U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

The Role of a Nuclear Regulator

The Honorable Peter B. Lyons
Commissioner
U.S. Nuclear Regulatory Commission

Young Professionals in Energy
Columbia University
New York
April 29, 2009

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Oversight

Uranium Mining

Uranium Conversion

Uranium Enrichment

Power Reactors

Transportation

Storage

Waste Disposal

Medical/Industrial

New Reactors

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Commissioners

Commissioner
Kristine Svinicki

Sworn In:
3/28/08
Term Ends:
6/30/12

Commissioner
Gregory Jaczko

Sworn In:
1/21/05
Term Ends:
6/30/13

Chairman
Dale Klein

Sworn In:
7/01/06
Term Ends:
6/30/11

Commissioner
Peter Lyons

Sworn In:
1/25/05
Term Ends:
6/30/09

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC's Legislative Mandate

- **Atomic Energy Act (1954) as amended**
  - "Assure the adequate protection of public health and safety and the promotion of the common defense and security."
- **National Environmental Policy Act (1969) as amended**
  - "…to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Mission

– To license and regulate the nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of public health and safety, promote the common defense and security, and protect the environment.

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Institute of Nuclear Power Operations

- INPO was formed by the U.S. nuclear industry following the Three Mile Island accident
  - Mission: To promote the highest levels of safety and reliability - to promote excellence - in the operation of nuclear electric generating plants.

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Some Statistics

NUCLEAR PLANT STATISTICS – 2008

Number of Plants Operating	104
Number of Plants Under Construction (Watts Bar Unit 2)	1
Number of Plant Orders Canceled	120
Last Industry Order for a New Plant	1973
Last Construction Permit Issued	1978

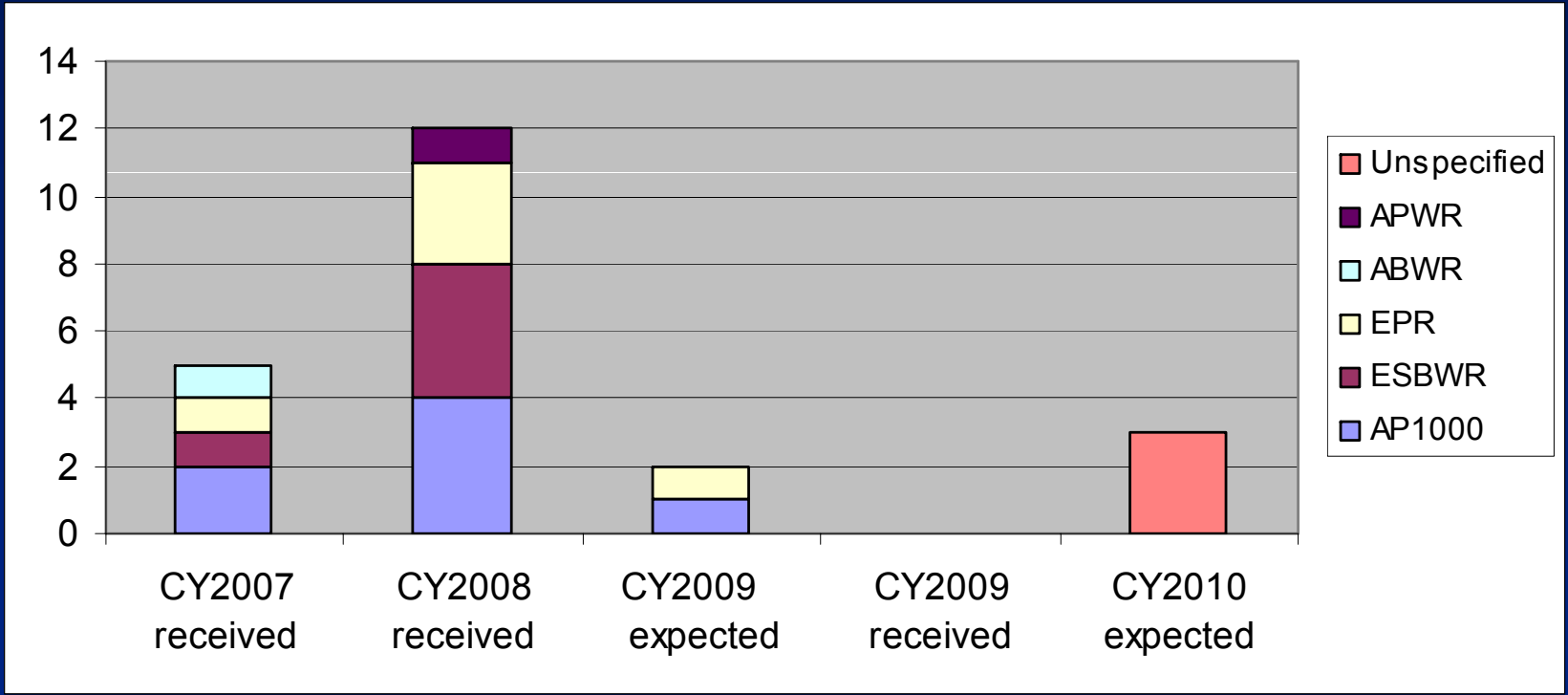
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

The Outlook?

- Global Warming Concerns
- Energy Diversity/Resource Limitations
- Inter-relationship of Energy Policy and Foreign/Military Policy
- New Licensing Process
- Increased Public Support
- Government Policy – Energy Policy Act of 2005
- Demand for New Electricity Generation
- Cost of Electricity Production

