COMMISSION BRIEFING SLIDES/EXHIBITS

BRIEFING ON THE NUCLEAR EDUCATION PROGRAM

MARCH 20, 2009

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Briefing on the Nuclear Education Grant Programs

March 20, 2009

Program Overview

- **Two Education Grant Programs: $5M & $15M**
- **Energy Policy Act of 2005 - $5M**
  - **Curricula Development focus**
    - **Program Manager – Randi Neff**
- **FY 2008 language - $15M**
  - **Scholarships, Fellowships, Faculty Development and Trade Schools**
    - **Program Manager – John Gutteridge**
- **Cooperation among a number of NRC Program offices**

FY 2009 Language - $15M

- **Partitioned:**
  - **$10M for same purposes as last year:**
    - **Faculty support**
    - **Scholarships & fellowships**
    - **Trade schools**
  - **$5M for research and development**
    - **In coordination with NNSA ($5M) and DOE ($5M)**
    - **NRC to focus on faculty support**
- **Authorized for 10 years**

$5M Grant Program

Randi Neff

Curricula Development Grant Program

- **2007:**
  - Developed grant process
  - 26 awards to 17 States plus D.C.
  - 8 to minority serving institutions
- **2008:**
  - 40 awards to 25 States, D.C. and Puerto Rico
  - 11 to minority serving institutions

Scholarships and Fellowships

- **Funding FY 2007 – 385K**
  - **Grants to Universities or Colleges**
    - **Recipient work requirement at NRC**
- **Awarded 10 grants**
  - **Average award 50K**
    - **Hired 8 recipients**

2007-2008 Accomplishments

- 20 new university programs started
  - New courses on reactor safety
  - Expanded use of technology
- Grants.gov
- Implementation of Automated Standard Application for Payments

FY 2009 Program Dates

- Announcement issued: October 10, 2008
- Applications due: January 22, 2009
- Peer reviews conducted: March 2009
- Award date: June 1, 2009
- Funding is in FY 2009 budget

$15M Grant Program

John Gutteridge

$15M Grant Process – FY 2008

- **Announcement Issued: February 15, 2008**
- **Applications Due: April 1, 2008**
- **Peer review conducted: April/May 2008**
- **Award Date: August 1, 2008**

$15M Grant Process (con't)

- **49 of 99 Applications Funded**
  - 6 Trade, 21 Faculty Development &
  - 22 Scholarships and Fellowships
  - More than 120 students funded
  - 19 of 25 states; 33 of 49 institutions
  - Two of four minority serving institution applications were funded
- **Cost-sharing: faculty development**

FY 2009 Program

- **Announcements issued: December 23, 2008**
- **Applications due: February 25, 2009**
- **Peer reviews: March/April 2009**
- **Award date: July 1, 2009**

2009 - Lessons Learned

- Improved understanding of curriculum costs
- Leveraging and partnering encouraged
- Changing GPA requirements
- Broadening of eligible disciplines

2009 - Lessons Learned (con't)

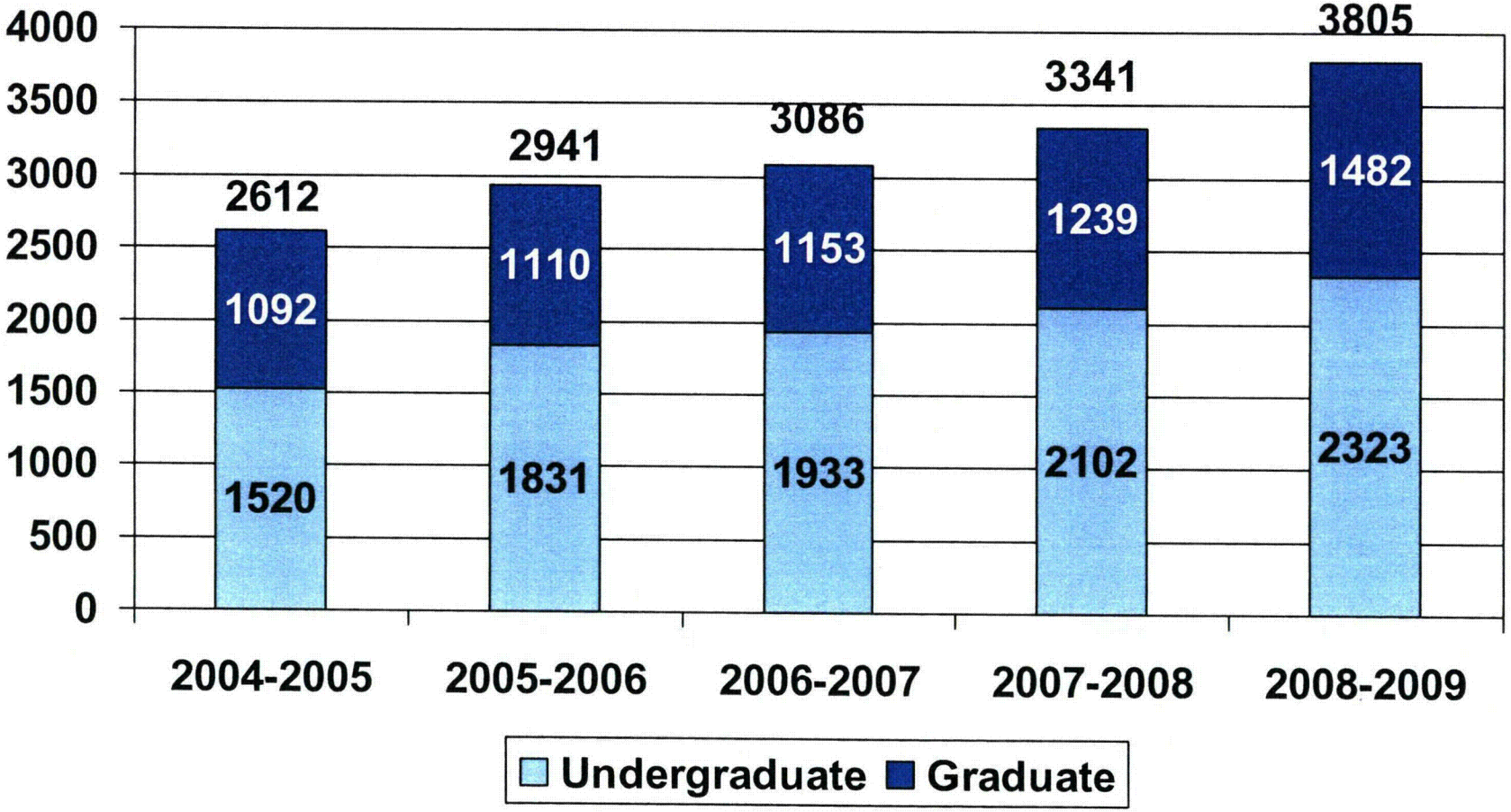
- **Emphasizing participation of:**
  - **Trade schools/community colleges**
  - **Minority serving institutions**
  - **Health physics and radiochemistry**
- **Expanding peer-review community**

