

**STATEMENT OF  
GENERAL BRENT SCOWCROFT, CO-CHAIRMAN  
AND  
DR. RICHARD MESERVE, COMMISSIONER  
BLUE RIBBON COMMISSION  
ON AMERICA'S NUCLEAR FUTURE  
BEFORE THE  
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY  
U.S. HOUSE OF REPRESENTATIVES  
SECOND SESSION, 112TH CONGRESS  
FEBRUARY 8, 2012**

**Introduction**

Chairman Hall, Ranking Member Johnson, members of the Committee, it is a pleasure to appear before you today to discuss the final recommendations of the Blue Ribbon Commission on America's Nuclear Future. We appreciate the leadership this Committee has shown in confronting some of our nation's biggest challenges, which certainly include the focus of this hearing - managing spent nuclear fuel and high level nuclear waste in the United States. Thank you for allowing us the opportunity to testify before you today.

Before we begin, I would like to pass along Co-Chairman Hamilton's deepest regrets for not being here with us today. It's been an absolute pleasure working with him. Both the Congressman and I are thankful that Dr. Richard Meserve could stand in his place today. I would also like to thank the rest of the members of the Commission who worked so hard in creating our final report. Congressman Hamilton and I were delighted to work with such a talented and dedicated group of fellow Commissioners. We are thankful for the expertise and insights they brought to our endeavors. Their professionalism led to our final report having unanimous approval; all of the Commissioners have agreed to our final report, a fact which we believe speaks to the strength of our recommendations.

As you aware, the Blue Ribbon Commission was formed by the Secretary of Energy at the direction of the President. Our charge was to conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle and to recommend a new strategy. We came away from our review frustrated by decades of unmet commitments to the American people, yet confident that we can turn this record around.

## **Framing the Issue**

Mr. Chairman, as we are all too well aware, America's nuclear waste management program is at an impasse. The Administration's decision to halt work on a repository at Yucca Mountain is but the latest indicator of a policy that has been troubled for decades and has now all but completely broken down. The approach laid out under the 1987 Amendments to the Nuclear Waste Policy Act has simply not worked to produce a timely solution for dealing with the nation's most hazardous radioactive materials. The United States has traveled nearly 25 years down the current path only to come to a point where continuing to rely on the same approach seems destined to bring further controversy, litigation, and protracted delay.

What we have found is that our nation's failure to come to grips with the nuclear waste issue has already proved damaging and costly. It will be even more damaging and more costly the longer it continues: damaging to prospects for maintaining a potentially important energy supply option for the future, damaging to state – federal relations and public confidence in the federal government's competence, and damaging to America's standing in the world as a source of nuclear expertise and as a leader on global issues of nuclear safety, non-proliferation, and security.

This failure is also costly to utility ratepayers who continue to pay for a nuclear waste management solution that has yet to be delivered, to communities that have become unwilling hosts of long-term waste storage facilities, and to U.S. taxpayers who face billions in liabilities as a result of the failure to meet federal waste management commitments. The national interest demands that our nuclear waste program be fixed.

The need for a new strategy is urgent, not just to address these damages and costs, but also because this generation has a fundamental ethical obligation to avoid burdening future generations with finding a safe permanent solution for managing hazardous nuclear materials they had no part in creating. At the same time, we owe it to future generations to avoid foreclosing options wherever possible so that they can make choices—about the use of nuclear energy as a low-carbon energy resource and about the management of the nuclear fuel cycle—based on emerging technologies and developments and their own best interests.

Put simply, the overall record of the U.S. nuclear waste program has been one of broken promises and unmet commitments. And yet the Commission finds reasons for confidence that we can turn this record around. To be sure, decades of failed efforts to develop a repository for spent fuel and high-level waste have produced frustration and a deep erosion of trust in the federal government. But they have also produced important insights, a clearer understanding of the technical and social issues to be resolved, and at least one significant success story – the

WIPP facility in New Mexico. Moreover, many people have looked at aspects of this record and come to similar conclusions.

### **The Scale of the Problem**

Mr. Chairman, before we discuss our recommendations it is useful to briefly review the scale of the nuclear waste problem in the U.S. As this Committee is certainly aware, there are 104 commercial nuclear power reactors operating in the United States today, supplying approximately 20 percent of our nation's electricity needs. The industry as a whole generates more than 2,000 metric tons of spent nuclear fuel on an annual basis. At present, nearly all of the nation's existing inventory of approximately 65,000 metric tons of spent fuel is being stored at the reactor sites where it was generated—about three-quarters of it in shielded concrete pools and the remainder in dry casks above ground. Roughly speaking, this spent fuel would cover one football field to a depth of approximately 20 feet. This inventory also includes approximately 3,000 metric tons of what we've called "stranded" spent fuel, fuel in storage at ten sites where nuclear power reactors have been shut down and are no longer operating.

In addition to the civilian spent nuclear fuel, there is a considerable inventory of DOE-managed nuclear waste – in the form of both spent nuclear fuel and of liquid high level waste. The current inventory of DOE-managed spent fuel represents a relatively small fraction of the nation's total civilian spent-fuel inventory: approximately 2,500 metric tons. Along with spent nuclear fuel, DOE manages an inventory of high level waste totaling more than 3,000 canisters of vitrified wastes and some 90 million gallons of liquids, sludges and solids from past fuel reprocessing operations for weapons production. Most of this waste is being stored at DOE's Hanford, Idaho National Laboratory, and Savannah River sites. In addition, there is a small amount of vitrified high level waste from reprocessing fuel from both commercial power reactors and government reactors at the West Valley site in New York that will also require disposal.

