

The Future of the Nuclear Industry & an Overview of The Nuclear Sector Coordinating Council - Radioisotopes

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NDTMA 2006 Annual Meeting

February 16, 2006



Overview

- Energy security and our energy situation today
- Nuclear industry positioning for new plant construction
- Concerns about nuclear energy
- Resource issues
- What is the industry doing to build sustainable confidence in nuclear
- Who and What is The Nuclear Sector Coordinating Council - Radioisotopes
- Nuclear needs more NDT professionals



Energy security and our energy situation today

- National security involves more than protection against external military and terrorist threats.
- Public confidence
 - Economic prospects
 - Economic growth
 - Create jobs and
 - Promise a higher standard of living
- Security at risk
 - Natural gas
 - in the \$6 to \$7 per million BTU range (one of the major trading hubs still over \$10 per million BTU)
 - Prices soared to over \$15 per million BTU following the Gulf hurricanes
 - 20 % of natural gas production and roughly 30 % of oil production is still shut down

Energy security and our energy situation today

- Higher energy prices ripple through the economy
 - Fuel costs for the electric sector increased 35% this past year
 - Some utilities are warning of 30 to 40 % increases in electricity costs this winter
 - Annual energy expenditures increased 8.5 % previously about 6.0%
 - Wall Street is warning investors away from industries that depend heavily on natural gas
- How did the US get this way?
 - Since 1992, electric industry built over 275,000 megawatts of natural gas-fired generating capacity.
 - Gas-fired capacity was also being built to serve baseload demand
 - Since 1992 completed only 14,000 megawatts of new nuclear and coal-fired capacity
 - Investment in new nuclear and coal-fired power plants has virtually disappeared
 - Chronic underinvestment in new generating plants, long-distance transmission and other critical energy infrastructure

Nuclear Industry Positioning for New Plant Construction

- Energy Policy Act of 2005
 - Broad-based stimulus for investment in new electric power infrastructure
 - New generation of nuclear plants
 - Essential to preserve the diversity of fuels
- Two essential building blocks for new nuclear
 - Investment stimulus for new nuclear power plants
 - Loan guarantees
 - Production tax credits
 - Innovative form of investment protection for the first reactors
 - indemnify debt service and other costs
 - If operation is delayed for reasons beyond the company's control

Nuclear Industry Positioning for New Plant Construction

- Nine companies, consortia or joint ventures have firm plans for 12 to 15 new nuclear power plants
 - First of application for combined license will be submitted to the Nuclear Regulatory Commission in 2007, and should be approved by 2010
 - 48-month construction period
 - Commercial operating in 2014-2015
 - 30,000 megawatts of new nuclear by 2025

Concerns about nuclear energy

- Three attributes
 - Reliable
 - Affordable electricity at low cost (Forward price stability)
 - Clean air

Concerns about nuclear energy

- What about safety?
 - An unforgiving technology
 - Controlled with proper design, maintenance, training, qualification standards and procedural compliance
 - An unforgiving public environment
 - Continue to make positive news not negative news
 - More attention to materials issues
 - Process holds industry to high standards
 - Strong, independent regulator in the Nuclear Regulatory Commission
 - Institute of Nuclear Power Operations - independent form of self-regulation through peer review and peer pressure
 - Nuclear Energy Institute – one industry voice addressing regulations and legislation
 - Electric Power Research Institute – industry focus research on today's and tomorrow's challenges

Concerns about nuclear energy

- What about the economics?
 - Today average busbar costs in the range of \$23 per megawatt-hour
 - New plants first year between \$55 and \$68 per megawatt-hour
 - Loan guarantees or production tax credits reduce this to \$39 and \$46 per megawatt-hour
 - Fully competitive with new coal-fired capacity at \$49 or natural gas in the \$6 to \$7 per million BTU range