Conclusions

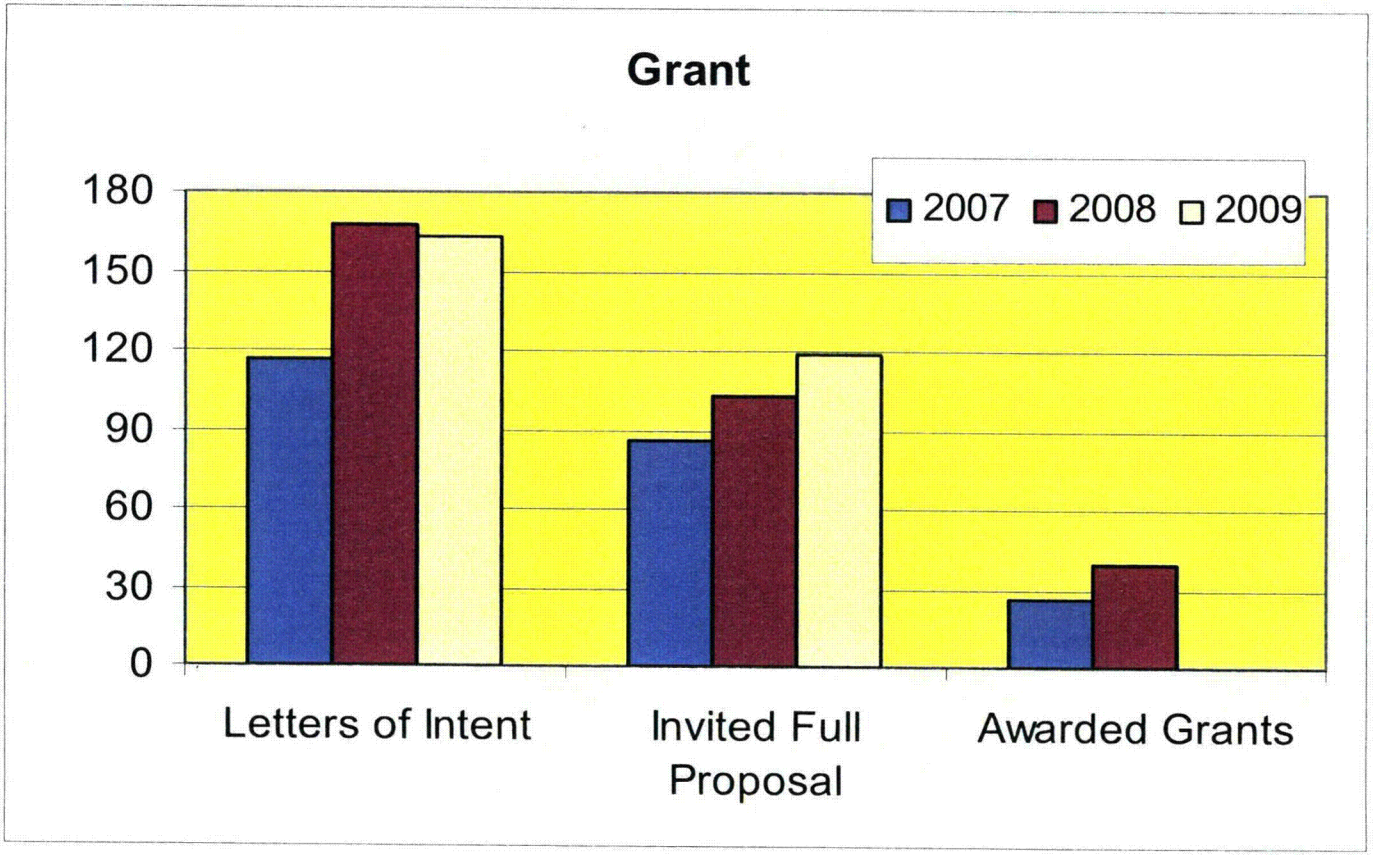
- Developed good working relationships with educational institutions
- NRC grant program is assisting in the development of a well-trained workforce
- This workforce is critical to nuclear safety
- Service agreement seems well accepted by students and universities
- Under-represented groups have been encouraged to apply

Background Slides

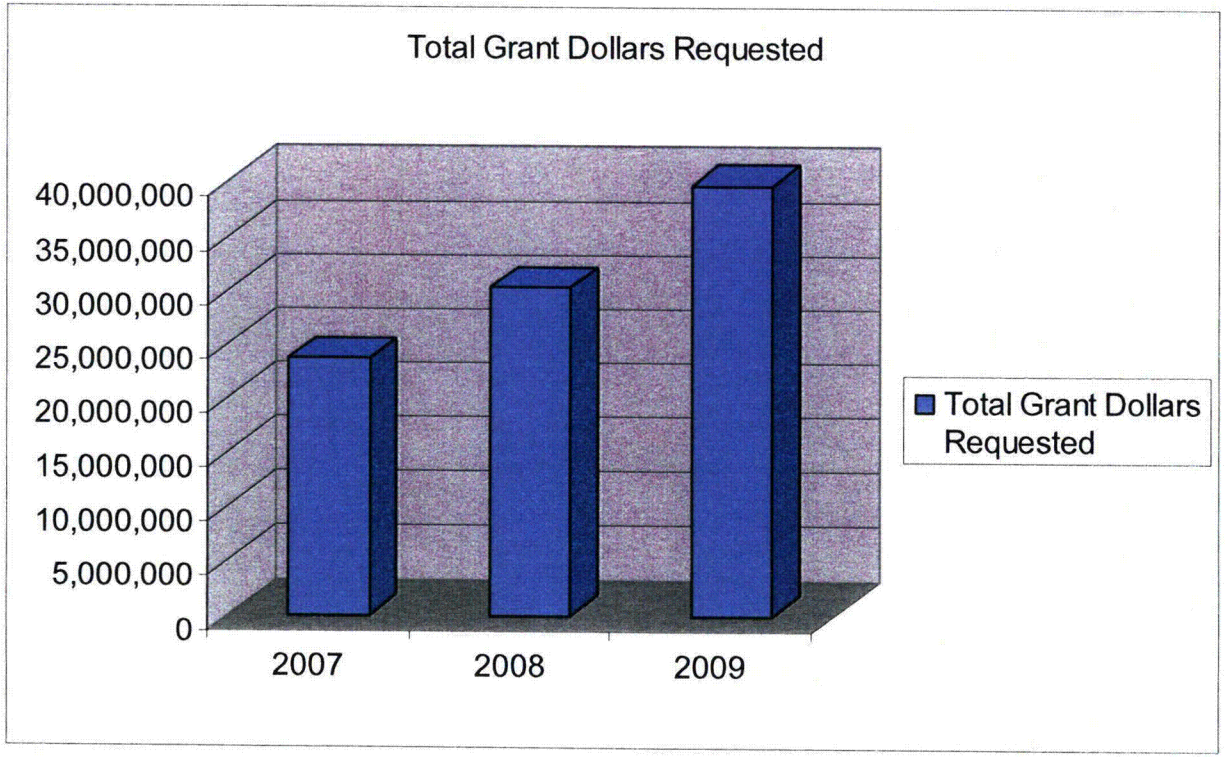
NE Enrollment Trends (2004-2009)



