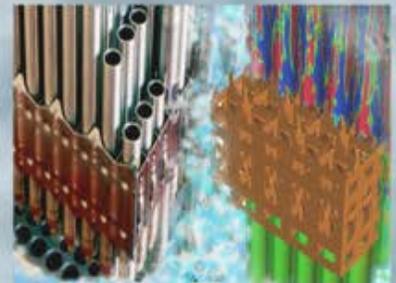
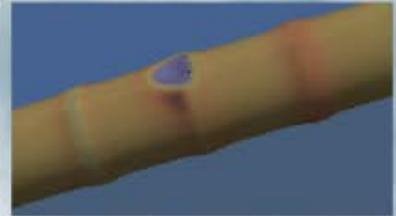
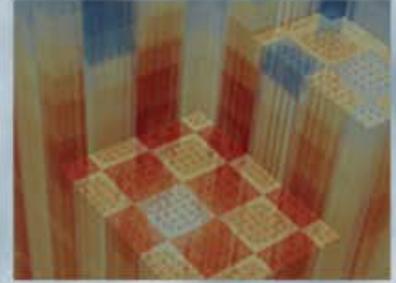


CASL Program Highlights March 2015

Douglas Kothe
Oak Ridge National Laboratory

March 31, 2015

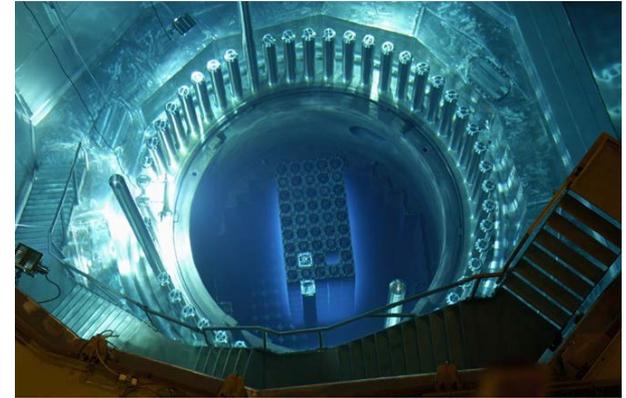


CASL Industry Council Meeting Highlights

Results and Industry Interests

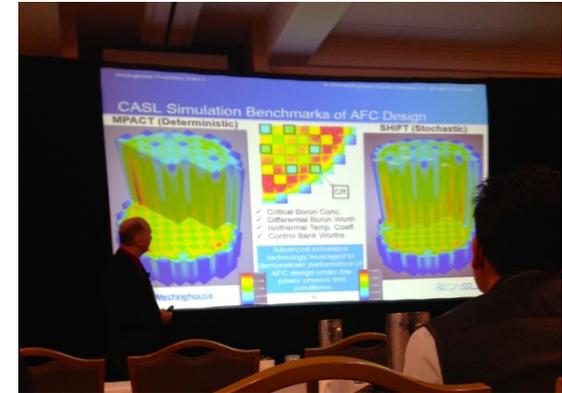
Mar 17-18, EPRI Offices, Charlotte, NC

- Industry Council meeting chaired by Scott Thomas, Duke Energy
- Eleven industry attendees
 - Five utilities (TVA, Duke, Dominion, Exelon, EDF), three fuel vendors, and two naval reactors represented
 - International participants from France and the UK
- Industry feedback highlights
 - CIPS/CILC modeling results of Seabrook Cycle 5 CILC failure was impressive
 - Duke and Exelon stated intent to share data for validation exercises
 - EDF expressed interest to benchmark VERA to their models
 - Validation and verification for the VERA tools is needed
 - Seek VERA applications that can provide demonstrable utility value



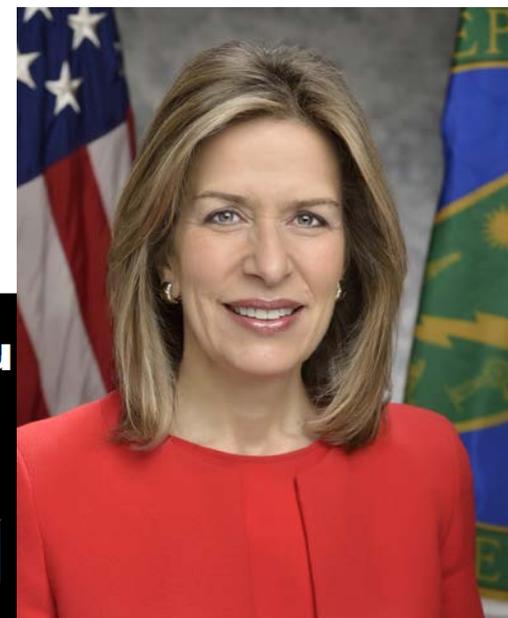
CASL Highlighted at Industry-Based Advances in Nuclear Fuel Management Conference, Mar 29 – Apr 1, 2015

