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SECTION 123: CIVILIAN NUCLEAR COOPERATION AGREEMENTS

HEARING

BEFORE THE

COMMITTEE ON FOREIGN RELATIONS UNITED STATES SENATE

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SECTION 123: CIVILIAN NUCLEAR COOPERATION AGREEMENTS

THURSDAY, JANUARY 30, 2014

U.S. SENATE,
COMMITTEE ON FOREIGN RELATIONS,
Washington, DC.

The committee met, pursuant to notice, at 9:35 a.m., in room SD–419, Dirksen Senate Office Building, Hon. Robert Menendez (chairman of the committee) presiding.

Present: Senators Menendez, Cardin, Shaheen, Murphy, Kaine, Markey, Corker, Risch, Rubio, Johnson, and McCain.

OPENING STATEMENT OF HON. ROBERT MENENDEZ, U.S. SENATOR FROM NEW JERSEY

The CHAIRMAN. Good morning. This hearing of the Senate Foreign Relations Committee will come to order.

Let me welcome our panelists today. We appreciate your participation.

This year we have several agreements before the committee: an updated agreement with Taiwan, an extension of the agreement with the IAEA, both of which have been submitted to Congress. The Vietnam agreement has been initialed, as I understand it, and we are looking forward to reviewing it when it is submitted to Congress. Other countries are also seeking to negotiate such agreements with the United States.

Over the last several years, the administration has conducted and recently completed a policy review of 123 agreements, and we are looking forward today to hearing the results of this review.

One question is how the review dealt with what has become known as the "gold standard." Should the United States require countries with which it enters into 123 agreements to completely forgo enrichment and reprocessing? And in that respect, I will look forward to hearing that response.

You know, we have the United Arab Emirates Agreement, which is, in my mind, the gold standard. And yet, we are in the midst of negotiations with Iran which would permit, from everything I gather from the joint plan of action, some level of enrichment to take place. And so in one respect you have a very staunch ally who you have this very high standard for. In another respect, you have a country that ultimately engages in a series of support of terrorism across the globe, that is engaged in Syria, that has challenged the world with its nuclear ambitions, and we are headed to something that is far less than the UAE standard. So I think it is important to get a sense of how we pursue these agreements.

If the administration has settled on a case-by-case basis, we would like to know what are the criteria for pursuing or not pursuing the gold standard.

In the 1970s nonproliferation concerns prompted Congress to pass the Nuclear Nonproliferation Act of 1978 requiring states to comply with much more robust nonproliferation conditions before signing nuclear cooperation agreements with the United States.

A lot of water has passed under the bridge since then. Iran and North Korea have sought to use the pretense of a civilian nuclear program to work toward nuclear weapons, and the A.Q. Khan network spread nuclear technology across the globe.

Another important issue related to 123 agreements is the declining role of the United States in the global export market for nuclear technology. Until the end of the cold war, the United States was the dominant global supplier of commercial nuclear energy technology. Over the last 30 years, we have seen a significant decline in the U.S. share of the market and in our ability to promote national security objectives through peaceful nuclear cooperation.

For Congress, the question is how can we support our nuclear industry while at the same time upholding high nonproliferation standards. Section 123 of the Atomic Energy Act charges the Congress and the Senate Foreign Relations Committee, in particular, with important oversight duties related to these agreements. It is now up to the Senate Foreign Relations Committee and the Congress, broadly, to decide whether we believe the agreement meets the nonproliferation criteria of the Atomic Energy Act and is in the best interests of the United States.

We look forward to our panelists helping to shed light on these issues and understanding a better sense of how the administration views them in the performance of our oversight duties.

Let me recognize Senator Corker, who has had a great deal of interest in this field, and we look forward to his remarks.

OPENING STATEMENT OF HON. BOB CORKER, U.S. SENATOR FROM TENNESSEE

Senator CORKER. Mr. Chairman, thank you. Thank you very much for having this hearing. I know we had a number of discussions and I appreciate the way that the minority and the majority work together on these kinds of issues.

And I want to thank our witnesses for being here today.

I have some brief opening comments, and because this is a little more technical in nature, if I could, I would like my full written opening comments to be part of the record.

The CHAIRMAN. Without objection.

Senator CORKER. Today we have the opportunity to examine and begin the process to weigh in on what shape U.S. policy in this arena should take and review and calls to be more robust the role that Congress plays in entering into these important decisions.

I want to thank the witnesses for appearing before us today. I am particularly interested in hearing from our private panel as we examine U.S. policy in relation to civil nuclear cooperation agreements and the role that they play in achieving U.S. nonproliferation goals.

I am concerned about the administration's current policy or, rather, lack of consistent policy toward the negotiation of civil nuclear cooperation agreements. Their acceptance of enrichment and reprocessing, E&R, capabilities in some but not all new agreements with countries where no such capability currently exists is inconsistent and confusing.

The gold standard where nations foreswear domestic E&R capabilities was finalized under this administration with the completion of the civil nuclear cooperation agreement with the United Arab Emirates. This agreement signaled our country's strong commitment to nuclear nonproliferation and established a high standard to ensure tight control of potentially dangerous technologies.

The absence of a consistent policy weakens our nuclear nonproliferation efforts and sends mixed signals to those nations we seek to prevent from gaining or enhancing such capability and signals to our partners that the gold standard is actually no standard at all.

I am equally concerned that the current administration has taken an economics industry first national security second approach to entering into these 123 agreements. Also, we need to understand how the agreement with Iran, as the chairman mentioned and as we have talked about privately, relates to other civilian agreements in our overall nonproliferation strategy. I do not see how, in essence, agreeing to the type of thing that we have agreed to with Iran does not undermine our ability in these 123 agreements with every other country that seeks an agreement with us.

This agreement with Iran is a de facto signoff on enrichment, and while we are not negotiating a 123 agreement with Iran, these negotiations will have implications for our global nuclear nonproliferation regime.

This committee has an important obligation to review and provide recommendations to the full Congress on all 123 agreements submitted for consideration under the Atomic Energy Act. The 123 agreement with Taiwan was submitted to our committee for consideration on January 7, 2014. While this agreement preserves the gold standard, I am concerned about the decision to make the agreement of unlimited duration, bypassing congressional review of the agreement beyond the current 60-day statutory review period.

Later this year, we will be asked to review a 123 agreement with Vietnam. This agreement reportedly does not meet the gold standard. Rather, it relies on a political side note that Vietnam will seek to meet its fuel requirements through the international nuclear fuel market.

With this great inconsistency across agreements, which standards can we expect the administration to reach for negotiating new agreements with Jordan or Saudi Arabia?

I also appreciate the opportunity to raise prospects for an enhanced congressional role in the 123 process. I think most of us know the process that we now have is really no process at all and it really does not allow us to weigh in in the way we should appropriately weigh in. I am concerned that Congress will be increasingly marginalized if we do not explore changes to the current process for congressional review. We should examine whether it is time

for Congress to provide a resolution for approval on all agreements except perhaps in the case where an agreement reaches the gold standard.

I welcome our witnesses' comments and observations on this and other proposals.

In closing, the United States must lead with high standards that prevent the proliferation of technologies if we are to have a credible and effective nuclear nonproliferation policy. I look forward to hearing from our witnesses on the most effective avenues for achieving this primary goal.

And again, I want to thank the chairman for having this hearing and for those who are here pursuing appropriate oversight on something that is so important to our country. So thank you.

[The prepared statement of Senator Corker follows:]

PREPARED STATEMENT OF SENATOR BOB CORKER

Chairman Menendez, thank you for agreeing to hold this important and timely hearing today.

Not only have I requested that we hold this hearing for some time now, but nearly 2 years ago Senator Lugar sent a letter to then Chairman Kerry requesting this very same hearing.

Now, 2 years later, we have the opportunity to examine and begin the process to weigh in on what shape U.S. policy in this arena should take and review—and cause to be more robust—the role that Congress plays in entering into these important decisions.

I also want to thank the witnesses for appearing before us today. I am particularly interested in hearing from our private panel today, as we examine U.S. policy as it relates to civil nuclear cooperation agreements and the role they play in achieving U.S. nonproliferation goals.

As I stated in a letter to Secretary Kerry on October 28 of last year, I am deeply concerned about the administration's current policy—or rather lack of consistent policy—toward negotiation of civil nuclear cooperation agreements. The administration's acceptance of enrichment and reprocessing (ENR) capabilities in some, but not all, new agreements with countries where no ENR capability currently exists is inconsistent and confusing, potentially compromising our Nation's nonproliferation policies and goals.