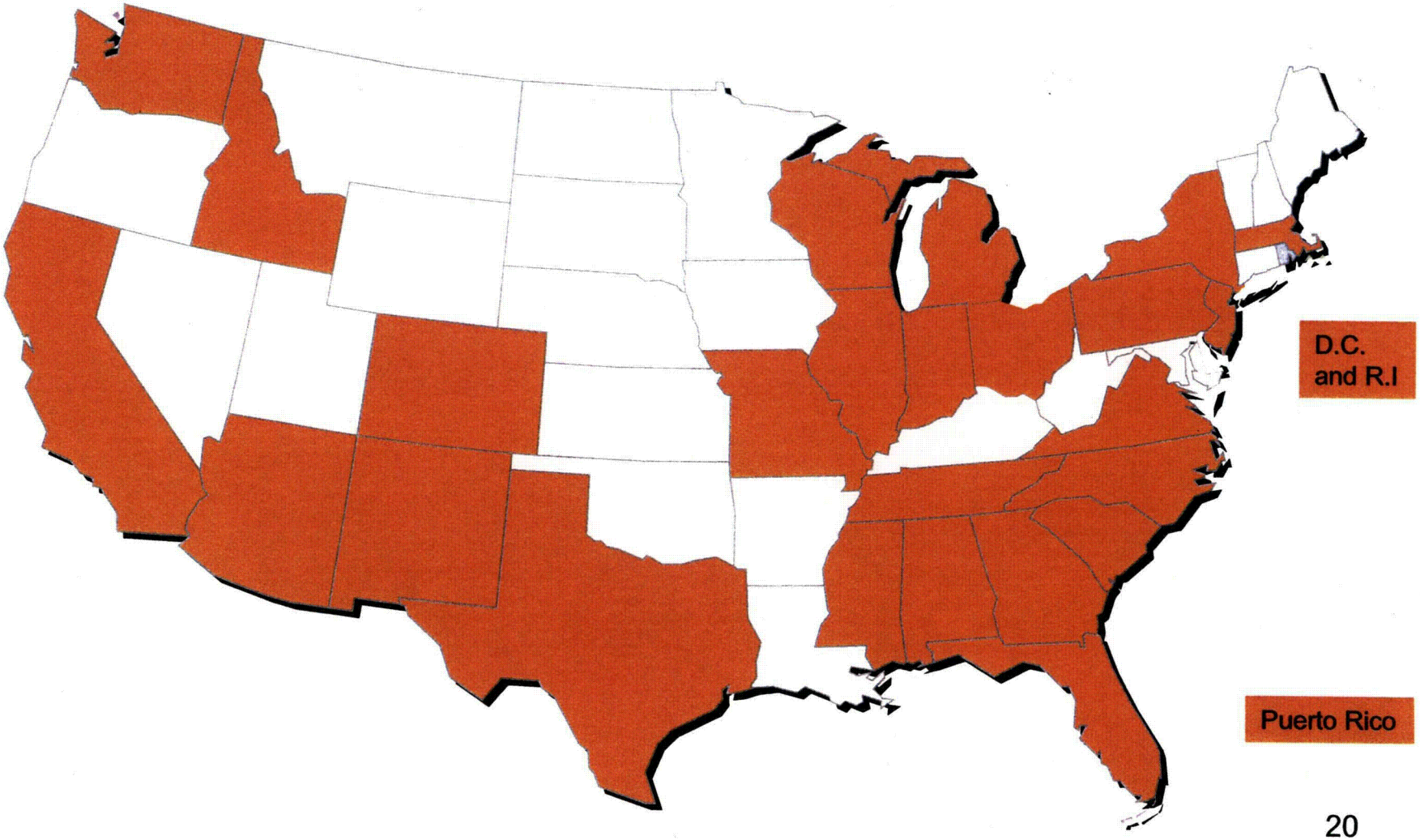
Grant Stats


Grant
2007
2008
2009
180
150
120
90
60
30
0
Letters of Intent
Invited Full Proposal
Awarded Grants

Total Grant Dollars Requested



States Receiving Grants



Health Physics (HP) Academic Program Support

NRC Commissioner's Meeting on the Nuclear Education Program

20 March 2009

Richard E. Toohey, PhD, CHP

President, Health Physics Society

HPS

HP Academic Program Overview

- 23 Institutions with programs from BS to PhD
- 2 Institutions with AA only
- 4 Institutions ABET Accredited BS program
- 5 Institutions ABET Accredited MS program

HPS

HP Academic Program Overview – cont.

