News Release Senator Pete V. Domenici

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United States Senator

Current Developments in Nuclear Energy and Radiation Policy

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Nuclear Waste and Energy

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I appreciate the invitation to participate with you today as you start this important conference. As you well know, the subjects that you are exploring are very high on my list of personal interests. Unfortunately, the pace of actions in the Senate precludes my attendance.

It's been an interesting year for nuclear energy. For that matter, it's been an interesting year to test our national energy policy - or more specifically our absence of a national energy policy. As stark evidence of that fact, we've experienced tremendous swings in prices for oil-based products over the last 18 months, gyrations that underscore our dependence on foreign sources for this precious commodity and for energy resources in general. These events have significantly raised the public's awareness of the importance of stable, predictable baseload sources of low cost electricity, which nuclear energy supplies.

Nuclear energy has risen to the challenge of providing for our nation's energy needs with superb performance. Last year, it produced about 22 percent of our nation's electricity. The average unit capability factor for the nation, the factor that measures the percentage of maximum electricity generation that a plant is capable of supplying, rose to 88.7 percent in 1999. It was 62.7 percent in 1980.

Safety of U.S. plants remains excellent, the number of unplanned automatic shutdowns, or scrams, was zero for the third year in a row. The industry's safety accident rate has dropped from 2.1 lost-time accidents per 200,000 worker-hours in 1980 to 0.34 in 1999 -- compared to the rate for all of U.S. private industry of 2.9 in 1998. Another impressive statistic is that 96% of the U.S. nuclear power plants were available more than 95 percent of the time.

There's still more positive news for nuclear energy. We've now seen the first license renewals for nuclear power plants, an immensely important milestone. It's important from

many perspectives:

- ! it demonstrates a long term future for nuclear energy,
- ! it demonstrates that a rejuvenated NRC is responding to complex issues within a reasonable time frame, and
- ! it continues the environmental benefits of nuclear energy by avoiding replacement of aging plants with fossil fueled- plants.

There's bad news too. We've had our share of disappointments in the legislative arena as the Administration again blocked all progress toward expedited nuclear waste disposition schedules. Their actions seriously undermine the optimism I have for the future of nuclear energy in the United States.

On the one hand, Yucca Mountain work continues to advance the scientific understanding of this location. I am hearing somewhat higher confidence that it may be possible from a scientific perspective to certify that site as a high level waste repository. But on the other hand, I've seen no hint that the opposition in Nevada is going to be swayed by any amount of scientific evidence. Between Nevada opposition and scientific questions, I seriously doubt that we are going to see Yucca Mountain in operation by the advertised 2010 date.

Even if Yucca Mountain is operating in 2010, many utilities are desperate for storage now. Some plants are running out of storage space, and face premature closure of their facilities. Such closures would only force their replacement by other sources capable of generating such large amounts of baseload power. That forces the utilities to use more fossil-fueled plants, which only increases environmental concerns and the risk of price fluctuations.

We need solutions as soon as possible for nuclear waste, and Congress did its best this year to provide leadership in this key area. Senate bill S.1287 developed by Senator Frank Murkowski provided a solution by creating an "early receipt facility" near Yucca Mountain that could have begun to receive waste in 2007. But even after that bill passed both Houses by significant margins, it was vetoed by the President. A veto over-ride vote in the Senate failed by one slim vote. Thus, the Administration succeeded for yet another year in stopping all progress toward earlier solutions.

I remain puzzled and alarmed how an Administration that claims to be concerned with issues like greenhouse gas emissions and environmental pollution can so completely turn its back on solving the largest roadblock to effective utilization of nuclear power – a credible long-term solution for nuclear wastes.

Senate bill 1287 had one entire title that I authored. Title III required an Office of Spent Nuclear Fuel Research to be set up within the Department of Energy's Office of Nuclear Energy Science and Technology. It required that we explore alternative advanced solutions for spent fuel, solutions that might enable future generations to decide that it is their best interests to utilize the tremendous residual energy in spent fuel or to minimize the toxicity of the final waste form emplaced in a repository through reprocessing and

transmutation. Title III, of course, died with the rest of S.1287 with the President's veto.

One of the key issues underlying all aspects of nuclear technologies involves the radiation standards that are utilized. I've been concerned for several years that we have an abysmally poor understanding of these effects, and that we may be using standards that are both very costly and very poorly determined. I'm concerned that our poor understanding of these effects may be leading us to use radiation protection standards that incorrectly represent risks and drive the costs unnecessarily high.

As you all know, radiation standards are now determined with the Linear-No-Threshold, or LNT, model. That model is based only on linear extrapolations from a small set of very high dose and dose rate exposures, like those from atomic bomb victims. For a whole host of reasons, the American taxpayers deserve to know if that model is accurate. The applications and implications of the LNT model, and the uncertainties inherent in it, are just far too large for it to continue to be used without more complete understanding.

If these standards overestimate risks, they force us to divert funds from other, potentially more worthy, national goals. Alternatively, if the standards underestimate risks, we need to invest still more in cleanup activities. Many companies' profits from these cleanup contracts are enhanced by the use of the LNT model, which unfortunately tends to build a constituency with a vested interest in maintaining the LNT model.

