

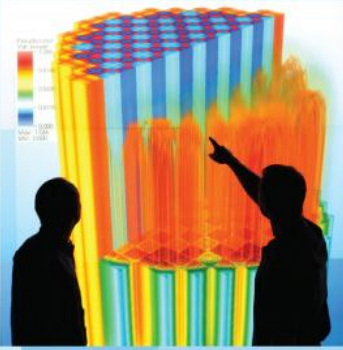
Power uprates
and plant life extension



CASL-U-2011-0049-000-a



Engineering design
and analysis



L2:VUQ.P2.03

Brian Adams

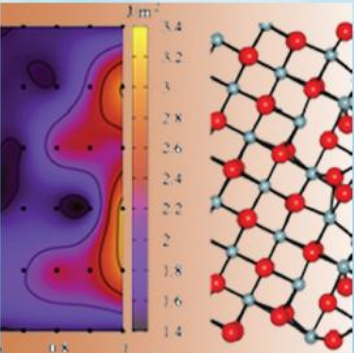
SNL

Completed: 3/31/11

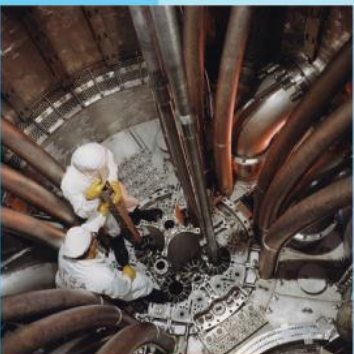
Science-enabling
high performance
computing



Fundamental science



Plant operational data



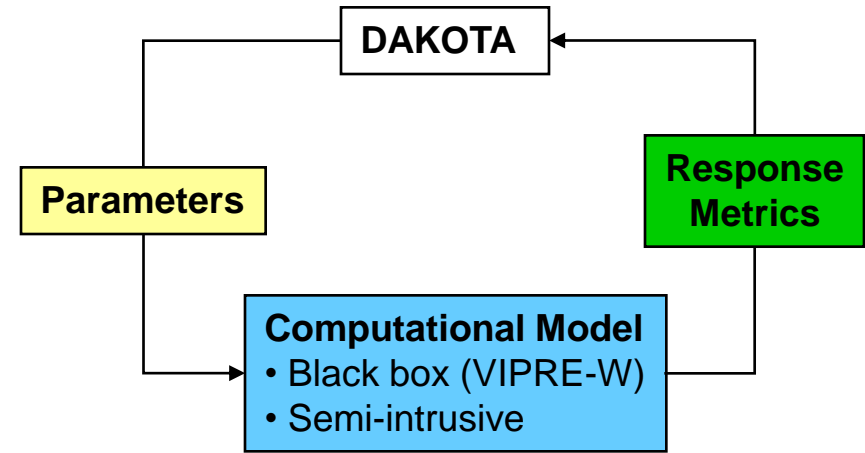
U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

VUQ: Achieving Credible, Science-Based Predictions

Milestone VUQ.Y1.03 (Enable SA/UQ Demonstrations in VERA)

- **Strategy:** Integrate SNL's *DAKOTA* UQ Toolkit with Westinghouse's *VIPRE-W* subchannel T/H simulator
- **Demonstration for CRUD/CIPS problem (quarter-core geometry):** Assess influence of core operating parameters on mass evaporation rate
- **Results:** Affirmed well-known sensitivity to temperature and exposed sensitivity to pressure. Boiling model parameters may dominate UQ *if not sufficiently informed by data*



VIPRE-W quarter-core geometry and axial layout
 (with 193 flow channels shown, 93 nodes in axial direction (not shown))