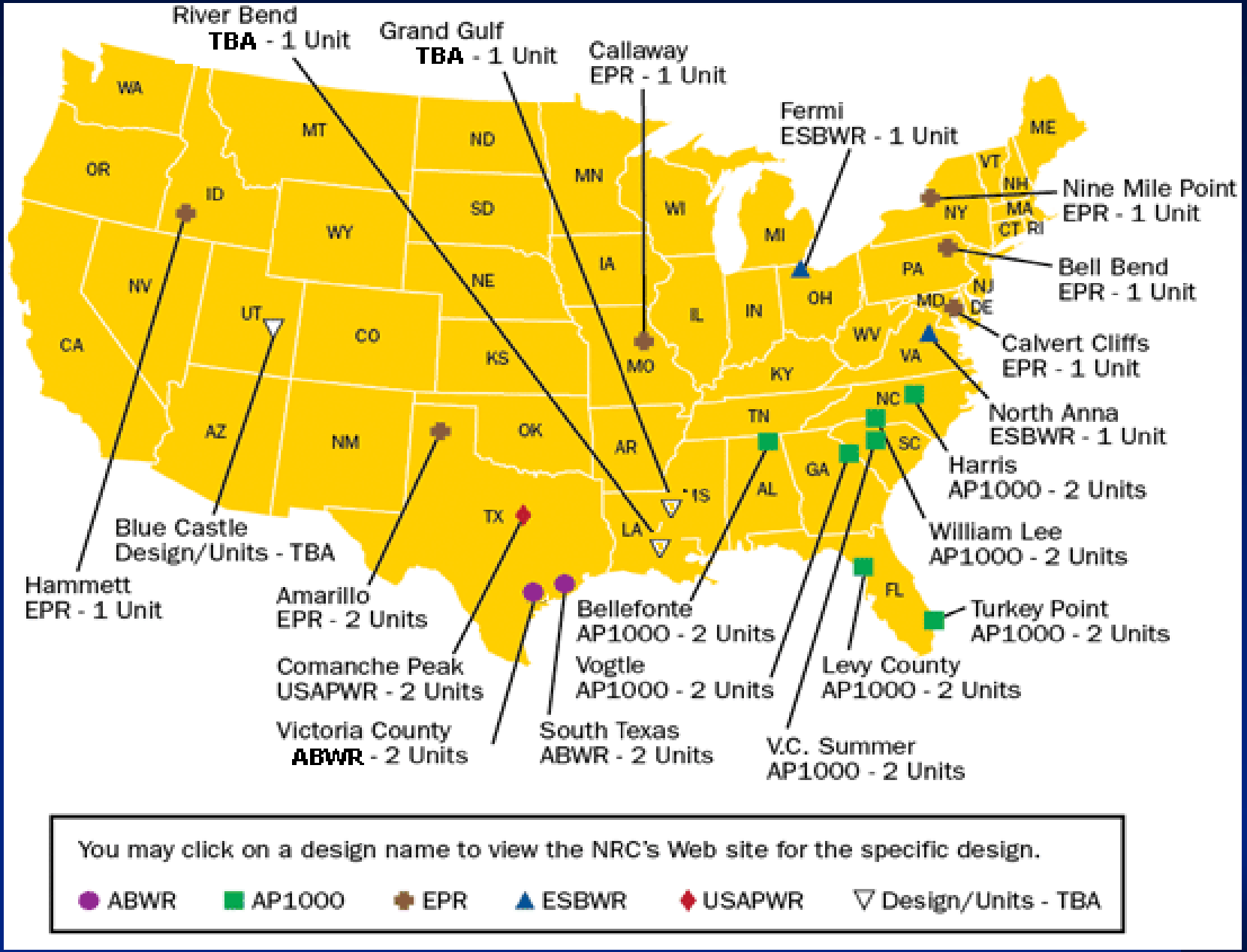
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

COL Applications Expected & Received



Valid as of April 8, 2009

Possible New Plants



You may click on a design name to view the NRC's Web site for the specific design.

● ABWR ■ AP1000 ✚ EPR ▲ ESBWR ♦ USAPWR ▽ Design/Units - TBA

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

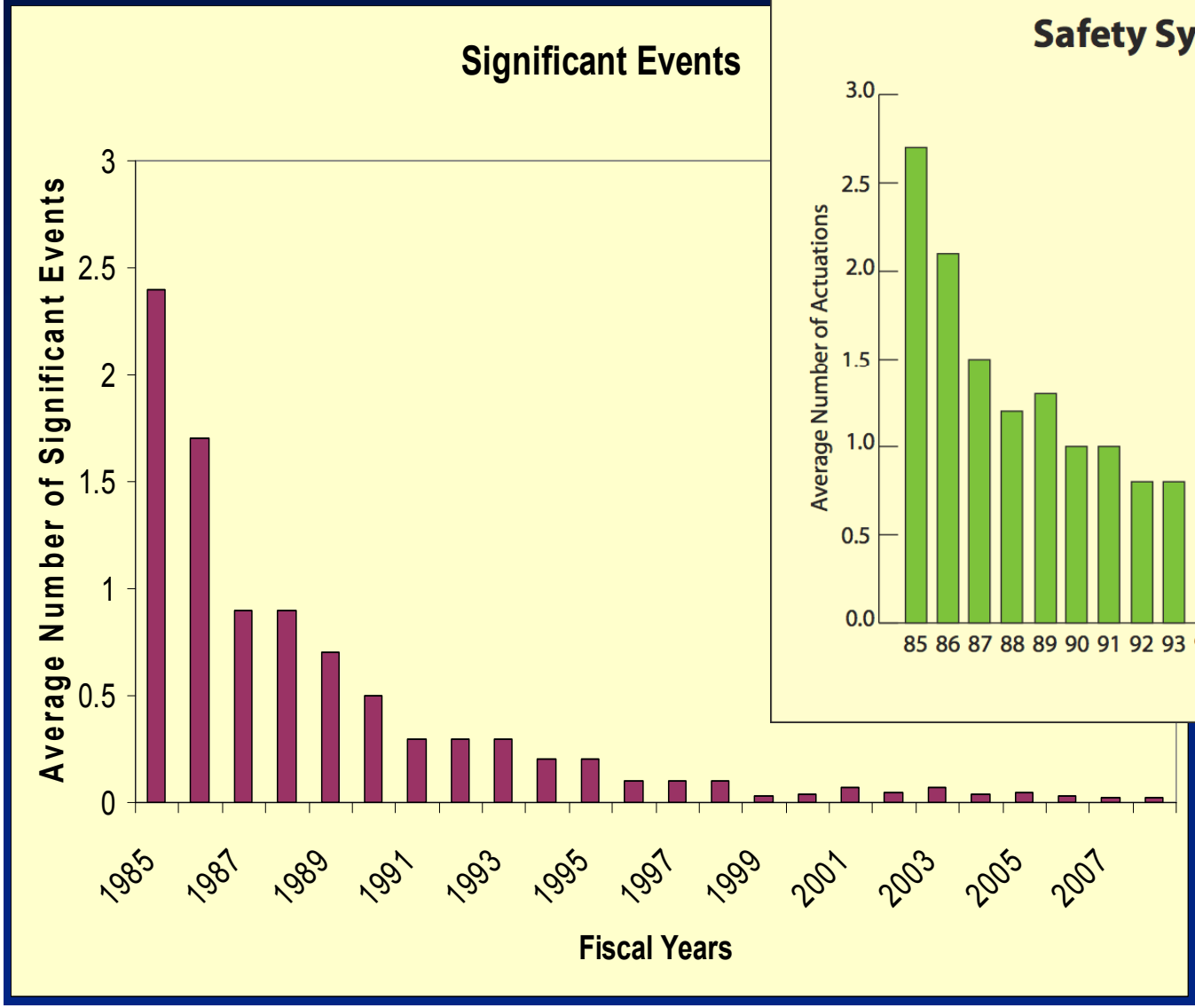
Nuclear Renaissance ?

