

2007 NUCLEAR ENGINEERING STUDENT DELEGATION
WASHINGTON, D.C. JULY 9TH – 11TH
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POLICY STATEMENT

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EXECUTIVE SUMMARY

We, the 2007 Nuclear Engineering Student Delegation, understand that nuclear science and engineering is vital for the future economic growth of the United States. Many industries will benefit from the research and development fostered by nuclear science and engineering programs. As our economy continues to grow, the country's energy demand will increase and climate change will start to take center stage in our national energy policy. Electricity from nuclear power will be critical in meeting this energy growth demand, while reducing emissions.

In addition, the applications of nuclear science are far-reaching and will have a lasting effect on our country. To benefit students, universities and industries in this field, we strongly recommend supporting the following programs.

- The Nuclear Engineering Student Delegation urges Congress to fully fund university-based nuclear engineering programs and reactors. This funding should be at least commensurate with the authorized levels of the Energy Policy Act of 2005, which authorized \$50.1 Million.
- We advocate that the Department of Energy (DOE) follow through with its commitment to submit a License Application for Yucca Mountain by June of 2008.
- We support evaluating the suitability of reorganizing the waste management effort into a private-public partnership, total privatization or militarization of the project.
- We support the science and research conducted under the Global Nuclear Energy Partnership (GNEP) and encourage government to expand the alternative technologies considered for the program.
- We encourage Congress to immediately enact the International Atomic Energy Agency (IAEA) Additional Protocol, as well as pass Senate Bill S.1138 in order to help strengthen the international non-proliferation regime.
- The Delegation recommends the immediate enforcement of existing laws regulating land border control to prevent the transportation of special nuclear materials (SNM) into the United States.
- The Delegation recommends funding research and implementation of practical and cost-effective methods that can screen all cargo before arrival at United States' seaports.
- We support the Reliable Replacement Warhead (RRW) program and Complex 2030 as critical components of our future national security, non-proliferation efforts, and nuclear technology development.

We welcome your feedback and look forward to any opportunity to further express our views regarding these important issues.

POLICY STATEMENT

Thirteen years ago, the first Nuclear Engineering Student Delegation to Washington, D.C. was formed to reinstate funding for research reactors. Today, the Delegation continues to express the views of the student population on nuclear science, policy, and education. Every year, the Delegation is made up of a diverse group of students from the nation's most prestigious nuclear engineering programs, representing various disciplines within the nuclear sciences. The students independently organize and run this three-day trip to Washington, D.C. The Delegation is not representing any organization or university, as the attending students are expressing their own views.

For any further information regarding any of these issues, please contact Tyler Schweitzer at Tyler.Schweitzer@nesd.org or visit our website at <http://www.nesd.org/>. Thank you for your consideration.

University Programs

University-based nuclear engineering funding bolsters three things: people, programs, and reactor facilities.

The reason DOE cites for termination of the University Reactor Infrastructure and Education Assistance Program (University Programs) is the presence of increased undergraduate enrollment. This was surprising because in previous years graduate enrollment was used as a benchmark and it has not increased at the same pace as undergraduate enrollment. Also, the demand for nuclear engineers at all levels is increasing.

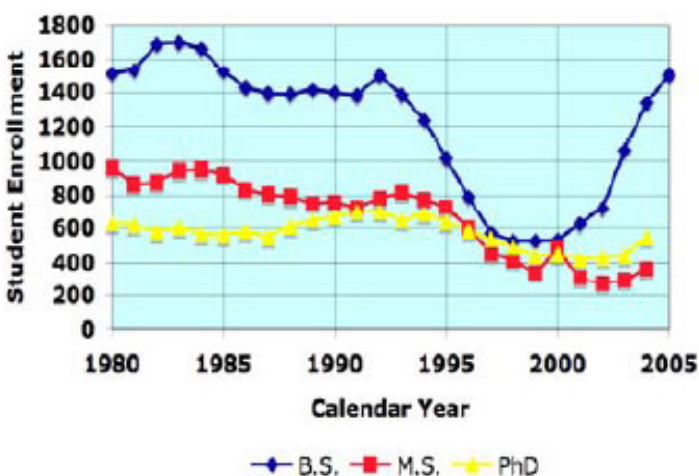


Figure 1: Student Enrollment in Nuclear Engineering Programs over the past 20 years¹

The Nuclear Energy Institute (NEI) estimates that 26% of engineers working in the U.S. nuclear utilities will be eligible for retirement in the next five years.