- ANFM attendees represent a key target audience for CASL Developments
- CASL broadly represented in technical program:
 - Westinghouse highlighted applications to AP1000 in Plenary Session
 - CASL Director and Chief Scientist participated in panel session on future directions for fuel management analysis
 - Technical papers on uncertainty quantification, AP1000® applications, CRUD challenge problem, and COBRA-TF thermal hydraulics
 - First VERA workshop with 15 participants



CASL Director Doug Kothe Briefs DOE Deputy Secretary Sherwood-Randall

- CASL Accomplishments, Objectives and Phase 2 Outcomes Covered as part of March 12 ORNL Visit



CASL: Consortium for Advanced Simulation of Light Water Reactors

Mission

Provide leading-edge modeling and simulation (M&S) capabilities to improve the performance of currently operating light water reactors (LWRs)

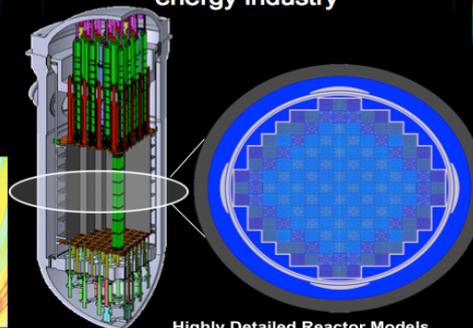
DOE's first Energy Innovation Hub

A unique partnership of government, industry, and academia



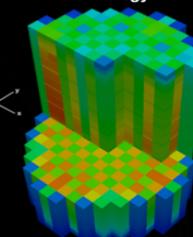
Vision

Predict, with confidence, the performance and assured safety of nuclear reactors, through comprehensive, science-based M&S technology deployed and applied broadly by the US nuclear energy industry

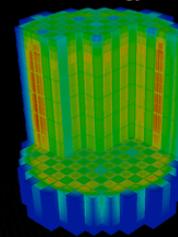


Developing, applying, and deploying the Virtual Environment for Nuclear Reactor Applications (VERA)

Industry technology



CASL technology



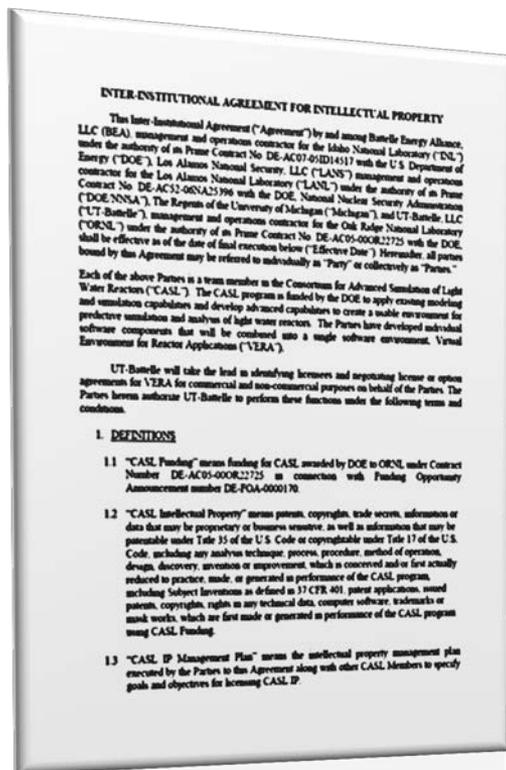
Simulated reactor core power distribution

Delivering high-fidelity predictions of core behavior in pressurized water reactors