### **Our Approach**

Fulfilling our charter has required the Commission to investigate a wide range of issues and listen to a broad spectrum of concerned stakeholders. It became clear to us early on that many of the problems facing our nuclear waste program have their roots in social distrust and lack of confidence in government, so we strove to make the Commission's work as inclusive, transparent, and accessible as possible. We heard from hundreds of invited witnesses, toured nuclear waste management facilities in the U.S. and abroad, and received thousands of comments at more than two dozen public meetings and through our web site.

The Commission released a draft report for public comment in July of 2011. To facilitate meaningful discussion about our draft report, we arranged for a series of public meetings to be held in cooperation with regional state government groups. These meetings were held in Atlanta, Boston, Denver, Minneapolis, and Washington, DC, and were quite helpful in gaining useful insights that are reflected in our final report.

In total, we received and reviewed several thousand comments on our draft report. We are indebted to the many people who have given us the benefit of their expertise, advice, and guidance. A full list of the Commission's meetings is included in a longer version of this statement that we intend to submit for the record.

### **Key Elements of the Blue Ribbon Commission's Final Recommendations**

Mr. Chairman, the strategy we recommend in our final report has eight key elements:

1. A new, consent-based approach to siting future nuclear waste management facilities.
2. A new organization dedicated solely to implementing the waste management program and empowered with the authority and resources to succeed.
3. Access to the funds nuclear utility ratepayers are providing for the purpose of nuclear waste management.
4. Prompt efforts to develop one or more geologic disposal facilities.
5. Prompt efforts to develop one or more consolidated storage facilities.
6. Prompt efforts to prepare for the eventual large-scale transport of spent nuclear fuel and high-level waste to consolidated storage and disposal facilities when such facilities become available.
7. Support for continued U.S. innovation in nuclear energy technology and for workforce development.
8. Active U.S. leadership in international efforts to address safety, waste management, non-proliferation, and security concerns.

Although the elements of this strategy will not be new to Members and staff of this Committee who have followed the U.S. nuclear waste program over the years, we are certain they are all necessary to establish a truly integrated national nuclear waste management system, to create the institutional leadership and wherewithal to get the job done, and to ensure that the United States remains at the forefront of technology developments and international responses to evolving nuclear safety, non-proliferation, and security concerns.

A few general points about the Commission’s proposed strategy are worth emphasizing before our recommendations are discussed in greater detail here today. First is the issue of cost. In this time of acute concern about the federal budget deficit and high energy prices, we have been sensitive to the concern that our recommendations—particularly those that involve launching a new approach and a new organization for nuclear waste management—could add to the financial burden on the U.S. Treasury and on American taxpayers and utility ratepayers. Certainly it will cost something to implement a successful U.S. waste management program; however, trying to implement a deeply flawed program is even more costly, for all the reasons already mentioned. In fact, U.S. ratepayers are *already* paying for waste disposal (through a fee collected on each kilowatt-hour of nuclear-generated electricity)—but the program they’re paying for isn’t working.

Overall, we are confident that our waste management recommendations can be implemented using revenue streams *already dedicated for this purpose* – in particular the Nuclear Waste Fund and fee. Other Commission recommendations—particularly those concerning nuclear technology programs and international policies—are broadly consistent with the program plans of the relevant agencies.

Another overarching point concerns timing and implementation. All of our recommendations are interconnected and will take time to implement fully, particularly since many elements of the strategy we propose require legislative action to amend the Nuclear Waste Policy Act and other relevant laws. Nevertheless, prompt action can and should be taken in several areas, without waiting for legislative action, to get the waste management program back on track.

One of the many actions we recommend the Administration take in the near-term is to ensure that funds already being collected from nuclear utility ratepayers to cover the costs of spent fuel disposal are available to serve their intended purpose. In our report we suggest a series of actions that can be taken promptly to give the waste program the budgetary certainty that will be essential for long-term success. We also recommend steps the Department of Energy should take to enable implementation of our consolidated storage recommendations, including efforts to provide assistance to states and regional state government groups that can be used to begin transportation planning and to support local and tribal officials in areas likely to be traversed by spent fuel shipments.

Finally, there are several questions the Commission was not chartered to address. We have not rendered an opinion on the suitability of the Yucca Mountain site or any other specific site, nor have we commented on the request to withdraw the license application for Yucca Mountain. Instead, we focused on developing a sound strategy for future storage and disposal facilities and operations that we believe *can and should be implemented regardless of what happens*

*with Yucca Mountain.* We have also not offered a judgment about the appropriate role of nuclear power in the nation's future energy supply mix.

These are all important questions that will engage policy makers and the public in the years ahead. However, none of them alters the urgent need to change and improve our strategy for managing the high-level wastes and spent fuel that already exist and will continue to accumulate so long as nuclear reactors operate in this country. That is the focus of the Commission's work and of the specific recommendations that follow.

