Preparing the Next Generation Nuclear Stewards

Presentation to INMM Executive Committee

July 14, 2001

Indian Wells, California

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The Situation and Complication

- The world has “harnessed” the power of the atom for over six decades, and as we enter the new millennium the knowledge of the atom has matured to offer significant benefit to the human race…
- But there is growing concern that both domestically and abroad we are not preparing an adequate number of scientific, engineering and technical workers to properly manage the existing nuclear infrastructure and to address the environmental legacy of a fifty year nuclear arms Cold War. This nuclear stewardship must pass from this generation to the next, and the next, and the next…

The Question

- Can organizations such as the INMM mobilize resources internationally to ensure that the **Next Generation of Nuclear Stewards** are prepared to accept the responsibility for this legacy, and pass it on to their next generation?

The Challenge

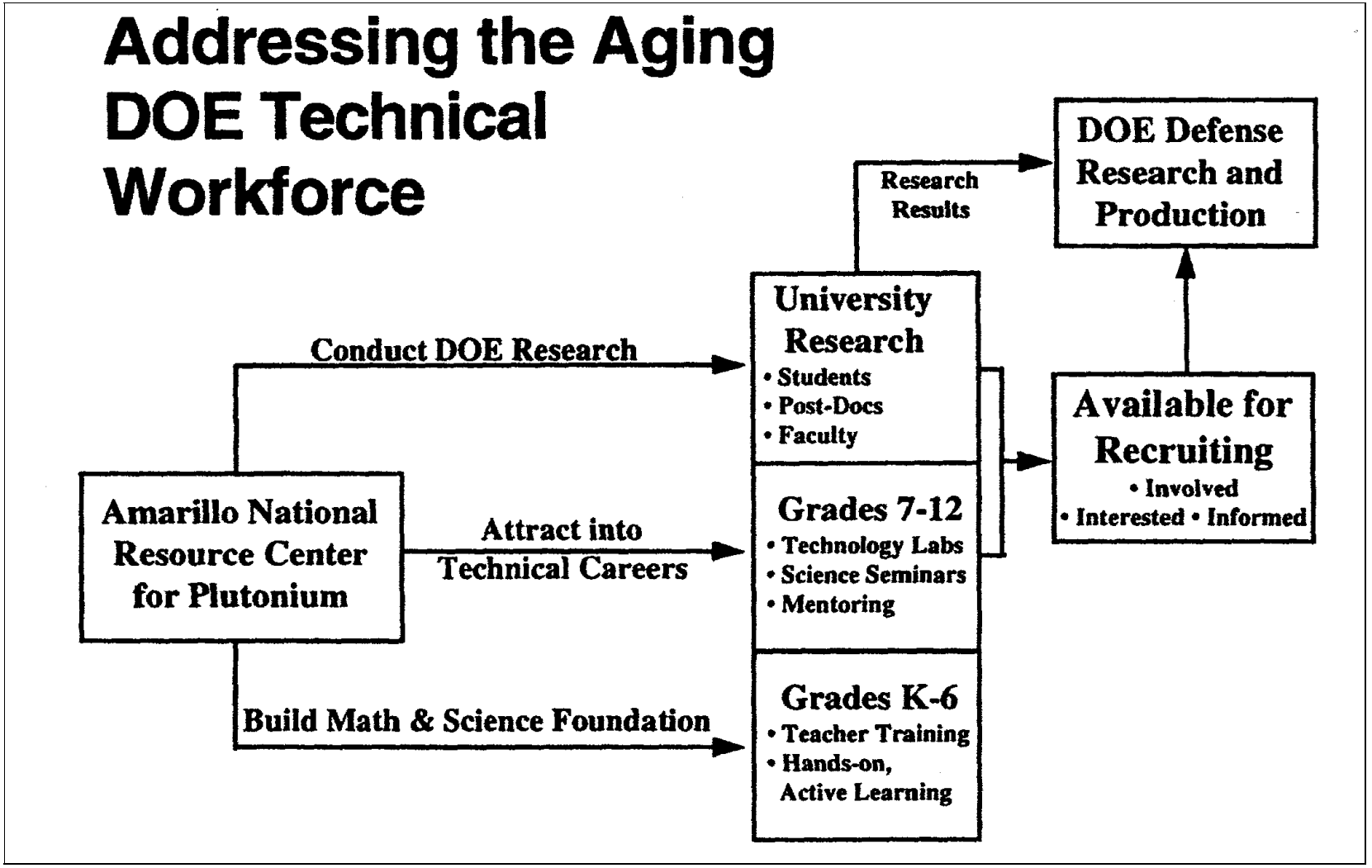
- April, 1998:
  - Obie Amaker, president of the INMM challenged the newly forming Southwest Chapter of INMM at the DOE Central Training Academy in Albuquerque, New Mexico:

> "The Executive Committee of INMM is concerned about the aging of the membership…we are not bringing in new, young people to our organization. Does this forebode the loss of a generation of nuclear materials management expertise to serve the needs of the nuclear industry worldwide, as well as represent the mission of the Institute? Can you accept this challenge?"

