

SUNRISE* -

Supporting the Nuclear Renaissance in the United States

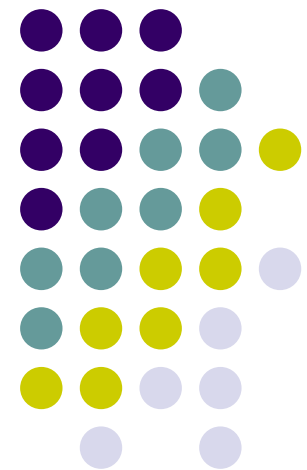
Mel Buckner

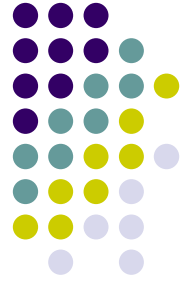
Interim Executive Director

2007 SEMA Conference

**The Nuclear Renaissance and Energy Independence:
Opportunities with New Missions at the Savannah River
Site and Beyond**

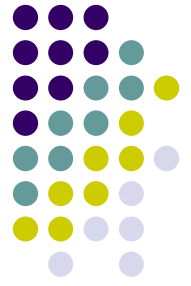
April 18, 2007





Outline

- What & Who is SUNRISE?
- SUNRISE Initiative
- Situation with NS&E Education
- Situation with Nuclear Infrastructure
- Status and Next Steps

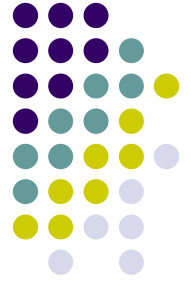


What is “SUNRISE” ?

- Regional concept to support the rebuilding of the nuclear industry in the U.S.
- A grass roots initiative of academia, industry, and government facilities across the southeastern region... and growing
- Focused on the horizon of next-generation nuclear education and research
- Addressing the needs of the growing nuclear workforce and technology of the emerging nuclear renaissance
- Will complement and supplement existing facilities and capabilities (university reactors, laboratories, etc.) in southeast.

SUNRISE – Supporting the Nuclear Renaissance in the US

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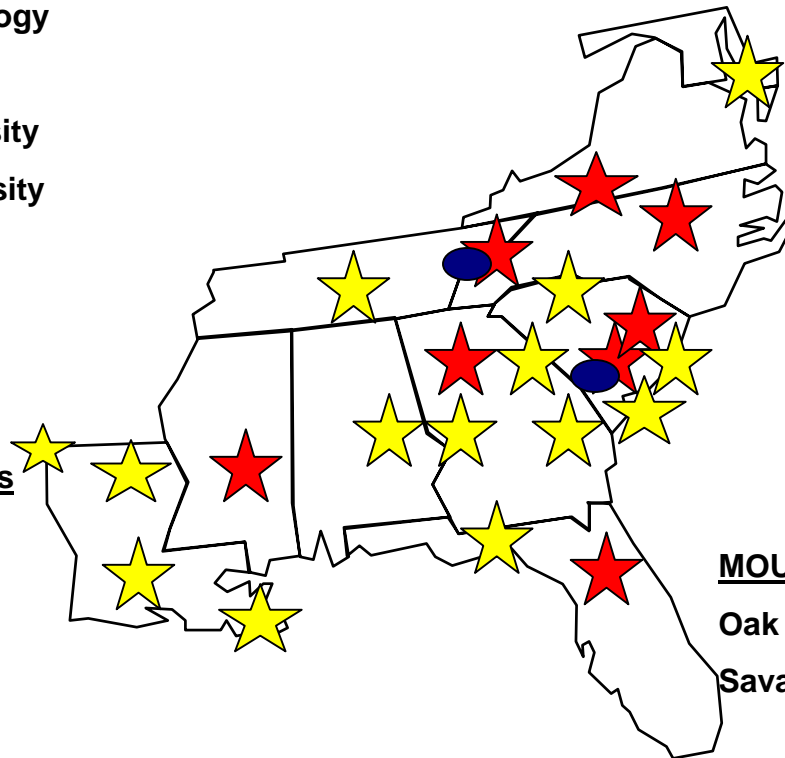