- Number of faculty spending >25% FTE on HP ranges from 1 to 11
- Number of enrollees for 07-08 ranges from 0 to 80
- Health Physics Education Reference Book 2007-2008 (latest edition) is available at http://hps.org/documents/edrefbook.pdf

HPS

HP Academic Program "Unique" Characteristics

- **Degree Programs reside in various Departments – Not a single "champion" agency**
  - **HP – 1**
  - **Biology/Health – 2**
  - **Environmental Science – 2**
  - **Medical Sciences – 3**
  - **Physics – 6**
  - **Nuclear Engineering - 9**

HPS

NRC Support for HP Programs

- **Programs very pleased with first 2 years experience**
  - **Feel like an "equal partner"**
  - **Staff has been excellent with help and support**
  - **Feel NRC represents the breadth of disciplines in HP**

HPS

HP Program "Wish List" for NRC Education Program Fellowships/Scholarships

- Nationally competitive program
- Students apply directly to NRC
- Identify "Eligibility" for institution
  - ABET Accredited
  - Non-ABET programs submit a one time application

HPS

HP Program "Wish List" for NRC Education Program Fellowships/Scholarships

- **Should be full in level of support**
  - **Fellowships – tuition, fees and monthly stipend**
  - **Scholarships - tuition**

HPS

HP Program "Wish List" for NRC Education Program New Initiative

- **Education Block Grants – provide educational infrastructure**
  - **Junior faculty positions and research**
  - **Full faculty research**
  - **Infrastructure support**
  - **Student funding through HP programs**

HPS

HP Program "Wish List" for NRC Education Program New Initiative

- Encourage industry/national laboratory collaboration
- Provide support for up to 5 years
- Eligible institutions and performance metrics
- Use subject area (versus geographical) consortium approach

HPS

Possible Subject Area Consortia

- Radiochemistry
- Internal Dosimetry
- Environmental HP
- Nuclear Power/Fuel Cycle HP
- D & D HP
- NORM HP
- Instrumentation/detection

HPS

Acronymns

- AA: Associate of Arts
- ABET: Accreditation Board for Engineering and Technology
- D & D: Decontamination and Decommissioning
- NORM: Naturally Occurring Radioactive Materials

HPS

Nuclear Energy Education Program

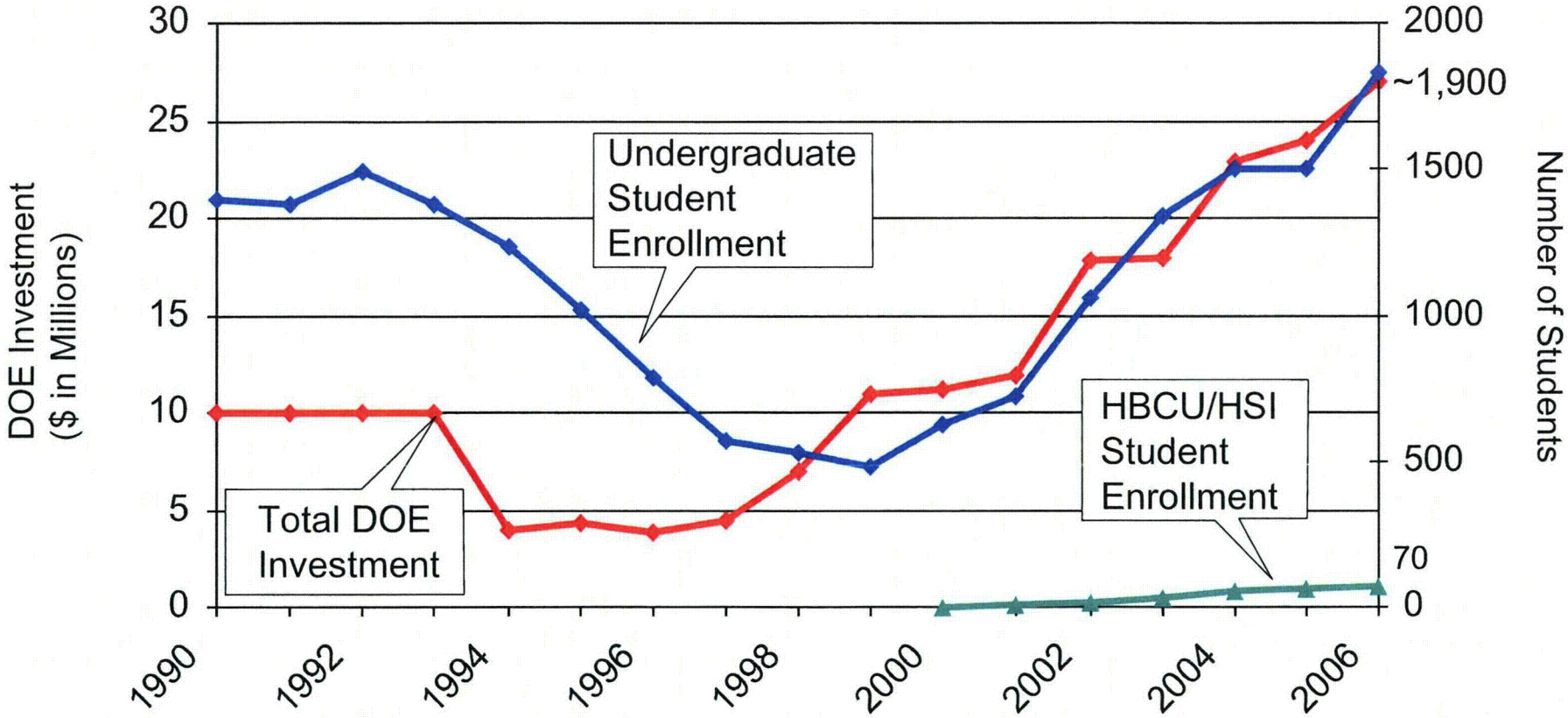
March 20th, 2009

Mike Corradini, Chair
Nuclear Engr. & Engr. Physics
University of Wisconsin – Madison

Nuclear Engr. Education History

- 1999: NERAC concerned with the declining investment in NE education – renewed effort by DOE
- 2006: DOE declared victory and eliminated the education program
- ANS FINE report urged a reversal
- NRC now has the education piece: comprehensive and coordinated

Enrollment and Investment



Nuclear Engr. Education Status

- **Current program is well-structured**
  - **Educational grants to build curricula**
  - **Scholarships to build workforce**
  - **Fellowship program (with others)**
  - **Junior Faculty program for the future**
  - **Technical college training program**
- **FY-2009 funding requires a closer collaboration with DOE & NNSA**

Nuclear Engr. Education Future

- Continue the current NRC program which is comprehensive
- Support the collaboration with DOE and NNSA to add elements:
  - Education programs for human infrastructure (NRC, DOE, NNSA)
  - Infrastructure support (URR's – DOE)
  - Mission-oriented research (DOE)
  - Investigator Initiated research (DOE)

RECENT NEW NE PROGRAMS

- Colorado State University
- South Carolina State University
- University of South Carolina
- Texas Tech University
- Univ. of California, Los Angeles
- Virginia Commonwealth University

(+ programs under consideration)

USNRC Contributions to the Enhancement of Nuclear Programs at South Carolina State University

Kenneth D. Lewis, Ph.D., P.E.
Dean and Professor

TABLE OF CONTENTS

South Carolina State University

South Carolina State University is a Historically Black College (HBCU), founded as an 1890 Land Grant, co-educational institution located in Orangeburg, South Carolina. The enrollment is ~ 4884.