Many scientists seriously question whether the LNT model is valid. They suggest that data support a model wherein benefits are derived from moderate doses of radiation, perhaps by stimulating cellular repair mechanisms within the body. In this view, the constant exposure to natural backgrounds has required the body to develop a suite of repair mechanisms.

These concerns led me to start a program in the Department of Energy in 1999 to explore the cellular and molecular bases for radiation protection standards. My goal was to better understand radiation effects at low doses and to use this knowledge to lead to more credible radiation protection standards.

I'm pleased that this program is now well into its second year, and is funding a wide range of projects that should provide improved confidence in future standards. Funding for this program remains a challenge, however.

The Energy and Water Appropriations bill for the current year, provides $18.2 million for this program. The Department's own program plan for next year calls for $22.5 million. But unfortunately, the Administration only suggested funding this program at $11.7 Million next year, a far cry both from the current level and from their needs. In a few minutes, I'll discuss how the Senate Energy and Water Appropriations bill for the 2001 fiscal year treats this program. In fact, it is my commitments as chairman of the Senate subcommittee developing this bill that is one of the roadblocks to my attendance with you here today.

My concerns on radiation standards led me to request that the General Accounting Office review a wide range of related issues. My request to the nation's Comptroller General, David Walker, went out on July 15, 1999. I'm pleased to report to you that the GAO has completed their study, which I released to the public two days ago.

In my request to the GAO, I asked them a series of questions:

- How have radiation standards changed since 1994? Is a consensus being approached, and what has resulted from the recommendations in your previous report in 1994?
- What were the bases for setting the radiation protection limits, and how is the linear-no-threshold hypothesis used in setting these limits?
- If differences exist between agencies' standards, what is the impact of these differences?
- Provide, from available data, information on the variance in background radiation among locations in the United States and around the world. Are differences in cancer rates among these locations related to differences in background radiation levels?
- What are the costs of complying with current radiation protection regulations, and how, if at all, would these costs be affected if radiation standards were substantially relaxed?

The title chosen by the GAO provides a good clue to its evaluations,

Radiation Standards
Scientific Basis Inconclusive and EPA and NRC Disagreement Continues.

The conclusions of the report won't be very surprising to this audience. As the title indicates, they found the scientific basis for current radiation regulations is inconclusive, with more work needed. They note strong scientific consensus supporting the low dose radiation effects studies that I initiated within the Department of Energy.

The report discussed the assumptions on which the LNT model is based. Consistent with several recent conferences, they noted that there is simply no conclusive evidence for any radiation-induced effects on human health below 5,000 to 10,000 millirems. And they re-stated the extremely weak endorsement of the LNT model by groups like that National Academy of Science's fifth study of the Biological Effects of Ionizing Radiation, or BEIR V, which noted that the "linear model is not inconsistent with available research data."

The report noted the continuing differences between the EPA and NRC approaches to radiation standards, after 8 years of trying to come to agreement. They noted that this dual regulation by the two entities:

- Complicates cleanup and decommissioning processes,
- Causes duplication of effort and regulatory delays,
- Adds to facilities' compliance costs, and
- Raises public questions about the safety of cleanup levels.

They evaluated the two agencies' standards for Yucca Mountain, and quoted many technical groups, including the National Academy of Sciences and the NRC, who have stated that EPA has not provided a technical rationale for its approach, has not done analysis of benefits and costs, has not provided proposals that are scientifically supported, and has proposed standards that provide little or no public health benefit.

I've frequently noted that the nation should depend on the bipartisan, highly technically qualified experts of the NRC for guidance pertaining to radiation policy, and not on the politically driven agendas of the EPA. This GAO report certainly reinforces my views.

The report did not fully quantify cost differentials between alternative cleanup standards, but provided examples of the large cost multipliers for the few projects that have been evaluated for cleanup to various radiation dose levels. They noted, for example, up to a factor of 7 in costs between cleanup of a site to 100 vs. 15 millirems. And they noted that the baselines on which these multipliers may be applied are gigantic, over $200 billion for the DOE complex and at least $40 billion for civilian nuclear power plants.

The report reviewed 82 separate studies of cancer incidence for populations living in areas with different background levels. They could find little or no evidence of elevated cancer risks from high natural backgrounds, and concluded that cancer risks from exposures of a few hundred millirems annually are very small or nonexistent. This supports one conclusion of the report that both the NRC and the EPA regulatory levels are so low that the benefits to the public may not be clearly demonstrated.

It will be next year before Congress can fully assess this excellent GAO report and consider actions. The most obvious action may be to evaluate legislative approaches to either force EPA and NRC to define one standard or give the responsibility to one agency.

Let me turn from radiation standards to nuclear energy. My Appropriations subcommittee on Energy and Water Development completed its markup just three days ago, and the full Appropriations committee will consider actions on this bill in two days. I am very proud of the progress in the Senate bill.

Let me give you some examples of the content of this bill. The Nuclear Energy Research Initiative has been in existence for only two years, it's funded at $22.4 million in the current year. The Senate mark raised the funding for next year to $41.5 million and included several new charges to the Initiative.