University Members ★

- Georgia Institute of Technology
- Mississippi State University
- North Carolina State University
- South Carolina State University
- University of Florida
- University of South Carolina
- University of Tennessee
- Virginia Tech

Potential University Members

- Clark Atlanta University
- Clemson University
- Francis Marion University
- Florida State University
- Louisiana State University
- Louisiana Tech
- Medical College of Georgia
- Medical University of South Carolina
- Tulane University
- Tuskegee University
- University of Georgia
- University of Maryland
- Vanderbilt University



Industry Members

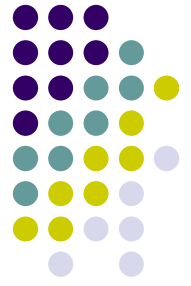
- Economic Development Partnership of Aiken and Edgefield Counties
- General Atomics
- AREVA
- Fluor
- South Carolina University Research & Education Foundation

MOU in development ●

- Oak Ridge National Laboratory
- Savannah River National Laboratory

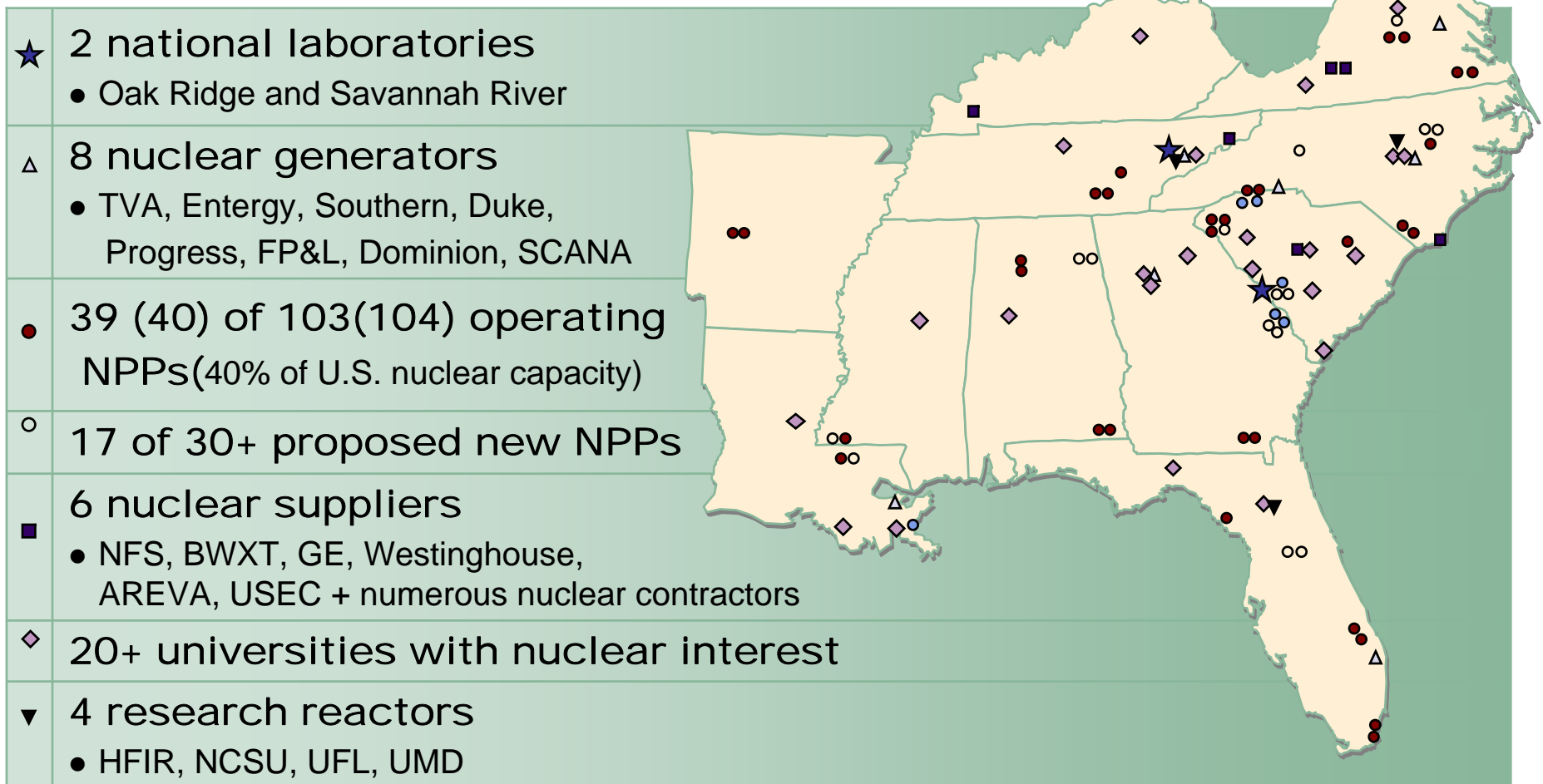
Board of Directors – 13 Members (currently); Farzad Rahnema (Chair), Paul Turinsky (Vice-Chair), Travis Knight (Secretary), Mel Buckner (Interim Executive Director)