Initial Efforts - 1998-1999

- Team formed at CTA meeting:
  - Jack Jekowski, Pamela Dawson, Brenda Swindell
- Special session held at 39th Annual Meeting in Naples
  - Jim Tape - invited speaker on INMM Foundation
  - Mike Ehinger - invited speaker, Univ. of Tennessee
  - Rick Hartley - invited representative, Amarillo National Resource Center
- Presentation made to SW Chapter Annual Meeting in Rocky Flats, March, 1999

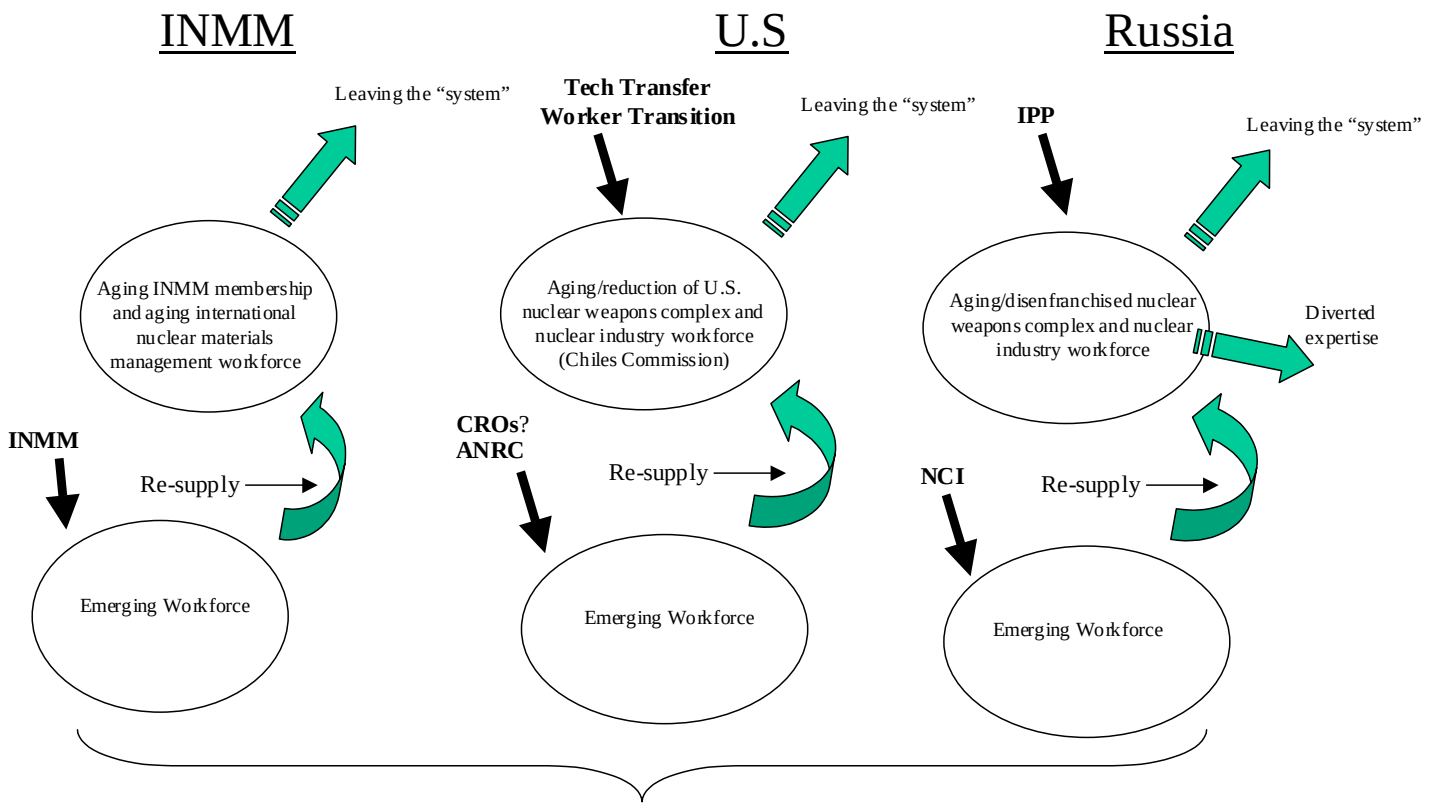
Initial Efforts - ANRC Concept



Initial Efforts - Development of Concepts

- Discussions with UNM on concept of a U.S.-Russia Bilateral Education Partnership