Furthermore, the anticipated nuclear renaissance has resulted in unprecedented demand for new engineers. Meanwhile, the United States is falling orders of magnitude behind other countries in the number of engineering graduates produced.

While undergraduate enrollments have increased significantly as seen in Figure 1, this increase does not represent a proper metric to evaluate funding. We are on the verge of a supply shortage of a major national asset, and this is not the time to zero out a primary funding sources.

The University Programs have been a major source of funding supporting United States nuclear engineering departments. Many universities have flourished as a result of this federal funding and have been able to receive matching grants from industry.

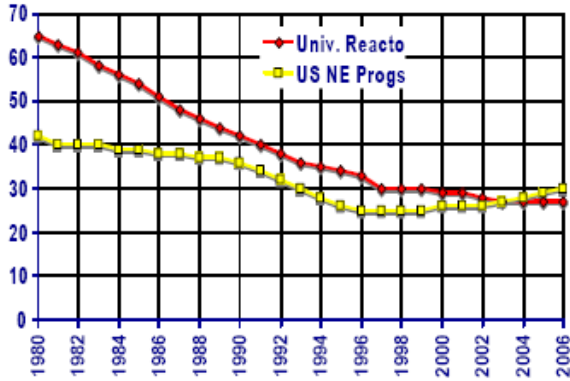


Figure 2: Decline of University NE Programs and University Reactors¹

However, some nuclear engineering departments continue to struggle. For example, in 2002 the nuclear engineering program at the University of Massachusetts at Lowell lost its accreditation and became a part of the mechanical engineering program. Shortly thereafter, it was moved to the chemical engineering department, where it maintains only two fulltime professors and merely strives to maintain itself as an option within the department. This is one place that federal funding could support a revival effort.

On the other hand, the elimination of federal funding will result in a quick decline in the number of nuclear engineering programs. Figure 2 shows the decline of university engineering programs in the 1990's and how these programs have begun to increase in the past couple of years. Funding to University Programs should be based on more comprehensive metrics than solely national undergraduate enrollment rates. A series of attributes should be evaluated by the DOE such as graduation rate, size of endowment, overall ability to self-sustain growth and industry demand.

There is a very disturbing trend in our nuclear departments today. Research reactors are disappearing and the ones that remain are aging. Almost all have antiquated control rooms and lack the funding to be fully utilized.

University research reactors give young engineering students a valuable hands-on experience with nuclear technology. The presence of these facilities have a positive impact on enrollment levels of nuclear engineering students, the quality of their educational experience, and the health of nuclear engineering departments.

It is absolutely imperative to national interests that the United States maintains technical dominance. This is particularly true for engineering where we are falling behind the rest of the world, and more specifically true for nuclear engineering, which holds so much promise for meeting future energy needs and combating global warming.

Spent Nuclear Fuel Management

We advocate that DOE follow through with its commitment to submitting a License Application for Yucca Mountain by June of 2008. This will begin the critical process of an independent

regulator thoroughly reviewing the proposed design, and determining if sufficient analyses have been conducted to properly assess the performance/risk. We also advocate that DOE expedite the removal of defense wastes and fuel from decommissioned sites to Yucca Mountain, a willing host site, or an alternative federal site. This initial campaign of shipments will increase public confidence by demonstrating the ability to safely transport and store high-level waste.

We support evaluating the suitability of reorganizing the waste management effort into a private-public partnership or total program privatization. The nation's decision that geologic disposal at Yucca Mountain is the appropriate final solution is reflected in Congress' passing of the Nuclear Waste Policy Act as amended in 1987 and the President's approval of the site in 2002. The delays that have occurred as a result of fierce political opposition are estimated to cost tax-payers \$500 million per year². The utilities are currently operating an above-ground storage solution at many reactor sites. Since the utilities have a vested interest in the management of their nuclear waste, it would be logical for them to take a more active role in the establishment of a sustainable solution for waste management strategy.