Why “SUNRISE” in Southeast U.S.?



- Southeast US has the potential to be the center of a reinvigorated nuclear enterprise in the US.
- Utilities in the region are clearly committed to growing their nuclear generation component.
- Nuclear industry is well-represented in the region.

The Southeast Is Strategically Positioned To Support U.S. Nuclear Renaissance



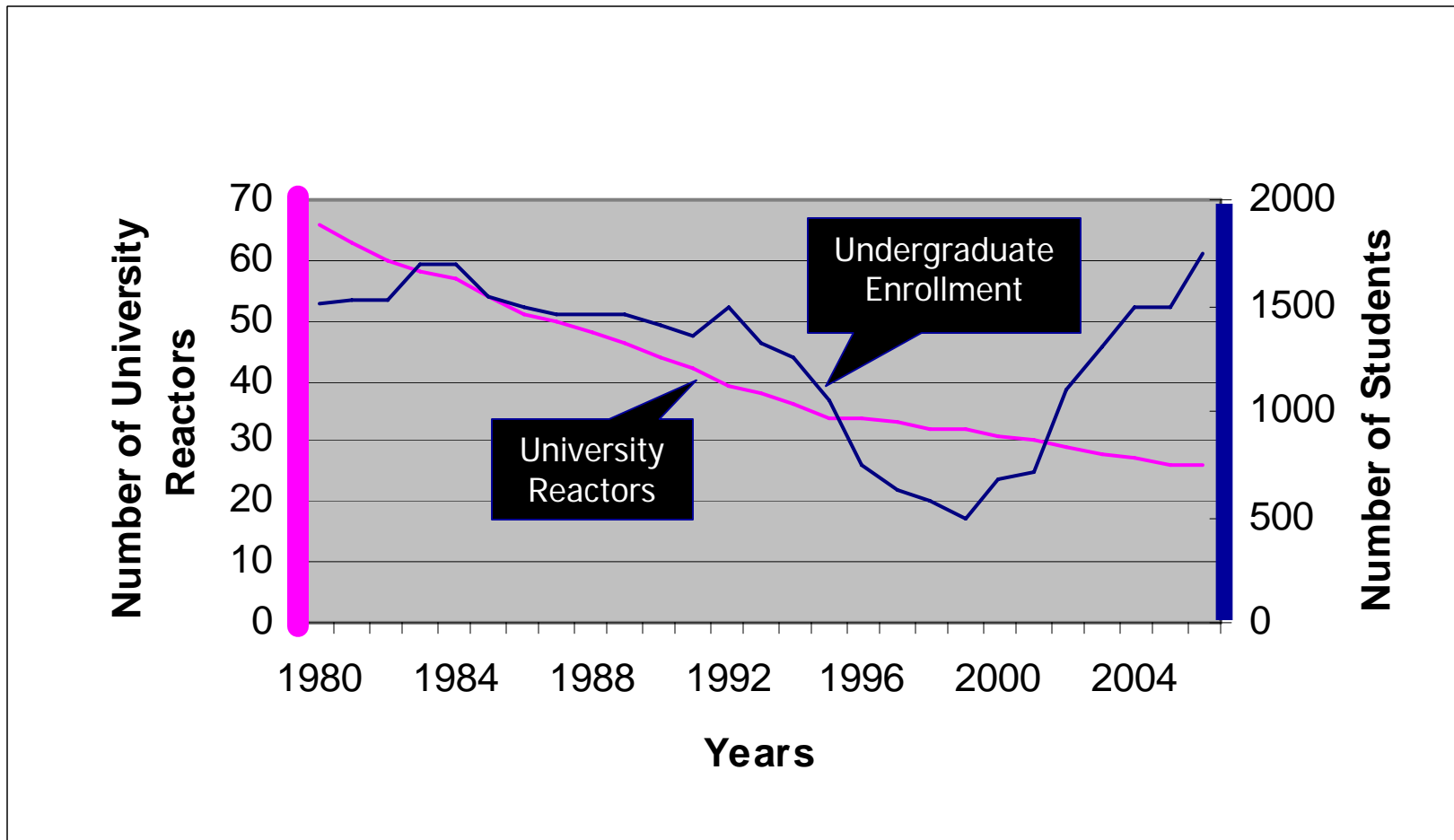
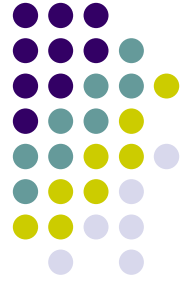
Original by ORNL