INMM STRATEGIC ISSUE:
EDUCATING THE NEXT GENERATION
Defining the Issues



Educating/involving the Emerging Workforce - a common element

Initial Efforts - 1999-2000

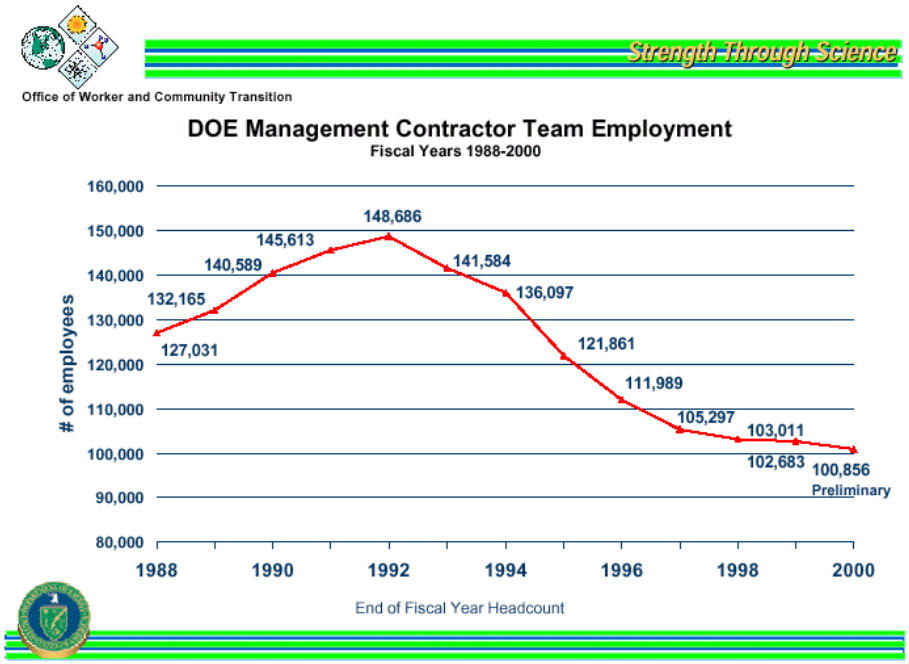
- Special Session conducted at 40th Annual Meeting in Phoenix, 1999
  - Ed Walters, John Russell from UNM
  - Bill Desmond, DOE
  - Rick Hartley
  - Representative from Texas A&M
  - Others during meeting - Debbie Dickman, Obie Amaker, Jim Tape, Pam Dawson, others
- Closing Plenary presentation by Pete Lyons (Scientific staff to Sen. Pete Domenici) on decline of nuclear engineering programs

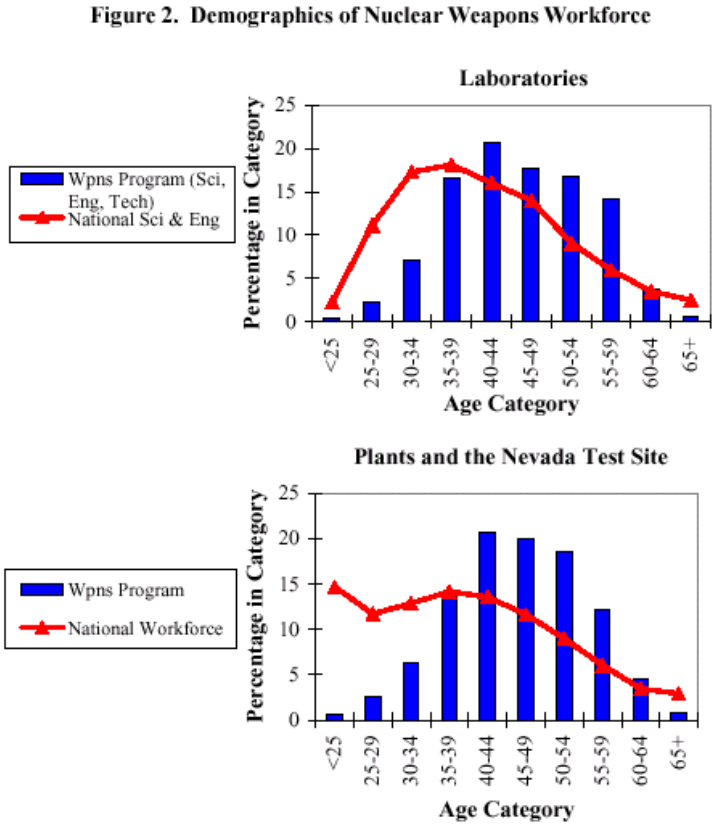
Initial Efforts - 2000-2001

- 41st Annual Meeting (2000) (New Orleans) - continued discussions in special interest groups.
- “Magnet” school initiative suggested by Rick Glass, DOE/AL manager - Albuquerque Public Schools
- March, 2001- Special session at Nuclear Security Decision Maker’s forum: *“Recruiting and Maintaining the Scientific and Engineering Nuclear Weapons Work Force”*
- Presentation on Albuquerque Math, Science and Technology Partnership to Annual SW Chapter meeting - May, 2001 in Taos, NM
- Initial discussions on potential for changing the mission of the Community Reuse Organizations to assist with “filling the pipeline” in education for both private sector and DOE