The "gold standard," where nations forswear domestic ENR capabilities, was finalized under this administration with the completion of the civil nuclear cooperation agreement with the United Arab Emirates. The UAE 123 agreement signaled the United States strong commitment to nuclear nonproliferation and established a high standard to ensure tight control of potentially dangerous technologies that can also be used for the foundations of a nuclear weapons program.

The absence of a consistent policy weakens our nuclear nonproliferation efforts, and sends a mixed message to those nations we seek to prevent from gaining or enhancing such capability, and signals to our partners that the "gold standard" is no standard at all.

I am equally concerned that the current administration has taken an "economics"/industry first, national security second approach to entering into 123 agreements.

Also, we need to understand how the agreement with Iran relates to our other civilian nuclear agreements and our overall nonproliferation strategy.

The agreement with Iran is a de facto sign-off on enrichment, and while we are not negotiating a 123 agreement with Iran, these negotiations will have implications for our global nuclear nonproliferation regime.

As many of us may recall, during the review of the India 123 agreement several years ago, the administration at that time indicated that the value of the agreement, in addition to demonstrating a growing commitment to the bilateral relationship, was in the nature of contracts for our domestic nuclear suppliers.

Those contracts have yet to appear for U.S. industry, likely never will appear, and we are left holding a bag of goods. To say many in Congress have buyer's remorse would probably be an understatement as it pertains to the concessions made in this agreement in order to "open the market" for U.S. industry.

It was this administration, following in the disappointing footsteps of the India agreement that negotiated the first "gold standard" agreement between the United States and the UAE.

This standard, welcomed by Congress, has since been set aside for a "case-by-case" approach that no longer seeks these strong commitments from our partners.

In a 2012 editorial titled "Shall We Call it the Bronze Standard," the New York Times rightly pointed out the following with regard to the new, relaxed standard:

> American officials now say that asking for too much could cost America's nuclear industry valuable new business. Officials also insist that once American businesses have contracts in hand, Washington can still use its nuclear trade rules and suasion to urge countries signing nuclear deals to limit enrichment and reprocessing and meet other nonproliferation standards so there is no diversion.
>
> But if the administration doesn't make curbing the spread of enrichment and reprocessing an explicit priority, it will never happen. As for the business rationale, the Bush and Obama administrations and the nuclear industry made similar claims when they cast proliferation concerns aside and gave India an overly generous nuclear deal in 2008. The Indians are still mainly buying from others because they have yet to institute a sufficient liability regime to protect American firms.
>
> The blowback from not pressing others to accept the same deal as the U.A.E could also be significant. If Vietnam is given easier terms, charges will inevitably arise that Washington is tougher on the Arab world. If the provision is not in the agreement with Jordan or others in the Mideast, the U.A.E. has the right to renegotiate its deal."

Within this committee, we have an important obligation to review and provide recommendations to the full Congress on all 123 agreements submitted for consideration under the Atomic Energy Act.

This year, we have already passed an extension to the ROK 123 agreement, providing another 2 years for the administration to reach a new comprehensive deal. Maintaining uninterrupted civilian nuclear cooperation is important for U.S. political and commercial interests. And while I was pleased to support this extension, I am concerned that the administration will not hold the line on advanced consent for enrichment and reprocessing.

We are also presently asked to review the 123 agreement with Taiwan, which was submitted to our committee for consideration on January 7, 2014.

While this agreement preserves the "gold standard," I am concerned about the decision to make the agreement of unlimited duration thereby bypassing congressional review of the agreement beyond this current 60-day statutory review period.

I do hope that our government witnesses will address the reasons for concluding that this was the best approach, but caution that it should not become common practice.

Later this year, we will be asked to review a 123 agreement with Vietnam. This agreement reportedly does not meet the "gold standard." Rather it relies on a political side note that Vietnam will seek to meet its fuel requirements utilizing the international nuclear fuel market.

If the Vietnamese are willing to buy their nuclear fuel on the international market, why aren't they willing to agree to legally binding language forswearing enrichment and reprocessing technologies?

With this great inconsistency across agreements, which standards can we expect the administration to reach for in negotiating new agreements with Jordan or Saudi Arabia?

I also appreciate the opportunity to raise prospects for an enhanced congressional role in the 123 approval process. While Congress provides an important check on the administration to ensure that our national security interests are placed first and are being met with each agreement, I am concerned that we will be increasingly marginalized if we do not explore changes to the current process for congressional approval.

The law governing the current congressional role was written decades ago and has had little updating since. With a packed domestic agenda and a growing number of members with little to no background in civil nuclear cooperation agreements, the process by which an agreement goes into effect absent a resolution of "disapproval" opens the door for less and less review of these important agreements.

We should examine whether it is time to call on Congress to provide a resolution of approval on all agreements prior to them becoming law, except perhaps in the case where an agreement reaches the "gold standard." I welcome our witness's comments and observations on this and other proposals to update the Atomic Energy Act.

The CHAIRMAN. Thank you, Senator Corker, and thank you for your contributions to this effort.

Our first panel is Thomas Countryman, the Assistant Secretary of State for the Bureau of International Security and Nonproliferation, and the Deputy Secretary of Energy, Daniel Poneman. Thank you both for your presence here today. We look forward to your testimony. Your full statements will be included in the record without objection. And I would ask you to try to summarize your statements in about 5 minutes or so, so we could enter into a dialogue.

With that, Mr. Secretary, do you want to start off?

STATEMENT OF HON. DANIEL B. PONEMAN, DEPUTY SECRETARY OF ENERGY, U.S. DEPARTMENT OF ENERGY, WASHINGTON, DC

Mr. PONEMAN. Thank you, Mr. Chairman.

Chairman Menendez, Ranking Member Corker, distinguished members of the committee, I appreciate the opportunity to testify before you today on the administration's policies regarding civil nuclear cooperation and nonproliferation.

I first worked on this issue as a summer intern in 1975 for my home State senator, John Glenn. I was working on S. 1439, the Export Reorganization Act, which, in fact, became the 1978 Nonproliferation Act that you referred to, Mr. Chairman. So I have nearly 40 years on this subject, including serving 6 years on the National Security Council staff both for President George Herbert Walker Bush and President Clinton.

At the NSC, I was proud to be part of the team under President Bush that negotiated the deal to purchase 500 metric tons of highly enriched uranium from Russia, 20,000 weapons worth of bombs, three a day that have been taken down, and we have successfully concluded that deal just in December. I was also proud to serve on the team that stopped North Korea's plutonium production for a number of years under President Clinton.

In short, for four decades my preeminent concern has been to stop the spread of nuclear weapons and to stop dangerous materials and technologies from falling into the wrong hands. Throughout our policy has benefited from an enormous degree of bipartisan cooperation and consensus, going back to President Eisenhower's 1953 "Atoms for Peace" speech in which he sought to secure the benefits of the peaceful use of the atom while guarding against misuse for military or other destructive aims. Every President since President Eisenhower has embraced these goals.

So when President Obama delivered his compelling vision to advance our nuclear security in his 2009 speech in Prague, he was following firmly in the footsteps of all of his predecessors in advancing a strong vision of global leadership in reducing nuclear threats.

It has always been U.S. policy that 123 agreements should support U.S. nonproliferation objectives. Indeed, our 123 agreements are the world's strongest framework agreements for peaceful nuclear cooperation precisely because of the 1978 Nonproliferation Act.

Consider the specific provisions. The United States requires our partners to commit to the legal obligations contained in section 123

of the Atomic Energy Act. The U.S. Government requires non-nuclear-weapon state partner countries to have in place IAEA safeguards over all nuclear materials in peaceful nuclear activities. The United States requires guarantees that any nuclear material and the equipment transferred be used only for peaceful purposes; 123 agreements also provide the United States with the right to demand the return of any U.S.-obligated material and equipment if a non-nuclear-weapon state detonates a weapon or abrogates its safeguard agreement. Partners may not retransfer any nuclear material or equipment supplied by U.S. companies without permission of the U.S. Government. Partners may not enrich, reprocess, or otherwise alter in form or content U.S.-obligated material without U.S. Government consent. Partners also must adhere to the U.S. requirements for physical security and storage of U.S. nuclear material and equipment.

Our 123 agreements set the bar high discouraging a nonproliferation race to the bottom in which potential partners negotiate peaceful nuclear cooperation agreements with suboptimal nonproliferation controls.

Therefore, in our view, the more 123 agreements that exist in the world, the stronger the nonproliferation controls that will apply to all nuclear commerce. Consequently, it is in the U.S. national security interest to maximize the number of countries with which the United States has 123 agreements.

