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Update...

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A View from the President's Desk ... *Prudent Fuel Management*

Rodney L. Grow, President

With the continuing consolidation among electric utility companies and fuel suppliers coupled with the loss of experienced personnel and the short supply of new talent, the need for independent fuel management and reload design oversight increases. Both the consolidation of product lines and analysis methodologies complicates utility evaluation of alternative fuel utilization strategies along with the reload design and safety analysis process. URA has some great ideas to help utilities deal with these problems.

- Reload Design Process Assessments
- Independent Analysis of Industry Issues
- Independent Fuel Management Plans
- Vendor Technical Evaluation and Assessment of the Reload Core
- Methodology Independent Reload Design Graphical User Interfaces (GUIs)

The reload design process should be periodically assessed with the goal of process improvements via the identification of strengths and weaknesses, inefficiencies, methodology enhancements and relevant industry practices. This periodic process assessment is beneficial for any utility involved in the reload design process. See page 2 for more discussion of this idea.

The ability to analyze and understand emerging industry issues is essential for effective fuel management. In URA's REA Analysis discussion on page 2, the current industry issue on the applicable calories/gram limit for Rod Ejection Analysis is independently evaluated using state-of-the-art tools by URA as part of an industry wide effort.

Rod Grow

In either the case of a fuel vendor performing all reload design activities or the utility sharing the design responsibilities while using the vendor's methodology, a periodic independent multi-cycle fuel management evaluation should be performed. These ideas are presented in more detail on page 3 of this issue.

When a fuel vendor provides the reload design and safety evaluation analysis of record for a plant, the utility needs to understand the tradeoffs between efficient designs and safety margins, and to understand the cause and effect relationships between fuel design and core performance. Our vendor technical evaluation services address this need as discussed on page 3.

Reload design process improvement and the ability to examine many loading patterns quickly is the motivation behind a reload design GUI. URA's reload design GUI is methodology independent and is discussed on page 4.

Current Projects in Brief:

- IBM mainframe analysis codes converted to PC for Oyster Creek
- Crystal River Core Physics Workstation (CPW) with interface to Framatome's NEMO code
- Excel Object Linking and Embedded (OLE) methodology used for CPW
- Training and analysis support for Oyster Creek transition
- Calvert Cliffs Reload Design Process Assessment

Inside this issue:

Reload Design Process Assessment

Working with utility staff to assess reload design processes

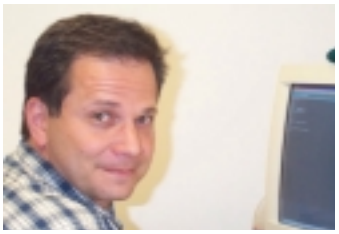
Is your reload design process efficient, technically up to snuff and does it have the appropriate interfaces and controls? These are the types of questions addressed by URA's independent assessment services. Whether the reload design and safety evaluation is performed in-house by the utility staff, by the fuel vendor or some combination of the two, URA's process assessment can identify potential enhancements, cost reductions and technical improvements.

URA has a long history of providing Program Plans to develop new capability and providing assessments of existing reload design processes. URA's familiarity with all US fuel vendor reload design and safety evaluation methodologies plus our hands-on experience with BWR and PWR fuel designs provides a solid foundation for these consulting services. For more information on this service, contact Rod Grow (rlgrow@urac.com).

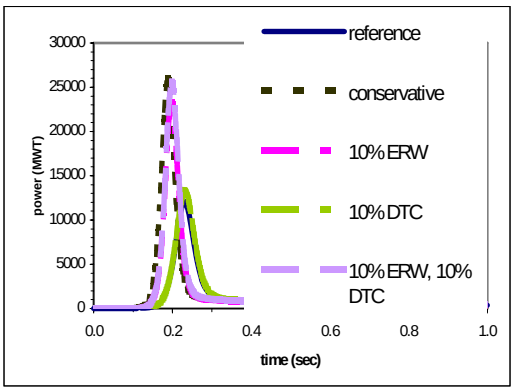
REA Analysis

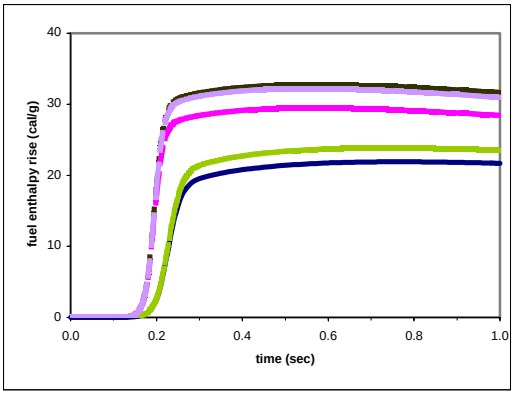
"In the mid 90's, tests performed at Cabri indicated that the failure threshold for highly burned fuels was lower than originally assumed."