### **Further Discussion of the BRC's Recommendations**

Mr. Chairman, as we mentioned previously, there are eight key elements to our strategy that are essential to the future success of the nuclear waste management program in the United States. We will now discuss those in more detail.

#### ***1. A New Consent-Based Approach to Siting***

Siting storage or disposal facilities has been the most consistent and most intractable challenge for the U.S. nuclear waste management program. Of course, the first requirement in siting any facility centers on the ability to demonstrate adequate protection of public health and safety and the environment. Beyond this threshold criterion, finding sites where all affected units of government, including the host state or tribe, regional and local authorities, and the host community, are willing to support or at least accept a facility has proved exceptionally difficult. The erosion of trust in the federal government's nuclear waste management program has only made this challenge more difficult. And whenever one or more units of government are opposed, the odds of success drop greatly. The crux of the challenge derives from a federal/state/tribal/local rights dilemma that is far from unique to the nuclear waste issue—no simple formula exists for resolving it. Experience in the United States and in other nations suggests that any attempt to force a top-down, federally mandated solution over the objections of a state or community—far from being more efficient—will take longer, cost more, and have lower odds of ultimate success.

By contrast, the approach we recommend is explicitly adaptive, staged, and consent-based. Based on a review of successful siting processes in the United States and abroad—including most notably the siting of a disposal facility for transuranic radioactive waste, the Waste Isolation Pilot Plant (WIPP) in New Mexico, and recent positive outcomes in Finland, Sweden, Spain and France—we believe this type of approach can provide the flexibility and sustain the public trust and confidence needed to see controversial facilities through to completion.

In practical terms, this means encouraging communities to volunteer to be considered to host a new nuclear waste management facility while also allowing for the waste management

organization to approach communities that it believes can meet the siting requirements. Siting processes for waste management facilities should include a flexible and substantial incentive program.

The approach we recommend also recognizes that successful siting decisions are most likely to result from a complex and perhaps extended set of negotiations between the implementing organization and potentially affected state, tribal, and local governments, and other entities. It would be desirable for these negotiations to result in a partnership agreement or some other form of legally enforceable agreement with the organization to ensure that commitments to and by host states, tribes, and communities are upheld. All affected levels of government must have, at a minimum, a meaningful consultative role in important decisions; additionally, both host states and tribes should retain—or where appropriate, be delegated—direct authority over aspects of regulation, permitting, and operations where oversight below the federal level can be exercised effectively and in a way that is helpful in protecting the interests and gaining the confidence of affected communities and citizens. At the same time, host state, tribal and local governments have responsibilities to work productively with the federal government to help advance the national interest.

In this context, any process that is prescribed in detail up front is unlikely to work. Transparency, flexibility, patience, responsiveness, and a heavy emphasis on consultation and cooperation will all be necessary—indeed, these are attributes that should apply not just to siting but to every aspect of program implementation.

This discussion raises another issue highlighted in numerous comments to the BRC: the question of how to define “consent.” The Commission takes the view that this question ultimately has to be answered by a potential host jurisdiction, using whatever means and timing it sees fit. We believe that a good gauge of consent would be the willingness of the affected units of government – the host states, tribes, and local communities – to enter into legally binding agreements with the facility operator, where these agreements enable states, tribes, or communities to have confidence that they can protect the interests of their citizens.

All siting processes take time; however, an adaptive, staged approach may seem particularly slow and open-ended. This will be frustrating to stakeholders and to members of the public who are understandably anxious to know when they can expect to see results. The Commission shares this frustration—greater certainty and a quicker resolution would have been our preference also. Experience, however, leads us to conclude that there is no short-cut, and that any attempt to short-circuit the process will most likely lead to more delay. That said, we also believe that attention to process must not come at the expense of progress and we are sympathetic to the numerous comments we received asking us to include a more detailed and

specific set of milestones in our final report. Obviously there is an inherent tension between recommending an adaptive, consent-based process and setting out deadlines or progress requirements in advance. But we agree that it will be important—without imposing inflexible deadlines—to set reasonable performance goals and milestones for major phases of program development and implementation so that Congress can hold the waste management organization accountable and so that stakeholders and the public can have confidence the program is moving forward. Other countries have taken this approach, in several cases identifying target timeframes, rather than specific dates for completing stages in their process. For example the implementing organization might consider a range of, say, 15 to 20 years to accomplish site identification and characterization and to conduct the licensing process for a geologic repository. A notional timeframe for siting and developing a consolidated storage facility would presumably be shorter, perhaps on the order of 5 to 10 years.

## ***2. A New Organization to Implement the Waste Management Program***

The U.S. Department of Energy (DOE) and its predecessor agencies have had primary responsibility for implementing U.S. nuclear waste policy for more than 50 years. In that time, DOE has achieved some notable successes, as shown by the WIPP experience and recent improvements in waste cleanup performance at several DOE sites. The overall record of DOE and of the federal government as a whole, however, has not inspired widespread confidence or trust in our nation’s nuclear waste management program. For this and other reasons, the Commission concludes that a new, single-purpose organization is needed to provide the stability, focus, and credibility needed to get the waste program back on track. We believe a congressionally chartered federal corporation offers the best model, but whatever the specific form of the new organization it must possess the attributes, independence, and resources to effectively carry out its mission.