A decade ago, I joined with then-Professor Ernest Moniz and other colleagues to propose a global regime that minimized acquisition of enrichment and reprocessing technologies. Such a regime would achieve that minimization goal not by legal diktat or diplomatic pressure, but rather by addressing the underlying concern in many countries to secure reliable nuclear fuel services from the commercial marketplace. This approach of acquiring services from the existing market would save nations billions of dollars in unnecessary investments in fuel cycle facilitates, thereby becoming a far more attractive prospect.

We want other nations to enter into 123 agreements with the United States because our standards are the highest in the world. When we enter into 123 agreements, we bring our nonproliferation standards to the partner country and thereby enhance our national security. Conversely, when a state opts to enter into an agreement for civil nuclear cooperation only with another country, not the United States, then U.S. influence on that nation's nonproliferation regime decreases, as does our influence over the global regime.

In short, we have a variety of tools, in addition to the 123 agreements, Mr. Chairman, which I think Mr. Countryman will go into in great detail, but the bottom line is that the United States has the highest nonproliferation standards in the world. Our 123 agreements remain a highly effective tool in promulgating those standards, though they are far from the only tool, and it is therefore in our national security interest to ensure that we can renew current and achieve new 123 agreements with partner countries.

Thank you.

[The prepared statement of Mr. Poneman follows:]

PREPARED STATEMENT OF DEPUTY SECRETARY DANIEL B. PONEMAN

Chairman Menendez, Ranking Member Corker, and distinguished members of the committee, I appreciate the opportunity to testify before you today on the administration's policies regarding civil nuclear cooperation.

I first worked on this issue as a summer intern in 1975 for my home State Senator, John Glenn of Ohio. That summer I was assigned to work on S. 1439, the Export Reorganization Act, which was designed to address some of the shortcomings in our system and strengthen our nonproliferation controls. That legislation eventually evolved into the Nuclear Non-Proliferation Act of 1978. So I have nearly 40 years of experience with this issue, including 6 years on the National Security Council (NSC) staff under President George H.W. Bush and President Bill Clinton, for whom I served as the first Special Assistant to the President for Nonproliferation and Export Controls.

At the NSC, I was proud to be part of the initial team under President Bush that negotiated the agreement with Russia to purchase 500 metric tons of highly enriched uranium to be blended down into commercial reactor fuel. That 20-year deal concluded last month, having eliminated 20,000 bombs-worth of nuclear material, while providing one-tenth of America's electricity for the last generation. And I was proud to serve on the team under President Clinton that worked to reduce the proliferation threat emanating from North Korea's nuclear programs, an issue that we continue to confront today.

In short, for four decades I have done my best to prevent nuclear weapons or the materials and technologies that can be used to build them from falling into the wrong hands, and have benefited throughout from the wide degree of bipartisan consensus supporting U.S. nonproliferation policy. That consensus was well articulated by President Eisenhower in his historic 1953 "Atoms for Peace" speech, then institutionalized in 1957 with the creation of the International Atomic Energy Agency (IAEA), and ultimately universalized through the Nuclear Nonproliferation Treaty (NPT) of 1968, all of which seek to secure to humankind the benefits of the peaceful use of the atom while guarding against its misuse for military or other destructive aims. Every President since Eisenhower has embraced these goals, each applying the flexibility of his own policies to achieve these goals.

This is indeed fortunate, since there is no more important task than succeeding in this daunting yet imperative national security mission. So when President Obama delivered his compelling vision to advance our global nuclear security in his 2009 Prague speech, he was following firmly in the footsteps of his predecessors in advancing a strong vision of global leadership in reducing nuclear threats. The Department of Energy (DOE), through its national laboratories and production plants, and in close partnership with the State Department, Department of Defense, Nuclear Regulatory Commission (NRC) and other U.S. Government and international partners, has worked and will continue to work tirelessly to reduce this threat and enhance the nuclear nonproliferation regime.

In your letter, Mr. Chairman, you asked about the administration's policy on 123 agreements. At the broadest level, it is and always has been U.S. policy that 123 agreements should support U.S. nonproliferation objectives, to combat the threat that nuclear weapons and related materials and technologies should fall into the wrong hands. And, by their structure, 123 agreements serve that mission well. Indeed, our 123 agreements are the world's strongest framework agreements for peaceful nuclear cooperation. No government requires more stringent nonproliferation conditions than the United States.

Consider the specific provisions of our 123 agreements. The United States requires our trading partners to commit to the legal obligations contained in section 123 of the Atomic Energy Act. These obligations are purposely stringent and set the global standard for nuclear commerce. The U.S. Government requires non-nuclear-weapon-state partner countries to have in place IAEA safeguards over all nuclear materials in peaceful nuclear activities within the territory of such state, under its jurisdiction, or carried out under its control anywhere. Additionally, the cooperating party must guarantee that safeguards as set forth in the agreement for cooperation will be maintained in perpetuity with respect to all nuclear materials and equipment transferred pursuant to the 123 agreement and any special nuclear material used in or produced by such material and equipment. The United States requires guarantees that any nuclear material and equipment transferred be used only for peaceful purposes. 123 agreements also require that the United States has the right to demand the return of any U.S.-obligated material and equipment if a non-nuclear-weapon state detonates a weapon or abrogates its safeguards agreement. Partners may not retransfer any nuclear material or equipment supplied by U.S. companies without the permission of the U.S. Government. Partners may not

enrich, reprocess, or otherwise alter in form or content U.S.-obligated material without U.S. Government permission. Partners also must adhere to U.S. requirements for physical security and storage of U.S. nuclear material and equipment.

It is therefore in the U.S. national interest to encourage other governments that are considering commercial nuclear programs and that are in compliance with their nuclear nonproliferation obligations to sign 123 agreements with the United States. Our 123 agreements set the global nonproliferation standard, thereby discouraging a nonproliferation "race to the bottom," in which potential partners negotiate peaceful nuclear cooperation agreements with suboptimal nonproliferation controls.

The more 123 agreements that exist in the world, the stronger the nonproliferation controls that will apply to all nuclear commerce. Consequently, it is in the U.S. national security interest to maximize the number of countries with which the United States has 123 agreements.

There is nothing new in this logic. Indeed, a decade ago, I joined with then-professor, Ernest Moniz, and other colleagues to argue in favor of a global regime that minimized acquisition of enrichment and reprocessing technologies. Such a regime would achieve this minimization goal, not by legal diktat or diplomatic pressure, but rather by addressing the underlying concern in many countries to secure reliable nuclear fuel services from the commercial marketplace. This approach of acquiring services from the existing market would save nations billions of dollars in unnecessary investments in fuel cycle facilities, thereby becoming a far more attractive prospect. Of course, to be effective, these nuclear fuel service supply assurances would have to be credible—for example, they could only be revoked if the country in question violated its nonproliferation obligations, and not for other important but distinct issues of concern to the United States.

We want other nations to enter into 123 agreements with the United States because our standards are the highest in the world—bar none. When we enter into new 123 agreements, we bring our nonproliferation standards to the partner country, and thereby enhance our national security. Conversely, when a state opts to enter into an agreement for civil nuclear cooperation only with another country but not the United States, then U.S. influence on that state's nonproliferation regime decreases.

Some people have mistakenly viewed U.S. economic interests in nuclear trade as somehow at odds with a strong nonproliferation policy. This is a false dichotomy. A strong U.S. commercial nuclear industry does not weaken our nonproliferation; on the contrary it strengthens U.S. nonproliferation efforts, since it ultimately provides the basis for countries to enter into 123 agreements. Conversely, failure to reach a 123 agreement with a potential partner country prevents the United States from extending the coverage of its nonproliferation controls, thus weakening our nonproliferation efforts.

The U.S. commercial nuclear industry is no longer dominant in the global marketplace. Over time, the U.S. share of global exports for enriched uranium and other sensitive nuclear materials declined dramatically. As reported in a 1987 GAO report, the U.S. share of the global non-Communist market in enriched uranium declined from 100 percent in 1969 to 50 percent in 1987, Since that report, the decline in market share has continued to just 10 percent of the overall market in 2008. Diminishing U.S. market share means diminished controls over materials worldwide and diminished influence over the safety, security, and nonproliferation cultures of those markets.