One charge asked that they specifically study reactor-based transmutation for nuclear waste within the expanded NERI program. Another charge set aside $4.5 million for a serious review of Gen IV reactors, with the goal of future commercial deployment. The bill defines a Gen IV reactor as one that will, to the extent possible, have the following characteristics: superior economics, no possibility of a core melt-down and/or no requirement for a public evacuation plan, substantially reduced production of high level waste, highly proliferation resistant fuel and waste, and substantially improved thermal

efficiency.

Three additional research areas are highlighted within NERI in this bill. Each of these three is recommended for a $1 million investment. One involves a detailed assessment to analyze changes needed in existing Advanced Light Water Reactor, or ALWR, designs for them to be viable in the U.S. marketplace within the next 5 to 10 years.

Another area will explore the opportunities to develop and exploit the modular helium reactor technology for commercial applications. This study is coupled with the continued funding of this reactor in the joint United States-Russia program exploring this reactor for plutonium disposition.

And the third research area will focus on the feasibility of small modular reactors that may be attractive for remote communities. Such a reactor would have to be inherently safe, cost effective, have design features to deter sabotage or efforts to divert nuclear materials, have infrequent re-fuel requirements, and be largely factory-constructed and deliverable to remote sites.

The low dose radiation effects program that I highlighted earlier is funded at $20.1 million, far more than the $11.7 million proposed by the Administration. I was disappointed that the Administration's proposal was barely half of the funding that the Department had identified to keep this vital program on track.

In the materials disposition account, as I just noted, I've encouraged funding of the high temperature, helium gas-cooled reactor for possible use in disposition of weapons-grade plutonium. That funding is doubled for next year to $10 million. I understand that this program is attracting considerable interest within Russia and from other nations as well.

In that same account, I included strong guidance to explore thorium fuel assemblies. Such assemblies, when coupled to either plutonium or uranium seed fuels, may offer an extremely attractive approach to not only plutonium disposition but also to civilian power. Both of these reactor types should also be evaluated as part of the NERI Gen IV study, where I anticipate that they may fare extremely well against the criteria I cited.

Accelerator-driven transmutation of waste is another area in which I've encouraged research. This approach may enable dramatic changes in the toxicity of the final waste forms placed in a repository. There's significant international interest in this option, as well as in reactor-based transmutation. Last year, $4 million was used to create a technology road map, and $9 million this year served to start progress on that road map.

For next year, I've proposed that two key programs be combined, the Accelerator Transmutation of Waste and the Accelerator Production of Tritium, into one Advanced Accelerator Applications, or AAA, program. Both these programs depend on high current accelerators, although obviously their end goals are different. By combining the programs within the Nuclear Energy office, but with partial funding from Defense Programs, we can

realize efficiencies for the common elements, while enabling both programs to pursue the specialized technologies that they need for their separate missions. There are some other very attractive ideas for use of an intense neutron source, which AAA will explore, in a wide range of advanced nuclear energy and material science applications.

The total AAA program is funded at $60 million in the Senate mark, well above the Administration's proposals, which were zero for ATW and $19 million for APT – both of these Administration's proposals are incomprehensible in light of the potential impact of these programs.

Many other areas in this Senate bill impact aspects of your conference. For example, I've repeatedly emphasized the need to make progress in both military and civilian areas of nuclear technologies. Nuclear energy can not realize its potential unless the military clouds associated with nuclear issues are well controlled. This forces careful consideration of nuclear non-proliferation issues.

Several key non-proliferation programs are singled out for special consideration in the Energy and Water Development bill. The key program to prevent proliferation of materials, the Materials Protection Control and Accounting effort, is significantly enhanced, with an increase of $30 million over last year. These new resources should allow the MPC&A program to address important new opportunities for better control of new and spent fuel at Russian Navy sites.

Programs to prevent "brain drain" of weapons scientists are also boosted for next year. The Initiatives for Proliferation Prevention is funded at $2 million above the budget request. And the Nuclear Cities Initiative received a major boost, from $7.5 million this year, and a $17.5 million Administration request, to $30 million for next year.

In addition to this funding, I've worked to set the stage for a dramatic new era of progress in the Nuclear Cities Initiative with new guidance in the Defense Authorization bill. This language couples increased funding for nuclear cities to a requirement that the Russians develop a plan for downsizing and restructuring these cities that includes transparent, verifiable milestones. We need to insure that the production capacity of these cities, as well as their large number of weapon scientists, do not drive future global instabilities.

I want to conclude tonight by challenging many of you who are attending this Gordon Conference. Your technical leadership is essential if nuclear technologies are to realize their full potential to benefit mankind. You have the expertise to develop new approaches to some of the roadblocks erected against nuclear technology. You will be some of the ones supporting the new programs that I've outlined. And you have the technical credentials to challenge irrational or scientifically incorrect notions about nuclear technologies.

My challenge is to continue to provide leadership on a national level toward realization of the full positive impacts of these technologies. With your help on technical progress, I

look forward to dramatic advances in the coming years.

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