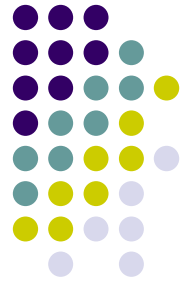
The Situation with Nuclear Science and Engineering (NSE) Education

- Reversal in the downward trend in Nuclear Engineering student enrollment – requires improved infrastructure in education & research
- Decline in the number of URRs ... from 66 in early 1980's down to maybe 26
- Universities have been forced to de-emphasize reactor-related course work
 - students receive degrees without hands-on reactor experience
 - facilities to support leading-edge research are limited.
- evaporating pool of nuclear workers – Engineers, Radiochemists, Health Physicists, and Rad Techs...
- Questionable ability of universities to field a growing workforce to support nuclear renaissance initiatives

Changes in Enrollment and Decline in University Reactors

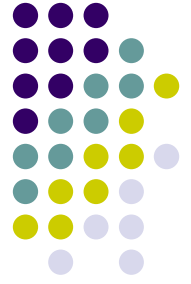


Status of Research Reactors in US



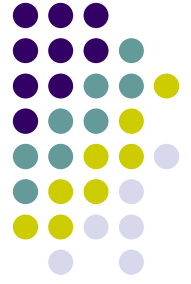
- More than half of all research reactors have been shut down since 1980.
- More than 80% of all research reactors are over 30 years old
- Most research reactors were designed for neutron applications research and are not capable of performing R&D or training for next generation reactors
- Only one new research reactor has been built in the last 20 years.