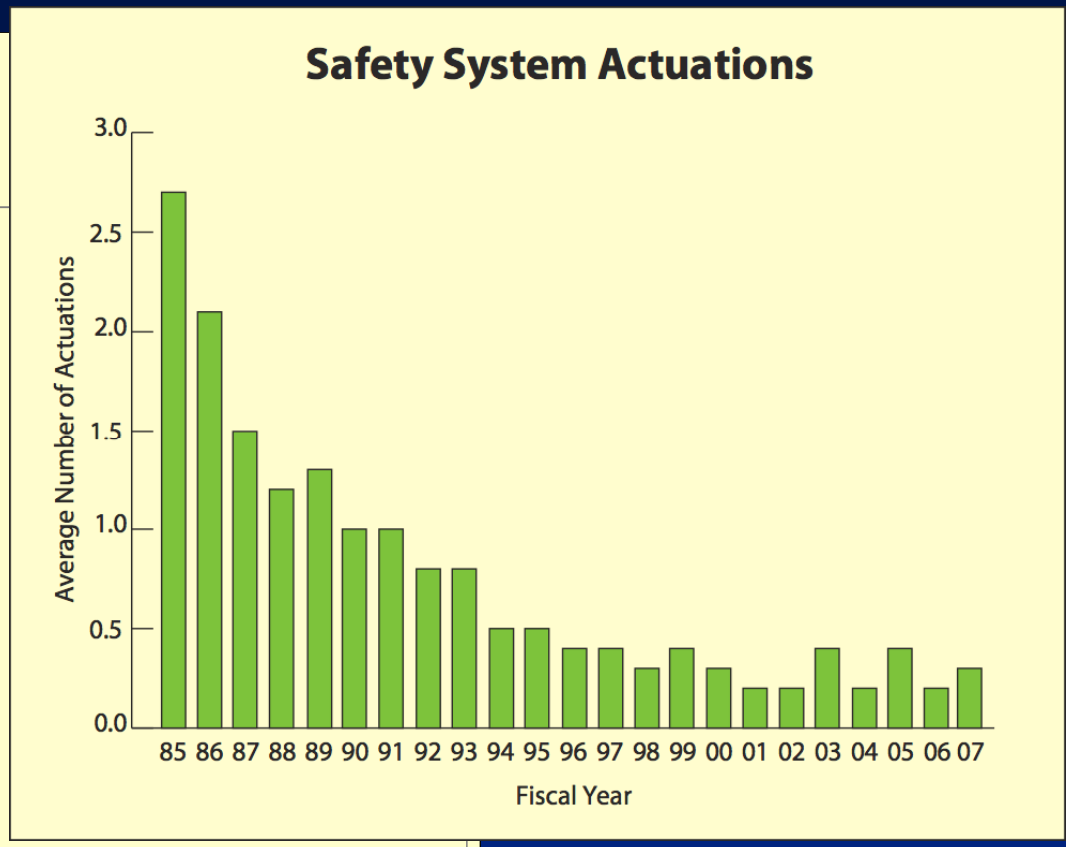
Favorable Outlook for Increased Safe and Secure Utilization of Nuclear Energy……

Depends on a foundation of….

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

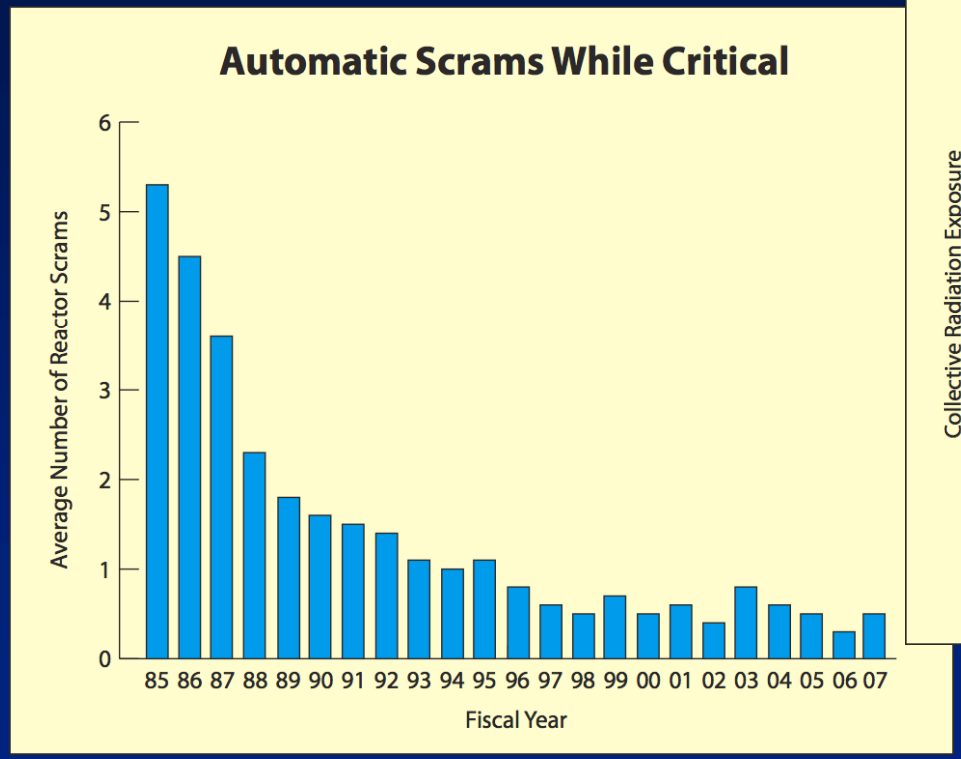
Historical Trend in Indicators of Safety Since 1985