It is important to remember that 123 agreements are not the only tools in our nonproliferation arsenal. In addition, we have the NPT regime; IAEA safeguards, now strengthened by the Additional Protocol; U.N. Resolution 1540; nuclear fuel banks; the Nuclear Suppliers Group; as well as a number of nonproliferation conventions on such matters as physical protection, safety, and radioactive waste. All of these tools advance the U.S. national security interest in achieving the lowest number of sensitive nuclear fuel cycle facilities and technologies (specifically enrichment and reprocessing).

Mr. Chairman, you asked whether the section 123 requirements need to be modified or updated. In our judgment, Mr. Chairman, the current requirements are strong, relevant, and effective. Indeed, in our view no country has more robust nonproliferation criteria, and the current requirements represent a major increase in rigor compared to those in effect prior to the 1978 Nuclear Nonproliferation Act. The nonproliferation criteria of section 123 should not lightly be changed. The U.S. Government has been persuading other countries to accept our existing rigorous set of constraints for 30 years, but we will undermine our ability to negotiate agreements and extend our strong nonproliferation controls if we keep changing the rules of the game and cause other countries to view the United States as an unreliable partner.

I would argue that changes made in 1978 were justified, as they addressed genuine weaknesses in the nuclear export regime. Indeed, they have been very successful in minimizing the proliferation of sensitive nuclear technologies like enrichment and reprocessing. While I understand well-meaning efforts to further constrain the acquisition and development of enrichment and reprocessing around the world, ratcheting up restrictions yet again will drive countries away from the United States and therefore out of the reach of U.S. 123 controls. A perfect policy that applies to zero percent of the market would be a perfect failure.

Mr. Chairman, you asked about the proposed Taiwan 123 Agreement. Recently, the President submitted this agreement to Congress for review. As required under the Taiwan Relations Act, the agreement was concluded between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO).

Entry into force of this agreement constitutes an important step forward in our cooperation with the authorities on Taiwan in the field of civil nuclear energy. The United States supplies all of their power and research reactors, along with the fuel to power them. The AIT–TECRO 123 Agreement will allow this cooperation to develop further.

In the AIT–TECRO Agreement and the supporting side letter, the authorities represented by TECRO renew their commitment to strong nonproliferation norms, including giving legal weight to their existing policy not to seek enrichment and reprocessing technologies. The proposed agreement prohibits the possession by the authorities on Taiwan of sensitive nuclear facilities and any engagement in activities involving sensitive nuclear technology in the territory of the authorities represented by TECRO. Assistant Secretary of State Tom Countryman will discuss the Taiwan 123 Agreement in greater detail. I simply want to reaffirm the basic point that the 123 agreement with TECRO is another 123 agreement that implements the longstanding U.S. goal to use 123 agreements as one means to achieve the lowest number of enrichment and reprocessing facilities around the world.

Finally, Mr. Chairman, you asked about the role of Congress in formulating 123 policy. As the committee knows, the role of Congress has been vital in this area, as has been expressed through the Atomic Energy Act of 1954, as amended. Congress developed and enacted this comprehensive framework, institutionalizing its vital review and oversight function. The documentation required to accompany a 123 agreement is extensive and requires a joint letter from the Secretaries of State and Energy, supplemented by separate input from the Nuclear Regulatory Commission and the Director of National Intelligence. That documentation is reviewed by both Houses of Congress. We believe it is a good system, with a robust role for Congress. As long as the President retains his prerogatives in the area of foreign diplomacy, the nonproliferation criteria of section 123 should not lightly be changed, for the same reasons our policy should not lightly be changed; the United States should be both strong and steadfast.

CONCLUSION

The United States has the highest nonproliferation standards in the world. Our 123 agreements remain a highly effective tool in promulgating those standards—though they are far from the only tool. It is in our national security interests to assure that we can renew current and achieve new future 123 agreements.

Though the strategy for engaging with individual nations is tailored to the nation at hand, the underlying principle remains the same: we must do what is necessary to minimize the acquisition and development of enrichment and reprocessing technology and provide persuasive alternatives.

Well-intended changes to requirements for 123 agreements risk making the perfect the enemy of the good—arriving at a policy that is strong on paper and nowhere else. We run the risk of countries moving forward without us—choosing instead to partner with countries that have less stringent nonproliferation controls and losing the opportunity to help new partners and allies use peaceful nuclear power.

The Department of Energy remains committed to implementing President Obama's policies and goals on nuclear nonproliferation and use of civil nuclear cooperation, as President Eisenhower expressed 60 years ago—that cooperation in the peaceful use of nuclear power will bring together an international community committed to using "their strength to serve the needs rather than the fears of mankind."

Thank you for the opportunity to address to committee, and I look forward to your questions.

The CHAIRMAN. Secretary Countryman.

STATEMENT OF HON. THOMAS M. COUNTRYMAN, ASSISTANT SECRETARY OF STATE, BUREAU OF INTERNATIONAL SECURITY AND NONPROLIFERATION, U.S. DEPARTMENT OF STATE, WASHINGTON, DC

Mr. COUNTRYMAN. Mr. Chairman, I want to thank you and the ranking member and the other members of the committee for this opportunity. Even more, I want to thank you for decades of strong congressional interest and support in the issue of nonproliferation. This enduring support, together with the direct interest of President Obama, has ensured that for the last several years the United States has maintained leadership of a nonproliferation regime globally that is not only strong but effective.

The 123 agreements must be understood within the context of a comprehensive nonproliferation policy that the United States has long pursued and continues to strengthen. This includes our efforts to minimize the further production of fissile material around the world, an effort to prevent the proliferation of sensitive technologies. It includes the President's efforts under the nuclear security summit process to secure fissile material around the world. It includes U.S. leadership within the Nuclear Suppliers Group which, again, under U.S. leadership established 3 years ago the strongest possible standards for preventing transfer of enrichment and reprocessing technology. And it also includes the strong support of the United States and again with the crucial support of the Congress for making the International Atomic Energy Agency the most credible and expert institution in the world for preventing proliferation.

Nonproliferation is an element of our dialogue with partners around the world. It is a crucial issue for the G8 grouping. We have also not just done the diplomatic work. We do the hard work, in this case led by the Department of Energy, to establish world fuel banks in the United States, in Russia under the leadership of the IAEA that can assure a reliable supply for countries pursuing civilian nuclear power.

It is in this context that 123 agreements have their importance. They are another vital tool in the toolkit that limits the proliferation of E&R technology and of weapons-grade material. As you know, by law 123 agreements contain stringent nonproliferation agreements, making them stronger than those pursued by any other country in the world when they sign nuclear cooperation agreements. They require partner countries to apply full-scope IAEA safeguards. They require that material and equipment transferred under the agreement will be used only for peaceful purposes. They require adequate physical protection of material which we can verify and many other requirements.

In approaching any particular negotiation of a 123 agreement, a process led by the Department of State, we consistently ask in every instance how we can best prevent the proliferation of sensitive nuclear technologies. It is simply not accurate to say that the economic interests have primacy over our nonproliferation interests, and the policy review conducted by the administration reaffirmed the primacy of our nonproliferation interests.

An approach that would be more restrictive or that would seek to make 123 agreements not only meet high standards but to be

uniform we fear would be self-defeating. On the particular issue of requiring a binding legal commitment from every country, we do believe that many countries would prefer not to pursue such an agreement rather than to agree to renounce forever a theoretical right.

In any 123 agreement, we seek to meet the legal requirements of the Atomic Energy Act and to maintain our principled stance, our leadership stance on enrichment and reprocessing. These are the primary goals. The exact structure, the exact text of the agreement are the means by which we reach those goals.

Mr. Chairman, you have in my written testimony additional comments about the specific questions raised on Vietnam and on Taiwan, which we are happy to expand on as you wish. I simply want to emphasize that we have crafted through the 123 agreements nuclear cooperation policies that are not only strong, they are effective. And that is borne out by the record that we have sustained in limiting the spread of such technologies.

Thank you very much. I look forward to your questions.

[The prepared statement of Mr. Countryman follows:]

PREPARED STATEMENT OF ASSISTANT SECRETARY THOMAS M. COUNTRYMAN

Mr. Chairman and Ranking Member, thank you for the opportunity to testify today before the committee. The question of the appropriate role of our civil nuclear cooperation agreements in U.S. nonproliferation policy is an important one, and it is my privilege to be here to address it.

LIMITING THE SPREAD OF ENRICHMENT AND REPROCESSING

Since taking office, this administration has made minimizing the further proliferation of nuclear weapons material a top priority. In order to do so, the administration has undertaken a large number of different activities designed to reinforce our longstanding policy of minimizing the further proliferation of enrichment and reprocessing, or ENR, technologies and initiated new efforts to this end. We have many tools to achieve this end, and for many years we've focused our efforts on raising global standards in this regard.