In 2002, SCSU introduced a B.S. program in Nuclear Engineering (jointly with the University of Wisconsin at Madison) and currently SCSU is the only HBCU to offer a B.S. degree in Nuclear Engineering.

BY 2010, HALF OF THE RESEARCHERS AT THE NATION'S DEFENSE LABS—WHICH EMPLOY MORE SCIENTISTS AND ENGINEERS THAN ANY OTHER GOVERNMENT AGENCY—WILL BE ELIGIBLE FOR RETIREMENT.

South Carolina State University

In January 2005, there was a total of seven (7) students in the Nuclear Engineering Program at SCSU. Three (3) students were completing course work at the University of Wisconsin. Of the four (4) students remaining at the SCSU campus, one eventually left the program.

PROGRESS OF THE NUCLEAR PROGRAM SINCE JANUARY 2005

- Enrollment Trends (Fall terms)

2002	2003	2004	2005	2006	2007
7	8	7	12	23	41

Enrollment increase is directly related to USNRC support through grants:

- NRC-38-07-320 (NE Enhancement)
- NRC-38-07-702 (Scholarship)
- NRC-38-08-965 (Scholarship)

USNRC Scholarship Recipients 2007-2008

Hampton, Candice	NE Enhancement Scholar - Fall 2008 SO
Hugine, Alysa	NE Enhancement Scholar - Fall 2008 FR
Shine, Justin	NE Enhancement Scholar - Fall 2008 SO
Jackson, Sadie B.	NE Enhancement Scholar - Fall 2008 JR
Chisholm, Katrina	NE Enhancement Scholar - Fall 2008 SR
Davidson, Kayla	NE Enhancement Scholar - Fall 2008 SO
Ellis, Jernai	NE Enhancement Scholar - Fall 2008 SO
Graham, Ashley	NE Enhancement Scholar - Fall 2008 SO
Harris, Jamika*	NE Enhancement Scholar - Fall 2008 SR
Hyatt, Damayne	NE Enhancement Scholar - Fall 2008 FR
O'Bryant, Demanti	NE Enhancement Scholar - Fall 2008 FR
Orridge, Arielle	NE Enhancement Scholar - Fall 2008 FR*
Sheppard, Lorenzo	NE Enhancement Scholar - Fall 2008 FR
Verner, Whitney	NE Enhancement Scholar - Fall 2008 JR

USNRC Scholarship Recipients 2007-2008

Gaffney, Vanna*	NE Enhancement Scholar, Sr
Bennett, Jamar	NE Enhancement Scholar, Fr
Chambers, Landis	NE Enhancement Scholar, Jr
Owens, Olemuel	NE Enhancement Scholar, Fr

PROGRESS OF THE NUCLEAR PROGRAM, cont.

- Federal Agency Support

2003	2004	2005	2006	2007
DOE	DOE	DOE	DOE	DOE **USNRC** DOEd DoD

ABET EAC ACCREDITATION OF THE NUCLEAR ENGINEERING PROGRAM

The SCSU Nuclear Engineering Program received an ABET-EAC visit in November 2007. In August 2008, the Nuclear Engineering Program became the first new NE Program accredited in over 30 years, and significantly, the first ever accredited at an Historically Black College and University.

ABET EAC ACCREDITATION OF THE NUCLEAR ENGINEERING PROGRAM, Cont.

In all of the key ABET activities, invaluable contributions were made by the USNRC's

Dr. John Larkins

who

- Helped formulate the mission statement
- Helped formulate the Program Objectives
- Was the key Industrial Advisory Committee person present during the ABET visit and held discussions with the ABET-EAC review team members.

Student Recruitment

Recruitment occurs along 4 major veins:

1. Major College Recruitment Fairs statewide

2. Electronic Recruitment through Venture Scholars subscription

3. Campus open houses for High School students

4. Grant from USNRC permitted a summer nuclear science program for High School Guidance Counselors who are already assisting the Program

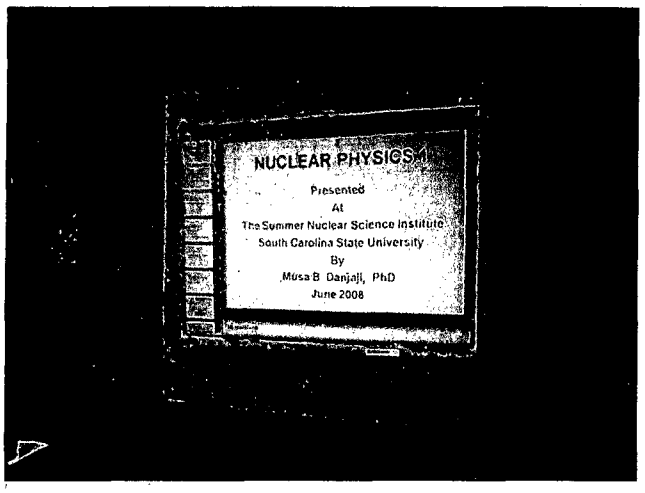
Outreach and Program Enhancement

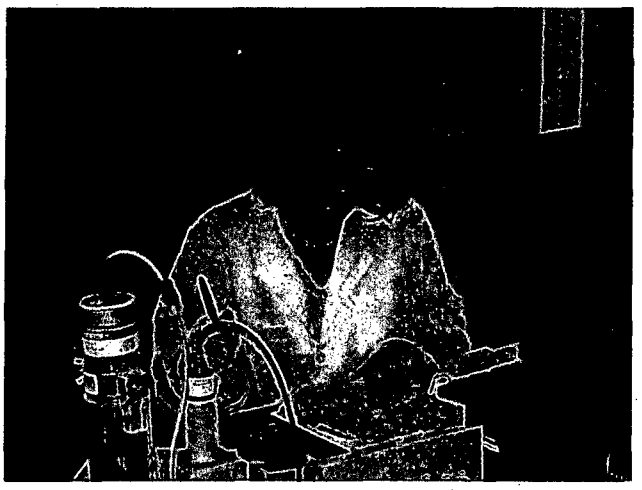
- $ 90K Grant USNRC-38-07-501 funded Summer Nuclear Science Institute for High School Guidance Counselors (for summers 2008 and 2009)