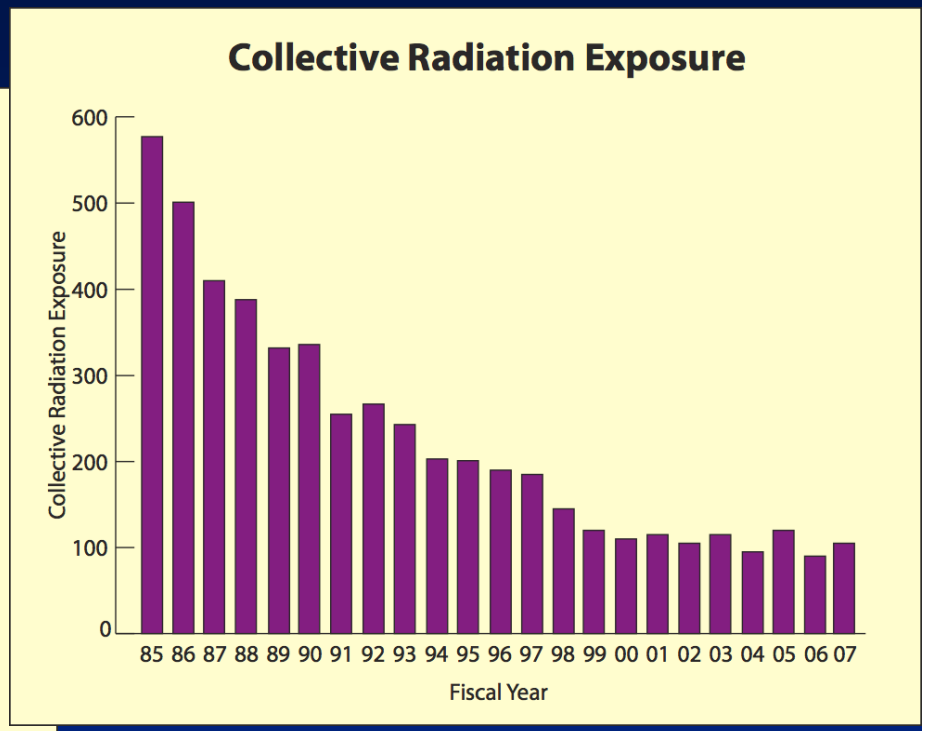




U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

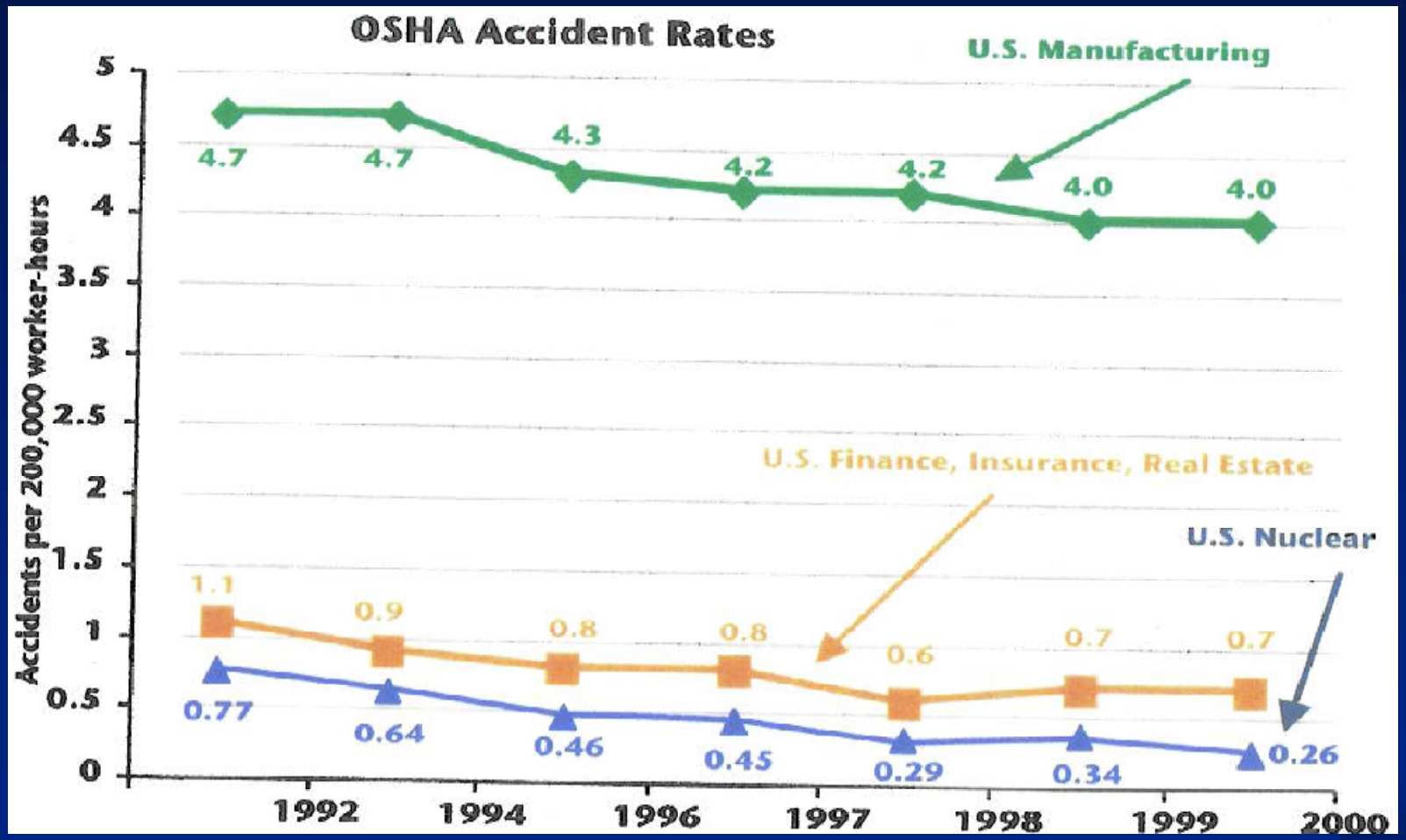
Safety Performance Trends continued





U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

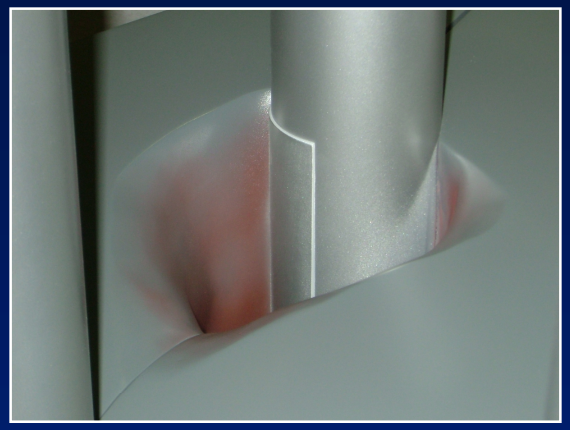
Occupational Accident Rates: An Indicator of Safety Consciousness?