Watching the Data Accumulate

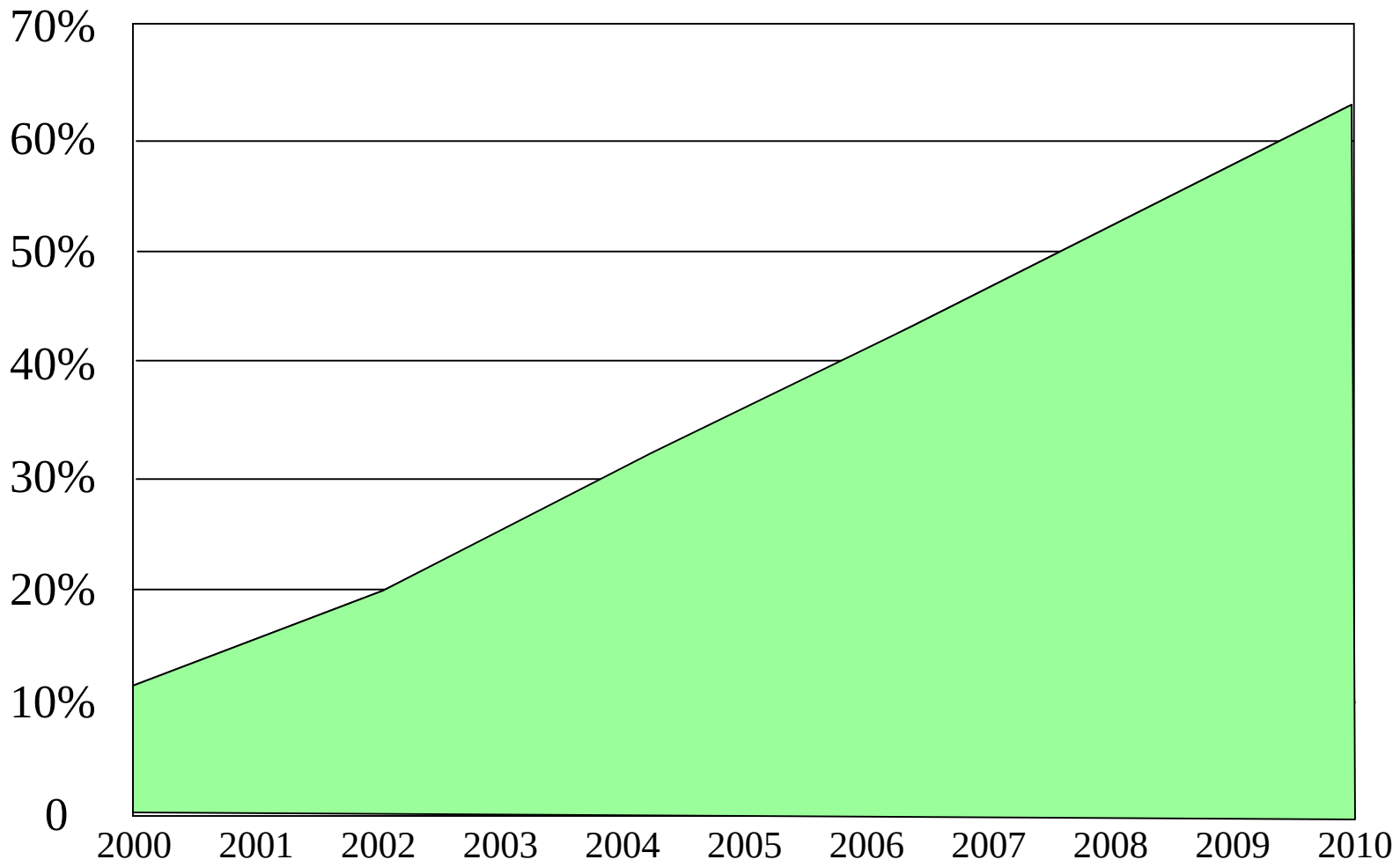
"During this downsizing, most facilities have done minimal hiring, raising concerns that the nation is not developing the next generation of nuclear stewards…" *Chiles Commission*





Downsizing within the U.S. Nuclear Weapons complex, and the aging of the existing workforce