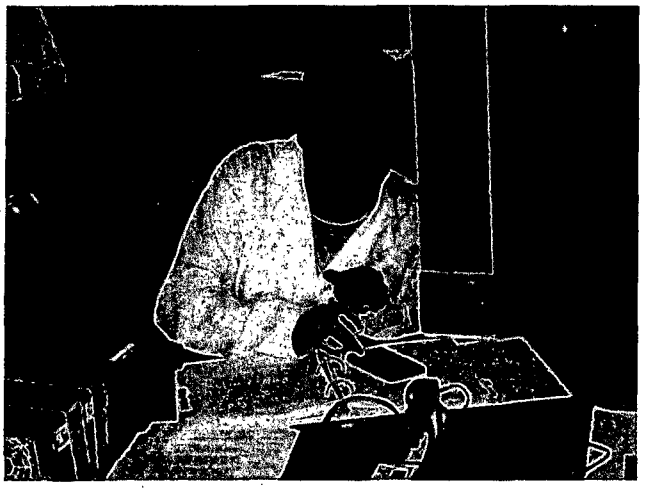
- Summer Nuclear Science Institute for High School Students (D o ED)

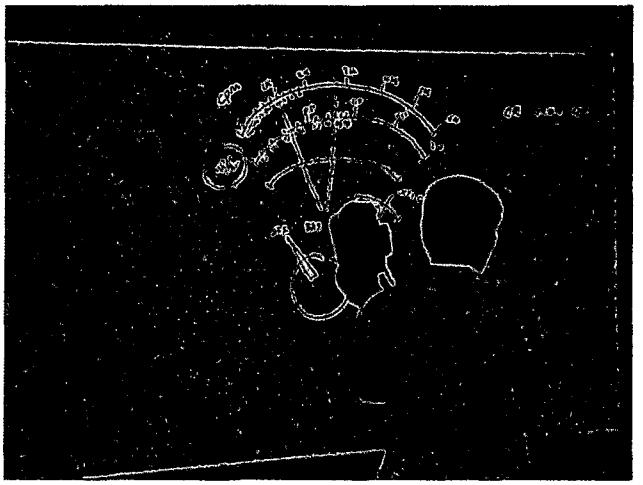
Summer Nuclear Science Institute
South Carolina State University

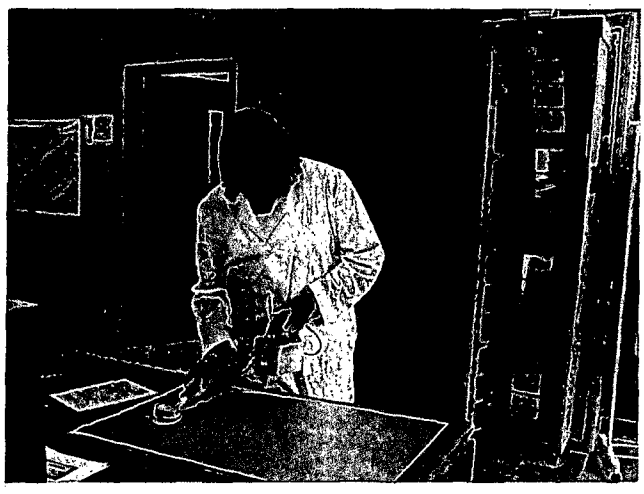
Summer Nuclear Science Institute for
High School Guidance Counselors
July, 2008. Funded by USNRC.

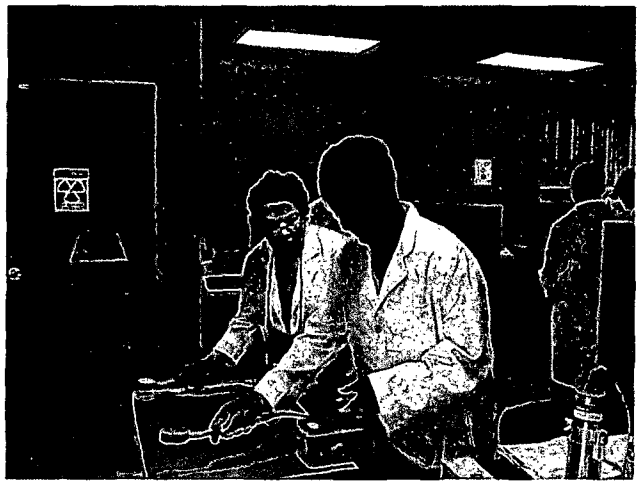

NUCLEAR PHYSICS
Presented
At
The Summer Nuclear Science Institute
South Carolina State University
By
Musa B Danjaji, PhD
June 2008