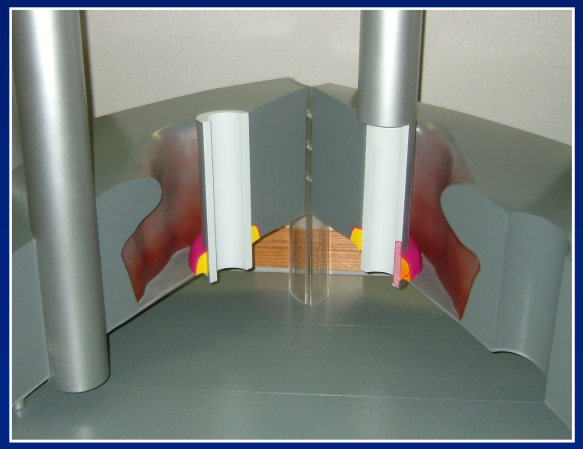


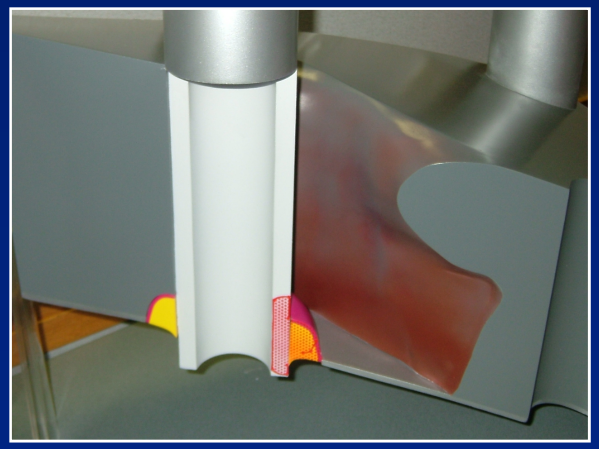
Source: U.S. Bureau of Labor Statistics, quoted in The GeoPolitics of Energy – Achieving a Just and Sustainable Energy Distribution by 2040, by Judith Wright and James Conca, BookSurge Publishing, 2007

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Davis-Besse Reactor Vessel Head Corrosion







Photos: Davis-Besse Head Corrosion Model at USNRC HQ, Rockville, MD

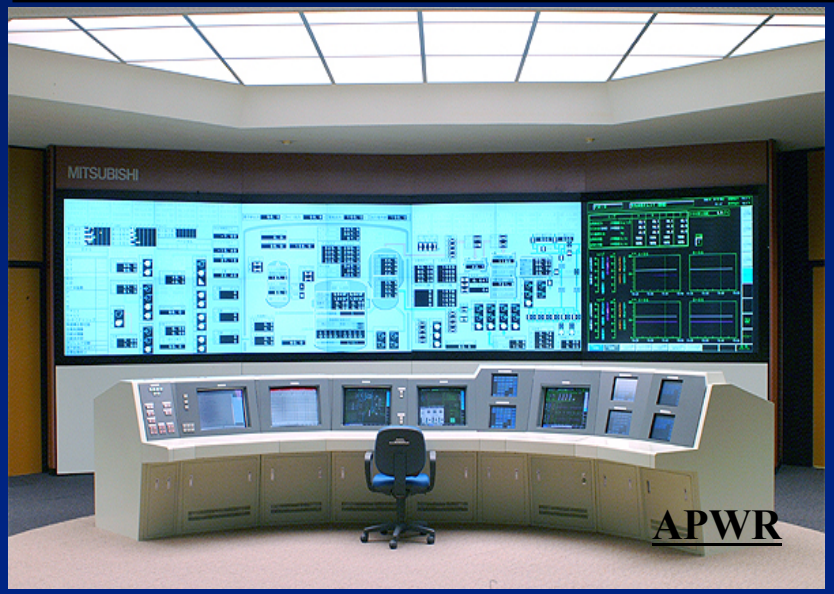
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Challenges NRC Faces

- Technology
  - Current
  - Digital
- Communications
- Workforce

Current Technology

Digital Technology



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

To be Seen as a Strong, Consistent, and Credible Regulator by our Stakeholders….

- Effective Communication is the Key
  - External Stakeholders
  - Internal Stakeholders

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

The Challenge of Informing the Public

"The professional person's standing in the community depends, in the final analysis, on the public's insight of his work, that is, on the educational level of the man in the street. When specialized knowledge of professional people is incomprehensible to the average man, he is apt to flounder between frustrated suspicion and excessive awe, leading him either to interfere unduly with professional independence or to accept naively every claim made by anyone who calls himself a professional."

H. G. Rickover

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Public Openness

- Essential to Regulatory Strength
- Opportunities for Public Comment
- Public Comments Addressed Openly
- Opportunities for Public Hearings
  - Licensing New Reactors
  - Renewing and Amending Licenses for Existing Reactors
- Balanced with Security Needs