DOE has evaluated the potential merits of partially privatizing the nuclear waste management in past studies, such as the *Alternative Means of Financing and Managing the Civilian Radioactive Waste Management Program* (OCRWM, 2001). This report proposes three long-term funding alternatives that deserve reconsideration and further analysis. Transforming OCRWM into a public-private hybrid may open up the opportunity to pursue alternative solutions to Yucca Mountain, at the discretion of management. However, it would not impede building a repository at Yucca Mountain, should the license application be approved. Such reorganization is appropriate when the Program evolves from a scientific research effort to large-scale implementation. The private partnership could be more effective at efficiently managing construction, transportation, operations and maintenance of the facilities. Privatization requires stable and adequate funding to allow for long-term planning of capital expenditures to enable a multi-year self-sustaining operation.

An additional strategy to privatization envisioned by this Delegation is the militarization of the back-end of the fuel cycle. This strategy eliminates costly and timely litigation which is currently an estimated \$70 Billion liability. Since 7,000 metric tons of the total high level waste legacy is defense waste, it is appropriate to consider the military for spearheading the implementation of this waste management solution.

The Nuclear Waste Policy Act established the Nuclear Waste Fund to pay for the disposal costs of spent nuclear fuel. Currently this fund is not being allocated appropriately because of an accounting classification issue. This issue needs to be resolved and additional changes to the funding mechanism need to be examined if privatization is to be pursued.

Global Nuclear Energy Partnership

We the Delegation support the efforts of the Senate Appropriations Sub Committee on Energy and Water Development to fund GNEP at the level of \$242 Million. We feel that this program will allow the country to research and develop advanced methods for managing the country's

spent nuclear fuel. In addition to the continuing research, we feel that GNEP should also investigate the feasibility of other technologies such as:

- Reprocessing technologies beyond URanium EXtraction Plus (UREX+) that are both simple and economical
- A multi-tiered approach to spent fuel management utilizing thermal as well as fast recycling via incorporation of Combined Non-Fertile and UO₂ (CONFU) and/or Mixed Oxide (MOX) fuel assemblies. The utilization of the existing reactor infrastructure allows for significant savings from both a fiscal and time perspective of the spent fuel management solution.
- Integrate the efforts of the Generation IV Reactors research into the advanced fuel cycle scenarios

Non-proliferation

The Nuclear Non-proliferation Treaty (NPT) regime has served the world well for nearly 40 years. Since the NPT was first opened for signature in 1968, only three countries lacking nuclear expertise at the time have explicitly developed and detonated nuclear weapons. Continued success in this area requires constant diligence and updated strategies.

We encourage the U.S. Congress to enact the International Atomic Energy Agency (IAEA) Additional Protocol immediately and to press upon other nations to do the same. The Additional Protocol will provide a much-needed boost to IAEA inspection efforts, as it accords expanded powers and access rights to IAEA inspectors. We encourage the speedy passage of senate bill S.1138, intended to investigate the establishment of an international nuclear fuel supply. This bill has been facilitated through private appropriations of \$50 million and is contingent upon future congressional support. The proposed fuel bank would provide additional guarantees of nuclear fuel for countries that forego sensitive nuclear facilities. International appeal for a nuclear fuel bank is high, as indicated by strong attendance at a September 2006 side meeting of the IAEA General Conference. US support and involvement in establishing a multinational fuel supply arrangement will serve as a partial solution to worldwide proliferation concerns. We also support GNEP in its mission to help strengthen the international non-proliferation regime.

As nuclear power gains importance in our energy supply, it is important to stress that the technologies utilized for nuclear generated electricity and nuclear weapons are distinctly different.

Border and Port Security

The rising threat of nuclear strikes from rogue states such as Iran and North Korea demonstrates the necessity for measures to enhance national security. Despite the laudable objectives of the Comprehensive Nuclear Test Ban Treaty (CTBT) and the NPT, the existence of these rogue states demands improved border and seaport security to prevent the catastrophic consequences of the detonation of nuclear weapon within the United States.