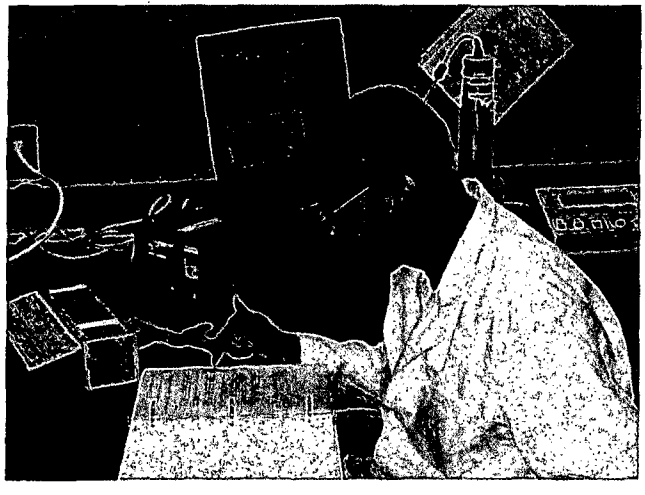


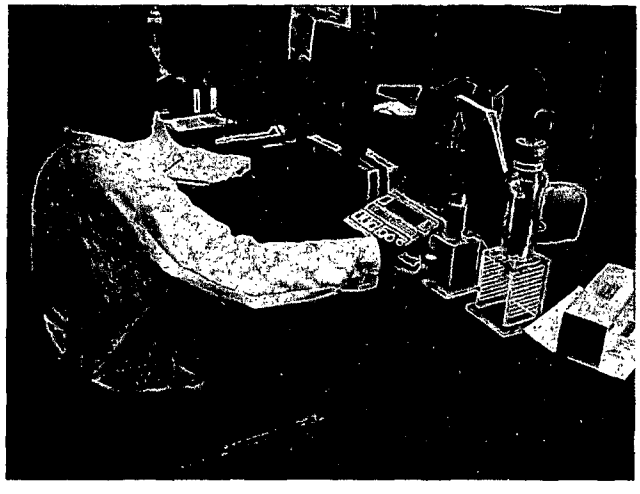




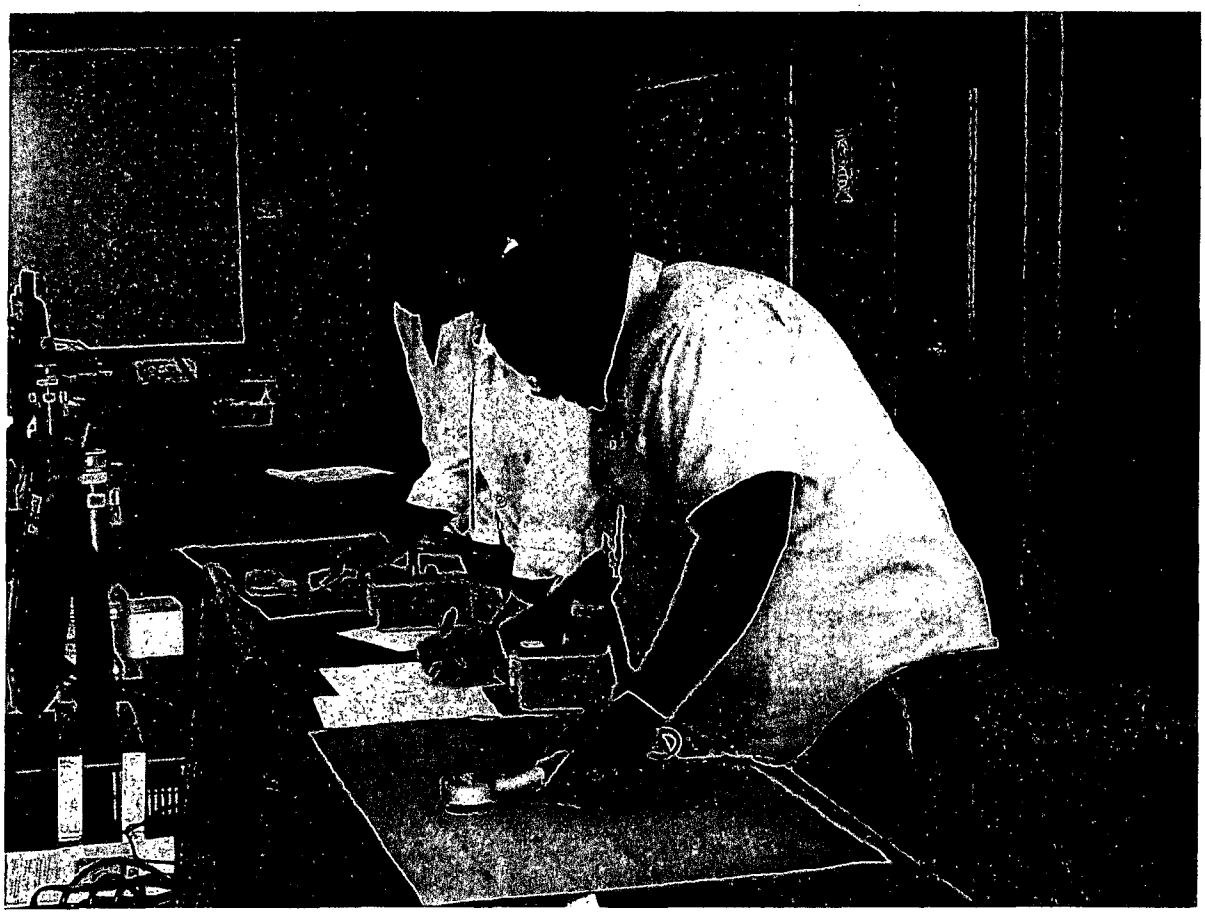








Summer Nuclear Science Institute
South Carolina State University



Guidance Counselors search for "hidden" radioactive sources on the underside of the poster board

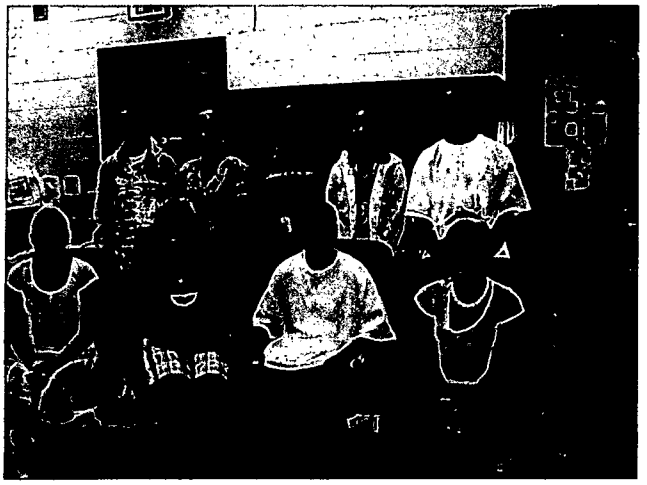
Summer Nuclear Science Institute, Guidance Counselor Field Trip to Savannah River MOX Facility

Summer Nuclear Science Institute
South Carolina State University

First session of the Summer Nuclear Science Institute for High School students was in June 2008. Students came from as far away as Tennessee. Included in the group was Eagle Scout candidate Benjamin Briganty, completing the Merit Badge in Nuclear Science and 4.0/4.0 g.p.a. twins Brittany and Briana Dawson.

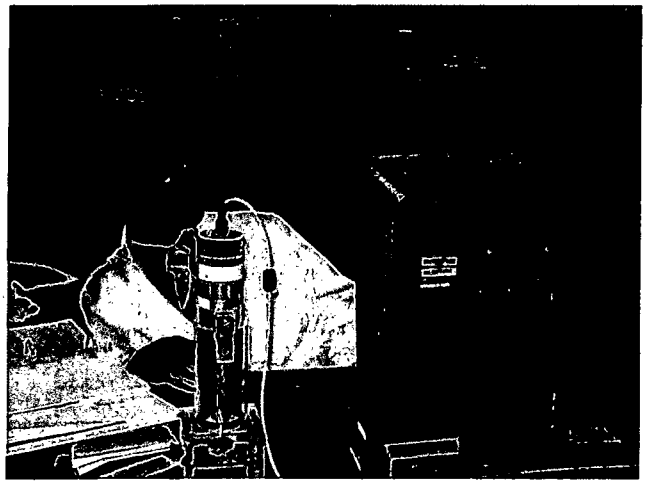
Summer Nuclear Science Institute
South Carolina State University

Summer Nuclear Science Institute
South Carolina State University



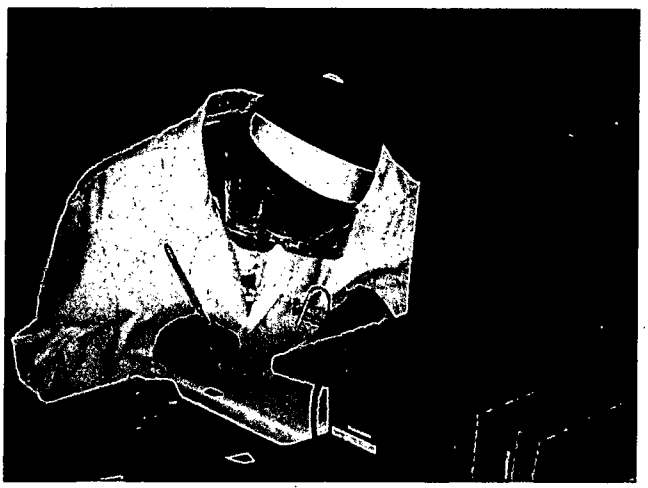
The Second group of High School students featured at least two students ranked number #1 in their class. All of these students are from South Carolina.