Concerns about nuclear energy

- What are you going to do with the high-level radioactive waste?
 - Follow the course recommended for decades by independent scientific organizations around the world, including our own National Academy of Sciences
 - Yucca Mountain in Nevada
 - Nothing has emerged so far during the past 20 years and \$6 billion of scientific investigation that would disqualify the Yucca Mountain site in any way
 - Facility will remain open and closely monitored for 100 to 300 years
 - Period of monitoring and retrievability should create confidence with the citizens of our nation that the repository is performing as designed ... that public safety is assured ... and that the environment is protected.
 - Extended monitoring and the ability to retrieve the fuel will allow recovery of the energy content in the fuel if it becomes cost-effective to do so or to reprocess it in order to reduce the volume and toxicity

Resource issues

- Current fleet
 - Replacement of major components
 - Steam generators
 - Reactor heads
 - Personnel
 - Aging work force
 - Craft ranks are thinning
 - New workers not in the pipeline
- Next generation
 - All of the above
 - Equipments needs even greater
 - Pressure vessels
 - Competition from overseas for components and expertise

What is the industry doing to build sustainable confidence in nuclear

- Define a long-term roadmap and vision for the technology
 - We are in a new construction cycle for advanced light water reactors
 - By 2025, demonstrate and start commercial deployment of high-temperature reactors, with a more varied product slate — electricity, hydrogen production, and process heat
 - By 2050, deployment of technologies to partition used fuel to recover the uranium and plutonium and the other potentially fissile elements, to deploy new-design fast-spectrum reactors capable of burning the actinides and to transmute the fission products into shorter-lived elements reducing the waste burden

What is the industry doing to build sustainable confidence in nuclear

- Long-term technology roadmap must
 - Address major concerns about nuclear energy of
 - Political leaders
 - Policymakers and
 - The public
- We are establishing a legitimate, necessary and credible undertaking for the future of nuclear energy

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

- Department of Homeland Security
 - Critical Infrastructure/Key Resource Sectors
 - Chemical and hazardous material
 - Transportation systems
 - Emergency Services
 - Postal and Shipping
 - Dams
 - Government Facilities
 - Commercial Facilities
 - Nuclear Reactors, Materials, and Waste
 - Agriculture and Food
 - Public Health/Healthcare
 - Drinking Water and Wastewater Systems
 - Energy
 - Banking and Finance
 - National Monuments and Icons
 - Defense Industrial Base
 - Information Technology
 - Telecommunications

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

- Why is it a Critical Infrastructure/Key Resource Sector
 - Important component of US infrastructure and economy
 - Potential target of terrorist
 - Potential weapon of a terrorist

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

- Nuclear Reactors, Materials, and Waste
 - Nuclear Power
 - Research Reactors
 - Radioisotopes
 - Radioactive Waste

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

- Nuclear Sector Coordinating Council
 - Sector generic issues
 - Transportation
 - Pandemic Influenza
 - Security of facilities
 - Impact of lost of other sectors
- Government Coordinating Council
 - Federal
 - NRC
 - EPA
 - DOT
 - Coast Guard