The central task of the new organization would be to site, license, build, and operate facilities for the safe consolidated storage and final disposal of spent fuel and high-level nuclear waste at a reasonable cost and within a reasonable timeframe. In addition, the new organization would be responsible for arranging for the safe transport of waste and spent fuel to or between storage and disposal facilities, and for undertaking applied research, development, and demonstration (RD&D) activities directly relevant to its waste management mission (e.g., testing the long-term performance of fuel in dry casks and during subsequent transportation).

For the new organization to succeed, a substantial degree of implementing authority and assured access to funds must be paired with rigorous financial, technical, and regulatory oversight by Congress and the appropriate government agencies. We recommend that the organization be directed by a board nominated by the President, confirmed by the Senate, and



selected to represent a range of expertise and perspectives. Independent scientific and technical oversight of the nuclear waste management program is essential and should continue to be provided for out of nuclear waste fee payments. In addition, the presence of clearly independent, competent regulators is essential; we recommend the existing roles of the U.S. Environmental Protection Agency in establishing standards and the Nuclear Regulatory Commission (NRC) in licensing and regulating waste management facilities be preserved but that steps be taken to ensure ongoing cooperation and coordination between these agencies.

Late in our review we heard from several states that host DOE defense waste that they agree with the proposal to establish a new organization to manage civilian wastes, but believe the government can more effectively meet its commitments if responsibility for defense waste disposal remains with DOE. Others argued strongly that the current U.S. policy of comingling defense and civilian wastes should be retained. We are not in a position to comprehensively assess the implications of any actions that might affect DOE's compliance with its cleanup agreements, and we did not have the time or the resources necessary to thoroughly evaluate the many factors that must be considered by the Administration and Congress in making such a determination. The Commission therefore urges the Administration to launch an immediate review of the implications of leaving responsibility for disposal of defense waste and other DOE-owned waste with DOE versus moving it to a new waste management organization. The implementation of other BRC recommendations, however, should not wait for the comingling issue to be resolved. Congressional and Administration efforts to implement our recommendations can and should proceed as expeditiously as possible

### ***3. Access to Utility Waste Disposal Fees for their Intended Purpose***

The 1982 NWPA created a "polluter pays" funding mechanism to ensure that the full costs of disposing of commercial spent fuel would be paid by utilities (and their ratepayers), with no impact on taxpayers or the federal budget. Nuclear utilities are assessed a fee on every kilowatt-hour of nuclear-generated electricity as a *quid pro quo* payment in exchange for the federal government's contractual commitment to begin accepting commercial spent fuel beginning by January 31, 1998. Fee revenues go to the government's Nuclear Waste Fund, which was established for the sole purpose of covering the cost of disposing of civilian nuclear waste and ensuring that the waste program would not have to compete with other funding priorities. In contrast, costs for disposing of defense nuclear wastes are paid by taxpayers through appropriations from the Treasury.

The Fund does not work as intended. A series of Executive Branch and Congressional actions has made annual fee revenues (approximately \$750 million per year) and the unspent \$27 billion balance in the Fund effectively inaccessible to the waste program. Instead, the waste

program must compete for federal funding each year and is therefore subject to exactly the budget constraints and uncertainties that the Fund was created to avoid. This situation must be remedied to allow the program to succeed.

In the near term, the Administration should offer to amend DOE's standard contract with nuclear utilities so that utilities remit only the portion of the annual fee that is appropriated for waste management each year and place the rest in a trust account, held by a qualified third-party institution, to be available when needed. At the same time, the Office of Management and Budget should work with the Congressional budget committees and the Congressional Budget Office to change the budgetary treatment of annual fee receipts so that these receipts can directly offset appropriations for the waste program. These actions are urgent because they enable key subsequent actions the Commission recommends. Therefore, we urge the Administration to act promptly to implement these changes (preferably in Fiscal Year 2013). For the longer term, legislation is needed to transfer the unspent balance in the Fund to the new waste management organization so that it can carry out its civilian nuclear waste obligations independent of annual appropriations (but with Congressional oversight)—similar to the budgeting authority now given to the Tennessee Valley Authority and Bonneville Power Administration.

We recognize that these actions mean no longer counting nuclear waste fee receipts against the federal budget deficit and that the result will be a modest negative impact on annual budget calculations. The point here is that the federal government is contractually bound to use these funds to manage spent fuel. The bill will come due at some point. Meanwhile, failure to correct the funding problem does the federal budget no favors in a context where taxpayers remain liable for mounting damages, compensated through the Judgment Fund, for the federal government's continued inability to deliver on its waste management obligations. These liabilities are already in the billions of dollars and could increase by hundreds of millions of dollars annually for each additional year of delay.

#### ***4. Prompt Efforts to Develop a New Geologic Disposal Facility***

Deep geologic disposal capacity is an essential component of a comprehensive nuclear waste management system for the simple reason that very long-term isolation from the environment is the *only* responsible way to manage nuclear materials with a low probability of re-use, including defense and commercial reprocessing wastes and many forms of spent fuel currently in government hands. The conclusion that disposal is needed and that deep geologic disposal is the scientifically preferred approach has been reached by every expert panel that has looked at the issue and by every other country that is pursuing a nuclear waste management program.

