# Studsvik

MARLA

Shuffle Design, Pool Management, Cask Loading, and Nuclear Material Tracking

MARLA is an easy-to-use, highly automated tool for helping operations staff plan a fuel shuffle, manage the spent fuel pool, and load dry casks. MARLA addresses the industry needs related to fuel movement activities by fully integrating state-of-the-art analytical solutions to support plant operations.

One Tool for All Your Needs

- Replace unsupported home-grown tools
- Plan fuel shuffles in minutes
- Manage fuel pools with the click of a button
- Design cask loading campaigns with ease
- Dramatically reduce planning time and outage costs
- Reduce the need for valuable engineering resources to perform administrative tasks
- Configuration control reduces human performance errors
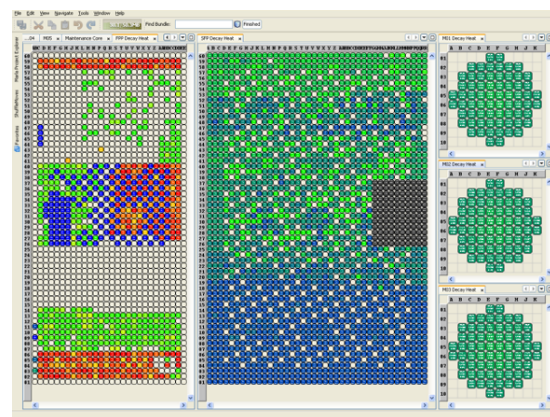
Spent fuel pool and cask loading overview interfaces in MARLA

Time-To-Boil

MARLA's site configuration tracking allows for best estimate time-to-boil calculations during core alterations. The explicit decay heat from each fuel assembly on site is determined on-demand, providing updated heat loads for the core and pool as the shuffle progresses. Each heat exchanger is modeled as in- or out-of-service, providing different scenarios for analysis.

MARLA makes shuffle planning, pool management, and cask campaigns point-and-click easy with the power of SIMULATE.
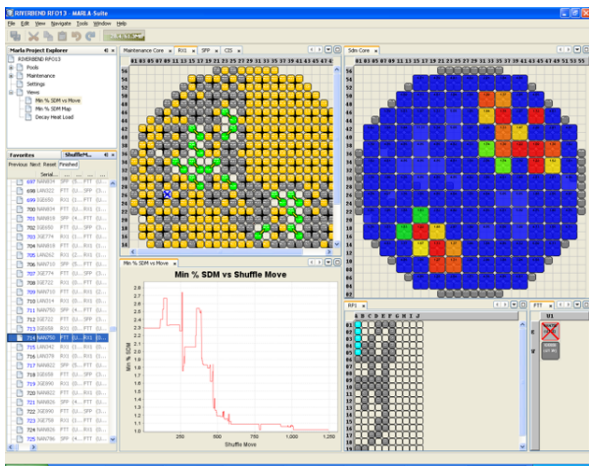
Core shuffling and SDM Calculations in MARLA

Point. Click. Done.

MARLA uses point-and-click graphics for quick and easy definition of all maintenance work scheduled to take place during the refueling outage. Drag-and-drop functionality allows users to easily make modifications to any automated sequence and accelerates the training of new personnel. Built on a solid foundation of Java, MARLA supports multiple screens, docking and undocking of various windows showing the core, the pool, and casks.

Shuffle Planning

- MARLA uses a Greedy algorithm coupled with Taboo search to design an in-core fuel shuffle that minimizes bridge motion while maximizing safety margin and reducing calculation time. MARLA performs in a few minutes what is otherwise an overnight calculation.

- MARLA also provides automation to design a full core off-load in lieu of an in-core shuffle.

- Automated licensing-grade shutdown margin calculation at each step. No working knowledge of SIMULATE required.

Maintenance Work Planning

- Staging the core for maintenance work is performed automatically by MARLA's optimization algorithm.

- For BWRs, a single, interactive maintenance canvas allows the user to specify tasks such as:

    - Control blade replacement

    - Detector replacement

    - Assembly inspection, sipping, or rechanneling

    - In-vessel visual inspection work

Pool Management

- MARLA automatically satisfies all rack restrictions while selecting locations in the fuel pool for fuel storage.

- MARLA allows the user to manage the contents of the spent fuel pool between outages. The user can easily rearrange the contents of the pool or subdivide the pool into different storage zones.

- MARLA stores the moves in a database and generates the corresponding move sheets for the bridge operators.

- MARLA features an automated implementation of the US NRC B.5.b guidelines for spent fuel storage; automatically arranging the pool to open spaces in a user-specified pattern using cooling times to define hot and cold assemblies.

Dry Cask Campaign Planning

- MARLA can automatically select assemblies for dry cask storage while taking future pool storage needs into account.

- MARLA contains an internal library of cask designs from which the user can choose. The software plans the loading of assemblies into casks well into the future to ensure the plant can fully load all casks safely without violating heat load limits.

Surveillance Mode

- MARLA's surveillance mode allows operators to electronically assign date and time stamps to each move as it is initiated and completed. Personnel can view the status of the fuel movements using a standard browser.

- Deviations from the pre-planned design are accommodated, which allows MARLA's surveillance mode to maintain a real-time configuration of the special nuclear material on site.

Unparalleled Customer Support

Studsvik's technical support is built on putting the needs of its customers first.

- 24-hour response time

- Easy ticketing system

- On-line support portals

- Access to technical documentation

- Active and growing user communities of practice

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