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

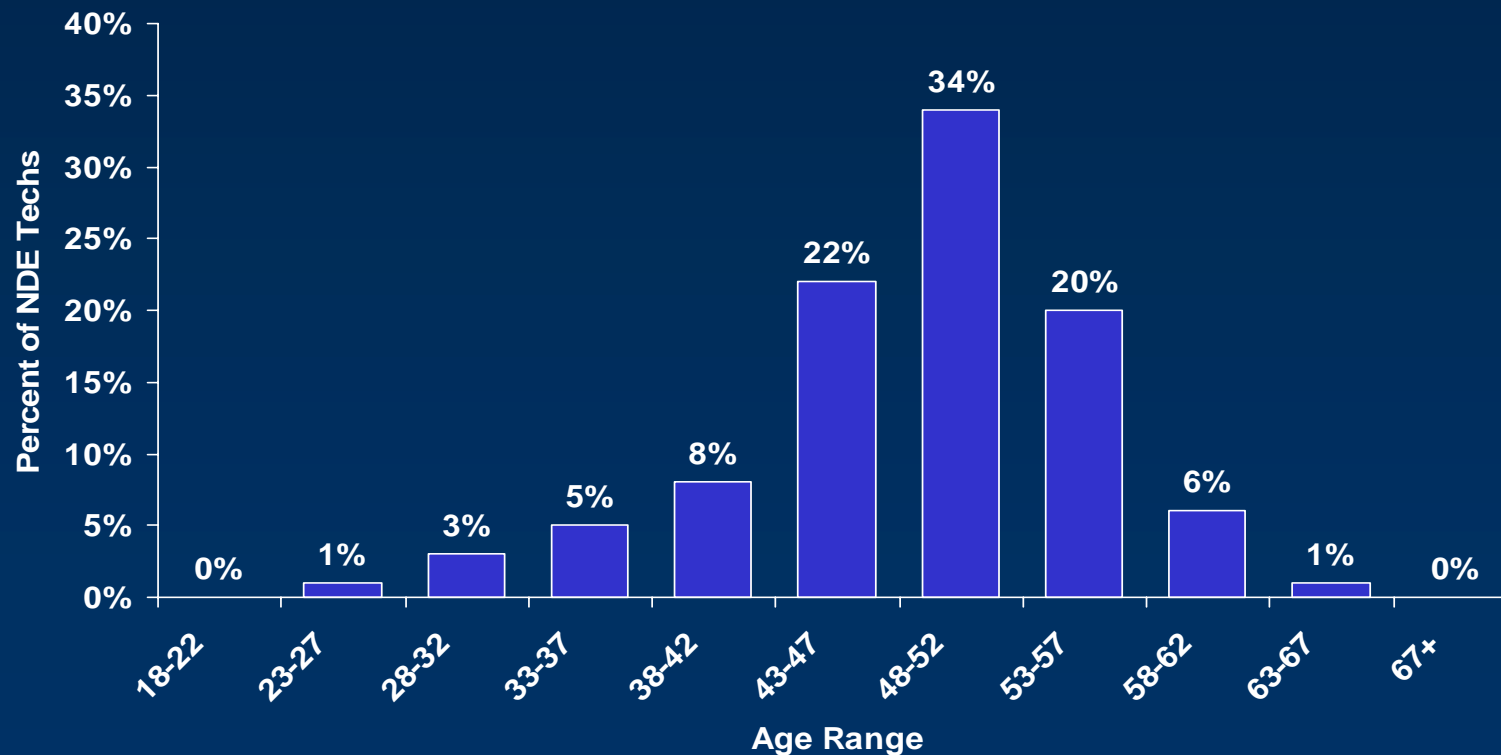
- Nuclear Sector Coordinating Council – Radioisotopes
 - ABB
 - AEA Technology QSA Inc.
 - Alpine Group
 - American Association of Physicists in Medicine
 - Association of Radioactive Materials Transporters
 - Auxier
 - Benton Dickinson
 - Bio-Nucleonics Pharma, Inc.
 - Coalition for the Advancement of Brachytherapy
 - CTI Molecular Imaging, Inc.
 - General Dynamics – Electric Boat
 - GE Healthcare
 - Health Physics Society
 - International Isotopes Idaho, Inc.
 - Johns Hopkins Bloomberg School of Public Health
 - MDS Nordion
 - Nondestructive Testing Management Association
 - Nuclear Energy Institute
 - Nucletron
 - Perkin Elmer
 - PETNET
 - Society of Nuclear Medicine
 - Steris Isomedix Services
 - TCI Medical Inc.
 - Tyco Healthcare
 - University of Utah

Who and What is The Nuclear Sector Coordinating Council - Radioisotopes

- What are the NSCC-R issues?
 - Import and Export
 - Transportation
 - Source Tracking
 - Potential Use of Isotopes in an RDD or RED
 - Harmonization Across the Agencies
 - Appropriate levels of Security
 - Appropriate Level of Screening Personnel
 - Who's in Charge
 - Physical Enhancements to Sources

Nuclear Needs More NDT Professionals

- Non-Destructive Exam (NDE) Work Force by Age Distribution



Nuclear Needs More NDT Professionals

- Top Recruiting Challenges in 2005
 - Female candidates 75%
 - Minority candidates 71%
 - Nuclear engineers 33%
 - Experienced engineers 29%
 - **NDE technicians 25%**
 - Health physicists 20%
 - Electrical engineers 17%
 - Mechanical engineers 17%
 - Maintenance technicians 17%