Some commenters have urged the prompt adoption of recycling of spent fuel as a response to the waste disposal challenge, as well as a means to extend fuel supply. *It is the Commission's view that it would be premature for the United States to commit, as a matter of policy, to "closing" the nuclear fuel cycle given the large uncertainties that exist about the merits and commercial viability of different fuel cycles and technology options.* Future evaluations of potential alternative fuel cycles must account for linkages among all elements of the fuel cycle (including waste transportation, storage, and disposal) and for broader safety, security, and non-proliferation concerns. Moreover, all spent fuel reprocessing or recycle options generate waste streams that require a permanent disposal solution. In any event, we believe permanent disposal will very likely also be needed to safely manage at least some portion of the commercial spent fuel inventory even if a closed fuel cycle were adopted.

The Commission recognizes that current law establishes Yucca Mountain in Nevada as the site for the first U.S. repository for spent fuel and high-level waste, provided the license application submitted by DOE meets relevant requirements. The Blue Ribbon Commission was not chartered as a siting commission. Accordingly we have not evaluated Yucca Mountain or any other location as a potential site for the storage or disposal of spent nuclear fuel and high-level waste, nor have we taken a position on the Administration's request to withdraw the license application. We simply note that regardless what happens with Yucca Mountain, the U.S. inventory of spent nuclear fuel will soon exceed the amount that can be legally emplaced at this site until a second repository is in operation. So under current law, the United States will need to find a new disposal site even if Yucca Mountain goes forward. We believe the approach set forth here provides the best strategy for assuring continued progress, regardless of the fate of Yucca Mountain.

##### ***5. Prompt Efforts to Develop One or More Consolidated Storage Facilities***

Safe and secure storage is another critical element of an integrated and flexible national waste management system. Fortunately, experience shows that storage—either at or away from the sites where the waste was generated—can be implemented safely and cost-effectively. Indeed, *a longer period of time in storage offers a number of benefits because it allows the spent fuel to cool while keeping options for future actions open.*

Developing consolidated storage capacity would allow the federal government to begin the orderly transfer of spent fuel from reactor sites to safe and secure centralized facilities independent of the schedule for operating a permanent repository. The arguments in favor of consolidated storage are strongest for "stranded" spent fuel from shutdown plant sites. Stranded fuel should be first in line for transfer to a consolidated facility so that these plant sites can be completely decommissioned and put to other beneficial uses. Looking beyond the issue of today's

stranded fuel, the availability of consolidated storage will provide valuable flexibility in the nuclear waste management system that could achieve meaningful cost savings for both ratepayers and taxpayers when a significant number of plants are shut down in the future, can provide emergency back-up storage in the event that spent fuel needs to be moved quickly from a reactor site, and would provide an excellent platform for ongoing R&D to better understand how the storage systems currently in use at both commercial and DOE sites perform over time.

For consolidated storage to be of greatest value to the waste management system, the current rigid legislative restriction that prevents a storage facility developed under the NWPA from operating significantly earlier than a repository should be eliminated. At the same time, efforts to develop consolidated storage must not hamper efforts to move forward with the development of disposal capacity. To allay the concerns of states and communities that a consolidated storage facility might become a *de facto* disposal site, a program to establish consolidated storage must be accompanied by a parallel disposal program that is effective, focused, and making discernible progress in the eyes of key stakeholders and the public. Progress on both fronts is needed and must be sought without further delay.

Even with timely development of consolidated storage facilities, a large quantity of spent fuel will remain at reactor sites for many decades before it can be accepted by the federal waste management program. Current at-reactor storage practices and safeguards are being scrutinized in light of the lessons that are emerging from Fukushima. In addition, the Commission recommends that the National Academy of Sciences (NAS) conduct a thorough assessment of lessons learned from Fukushima and their implications for conclusions reached in earlier NAS studies on the safety and security of current storage arrangements for spent nuclear fuel and high-level waste in the United States. This effort would complement investigations already underway by the NRC and other organizations. More broadly, it will also be vital to continue vigorous public and private research and regulatory oversight efforts in areas such as spent fuel and storage system degradation phenomena, vulnerability to sabotage and terrorism, full-scale cask testing, and others. As part of this process, it is appropriate for the NRC to examine the advantages and disadvantages of options such as “hardened” onsite storage that have been proposed to enhance security at storage sites.

#### ***6. Early Preparation for the Eventual Large-Scale Transport of Spent Nuclear Fuel and High-Level Waste to Consolidated Storage and Disposal Facilities***

The current system of standards and regulations governing the transport of spent fuel and other nuclear materials appears to have functioned well, and the safety record for past shipments of these types of materials is excellent. But the current set of transport-related regulations will need to be updated to accommodate changes in fueling practices. Moreover,

past performance does not guarantee that future transport operations will match the record to date, particularly as the logistics involved expand to accommodate a much larger number of shipments. Past experiences in the United States and abroad, and extensive comments to the Commission, indicate that many people fear the transportation of nuclear materials. Thus greater transport demands are likely to raise new public concerns.