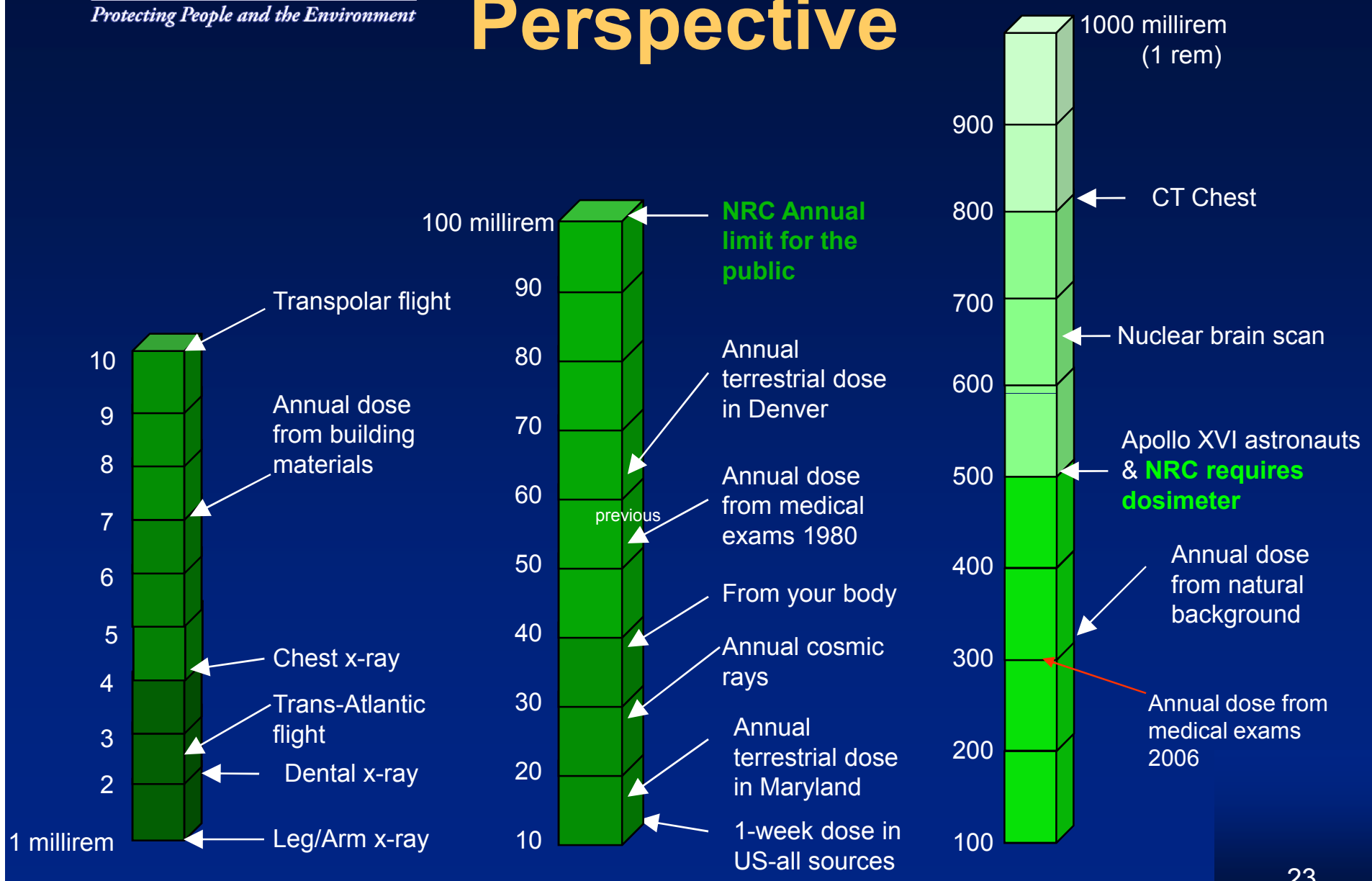
"Risk" is perceived in many different ways

We must **COMMUNICATE** how NRC requirements adequately **MANAGE** the risk to acceptable levels – and how NRC ensures licensees are meeting those requirements

We must **communicate** with both internal and external stakeholders the **assumptions** underlying our risk analyses

We must **communicate** risk **concepts** to the **public** in **understandable** terms

Radiation Doses in Perspective



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

ANOTHER EXTERNAL CHALLENGE- THE NATION'S TECHNICAL WORKFORCE

WORKING TOGETHER,

WE NEED TO COMMUNICATE THE SATISFACTION AND EXCITEMENT OF A TECHNICAL CAREER

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Our Task as Educators

- "We cannot always build the future for our youth, but we can build our youth for the future."

Franklin D. Roosevelt

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Societal Importance of Education

"If you can solve the education problem, you don't have to do anything else.

If you don't solve it, nothing else is going to matter all that much."

ALAN GREENSPAN, 2006

INTERNATIONAL MATH SCORE RANKINGS

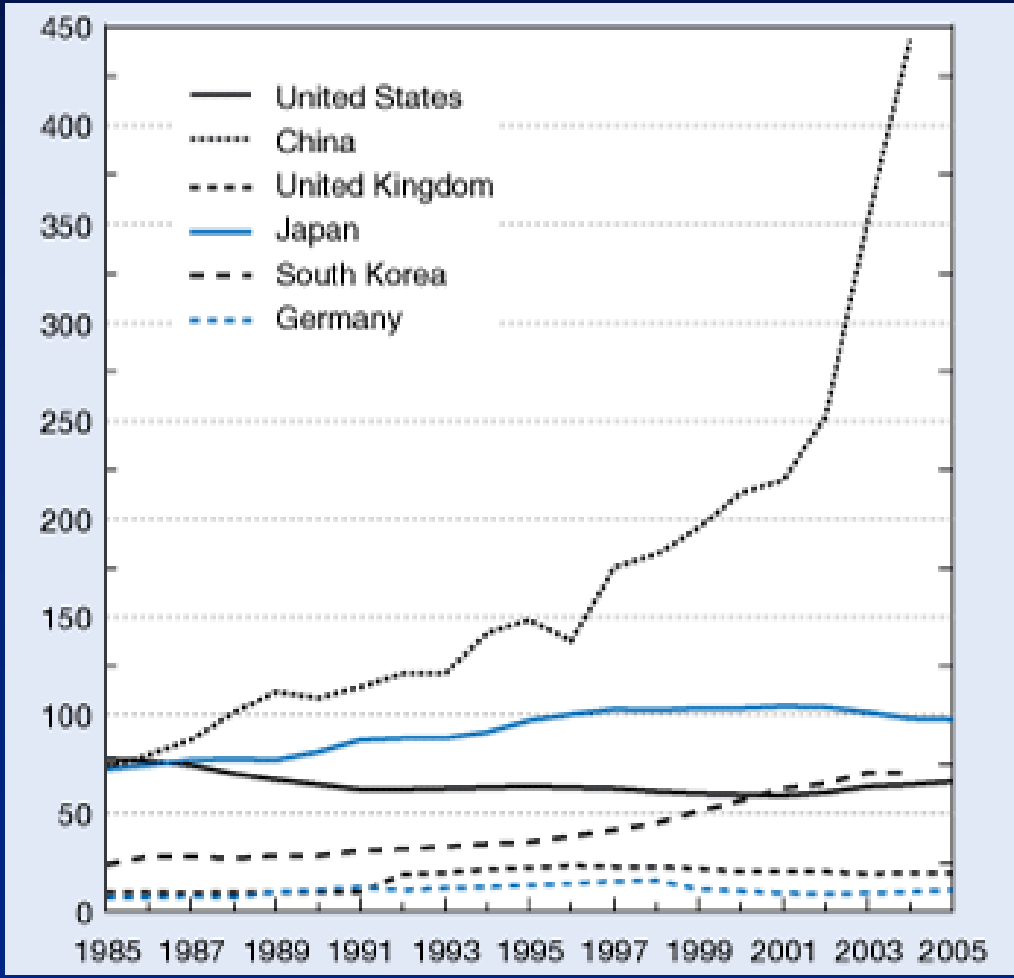
- Top Five performers with the US ranking
  - Grade 4
    - Hong Kong
    - Singapore
    - Taiwan
    - Japan
    - Kazakhstan
    - 11th United States
  - Grade 8
    - Taiwan
    - South Korea
    - Singapore
    - Hong Kong
    - Japan
    - 9th United States

