reports)

Saving Time and Money

The FIDMS core monitoring system helps customers save time and money with support functions that provide a centralized collection of data and data processing programs — eliminating peripheral data calculations previously done off-site or on separate computers. These functions include:

- Estimated critical condition calculations to predict critical rod or boron concentrations accounting for time-dependent poisons
- Shutdown boron concentration calculations
- Reactivity monitoring comparisons with measured, calculated and predicted boron concentrations with comparisons at-reactor and hot full power all rods out conditions
- Pre-calculated data display including data from the startup and operations report and plant curvebook
- Isotopic accounting reports
- All modules utilize the same calculational model and feed off a common set of data
- All modules are accessed from a single code system and feature user-friendly graphical user interface
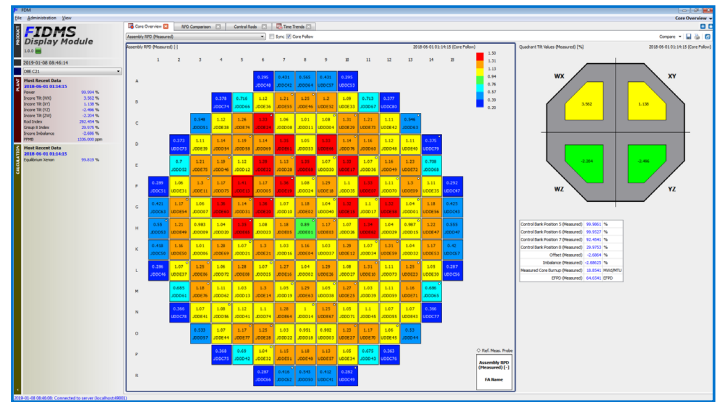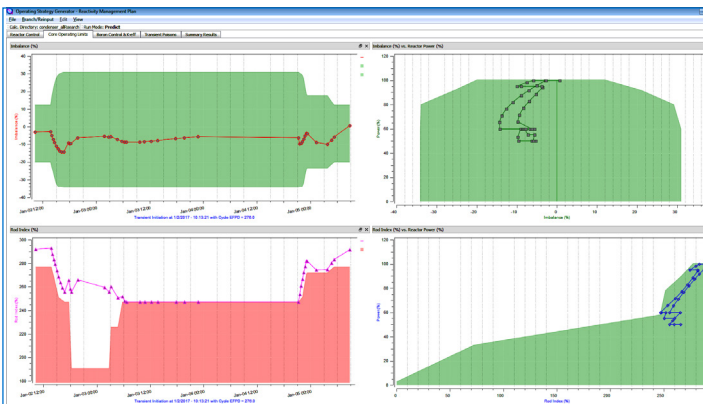
Always Prepared

The Operating Strategy Generator (OSG) function of the FIDMS system models reactor behavior through future anticipated transients — allowing customers to be prepared for the unexpected. The OSG function can also assist plant personnel in maximizing the use of control rods during a planned maneuver — minimizing the amount of waste water processing necessary which ultimately results in reduced dose for personnel. OSG determines the appropriate amounts of boron and corresponding control rod positions necessary to maintain the plant in the desired axial core power tilt and other specific requirements. The OSG may run in the optimize or predict mode.

Optimize Mode (First Pass Solution)

- User describes reactor power profile and desired rod or boron conditions
- OSG determines where calculations are needed and sets up and executes the required cases
- Simple critical search calculations (rod or boron) performed through the user-defined transient

Predict Mode

- User inputs the desired power profile
- Determines the "best" operating strategy (control rod and boron conditions) subject to technical specification constraints and user-defined parameters
- Output display functions show reactor conditions and Axial Offset through the transient

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