As with siting fixed facilities, planning for associated transportation needs has historically drawn intense interest. Transport operations typically also have the potential to affect a far larger number of communities. The Commission believes that state, tribal and local officials should be extensively involved in transportation planning and should be given the resources necessary to discharge their roles and obligations in this arena. Accordingly, DOE should (1) finalize procedures and regulations for providing technical assistance and funds for training to local governments and tribes pursuant to Section 180(c) of the NWPA and (2) begin to provide such funding, independent from progress on facility siting. While it would be premature to fully fund a technical assistance program before knowing with some certainty where the destination sites for spent fuel are going to be, substantial benefits can be gained from a modest early investment in planning for the early transport of spent fuel from shutdown reactor sites.

Planning and providing for adequate transportation capacity while simultaneously addressing related stakeholder concerns will take time and present logistical and technical challenges. Given that transportation represents a crucial link in the overall storage and disposal system, it will be important to allow substantial lead-time to assess and resolve transportation issues well in advance of when materials would be expected to actually begin shipping to a new facility. For many years, states have been working cooperatively with DOE to plan for shipments, often through agreements with regional groupings of states and in ways that involve radiological health, law enforcement, and emergency response personnel. As has been shown with the WIPP program and other significant waste shipping campaigns, planning, training and execution involves many different parties and takes time. In addition, specialized equipment may be required that will need to be designed, fabricated and tested before being placed into service. Historically, some programs have treated transportation planning as an afterthought. No successful programs have done so.

### ***7. Support for Advances in Nuclear Energy Technology and for Workforce Development***

Advances in nuclear energy technology have the potential to deliver an array of benefits across a wide range of energy policy goals. The Commission believes these benefits—in light of the environmental and energy security challenges the United States and the world will confront this century—justify sustained public- and private-sector support for RD&D on a range of reactor and fuel cycle technologies. The invitation for us to testify before this committee asked that

our testimony identify nuclear energy research and development technology priorities and the potential impact of new technology on nuclear waste management policy.

We believe a well-designed federal RD&D program is critical to enabling the U.S. to regain its role as the global leader of nuclear technology innovation and should be attentive to opportunities in two distinct realms:

1. Near-term improvements in the safety and performance of existing light-water reactor technology as currently deployed in the United States and elsewhere as part of a once-through fuel cycle, and in the technologies for storing and disposing of SNF and HLW.
2. Longer-term efforts to advance potential “game changing” nuclear technologies and systems that could achieve very large benefits across multiple evaluation criteria compared to current technologies and systems. Examples might include fast-spectrum reactors demonstrating passive safety characteristics that are capable of continuous actinide recycling and that use uranium more efficiently, or reactors that—by using molten salt or gas coolants—achieve very high temperatures and can thereby supply process heat for hydrogen production or other purposes, or small modular reactors with novel designs for improved safety characteristics and the potential to change the capital cost and financing structure for new reactors.

The Commission believes the general direction of the current DOE research and development (R&D) program is appropriate, although we also urge DOE to take advantage of the Quadrennial Energy Review process to refine its nuclear R&D “roadmap.” We are not making a specific recommendation concerning future DOE funding for nuclear energy RD&D; in light of the extraordinary fiscal pressures the federal government will confront in coming years, we believe that budget decisions must be made in the context of a broader discussion about priorities and funding for energy RD&D more generally.

One area where the Commission recommends increased effort involves ongoing work by the NRC to develop a regulatory framework for advanced nuclear energy systems. Such a framework can help guide the design of new systems and lower barriers to commercial investment by increasing confidence that new systems can be successfully licensed. Specifically, the Commission recommends that adequate federal funding be provided to the NRC to support a robust effort in this area. We also support the NRC’s risk-informed, performance-based approach to developing regulations for advanced nuclear energy systems, including NRC’s ongoing review of the current waste classification system (changes to the existing system may eventually require a change in law).

Another area where further investment is needed is nuclear workforce development. Specifically, the Commission recommends expanded federal, joint labor-management and university-based support for advanced science, technology, engineering, and mathematics training to develop the skilled workforce needed to support an effective waste management program as well as a viable domestic nuclear industry. At the same time, DOE and the nuclear energy industry should work to ensure that valuable existing capabilities and assets, including critical infrastructure and human expertise, are maintained. Finally, the jurisdictions of safety and health agencies should be clarified and aligned. New site-independent safety standards should be developed by the safety and health agencies responsible for protecting nuclear workers through a coordinated joint process that actively engages and solicits input from all relevant constituencies. Efforts to support uniform levels of safety and health in the nuclear industry should be undertaken with federal, industry, and joint labor–management leadership. Safety and health practices in the nuclear construction industry should provide a model for other activities in the nuclear industry.

#### ***8. Active U.S. Leadership in International Efforts to Address Safety, Non-Proliferation and Security Concerns***

As more nations consider pursuing nuclear energy or expanding their nuclear programs, U.S. leadership is urgently needed on issues of safety, non-proliferation, and security/counter-terrorism. Many countries, especially those just embarking on commercial nuclear power development, have relatively small programs and may lack the regulatory and oversight resources available to countries with more established programs. International assistance may be required to ensure they do not create disproportionate safety, physical security, and proliferation risks. In many cases, mitigating these risks will depend less on technological interventions than on the ability to strengthen international institutions and safeguards while promoting multilateral cooperation and coordination. From the U.S. perspective, two further points are particularly important: First, with so many players in the international nuclear technology and policy arena, the United States will increasingly have to lead by engagement and by example. Second, the United States cannot exercise effective leadership on issues related to the back end of the nuclear fuel cycle so long as its own program is in disarray; effective domestic policies are needed to support America’s international agenda.