Trends in International Mathematics and Science Study (TIMSS) 2007

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

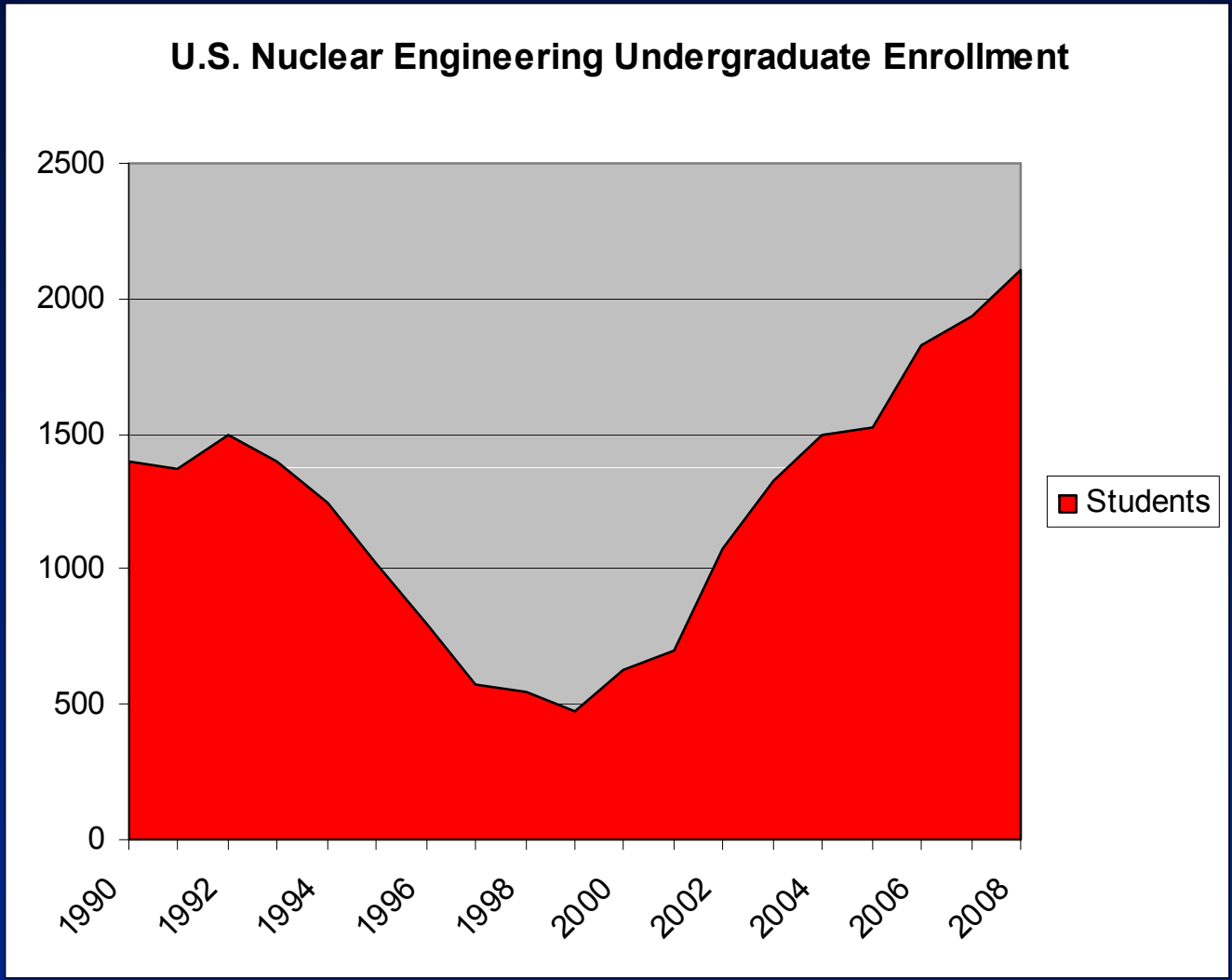
ENGINEERING
First University Degree

Thousands



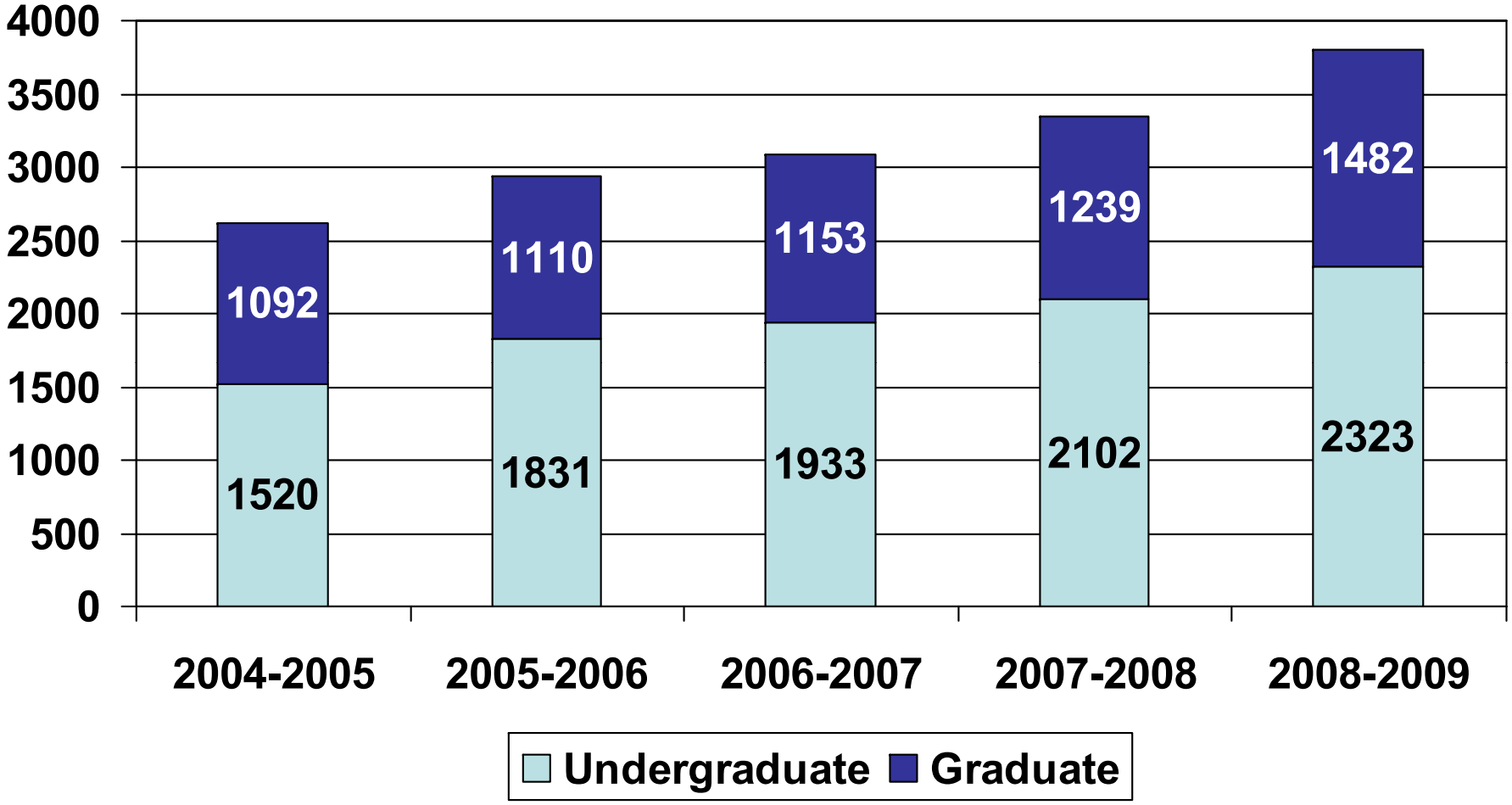
Source: Science and Engineering Indicators 2008