Updates to Inter-Institutional Agreement for VERA Intellectual Property

- Modification Number 1 routing for execution
 - Acknowledges the Board of Directors' request to set aside a portion of VERA License Consideration for post-CASL entity usage
- Working on what a “sustainability model” looks like for post-CASL activities based on:
 - Feedback received from March Industry Council meeting
 - Examination of other relevant models to leverage in building foundation for post-CASL entity (e.g., RELAP, CalCharge, etc.)
 - Subsequent IIA modification will further address details of “sustainability model” as that model is further articulated



CASL's First VERA Hands-on Workshop Held at Advances in Nuclear Fuel Management Conference, April 1, 2015

- 16 attendees from around the world took advantage of the opportunity to experience VERA's advanced coupled simulation capabilities
- The workshop's "Quick-Start" tutorials are based upon previous CASL simulations of Watts Bar unit 1



Bob Salko (ORNL) worked individually with students as needed to ensure success



Andrew Godfrey (ORNL) provided instruction for the class on using VERA

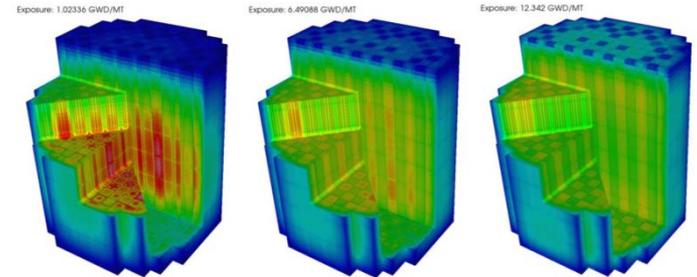
- The tutorials form the basis for future online self-training and additional in-depth classroom training on the VERA software
- The training courses are expected to increase the VERA user-base
- A dedicated 64-core training machine allows for mobility and later classes are planned at industry user sites

Workshop materials developed by
Rose Montgomery & Troy Eckerberry

CASL Milestones Delivered

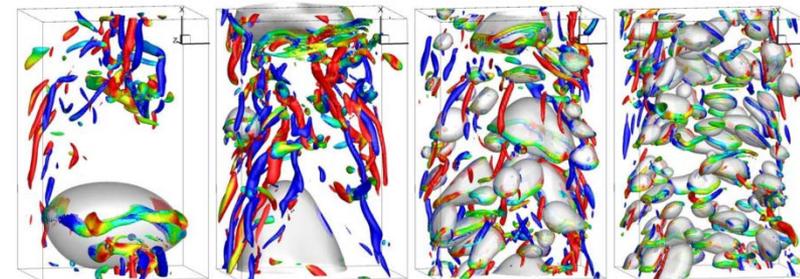
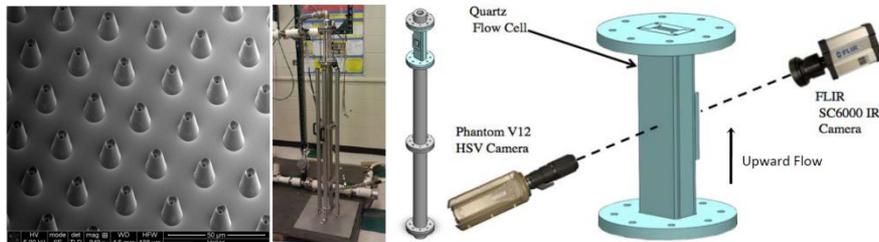
DOE Reportable Milestones

- ✓ Validate VERA-CS using the industry standard BEAVRS Cycle Depletion Benchmark Problem (FY15.CASL.003)
- ✓ Develop a preliminary deployment strategy for VERA that includes options for a post-CASL entity (FY15.CASL.004)



Other CASL Milestones

- ✓ Experimental Determination of the Effects of (Synthetic) CRUD on Subcooled Boiling
- ✓ Establish VERA documentation process and begin to improve VERA documentation.
- ✓ Prepare workshop content for AFMC (April 2015)
- ✓ Identify release candidates for VERA-EDU, schedule readiness review.
- ✓ ITM/DNS for high volume fraction bubbly flow regimes, machine learning for closure support - Phase I
- ✓ Complete PHI development activities on CFD interoperability
- ✓ Multi-Year Plan for Enhancing Turbulence Modeling in Hydra-TH



March 2015 VOCC Tours

- National Labs Commission
- Secretary General of the Korean Nuclear Safety & Security Commission
- Nuclear Energy Advisory Committee Facilities Subcommittee
- GE Power & Water
- Gary Mauldin, TVA