Summer Nuclear Science Institute, June 2008.



Students learned the basics of nuclear science, use of the G-M tube, and an introduction to nuclear spectroscopy, using the MCA. The final exam consisted of identifying "unknown" radioisotopes based upon their photon emission.

Summer Nuclear Science Institute, June 2008.



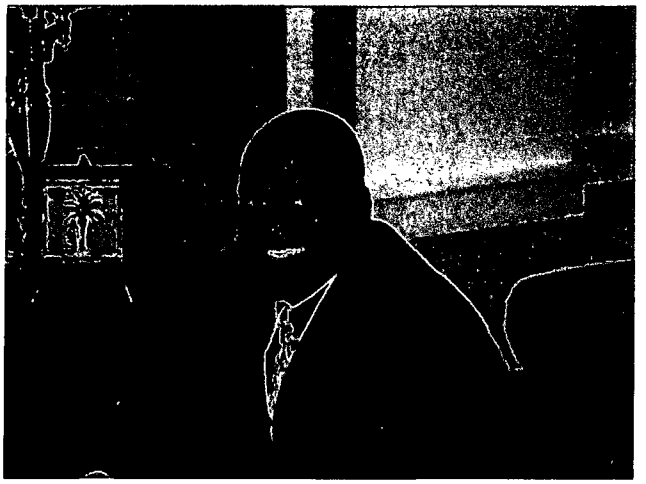
Radiochemistry and Health Physics Programs at South Carolina State University

Radiochemistry program was established in 2005 through a DOE/NNSA Grant. Four of the first five graduates in the Radiochemistry Option are shown with Dr. Todd Wright, former SRNL Director, summer 2006. All five have now graduated (2008).

Radiochemistry students performing actinide separations at Clemson University during summer 2006.

USNRC Scholarship Recipient Sophie Le, Junior Radiochemistry Major has been a USNRC Intern for 2 years and plans to eventually work for the USNRC.

Sharee Harris (So) and Bradley Childs (Jr), both Radiochemistry Majors, are USNRC Scholarship winners.



In 2008 SCSU introduced a Health Physics concentration within the Physics Department.

- USNRC scholar Ashley Graham is one of 3 students to elect this option so far. All 3 are supported through USNRC scholarships.

THANK YOU

USNRC

FOR YOUR

SUPPORT.

QUESTIONS?

NRC Education Program: Achieving Desired Results & Immediate Impact

March 20, 2009

Elaine Craft, Director

SC Advanced Technological Education Center of Excellence

Florence-Darlington Technical College, Florence, SC

NRC Education Grants: Achieving Desired Results and Immediate Impact

Outline

I. Florence-Darlington Technical College (FDTC) Case Study

II. Industry Employment Demand

III. Educational Continuum: Partnership for future nuclear workforce

I. FDTC Case Study

- **$150,000 NRC Scholarship Grant award (for 54 scholarships)**
- **Made new Pipe Welding Academy possible**
- **Scholarships enable enrollment based on talent and not ability to pay**

I. FDTC Case Study

- **Use of student "success coaches" is promoting retention/ completion**
- **20 certified graduate pipe welders to date (40% minority)**
- **34 more certified graduates anticipated by August 2009**

I. FDTC Case Study

- **All graduates working in nuclear power industry or still enrolled in higher education**
- **Recently employed graduate earning > $2,000/week**
- **Educational pathways lead to industrial and engineering technology degrees**

I. FDTC Case Study

- Knowledge/skills are transferable to multiple industries
- Success of NRC Scholarship program and student demand led to creation of new pre-pipe welding and evening programs
- 125 students enrolled in pre-pipe welding programs since Jan. '09

I. FDTC Case Study

- Pipe fitting and valve technician academies planned
- Demand for technicians and craftsmen > than for professionals
- Drawing students from across SC

I. FDTC Case Study

- Adding Nuclear Power Plant Operator certificate within engineering technology program
- Pilot site for Nuclear Energy Institute (NEI)
- Sponsoring NEI industry: Progress Energy

I. FDTC Case Study

- Wages in nuclear stimulate regional economies (sample median salaries without per diem or overtime)
- Reactor operator $77,782
- Electrical Technician $67,517
- Mechanical Technician $66,581

II. Industry Employment Demand

- First major growth since 1970's
- Potential for up to 26 new nuclear power plants
- New and replacement talent is needed
- The employment demand is unique in today's economy

II. Industry Employment Demand

- **Both theoretical and practical learning are required:**
  - **On-the-job-training alone is no longer sufficient**
  - **Advances in technology require greater knowledge and skills**

III. Education Continuum

- 2-year colleges: comprehensive and technologically advanced
- 1,195 community colleges in US enroll 11.5M
- Most diverse student population in higher education
- 47% attend with financial aid (76% at FDTC)

III. Education Continuum

- Many start at 2-year colleges en route to 4 -yr. degree
- 50% of those earning engineering or science bachelor's degrees attended community college
- Technical and community colleges prepare highly skilled technicians

III. Education Continuum

- ~50% of all employment today is in the "middle-skill" occupations:
  - More than high school
  - Less than baccalaureate
  - Government-education-industry partnership is vital to address workforce challenges

III. Education Continuum

- **Advancement of nuclear energy will not be possible without strengthening <u>every</u> component of the education continuum**
- **FDTC is pleased to be a partner with NRC in pro-actively addressing this challenge**

Conclusion

- **NRC Educational Grants are having significant impact and should continue/increase**
- **Nuclear power industry needs more talent than is currently available or in educational pipeline at all levels**

Conclusion

- **FDTC and other 2-year colleges are a critical part of the education continuum and solution to the nuclear power workforce challenge**