URA has been supporting NSP in their participation in the robust fuel program group. This industry wide effort aims at addressing the possibility of high burnup fuel failure during a postulated PWR Rod Ejection Accident (REA). In the mid 90's, tests performed at Cabri (France) indicated that the failure threshold for highly burned fuels was lower than originally assumed. This finding triggered a series of other experiments and analyses in order to help regulatory bodies all over the world reassess the safety and reliability criteria for addressing REA's. The US NRC is soon expected to issue their new standard. It is anticipated that the fuel failure threshold will be burnup dependent, lowering as the fuel exposure increases. The immediate consequence would be a new methodology required for addressing REA's for future reloads, especially for long cycle cores. Instead of waiting for the NRC's ruling, a group of interested participants decided to address the REA event with modern methodology and tools. The use of a three-dimensional transient simulator allows a considerable reduction in the conservatism of the simulation. Also expected to be part of a new REA methodology is a probabilistic approach so that extremely conservative (and very improbable) situations can be eliminated. Based on a CORETRAN model for Prairie Island, URA has explored a series of REA scenarios, investigating the sensitivity of the simulation to factors like rod worth, Doppler coefficient, Beta, and time step size. Reactivity insertions above $2.00 have been explored. CORETRAN has the capability of predicting fuel enthalpy rise not only at a nodal level but also in an individual pin. This increased detail is expected to become the standard for all modern REA methodologies. For more information on this analysis, contact Antonio Dias (afdias@urac.com)



Antonio working on the REA analysis

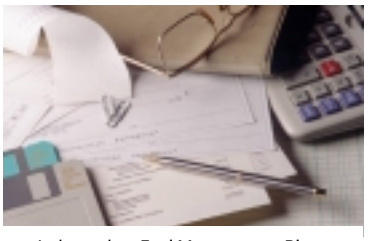




Independent Fuel Management Plans

The best choice for feed enrichments, split batches and burnable poison designs must be evaluated periodically on a multi-cycle basis. The evaluation should consider fuel utilization, design margin, risk minimization to fuel issues (e.g., Axial Offset Anomaly and Incomplete Rod Insertion) and overall fuel economics.

Independent evaluations should be performed every few years by both an independent methodology and an independent organization. URA has the experience and methodology via its Core Physics Workstation utilizing the new EPRI state-of-the-art physics methods in combination with Excel economic worksheets to provide these independent multi-cycle evaluations. URA's Fuel Management Plan capability is "ready to go" for all PWR and BWR plants. For more information on this service, contact Kevin O'Sullivan (ko'sullivan@urac.com).



Independent Fuel Management Plans

Vendor Technical Evaluation

When the vendor provides the analysis of record for a plant, the utility needs to assure itself that the work being done is of the highest quality. The utility has to be certain that the analysis contains no significant errors and the design meets all requirements.

URA performs independent technical evaluations and assessments of the critical aspects of the core design and reload safety analysis at the fuel vendor's facility during the time the Reload Licensing Report is to be transmitted to the utility.

This work focuses on assessing the vendor's technical performance for a specific cycle reload, documenting the assessment for control of the reload design process, and evaluating whether the cycle reload design could be improved.

The scope of work includes preparation for the technical assessments, conduct of on-site inspection at the vendor's facility, and preparation of a report to include an assessment of the reload design conformance by the vendor.

These inspections are technical and performance based, with adherence to reload design procedures and methods examined. Safety related and other design parameters are examined and assessed as well.

A typical inspection includes examination of the following:

- Utility Project Organization Structure and Roles
- The plant's cycle requirements and plant changes
- Vendor Reload Design and Safety Analysis Process
- Methodology (Procedures, Codes and Versions)
- Examination of Design Record Files
- Behavior of Physics Parameters
- Core Performance vs. Expectations
- Cycle specific event analysis versus bounding values
- Current Industry Problem Evaluation
- Risk Assessment

Additional attention is given to the changes and revisions since the previous cycle design process because processes that have changed are more prone to error than those that have not changed.

To facilitate these evaluations URA has signed three-party proprietary agreements with the fuel vendors and utilities.

A utility engineer familiar with plant data and fuel requirements usually accompanies the URA team during an inspection. This person can then verify plant data, contact plant engineers to resolve data questions, and learn the inspection process for future cycles. For more information on this service, contact Rod Grow (rlgrow@urac.com).

"URA's familiarity with all US fuel vendor reload design and safety evaluation methodology ... provides a solid foundation for these consulting services."

Point Beach

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Methodology Independent GUIs

Can Graphical User Interfaces (GUIs) be independent of the analysis code methodology? YES! URA has done this for the reload design process. By automating the process on a functional basis, recognizing generic inputs and outputs, and using a widely used programming tool, URA's Core Physics Workstation (CPW) has set the standard.

CPW resides on a PC and interacts with a core 3D simulation code residing on either the same PC or across the network on a Unix platform. URA has implemented and delivered CPWs in both PC and PC/Unix environments which utilize fuel vendor or third party nodal codes. The motivation behind these BWR and PWR CPWs is reload process improvement measured by reduced engineering manhours, faster turnaround time, and fewer errors in the reload design process. For more information on our CPW, contact Kevin O'Sullivan (ko'sullivan@urac.com).