

FIDMS

PWR Core Monitoring System

AREVA Solution

AREVA'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 – by simplifying and centralizing data collection. FIDMS ensures time and cost savings, increases plant efficiency and reduces human performance events.

Comprehensive Support

The FIDMS system is a comprehensive system supporting B&W plants, designed to assist reactor personnel in performing core monitoring and other required reactor operational calculations. FIDMS provides the utility with automatic on-line core follow calculations that give operators an instant assessment of real-time core safety limits. The system uses frequent on-line core follow calculations to track past and present plant operation and predict 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. 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-on actual startup critical conditions)
- Consolidate core-follow functions (isotopics tracking, core parameter trending, reactivity reports)



Features and Benefits

- Thermal limits compliance can be automatically monitored
- Flux maps can be 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 is readily available from multiple locations

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

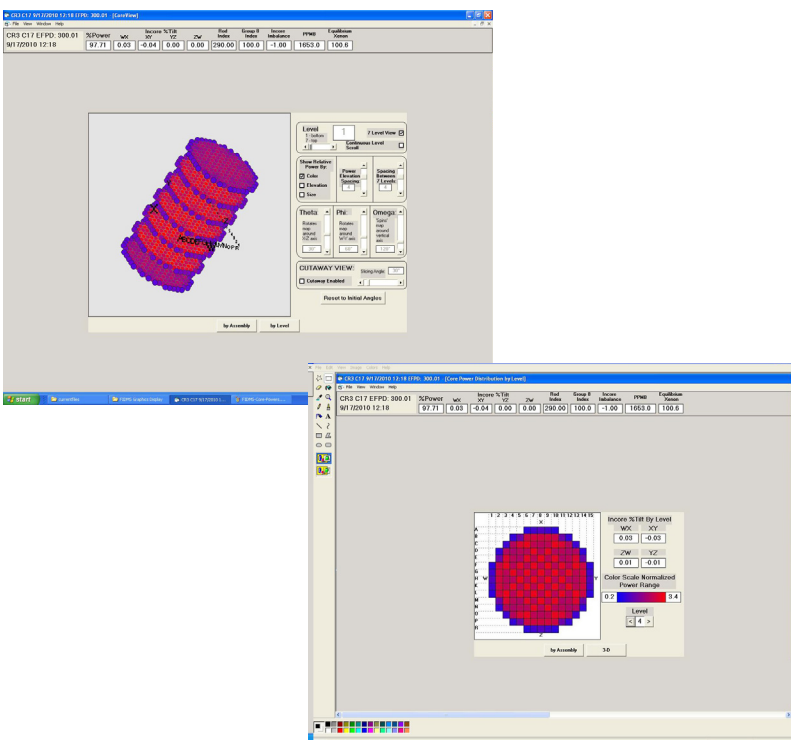
The Operating Strategy Generator (OSG) function of the FIDMS system models reactor behavior through future anticipated transients — allowing customers to be prepared for the unexpected. The OSG function can also assist plant personnel in maximizing the use of control rods during a planned maneuver — 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 AO through the transient



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