For example, in the Nuclear Suppliers Group (NSG), 6 years of effort culminated in the 2011 revised Guidelines establishing criteria for ENR transfers. These new criteria include full compliance by the recipient with the Nuclear Nonproliferation Treaty (NPT) and International Atomic Energy Agency (IAEA), safeguards; reporting on export controls to the United Nations Security Council's 1540 Committee; commitment to IAEA safety standards and adherence to accepted international safety conventions; and conclusion of an intergovernmental agreement with the supplier nation including assurances regarding nonexplosive use, effective safeguards in perpetuity, and retransfer. Suppliers also undertook to avoid, as far as practicable, the transfer of enabling design and manufacturing technology associated with nuclear transfers. The NSG has committed to facilitate access to nuclear material for the peaceful uses of nuclear energy, and to encourage states, within the scope of Article IV of the NPT, to rely on the international commercial market and other available international mechanisms for nuclear fuel services that do not undermine the global fuel market.

We've also worked with our global partners to create incentives for states to rely on international markets for low enriched uranium fuel, including separate fuel banks established by the U.S. Department of Energy, Russia, the IAEA, and a fuel assurance initiative from the United Kingdom.

123 AGREEMENTS POLICY

The implementation of agreements for peaceful nuclear cooperation, or 123 agreements, is another tool we have to limit the further proliferation of ENR. As you know, 123 agreements contain many stringent nonproliferation conditions, making them the strongest civil nuclear cooperation agreements in the world in terms of nonproliferation requirements. Our 123 agreements require partner countries to apply full scope IAEA safeguards to non-nuclear-weapon states; require that all material and equipment transferred under the agreement and special nuclear mate-

rial used in or produced therefrom, will be for peaceful purposes; require adequate physical protection of material transferred under the agreement; and grant U.S. consent rights over storage of the most sensitive materials, and over the enrichment, reprocessing, alteration in form or content, storage, and retransfer of U.S.-obligated nuclear material. With such high standards, it follows that the more 123 agreements we conclude, the stronger the nonproliferation controls that will apply to global nuclear commerce. Consequently, it is in the national security interests of the United States to maximize the number of countries with which we conclude 123 agreements. Put simply, global security is enhanced through our 123 agreements.

Some have advocated an approach that would require all future U.S. 123 agreement partners to agree to legal obligations not to pursue ENR technologies from any source. We do not believe such a "one size fits all" approach is in our national security interests. This type of blanket requirement would reduce our ability to extend our strong nonproliferation norms to new parts of the world—norms that have a real impact in preventing proliferation. Instead this blanket approach would likely drive states with emerging nuclear power programs into the arms of suppliers with lower nonproliferation standards.

Moving forward on future 123 agreement negotiations, we will maintain flexibility in the structure of our agreements in order to meet the requirements of U.S. law and advance our primary objective of combating the proliferation of ENR technologies. The commitments we seek may take a range of forms depending on the approach that best suits our primary policy objective of minimizing the further proliferation of ENR technologies.

OUR POLICY APPLIED TO VIETNAM

The text of the agreement we initialed with Vietnam in October is a good example of how our 123 agreement policy advances our objective of minimizing the proliferation of ENR technologies. In the text, Vietnam states its political commitment to rely on international fuel services and comply with the supplier controls adopted by the NSG rather than pursuing its own ENR facilities. This was an important step taken by the Government of Vietnam, because it is a public affirmation that domestic ENR facilities are not necessary. The scale of Vietnam's intended program does not warrant the investment, and international fuel cycle services are adequate to provide for its needs. I would note that this is also the case for the vast majority of states with emerging civil nuclear programs. The text of the 123 agreement with Vietnam is also fully compliant with all Atomic Energy Act of 1954 (AEA) requirements, including the requirement that Vietnam secure our consent before it can enrich or reprocess U.S.-origin materials. The agreement does not provide any advance consent in this regard.

Our 123 agreement negotiations with Vietnam also demonstrate the additional follow-on nonproliferation benefits that can accrue when we enter into 123 agreements with new partners. Since we began negotiating, Vietnam has brought into force an Additional Protocol with the IAEA, begun participating in the Global Initiative to Combat Nuclear Terrorism, and ratified the 2005 Amendment to the Convention on the Physical Protection of Nuclear Material. We are also seeing greater interest from Vietnam in endorsing the Proliferation Security Initiative.

CONGRESSIONAL ROLE/TAIWAN

In addition to outlining our 123 policy, you asked us to address three issues. First, you asked about the nonproliferation criteria each 123 agreement is required to meet. In 1978, Congress amended the AEA, thereby strengthening the legal requirements for 123 agreements. These changes addressed major issues associated with civil nuclear cooperation, including nuclear security and nuclear safeguards, ensuring that U.S. civil nuclear cooperation agreements have the strongest nonproliferation requirements in the world. We feel that these requirements in our 123 agreements, in combination with the other tools I have discussed, are sufficient. With regard to the role of Congress in 123 agreements, we believe congressional oversight has worked well over the years. As mentioned previously, the changes that Congress made in 1978 to the AEA have addressed the primary nonproliferation concerns about U.S. civil nuclear cooperation. To the fullest extent consistent with Presidential prerogatives in the area of foreign diplomacy and the negotiation of international agreements, we will continue to keep Congress informed of our progress in negotiating specific 123 agreements, and address concerns that Congress may raise in the course of our 123 agreement negotiations with potential partners.

Finally, you asked us to address the proposed Taiwan 123 Agreement, recently submitted for congressional review. Under the Taiwan Relations Act of 1979, any programs, transactions or other relations conducted or carried out by the President

or any agency of the United States Government relative to Taiwan are entered into by the American Institute in Taiwan, or AIT, and such agreements are concluded with the Taipei Economic and Cultural Representative Office in the United States, or TECRO, as the representative of the authorities on Taiwan. As a consequence, this proposed agreement is between AIT and TECRO. Upon entry into force, this agreement would replace a similar 1972 agreement for peaceful nuclear cooperation.

The authorities on Taiwan have been longstanding partners of the United States in the peaceful uses of nuclear energy, and we have cooperated closely in developing their civil nuclear program. All their power reactors and their existing research reactor were supplied by U.S. companies. All fuel for these reactors is supplied by the United States. As the President noted in his message transmitting the AIT–TECRO 123 agreement to Congress the authorities on Taiwan, over the last two decades, have established a reliable record on nonproliferation and on commitments to nonproliferation. For example, theirs was the first nuclear power program to accept application of the measures of the Additional Protocol to IAEA safeguards agreements. These commitments were reiterated in the letter from TECRO to AIT provided at the time the proposed agreement was signed.

The AIT–TECRO agreement contains all the provisions required by section 123 of the AEA, as amended, but it also contains additional provisions. One important provision that the authorities on Taiwan reiterated as a legal element in the agreement is their longstanding policy not to seek enrichment and reprocessing technologies.

Also under the terms of the agreement, all nuclear supply to the authorities on Taiwan from any source is treated as though it is supplied by the United States and is brought under the terms and conditions of the agreement. This provision ensures, inter alia, that all nuclear activities on Taiwan are subject to the safeguards requirements of the existing IAEA safeguards agreement, which normally applies only to material, equipment, components, or information supplied under the 1972 agreement and any superseding agreement. It has been U.S. practice for over 30 years to allow foreign suppliers to use the 1972 agreement, under appropriate conditions, and to bring nuclear activities on Taiwan under that agreement, in order to maintain full scope safeguards on Taiwan. The new AIT–TECRO agreement ensures that this continues to be the case, establishing a full scope safeguards requirement for the authorities on Taiwan and bringing the full scope of nuclear activities on Taiwan under the various consent requirements of the new agreement.

A third important feature is the indefinite term of the new agreement, unless the agreement is terminated by either of the parties on 1-year's notice. A 30-year term with rolling renewal for 5-year terms has been the usual practice in recent U.S. nuclear cooperation agreements. In this case, however, the agreement provides more than just a vehicle for U.S. supply. According to its terms, the safeguards agreement among the authorities on Taiwan, the United States, and the IAEA remains in force only as long as the peaceful nuclear cooperation agreement between the authorities in the United States and the authorities in Taiwan, including any superseding agreement, remains in force. The new AIT–TECRO agreement will be such a superseding agreement. If the safeguards agreement is terminated the IAEA would have the right to apply safeguards to existing nuclear material and to produced special fissionable material; however, no new material or equipment could be safeguarded. Without a new safeguards agreement, all nuclear trade with the authorities on Taiwan that required safeguards would cease.