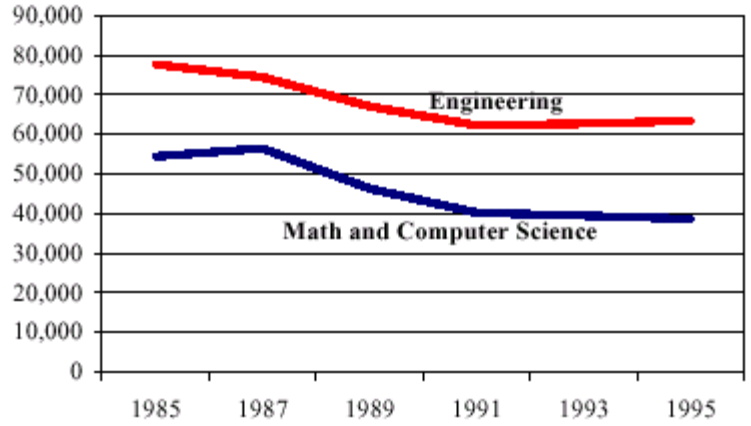
Watching the Data Accumulate



NWC-Wide Percent of Baseline (2000) Critical Skills Employees “Retirement Eligible” by Year (Cumulative)

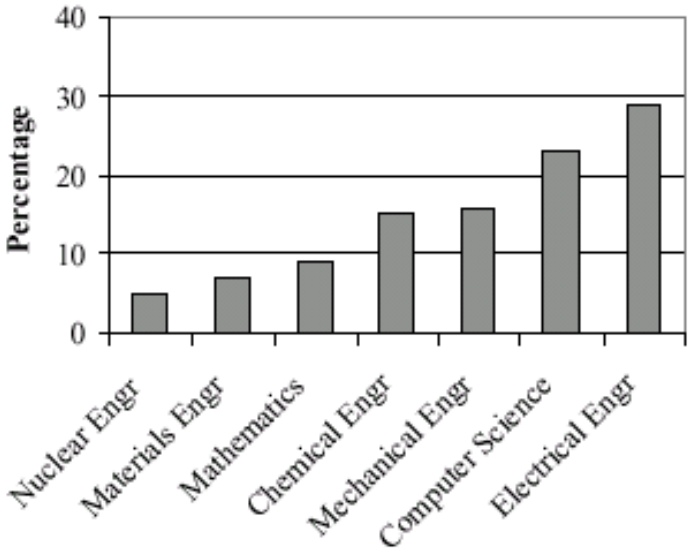
Watching the Data Accumulate

Figure 3. Technical Undergraduate Degrees Awarded Per Year[15]



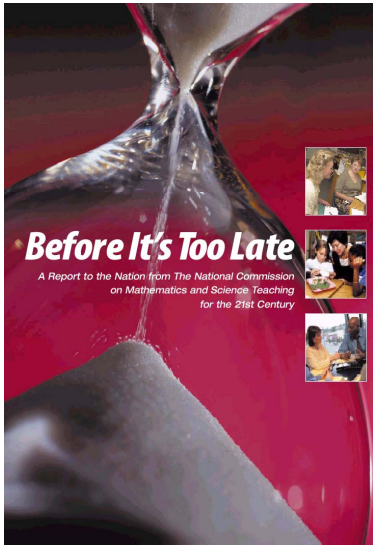
"The number of college students in many of the scientific and engineering fields relevant to nuclear weapons work is shrinking while the overall needs in the economy for such graduates continue to grow…The long-term challenge is to restore an adequate flow of new talent." *Chiles Commission*

Figure 5. Projected U.S. Job Growth 1996-2006[20]



A Decline in Science, Math and Engineering Degrees, combined with a declining nuclear industry

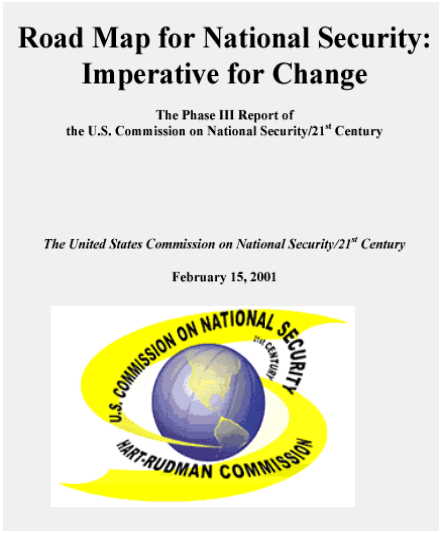
Watching the Data Accumulate



"We as a nation must take immediate action to improve the quality of math and science teaching in every classroom in the country. If we delay, we put at risk our continued economic growth and future scientific discovery."