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

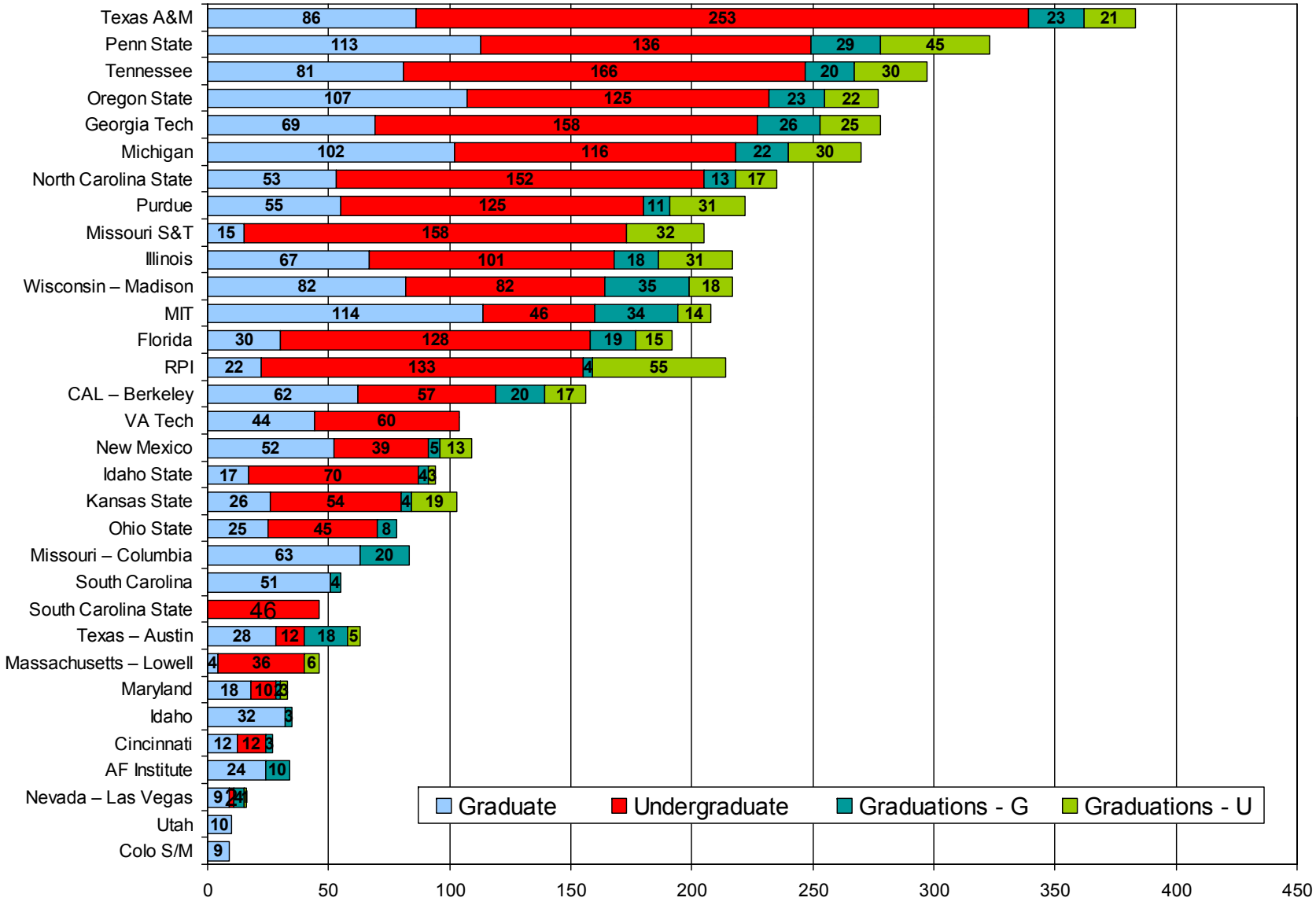


Source: DOE Survey, J. Gutteridge (2008)

NE Enrollment Trends (2004-2009)



Nuclear Engineering Enrollments and Graduations - 2008-09



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Hiring Trends

Goal – increase net staff by 200 per year

Accomplishments

Fiscal Year	2006	2007	2008
Hired	371	441	521
Attrition	211	222	208
Net Gain	160	219	313

NRC's Challenge

Maintain recognition as one of the best U.S. Federal agency workplaces!

Institute for the Study of Public Policy Implementation (ISPPI) at American University 2007 Best Places to Work in Federal Government survey

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Current Regulatory Issues of Interest

- **For New Reactor Designs**
  - Aircraft Crash Assessment Rulemaking
  - Digital Instrumentation and Controls
  - Small Reactors
- **For Operating Reactors**
  - Inattentive Security Guards
  - Fire Protection Closure
  - Digital Instrumentation and Controls
- **Materials Licensing**
  - Medical Isotope Supply
  - Cesium-137 Chloride continued use
- **Spent Fuel Management Policy**
  - Waste Confidence Policy/Rule
  - Repository Licensing

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

THE FUTURE IS NOW

Uranium Mining

Uranium Conversion

Uranium Enrichment

Power Reactors

Transportation

Storage

Waste Disposal

Medical/Industrial

New Reactors