In short, the AIT–TECRO agreement is unique, one of the strongest 123 agreements that the United States has ever negotiated, and one that will ensure the continued ability of U.S. industry to work with its partners on Taiwan.

NEXT STEPS

Going forward, we will use our 123 agreement negotiations to achieve a broad range of nonproliferation commitments with our partners. Beyond these commitments, the conclusion of 123 agreements with new partners yields even more nonproliferation benefits: the ability to influence the partner's nuclear programs in such a way that it comports with the highest global standards of safety, security, and nonproliferation. When we establish new nuclear partnerships, our government and private sector experts build new relationships and open up new venues for cooperation across the spectrum of nuclear activities. This gives us the opportunity to guide and shape the policies and practices of emerging nuclear states, and these opportunities are only available to us if we forge new nuclear cooperation relationships.

CONCLUSION

With these nonproliferation benefits in mind, we have crafted nuclear cooperation policies that are practical and pragmatic. Make no mistake, our policy is to pursue 123 agreements that minimize the further proliferation of ENR technologies worldwide. The United States wants all nations interested in developing civil nuclear power to rely on the international market for fuel services rather than seek indigenous ENR capabilities. These capabilities are expensive and unnecessary, and reliable supply alternatives are available in the global fuel cycle market.

We will continue to advance the highest possible nonproliferation standards worldwide, and at the center of these efforts is limiting the spread of ENR. Our 123 agreements are important tools in that regard, and the principles that we have established for their negotiation will maintain U.S. leadership in preventing the spread of nuclear weapons.

Mr. Chairman and Ranking Member, thank you.

The CHAIRMAN. Well, thank you both. I listened to your testimony and it is largely a restatement of what the law is. So let us explore things that are beyond the restatement of what the law is.

Secretary Countryman, is the United Arab Emirates a foe or an ally?

Mr. COUNTRYMAN. The United Arab Emirates is a crucial partner of the United States.

The CHAIRMAN. And is Iran a foe or an ally?

Mr. COUNTRYMAN. I hesitate to call people foe, but there is no question that they are not an ally.

The CHAIRMAN. All right. So we have one country that is an ally, another country that clearly is not an ally. We created a gold standard with the United Arab Emirates which basically makes a pledge to no enrichment in its 123 agreement with us. And then we take a country that is not an ally at least, which I think is the most charitable definition of Iran's relationship with us, and we in the interim agreement basically already have given up the essence of what the gold standard is, which is a commitment to have some level of enrichment.

So how does that policy at the end of the day inure to our benefit to ask other countries in the world to live up to the gold standard? I just do not get it. So I must be missing something here.

Mr. COUNTRYMAN. Several points, if you will permit, Mr. Chairman.

The CHAIRMAN. I know the State Department is great. They should be Senators because they can filibuster.

Mr. COUNTRYMAN. No, sir. [Laughter.]

The CHAIRMAN. As long as you get to the core essence of my question, I am happy to listen to several points.

Mr. COUNTRYMAN. Thank you, sir.

First, we were pleased that the United Arab Emirates volunteered to make these clearest possible statement to foreswear future attempts to have reprocessing and enrichment. That was valuable. It strengthens our ability to present this to you for your approval. It was the first such time that a country had volunteered to make such a commitment, and of course, we welcomed it.

Secondly, we are not with Iran negotiating a 123 agreement. We are negotiating an end to a program that is a security threat not only to the United States but to our allies. We are not negotiating an agreement in which the United States would provide sensitive technology to Iran.

Third, the current joint program of action under the interim agreement does not contain a right to enrich. The right to enrich is not explicitly stated in the Nuclear Nonproliferation Treaty.

The CHAIRMAN. But we may not have said the right to enrich, but clearly there is no question—I think you would be insulting the intelligence of the committee to suggest that, in fact, there is not some level of enrichment, whether you consider it a right or not, that is contemplated in this agreement. I mean, the plain reading of it says that. Am I mistaken about that?

Mr. COUNTRYMAN. No, sir, you are not mistaken.

The CHAIRMAN. Okay. So my core question is, okay, you are not negotiating a 123 agreement. I get that. I understand that. But the question is what standards do you set that ultimately say to UAE who is an ally, well, you know what? Here is your neighbor. They went on a path to not only nuclear enrichment, but from all accounts militarization of it, weaponization of it. And we are going to negotiate with them to stop, hopefully, their weaponization, but we will allow an enrichment to take place, and you, who live in the same neighborhood, cannot have that right which would give you a pathway at some time in the future if you decided you needed it for your national protection to achieve nuclear weapons.

I just do not get it. I do not understand how we are going to be able to have a lot more gold standards if this is the path that we are on. And I understand that we are not negotiating with Iran a 123 agreement, but by the same token, I think the ability to negotiate future 123 agreements, which my view of it is to get the Good Housekeeping Seal of the United States on it, but at the same time has not necessarily generated the ability for our nuclear industry to ultimately be the provider of that sensitive technology and wherewithal.

So I am trying to understand how it is that we are sending from my perspective mixed messages.

Let me ask Secretary Poneman. You know, I referred to the UAE agreement as the gold standard by including a legally binding obligation not to engage in enrichment or reprocessing activities, period, no matter from where the uranium or spent fuel comes from. And the Obama administration in its first term actually toughened this commitment from that which the Bush administration originally required.

I have not seen the Vietnam agreement yet. It has not been sent to us. But I have seen accounts of it.

Can you explain in a straightforward way what the standard is? Are there different standards for the Middle East versus East Asia?

Mr. PONEMAN. I can explain, Mr. Chairman, and thank you for the question. The standard is the less of these activities that is present, the safer we will all be. And Mr. Countryman said something very important. It was April 2008 that the UAE announced its own decision not to do these things. They took a sovereign decision they were comfortable with because they viewed that as in their best interest.

What we are trying to do in Iran is drive them down. They are starting with a far more, unfortunately, advanced nuclear capability, and we are trying to roll it back. So the thing that we are

trying to do in every case is to minimize those materials, that equipment that can produce nuclear weapons.

The CHAIRMAN. So are there different standards for the Middle East versus East Asia?

Mr. PONEMAN. There are different tools. The standard is always the same. Whatever we can do to minimize the threat that weapons will spread, including through these technologies, we will do. It may be that in a country you have more of a problem of a transit of loose export controls. That might be the higher value effort then in our effort in that country. We should always do that which is most likely to reduce the threat that the spread of weapons——

The CHAIRMAN. So I understand that Vietnam was willing to declare its intention, which is not legally binding, to only use foreign-supplied fuel for foreign-supplied reactors. That is close to the gold standard, but it is not the gold standard. So maybe we could call it the silver standard.

Why was Vietnam not required to make this lesser but still important statement of intent into a binding part of its new agreement?

Mr. COUNTRYMAN. First on the Middle East, if we are successful with Iran, we will dramatically reduce the temptation or incentive for any other country in the region to pursue the self-defeating path that Iran has taken.

The CHAIRMAN. Not if all you do is mothball. We are hearing a lot of difference between dismantling their illicit nuclear program and permitting maybe some very low level for civilian enrichment and medical research versus largely allowing their infrastructure to stay in place, mothballing it, yes, having safeguards that will give us warning signs in the future if they decide to break out, but at that time, there will be no sanctions regime left, and the only option for this President a couple of years from now or some future President will be whether or not you accept a nuclear-armed Iran or you exercise a military option. That is really an undesirable set of circumstances. So I am not quite sure how we make that argument.

Mr. COUNTRYMAN. Mr. Chairman, I will not predict the outcome of negotiations that are just beginning, but I can assure you no one looks at the goal as simply mothballing facilities.

The CHAIRMAN. Well, that is good to hear. We will see where we head on that.

Senator Corker.

Senator CORKER. Yes, sir, thank you, and I appreciate your questions.

Mr. Countryman, I guess one of the reasons this hearing is taking place is, look, we all talk with folks within the Department and get a general sense of how these negotiations take place. It is our understanding that when these negotiations begin, that the Department does not even necessarily begin by talking with other countries about the gold standard. It is an ad hoc decision that we will talk to this country this way, we will talk to this country that way. Why would we not in every single case begin with a strong definition of what our gold standard is and cause these countries—why is that not the beginning position in every single country we deal with? I do not understand that.

Mr. COUNTRYMAN. Thank you, Senator.