- Senator John Glenn

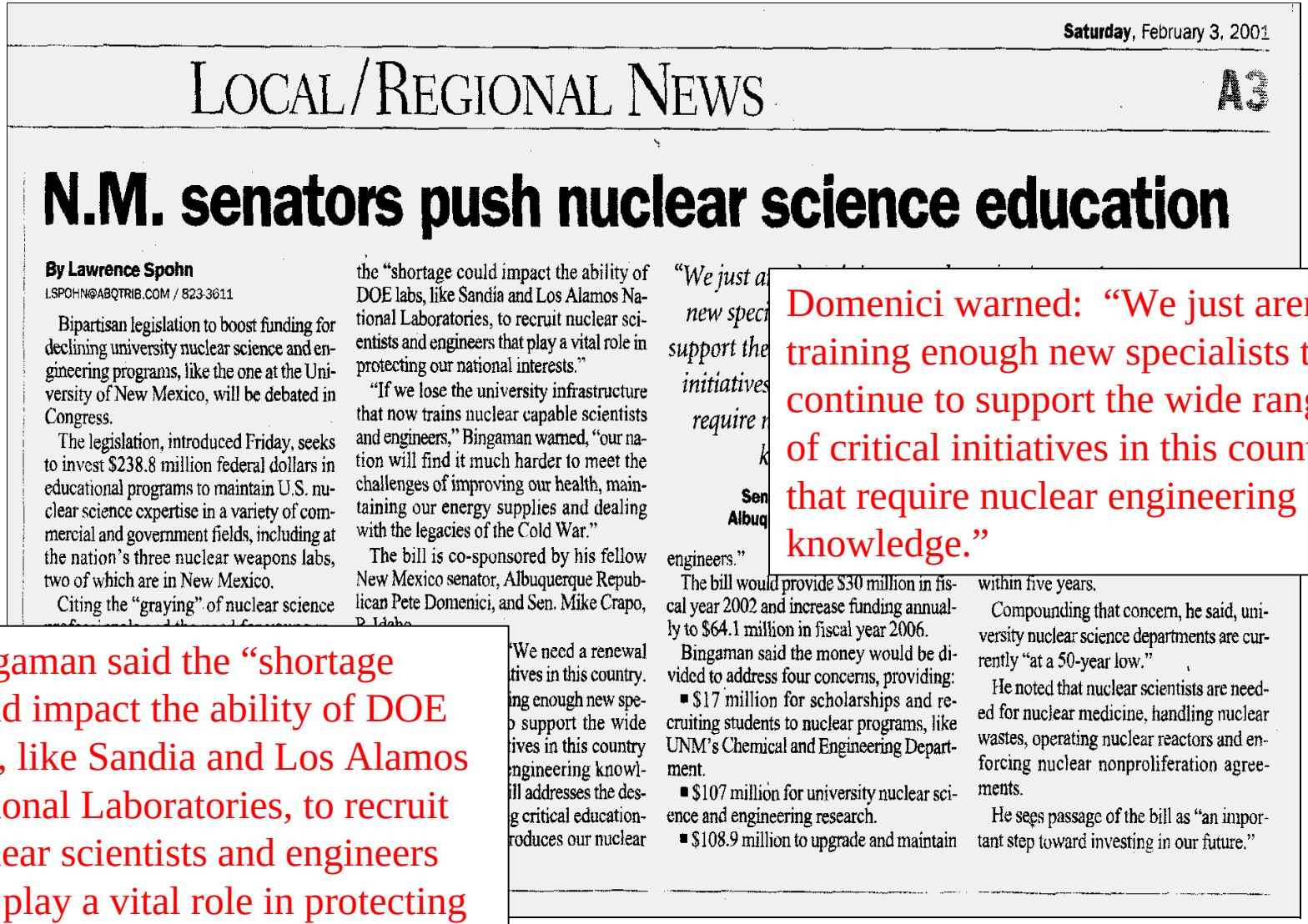
"The Glenn Commission"



"Education is the foundation of America's future…education in science, mathematics, and engineering has special relevance for the future of U.S. national security, for America's ability to lead depends particularly on the depth and breadth of its scientific and technical communities."

"The Hart-Rudman Commission"

Watching the Data Accumulate



Saturday, February 3, 2001

LOCAL/REGIONAL NEWS A3

N.M. senators push nuclear science education

By Lawrence Spohn
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Bipartisan legislation to boost funding for declining university nuclear science and engineering programs, like the one at the University of New Mexico, will be debated in Congress.

The legislation, introduced Friday, seeks to invest $238.8 million federal dollars in educational programs to maintain U.S. nuclear science expertise in a variety of commercial and government fields, including at the nation's three nuclear weapons labs, two of which are in New Mexico.

Citing the "graying" of nuclear science

the "shortage could impact the ability of DOE labs, like Sandia and Los Alamos National Laboratories, to recruit nuclear scientists and engineers that play a vital role in protecting our national interests."