Status of Research Reactors in Rest of World



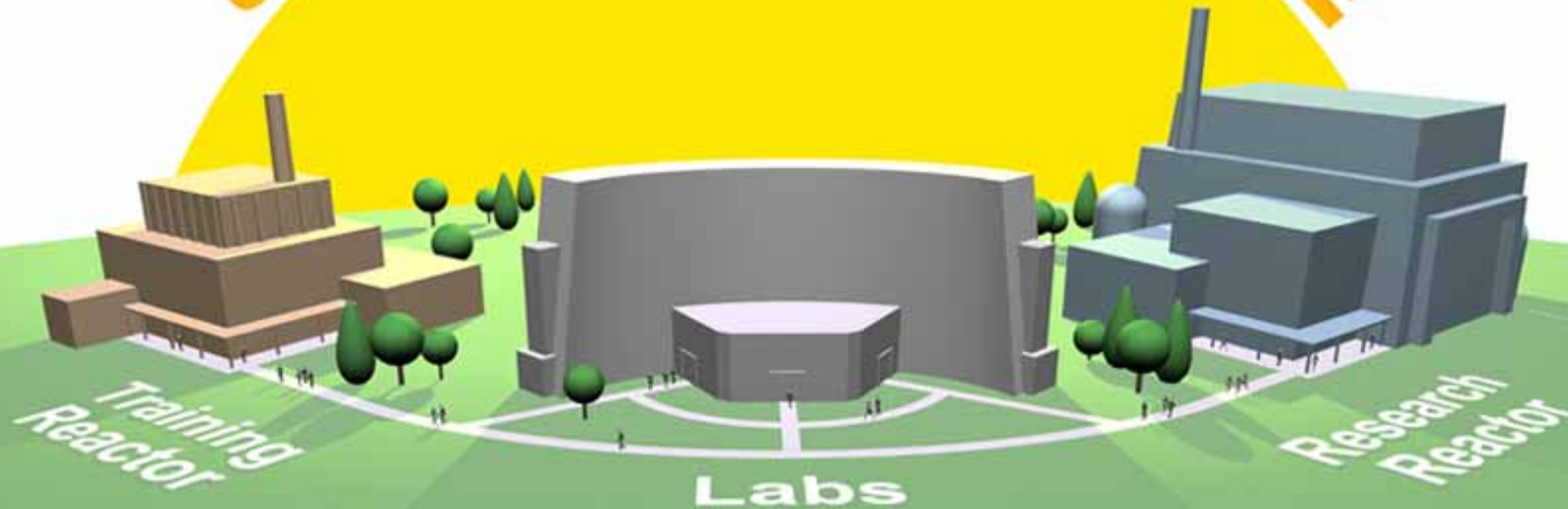
- Almost half of the research reactors are less than 30 years old
- 16 new research reactors under construction or are in planning stages.
- Several of the research reactors provide capabilities for R&D and training on advanced reactor concepts.

The Situation with Nuclear Infrastructure



- Limited capabilities to support research & development
 - Generation IV
 - GNEP (Global Nuclear Energy Partnership) – ABR and SMR
 - Space nuclear power
 - Naval nuclear propulsion
 - Homeland Security; structural, biological, and agricultural systems
- Issues of actual performance versus predicted performance cannot be resolved without experimentation
 - Reactor physics & Shielding
 - Thermal-hydraulics
 - Materials & structures
 - e.g., new fuels

S.U.N.R.I.S.E



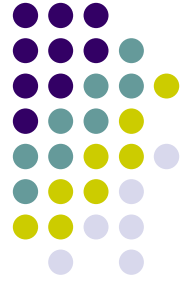
SOUTHEAST UNIVERSITIES NUCLEAR REACTORS INSTITUTE
FOR SCIENCE AND EDUCATION

**Education, Industry, and Government
Cooperating Today... To Prepare The Nation
for Tomorrow**

Broad Based Support for Regional Concept



- NERAC – regional reactor user facilities
- House Subcommittee on Energy – general concern at topical hearings:
 - loss of expertise in reactor systems,
 - inadequate research funding &
 - lack of interest in developing new programs at universities
- House Subcommittee on Energy and Water Development Appropriations
 - recommended next generation research reactor to be hosted at a DOE site
- General concern of ANS, NEI, NEDHO, NRC, DOE, TRTR, and many others for the erosion of nuclear education infrastructure
- PACE (Protecting America's Competitive Edge) educational and research initiatives – promotes regional cooperation.



Status and Next Steps

- Incorporation as a not for profit - Dec., 2006.
- Expanding university members in SUNRISE (currently 7 states represented) and building partnerships with industry and government facilities in the region.
- Developing proposals to support GNEP SMR program.
- Formation of a Nuclear Utilities Advisory Board
- Workshop to highlight the workforce and educational needs of the nuclear renaissance.
- Evaluating opportunities for Summer Institutes at ORNL and SRNL for specialized training (nuclear computational methods, reprocessing technology, etc.)