The fact that we analyze each country differently does not mean that it is an ad hoc approach. We describe to each country what we are looking for and specifically how we can assure the world, and in particular the U.S. Congress, that this agreement is good for the global nonproliferation regime, and that is where we begin a discussion with all of our partners.

Senator CORKER. What is it you look at? So we are going to go to UAE, as the chairman mentioned—and I know they announced unilaterally, but let us use them for an example. And then we are going to go to Vietnam, and it is a little different. They are going to give a political statement. They are not actually going to sign something. I mean, what is it you look at? So you look at X country. What is the environment that you look at there to decide, well, we are not really going to push for a strong agreement with them.

Mr. COUNTRYMAN. Sir, there is a wide range of factors that we would look at. They would include the regional situation and the threat perception of not only that country but of neighboring countries. It would include their record on nuclear——

Senator CORKER. Those things change, do they not? I mean, we began ourselves working with Iran back in 1950, and situations change quite a bit. Why would you assume that a region is going to stay as it is? And does it not create tremendous hypocrisy when we go from one country to another and have differing kinds of agreements?

Mr. COUNTRYMAN. First, there is no such assumption that things never change. That is why our agreements, which include requirements for continued U.S. control on the use and retransfer of U.S.-provided materials, are backed up by vigorous cooperation and enforcement.

Secondly, it is the fact that U.S. involvement by corporations, by the U.S. Government, and through the International Atomic Energy Agency are the most effective means of ensuring and monitoring any move in a dangerous direction.

Senator CORKER. So actually you brought up a point that—I know Mr. Poneman is here and I know he was just down at Oak Ridge in Tennessee, and Tennessee is a great partner, if you will, in nuclear efforts. And I am really, really proud of that and I am a strong supporter of nuclear energy.

On the other hand, in fairness—I say this with warmth, Mr. Poneman. I appreciate the role that you play at the Department of Energy. But I think there are concerns that all of our entities become captured by the people that they regulate and that your involvement actually in these negotiations is sometimes what drives us to have these happenstance, ad hoc agreements because potentially U.S. commercial interests trump the nuclear nonproliferation piece. So I would love for you to respond to that if you would.

Mr. PONEMAN. Thank you, Senator. I will not be outflanked in my opposition to the spread of nuclear weapons. Period. There is no commercial benefit that is worth a proliferation risk. Period. I think it is an unfortunate thing that that impression may have been created. Of course, the Congress split the Atomic Energy Commission in 1974 into ERDA and NRC to avoid exactly the conflict that you said.

I think the important thing is this, Senator. What we want is the 123 agreements to be in place. That is the prize. That is when we get the consent rights. That is when we have actual legal controls to stop retransfers, to stop subsequent use in reprocessing. So we want those agreements to be there. If we make those agreements hard for other governments to accept, nonproliferation loses first, and we have not even begun any kind of commercial discussion. So I think that is what we have to keep in mind.

Senator CORKER. Well, what is it that drives countries? You know, we have got all kinds of agreements relative to dealing with spent fuel. What is that drives countries? I know Jordan may talk with us. Our great friend, Jordan. I know they have some uranium deposits in their own country and they may want to talk with us about enrichment. And yet, we know that it is not financially something that is even productive to them.

So you act as if entering into a 123 agreement that does not have the gold standard somehow—or let me put it having the gold standard is somehow something that disables us from entering into these agreements. And yet, what is it that drives these countries to want to enrich or to want to reprocess when we have other ways of dealing with that?

Mr. PONEMAN. My experience, Senator—it is a great question. I do not think there is a lot of demand for this activity. It is very, very expensive. If you are just getting a couple of reactors, it does not make much sense. But I can tell you, sir, that I have had people say to me, because other governments have interagency processes too, why did you say these things. I did not have anybody in my country wanting to enrich, and now I do.

What is a problem, in my judgment, is if we turn something into a test of what they will view as their national sovereignty for a purely theoretical proposition instead of negotiating a practical agreement which, once it enters into effect, will actually constrain them.

Senator CORKER. Could we shorten the duration of these agreements? I mean, if they are worried about forever, if you will, not being able to enrich or reprocess, would it make sense to look at the duration of these agreements and instead of entering into a 30-year agreement, enter into a 10-year agreement?

Mr. PONEMAN. That is a great question, Senator. I would say two things.

Number one, the 123 agreements themselves I think generally serve our purpose the longer they are in effect because we get all those great, tough nonproliferation controls—the best in the world. However, when we have done things, as Professor Moniz and I suggested in this article, to ask people to go further and to voluntarily give up some of these rights, then I think the ability for them to say, hey, I am not giving it up forever, we can revisit this in 10 years or whatever, I think that becomes a valuable negotiating tool.

Senator CORKER. One final question. I know that other panelists here have questions. Look, Congress plays zero role in this really. The way this is now set up, it is almost impossible for us to have an issue when you do not, in essence, negotiate a gold standard. Does it not make sense for us to have the ability as a Congress that if you do not enter into an agreement that is, in fact, a pure

gold standard agreement, for us to vote up or down on it versus going through this resolution of disapproval process, which in essence gives us no real say because obviously the administration is negotiating these—they are going to veto. So would that not make sense and give you actually greater strength as you try to negotiate a gold standard with other countries?

Mr. PONEMAN. So, first, Senator—and I was proud of this. The congressional role is actually dispositive. You all wrote the Atomic Energy Act. I worked on the Nonproliferation Act. There was robust oversight. All those great controls that we are now getting the benefit—those were all congressional creatures. And we come up every time we have a 123 agreement with a classified nonproliferation assessment statement with all the agencies. So we believe Congress has played a very strong——

Senator CORKER. Would it be inappropriate for us to vote up or down if you violate the gold standard?

Mr. PONEMAN. First of all, with all due respect, Senator, I think the whole phrase, "the gold standard," has reduced to a bumper sticker something in a very unhelpful way because we are now focusing on one tool out of a toolbox instead of the goal. The goal is stopping weapons, and the goal to get to that is stopping the technology. So if that is to be the standard, obviously we welcome, obviously, the oversight of the Congress, but in terms of doing more things that could make the United States appear in the eyes of other countries less reliable and less likely to sustain the commitments that we make to them through the course of these negotiations, I think that would create a problem in getting people to accept the 123 restrictions that we already have in legislation.

Mr. COUNTRYMAN. Senator, could I make just one brief comment? And that is, Senator, the Congress is present even when you do not know that you are. At the beginning of our internal deliberations in approaching a 123 at the beginning of our bilateral consultations with a new partner, we go through and emphasize the strong interest of the Congress and the strong support of the Congress for nonproliferation goals. It is a huge influence.

Senator CORKER. Yes, I think we might want to express it ourselves, but thank you.

The CHAIRMAN. Senator Cardin.

Senator CARDIN. Thank you, Mr. Chairman.

Let me thank both of you for your long service to our country. We all share the nonproliferation objectives, and the 123 agreements are certainly a very valuable part of that. So I agree with you. It is in the U.S. interest to negotiate these agreements.

But I just really want to turn this around a little bit. It is in the interests of the countries we are negotiating with also to have a 123 agreement. This is not one-sided. They are getting access to the best technology in the world, the most reliable partner in the world. It is in their interest to have the United States as a partner in dealing with their nonmilitary use of nuclear material for purposes of energy or for purposes of medical.

And my question really deals with our expectations in countries that do not share our values, whether this is used in the toolbox to advance those values. Vietnam is a country in transition. I think we all would acknowledge that. They have made incredible

progress in a relatively short period of time, but they have a long way to go on respecting internationally recognized human rights.

Can you share with me what discussions take place when you are determining countries to get involved with and how you use this tool in our toolbox, the 123 agreements, to advance universal values in countries that are deficient that we are engaged with?

Mr. COUNTRYMAN. Thank you, Senator.

I can only speak generally about the reasons that have driven the United States and Vietnam to seek a strategic partnership with each other. These include a mutual interest in the security of Southeast Asia. It includes the great economic potential that the two countries offer each other.

Senator CARDIN. I understand. I am really interested in the human rights and good governance issues. I understand all that. And by analogy, we hear the same thing on trade agreements. You know, it is in our interest. We are in the country. We are enhancing security. I want to know what you are doing to enhance the change in Vietnam and other countries on basic internationally recognized human rights protections.

Mr. COUNTRYMAN. This is a central issue of the strategic dialogue that we have with Vietnam. It is constantly in the context that we have at senior levels. It is the important work of our Ambassador in Hanoi on a daily basis. We see some progress, but we also recognize that our engagement with Vietnam is a primary means for having seen some of that progress. We do not, however, link it directly to the negotiation of a 123 agreement. We have another channel for doing that.