The Fukushima accident has focused new attention on nuclear safety worldwide. Globally, some 60 new reactors are under construction and more than 60 countries that do not have nuclear power plants have expressed interest in acquiring them. These nations will have to operate their facilities safely and plan for safe storage and disposition of spent nuclear fuel. The United States should help launch a concerted international safety initiative—encompassing

organizations like the International Atomic Energy Agency (IAEA) as well as regulators, vendors, operators, and technical support organizations—to assure the safe use of nuclear energy and the safe management of nuclear waste in all countries that pursue nuclear technology.

Nuclear weapons proliferation has been a central concern of U.S. nuclear policy from the earliest days of the nuclear era. These concerns are still prominent, especially where the deployment of uranium enrichment, reprocessing, and recycled fuel fabrication technology is being contemplated. As countries with relatively less nuclear experience acquire nuclear energy systems, the United States should work with the IAEA, nuclear power states, private industry, and others in the international community to ensure that all spent fuel remains under effective and transparent control and does not become “orphaned” anywhere in the world with inadequate safeguards and security.

Longer term, the United States should support the use of multi-national fuel-cycle facilities, under comprehensive IAEA safeguards, as a way to give more countries reliable access to the benefits of nuclear power while simultaneously reducing proliferation risks. U.S. sponsorship of the recently-created IAEA global nuclear fuel bank is an important step toward establishing such access while reducing a driver for some states to engage in uranium enrichment. But more is needed. The U.S. government should propose that the IAEA lead a new initiative, with active U.S. participation, to explore the creation of one or more multi-national spent fuel storage or disposal facilities.

In addition, the United States should support the evolution of spent fuel “take-away” arrangements as a way to allow some countries, particularly those with relatively small national programs, to avoid the costly and politically difficult step of providing for spent fuel disposal on their soil and to reduce associated safety and security risks. An existing program to accept highly-enriched uranium fuel from research reactors abroad for storage in the United States has provided a demonstration—albeit a limited one—of the national security value of such arrangements. The capability to accept limited quantities of spent fuel from foreign commercial reactors could be similarly valuable from a national security perspective. As the United States moves forward with developing its own consolidated storage and disposal capacity, it should work with the IAEA and with existing and emerging nuclear nations to establish conditions under which one or more nations, including the United States, can offer to take foreign spent fuel for ultimate disposition.

The susceptibility of nuclear materials or facilities to intentional acts of theft or sabotage for terrorist purposes is a relatively newer concern but one that has received considerable attention since 9/11. The United States should continue to work with countries of the former Soviet Union and other nations through initiatives such as the Nunn-Lugar Cooperative Threat



Reduction Program and the Global Initiative to Combat Nuclear Terrorism to prevent, detect, and respond to nuclear terrorism threats. Domestically, evolving terrorism threats and security risks must be closely monitored by the NRC, the Department of Homeland Security, and other responsible agencies to ensure that any additional security measures needed to counter those threats are identified and promptly implemented. The recent events at Fukushima have – as they should – prompted the NRC and the industry to re-examine the adequacy of “mitigative strategies” for coping with large-scale events (like an explosion or fire) or catastrophic system failures (like a sudden loss of power or cooling); as noted previously, we also recommend that Congress charter the National Academy of Sciences to assess lessons learned from Fukushima with respect to the storage of spent fuel.

### **Tying It Together**

In conclusion, the problem of nuclear waste may be unique in the sense that there is wide agreement about the outlines of the solution. Simply put, we know what we have to do, we know we have to do it, and we even know how to do it. Experience in the United States and abroad has shown that suitable sites for deep geologic repositories for nuclear waste can be identified and developed. The knowledge and experience we need are in hand and the necessary funds have been and are being collected. Rather the core difficulty remains what it has always been: finding a way to site these inherently controversial facilities and to conduct the waste management program in a manner that allows all stakeholders, but most especially host communities, states, and tribes, to conclude that their interests have been adequately protected and their well-being enhanced—not merely sacrificed or overridden by the interests of the country as a whole.

This is by no means a small difficulty, but we have witnessed other countries make significant progress with a flexible approach to siting that puts a high degree of emphasis on transparency, accountability, and meaningful consultation. Indeed, our friends in Spain have just succeeded in selecting a site for a consolidated storage facility by using the kind of consent-based process we recommend. Here at home, we have had more than a decade of successful operation of WIPP. And most recently, the Fukushima accident in Japan has reminded Americans that we have little physical capacity at present to do anything with spent nuclear fuel other than to leave it where it is. Against this backdrop, the conditions for progress are arguably more promising than they have been in some time. But we will only know if we start, which is what we urge the Administration and Congress to do, without further delay.

Thank you for having us here today, and we look forward to your questions.

## **Blue Ribbon Commission on America's Nuclear Future – Commissioners, Commission Staff,**

### ***Commissioners***

Lee H. Hamilton, Co-Chair - Director of The Center on Congress at Indiana University; former Member, U.S. House of Representatives (D-IN).