"If we lose the university infrastructure that now trains nuclear capable scientists and engineers," Bingaman warned, "our nation will find it much harder to meet the challenges of improving our health, maintaining our energy supplies and dealing with the legacies of the Cold War."

The bill is co-sponsored by his fellow New Mexico senator, Albuquerque Republican Pete Domenici, and Sen. Mike Crapo,

"We just a
new speci
support the
initiatives
require

engineers."

The bill would provide $30 million in fiscal year 2002 and increase funding annually to $64.1 million in fiscal year 2006.

Bingaman said the money would be divided to address four concerns, providing:

- $17 million for scholarships and recruiting students to nuclear programs, like UNM's Chemical and Engineering Department.
- $107 million for university nuclear science and engineering research.
- $108.9 million to upgrade and maintain

within five years.

Compounding that concern, he said, university nuclear science departments are currently "at a 50-year low."

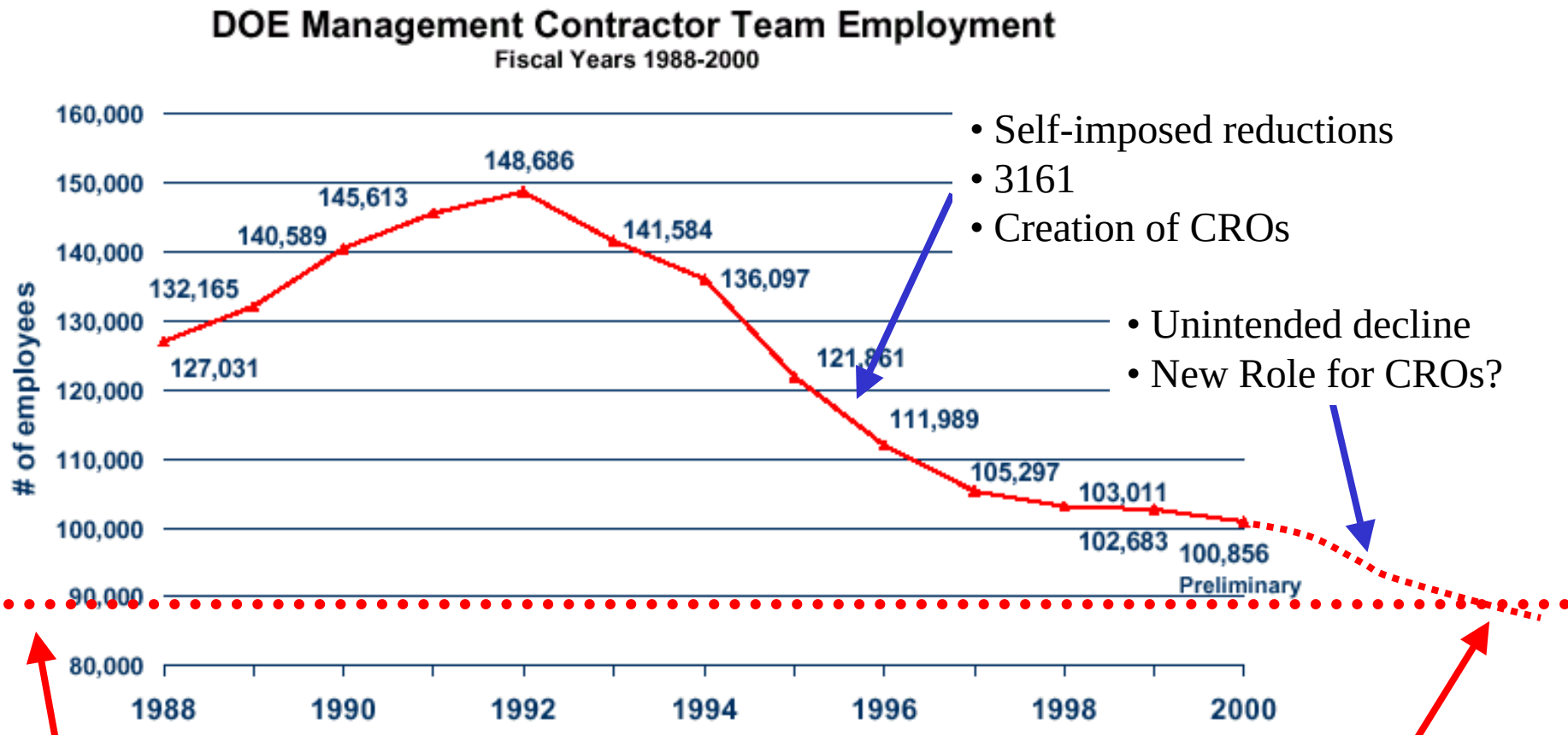
He noted that nuclear scientists are needed for nuclear medicine, handling nuclear wastes, operating nuclear reactors and enforcing nuclear nonproliferation agreements.

