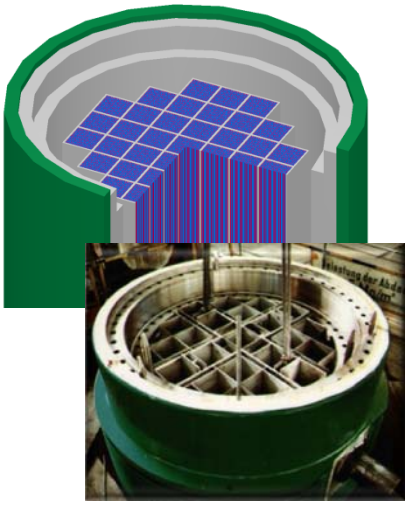
Nuclear Science and Technology Division

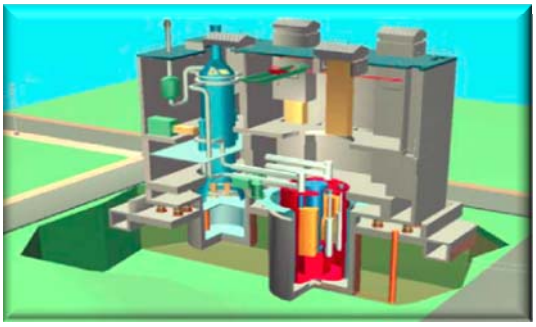
EES Energy and Engineering Sciences

http://www.ornl.gov/sci/nuclear_science_technology/

Nuclear Systems Analysis, Design, and Safety

ORNL is solving a wide range of critical problems in nuclear science and engineering technology through application of computational modeling, experiment design, and staff expertise with operating nuclear systems. State-of-the-art solutions are developed through integrated capabilities in these areas.



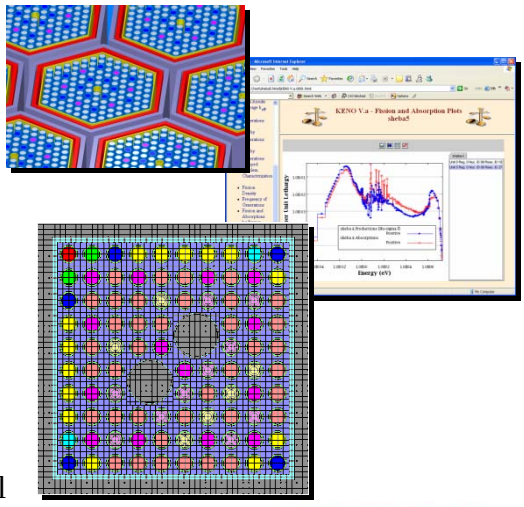


Nuclear Power

NSTD supports the design, operation, control, and safety of reactor systems through its focus on the development of next generation commercial reactors and space fission power systems. Capabilities include both analysis and modeling of reactor power systems combined with technology development and validation of such systems through unique experimental facilities. ORNL staff are currently supporting NASA, DOE, and NRC in areas ranging from advanced reactor concepts to regulatory support for current generation systems.

Nuclear Computational Methods

NSTD has earned a reputation for the development of internationally accepted state-of-the-art nuclear analysis tools for application to all areas of nuclear science and technology – from safety to safeguards, from nonproliferation R&D to isotope production, from shield design to reactor physics. The cornerstone of NSTD's computational methods is the SCALE system, which is capable of modeling all parts of the nuclear fuel cycle.

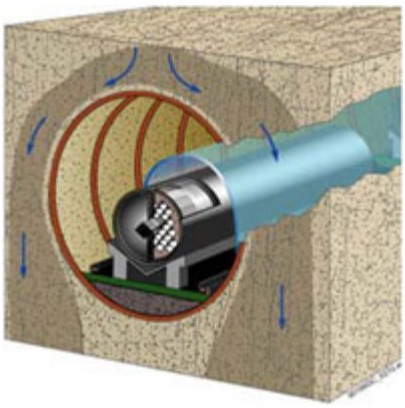


SCALE

NSTD

OAK RIDGE NATIONAL LABORATORY

MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY



Nuclear Safety

NSTD staff provide expertise in the resolution of nuclear safety issues through their experience in criticality safety, radiation protection and shielding, fuel and material performance, thermal hydraulics, and risk assessment.

Nuclear Research Support

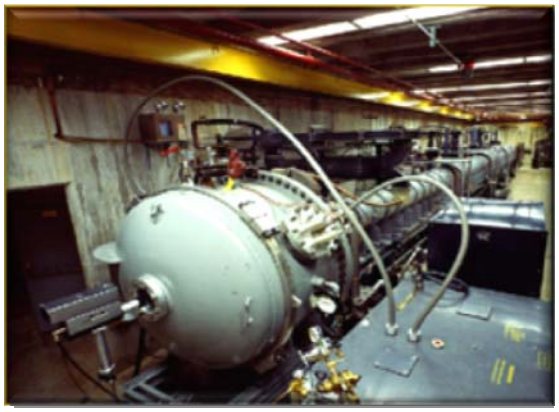
NSTD supports the Spallation Neutron Source (SNS), High Flux Isotope Reactor (HFIR), and ITER international fusion energy project for basic research on the nature of materials. Examples of support include expertise in simulating the interaction of radiation with materials, designing experiments to understand material performance in a nuclear environment, performing tests to investigate unique thermal-hydraulic phenomena, and performing analyses for radiation protection and shield design.

Nuclear Software and Data Distribution

The Radiation Safety Information Computational Center (RSICC) is an international center for nuclear software and data in radiation transport and safety. RSICC has 1700 software tools and serves over 11,000 scientists in 92 countries.

Nuclear Data

The Oak Ridge Electron Linear Accelerator (ORELA) is used to perform nuclear cross-section measurements and then subsequent analyses are used to produce Evaluated Nuclear Data Files (ENDF/B) for supporting nuclear applications. Tight coupling to NSTD application areas such as criticality safety and reactor physics ensures a comprehensive approach to the evaluation of the nuclear data and effective utilization of the data in computational methods.



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Energy and Engineering Sciences

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