Brent Scowcroft, Co-Chair - President of the Scowcroft Group; former National Security Advisor to Presidents Gerald Ford and George H.W. Bush.

Mark H. Ayers, President, Building and Construction Trades Department, AFL-CIO.

Vicky A. Bailey, Former Commissioner, Federal Energy Regulatory Commission; former Indiana PUC Commissioner; former DOE Assistant Secretary for Policy and International Affairs.

Albert Carnesale, Chancellor Emeritus and Professor, University of California, Los Angeles.

Pete V. Domenici, Senior Fellow, Bipartisan Policy Center; former U.S. Senator (R-NM).

Susan Eisenhower, President, Eisenhower Group, Inc.

Chuck Hagel, Distinguished Professor at Georgetown University and the University of Nebraska at Omaha; former U.S. Senator (R-NE).

Jonathan Lash, President, Hampshire College; former President, World Resources Institute.

Allison M. Macfarlane, Associate Professor of Environmental Science and Policy, George Mason University.

Richard A. Meserve, President, Carnegie Institution for Science and Senior Counsel, Covington & Burling LLP; former Chairman, U.S. Nuclear Regulatory Commission.

Ernest J. Moniz, Professor of Physics and Cecil & Ida Green Distinguished Professor, Massachusetts Institute of Technology.

Per Peterson, Professor and Chair, Dept. of Nuclear Engineering, Univ. of California – Berkeley.

John Rowe, Chairman and Chief Executive Officer, Exelon Corporation.

Phil Sharp, President, Resources for the Future; former Member, U.S. House of Representatives (D-IN).

### ***BRC Staff***

John Kotek – *Staff Director*

Matthew Milazzo – *Deputy Director, Staff Liaison to the Reactor and Fuel Cycle Technology Subcommittee*

Tom Isaacs – *Lead Advisor*

Alex Thrower – *Counsel, Staff Liaison to the Transportation and Storage Subcommittee*

Natalia Saraeva – *Research Associate, Staff Liaison to the Disposal Subcommittee*

Marika Tatsutani – *Lead Writer and Editor*

Mary Woollen – *Government and Community Liaison*

Irie Harris – *Office Manager*

***BRC Senior Consultants***

Dr. Tom Cotton – *Senior Technical Advisor*

Allen Croff – *Senior Technical Advisor*

Dr. Glenn Paulson – *Senior Technical Advisor*

## **Blue Ribbon Commission on America's Nuclear Future – Full Commission, Subcommittee, and Regional Meetings**

March 25 & 26, 2010 – Washington DC – Full Commission Meeting

May 25 & 26, 2010 – Washington, DC – Full Commission Meeting

July 7, 2010 – Washington, DC – Disposal Subcommittee Meeting

July 12 & 13, 2010 – Idaho Falls, ID – Reactor & Fuel Cycle Technologies Subcommittee Meeting

July 14 & 15, 2010 – Hanford Site/Kennewick, WA – Full Commission Meeting

August 10, 2010 – Maine Yankee Site/Wiscasset, ME – Transportation & Storage Subcommittee Meeting

August 19, 2010 – Washington, DC – Transportation & Storage Subcommittee Meeting

August 30 & 31, 2010 – Washington, DC – Reactor & Fuel Cycle Technologies Subcommittee Meeting

September 1, 2010 – Washington, DC – Disposal Subcommittee Meeting

September 21 & 22, 2010 – Washington, DC – Full Commission Meeting

September 23, 2010 – Washington, DC – Transportation & Storage Subcommittee Meeting

October 12, 2010 – Washington, DC – Reactor & Fuel Cycle Technologies Subcommittee Meeting

October 21 & 22, 2010 – Finland – Disposal Subcommittee Site Visits and Meetings

October 23-26 – Sweden – Disposal Subcommittee Site Visits and Meetings

November 2, 2010 – Chicago, IL – Transportation & Storage Subcommittee Meeting

November 4, 2010 – Washington, DC – Disposal Subcommittee Meeting

November 15 & 16, 2010 – Washington, DC – Full Commission Meeting

January 6 & 7, 2011 – Aiken, SC and Augusta, GA – Savannah River Site Visit and Meeting

January 26, 27 & 28, 2011 – Carlsbad and Albuquerque, NM – Waste Isolation Pilot Plant Site Visit and Meetings

February 1 & 2, 2011 – Washington, DC – Full Commission Meeting

February 3, 2011 – Washington, DC – Classified (Closed) Meeting

February 8-11, 2011 – Japan – Site Visits and Meetings

February 17 & 18, 2011 – Russia – Meetings

February 20, 21 & 22, 2011 – France – Site Visits and Meetings

May 13, 2011 – Washington, DC – Full Commission Meeting

June 21-28, 2011 – United Kingdom and France – Site Visits and Meetings

September 12, 2011 – Denver, CO – Regional Public Meeting

October 12, 2012 – Boston, MA – Regional Public Meeting

October 18, 2011 – Atlanta, GA – Regional Public Meeting

October 20, 2011 – Washington, DC – Regional Public Meeting

October 28, 2011 – Minneapolis, MN – Regional Public Meeting

December 2, 2011 – Washington, DC – Full Commission Meeting