He sees passage of the bill as "an important step toward investing in our future."

Domenici warned: "We just aren't training enough new specialists to continue to support the wide range of critical initiatives in this country that require nuclear engineering knowledge."

Bingaman said the "shortage could impact the ability of DOE labs, like Sandia and Los Alamos National Laboratories, to recruit nuclear scientists and engineers that play a vital role in protecting our national interests."

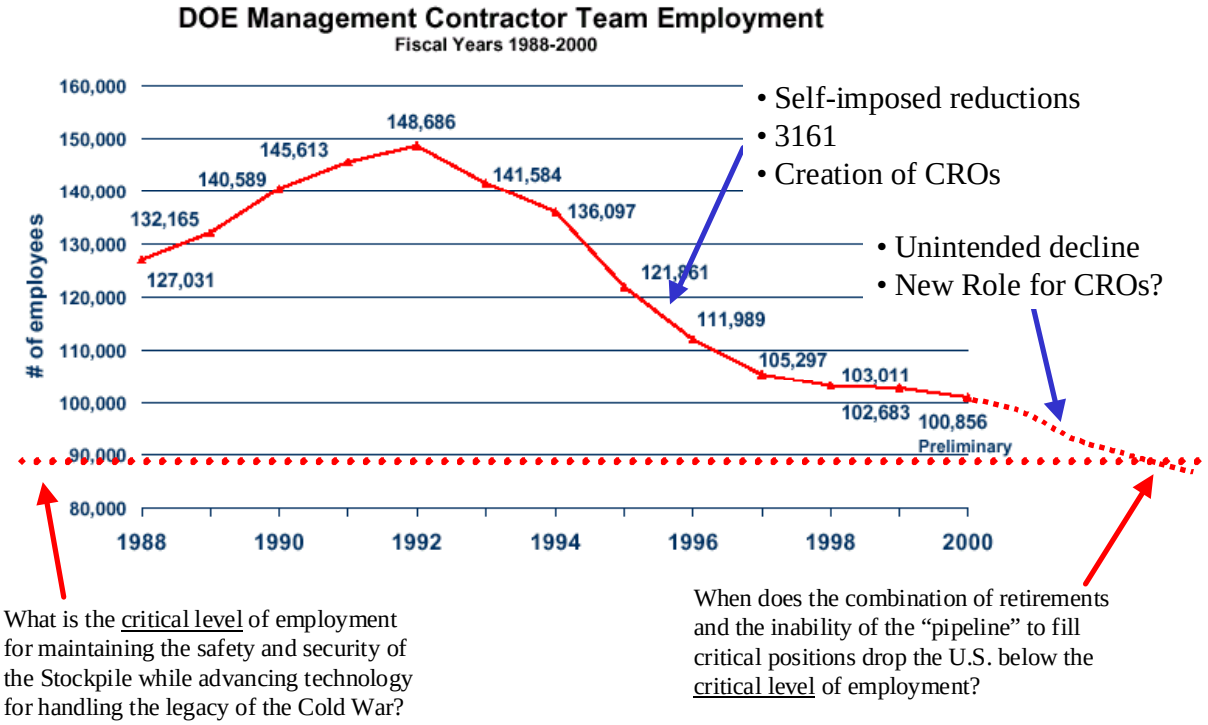
An Emerging Concept:
The "Critical Level of Employment"



What is the <u>critical level</u> of employment for maintaining the safety and security of the Stockpile while advancing technology for handling the legacy of the Cold War?

When does the combination of retirements and the inability of the "pipeline" to fill critical positions drop the U.S. below the <u>critical level</u> of employment?

Driving Forces - Complex Issues



- Reduction in workforce across the complex
- Decline in Math and Science achievement in Education System
- Decline in society's interest and support for science
- Nuclear environmental issues
- Nuclear Power decline
- Negative publicity - constant public and Congressional criticism
- Growing bureaucracy
- Lie detector tests/low morale
- Declining infrastructure
- No new and exciting science - absence of testing

And...What About the Rest of the World?

- INMM and other organizations - aging membership population
- Loss of critical skills in Russia
- Lack of recognition by general public worldwide that we have a nuclear legacy that will last for many, many generations

We worry about the stability of geological formations over 10,000 years for storage, but appear not to be concerned about having an adequate workforce to manage nuclear materials in the next 20!

What Can/Should INMM Do?

- Gather data from its international membership
- Leverage its reputation and relationships with other international organizations to “raise the flag” on the issues
- Develop strategies that reach to the earliest years of the education system, and positively influence the foundations of the “anti-science” societies of the Nuclear Weapons States
- Set measurable goals for new membership and student involvement