The effective open border policy the United States currently maintains is one of the largest threats to national security. The Delegation recommends the immediate enforcement of existing laws regulating land border control to prevent the transportation of special nuclear materials (SNM) into the United States.

United States seaports are another conduit by which terrorists can transport a nuclear weapon. The heterogeneity and large volume of cargo containers make them ideal for smuggling SNM. It is vital to implement advanced and diverse cargo screening techniques that utilize the unique properties of fissile materials, as current radiography technology is inadequate for accurately identifying potential threats. As such, the Delegation recommends funding research and implementation of practical and cost-effective methods that can achieve screening of all cargo before arrival at United States seaports. Current areas of study, including active interrogation and the feasibility of radiation detector arrays aboard inbound ships, promise a multi-faceted approach to port security that will accurately flag the presence of nuclear material.

Maintaining the credibility of the United States' nuclear deterrent will reduce the likelihood of a nuclear attack on American soil. For this reason, continued and increased funding of the RRW development program is also necessary.

The RRW and Complex 2030

The United States' nuclear deterrent is a key component in maintaining national security as well as international non-proliferation. The Stockpile Stewardship Program (SSP) has successfully maintained the safety and the reliability of the nuclear weapons stockpile and the nuclear deterrent capabilities of the United States for more than a decade. Current plans foresee maintaining nuclear warheads produced in the 1980's for many decades in the future. Our Cold War legacy warheads were designed to maximize explosive yield at minimum size and weight and were therefore designed relatively close to the "cliffs" of performance which limits our ability to modernize the safety and security of US nuclear weapons and this path neither preserves nor fully exercises the design expertise and manufacturing capabilities necessary to be able to respond to evolving or emerging threats. That is the basis for the RRW program.

The RRW is a redesigned nuclear warhead that will allow the Department of Energy's National Nuclear Security Administration (NNSA) to provide a credible nuclear deterrent with the smallest nuclear weapons stockpile needed for national security purposes. The RRW will be designed with state-of-the-art security and safety technologies that will maintain confidence in the reliability, safety, and security of the stockpile. The RRW's deep rooting in the past nuclear test database will also reduce the likelihood that an underground test would be needed. World-class nuclear scientists and engineers are an extremely important national security asset. RRW gives the declining number of these specialists who honed their skills on underground nuclear testing an opportunity to transfer their specific knowledge to the next generation of scientists. Finally, RRW will help to develop a nuclear weapons infrastructure that is more responsive to future national security needs.

The Delegation believes the NNSA should receive continued support and full budgeted funding towards the RRW program and the Complex 2030 initiative set forth by the agency. The principal elements of Complex 2030 include continuing work on the RRW, significantly increasing dismantlement of retired warheads, increasing security while reducing security costs by consolidating facilities to fewer sites, and establishing a plutonium center for research, development, production, and surveillance operations in lieu of a modern pit production facility. A revitalized weapons complex will also give the next generation of scientists and engineers a chance to build upon the deep base of nuclear expertise in this country that will ultimately help the United States maintain its militaristic and technological superiority on an international scale.

The Delegation encourages the NNSA to promote interaction between the current nuclear weapons complex and universities by ensuring facilities are open to students to perform and collaborate with experiments at their state-of-the-art facilities as well as continue that tradition into Complex 2030 facilities. The advanced facilities that will be built as part of Complex 2030 will provide advanced features applicable to weapons research, commercial nuclear power research, and general nuclear research that will be valuable to the development of nuclear technology in this country. The Delegation also believes the NNSA should develop a strategic plan for the of the nation's stockpile that clearly outlines a future for nuclear weapons development, deployment, and stewardship that compliments the long term plan associated with Complex 2030.

¹ "Nuclear's Human Element." American Nuclear Society Special Committee on Federal Investment in Nuclear Education. December 2006.

² Statement of Edward F. Sproat III Director for Civilian Radioactive Waste Management US Department of Energy Fiscal Year 2008 Appropriations Hearing.