Senator CARDIN. What is the other channel?

Mr. COUNTRYMAN. It is the strategic partnership dialogue which includes a human rights dialogue.

Senator CARDIN. Which is a consultation type of a process.

Mr. COUNTRYMAN. I think it is stronger than consultations.

Senator CARDIN. In what respect?

Mr. COUNTRYMAN. Well, sir, I am sorry but I will give you a detailed answer from our East Asia Bureau. I do not do this on a daily basis, and I apologize for that.

Senator CARDIN. Well, you also indicate that this is part of your discussions. Can you share with me in regards to Vietnam how this has come up in the 123 agreement? I understand from your point of view it is not tied to the agreement, but can you share with us how the discussions have taken place in regards to the 123 agreement with Vietnam—good governance and human rights?

Mr. COUNTRYMAN. Human rights has not been a topic in the 123 agreement negotiations. It was among the topics that were considered, I believe, at the time that we decided to respond to Vietnam's request to negotiate such an agreement.

Senator CARDIN. I do not understand that. Was it or was it not talked about in regards to the 123 agreement?

Mr. COUNTRYMAN. Within the United States, yes. With Vietnam, I do not believe so but I would have to go back and look at the record of negotiation.

Senator CARDIN. So it is not on the table with Vietnam. It does not come up in any discussions. There are no expectations from our involvement with Vietnam in this agreement that we do not care

what type of government they have as it relates to respect for their own people. That is the message we are sending in regards to these negotiations?

Mr. COUNTRYMAN. I do not agree that that is the message we are sending.

Senator CARDIN. And how are we sending a different message?

Mr. COUNTRYMAN. Because of our daily work with the Vietnamese Government and our pressing them through a number of other channels.

Senator CARDIN. I am talking about in regards to the 123 agreement.

Mr. COUNTRYMAN. In regards to the 123 agreement, your first statement was correct. It is not linked to human rights issues.

Senator CARDIN. I did not asked if it was linked. I asked is it part of the conversation.

Mr. COUNTRYMAN. Briefly, no.

Senator CARDIN. I find that very disappointing. I think, as I pointed out before, there is mutual benefit. Vietnam gets benefits out of having U.S. technology. Yes, we get benefits, too. And I find it somewhat surprising that we work in tunnel vision and we do not try to coordinate a policy that can help advance the respect for basic international human rights. There are a lot of countries in the world we can work with, but why are we interested in making this type of information available to a country that abuses the rights of its own citizens? What type of protections are built in? I understand that we have military protections, but we do not have other protections built in because we are not talking about how this is used. So I find that somewhat surprising. I knew it was not tied together, but I thought you would use this opportunity to advance a central part of our strategic plan, as I thought it was, in dealing with Vietnam.

Thank you, Mr. Chairman.

Mr. PONEMAN. Senator, if I may. I am not part of the Vietnam negotiations. But as to the broader issue, there has been a longstanding bipartisan tradition that nuclear weapons are different, and when we are doing things, including in the days of the Soviet Union when it had horrible repression——

Senator CARDIN. There was a longstanding view that trade was different also. There was a longstanding view that bilateral discussions would leave out human rights because it was just not important in dealing with our relationships with other countries. As long as we take that position, human rights will always be a secondary matter. The basic protection of human rights should always be at the table in U.S. negotiations.

The CHAIRMAN. Senator Risch.

Senator RISCH. Thank you, Mr. Chairman. I appreciate that and thank you for holding this hearing.

Gentlemen, I want to come at this from a little different tack. As you know, Idaho is home to the Idaho National Laboratory, the lead nuclear energy laboratory in America. As you also know, they play a role in the 123 agreements in not only providing the background and help for negotiating but also in the execution of the agreements.

The Idaho National Laboratory, as you know, has the experience over many, many years. It has got the technical expertise and the scientific research that are so crucial in successfully running nuclear facilities and in negotiating these agreements. And the lab has been a valuable and a proven asset when working with foreign countries in negotiating these agreements.

So we are open for business. We are ready to help. We got great people working there, and we want to do all we can to help you.

Having said that, some of the concerns that were expressed here I think are legitimate concerns, and they are going to have to be dealt with. Once you get past that, we are ready to help.

I think that we are in the very insipient stages of other countries turning to the more developed countries to produce nuclear energy. As this century goes forward and even I think into the next century, countries are going to be looking for places like the Idaho National Laboratory and the United States of America to help them get their nuclear programs up and running. If we do not do it, there are other players in this sandbox, as we know, and they are very aggressive and they are out there competing against us. And it is in our national security interest, obviously, to have these agreements because it allows us to have a negotiated agreement as to how the materials will be handled, and also it gets us into their business that could be very dangerous if we were not in the business.

So I admire what you do. I appreciate what you do, and just know that Idaho is ready to help.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Before I turn to Senator Shaheen, I want Senator Cardin to know that when the senior staff of the committee was in Vietnam, they told the Vice Foreign Minister that it would be my intention, when we consider a 123 agreement on Vietnam, to move a parallel resolution on human rights as part of our comprehensive partnership understanding. And so we would look forward to working with you in that regard.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman.

Mr. Poneman, in a 2012 letter, you said that you thought it best to deal with enrichment in each 123 agreement based on its merits, taking into account a partner's domestic politics and laws, proliferation concerns, and negotiability. Is that still the rough list of criteria that the administration applies? And can you elaborate on exactly what we are looking for in terms of politics and laws, negotiability? What exactly are you talking about?

Mr. PONEMAN. Thank you, Senator.

What we were trying to express is that, again, the zenith of what we are trying to do is to stop weapons. To stop weapons, we want as little possible fissile material that we can obtain. That means as little reprocessing and enrichment.

Each country has a different set of factors that they take into account. Vietnam has nothing on the boards, but they had a pile of HEU. So we got the highly enriched uranium back. That was important. I would not want to waste negotiating leverage on getting

something that they were not going for and then leave the highly enriched uranium sitting unprotected. So that is what I mean.

It is very, very consistent. We want to get that stuff out of there. We want the least technology and the fewest weapons. Period.

And because 185 countries all have—for the UAE, they did not care. What they did care about was setting a good example. That is what they cared a lot about, and they did a great job. And, of course, we embraced that. So that is what I mean. Every case is different, but we are always animated by that same top objective.

Senator SHAHEEN. Well, to follow on Senator Risch's line of comment, as I understand it, most other nuclear suppliers use less restrictive export guidelines to govern their nuclear cooperation. Is that correct?

Mr. PONEMAN. I would say we have the best in the world.

Senator SHAHEEN. And so it seems like one concern that is out there about raising our own standards is that it would drive potential partners toward less demanding countries. Is that accurate?

Mr. PONEMAN. That is very much our concern.

Senator SHAHEEN. So what other steps, short of mandating a gold standard-like agreement, can we use to encourage countries not to seek enrichment capabilities? I mean, what else is out there that we can be doing that we should be doing?

Mr. PONEMAN. Senator, we have been working very hard under the Prague framework that the President put out in April 2009 where he called for a new framework of civil nuclear cooperation to assure countries that if they have a civil nuclear program, they do not need to enrich. It is multibillion dollars they do not need to spend. It makes no economic sense in most cases. And so if we can say to them, look, we have got an IAEA fuel bank, they will guarantee you fuel supplies, we can enter into long-term cooperation with them in which we can provide certain kinds of assurances, which we have done in the past. We can enter into various forms of infrastructure development together and even, to take Senator Risch's point, enter into peaceful cooperation in nonproliferative nuclear technology in places like the Idaho National Laboratory. There is a whole suite of tools that we can apply, and I think we have to be very muscular in putting those on the table.

Senator SHAHEEN. Well, again, in your prepared remarks, you argued that even well-intentioned changes to the law would risk making the perfect the enemy of the good. But do you not think there are ways that we can tweak it or address the negotiations that would put the United States in a better position as we are trying to encourage other countries to not seek nuclear development?

Mr. PONEMAN. Senator, I think we are always open, including working with the distinguished members of this committee, to think of constantly ways we can enhance what we have that we can put forward. And I just gave just a few examples, but I am sure there are many more. We would be very happy to work with you on that.

Senator SHAHEEN. To switch to the Taiwan agreement, are there concerns about Taiwan's ability to enforce necessary export controls?

Mr. PONEMAN. I will turn to my State Department colleague for that.

Mr. COUNTRYMAN. Thank you, Senator.

Over the last two decades, the Taiwan authorities have established a very reliable record on nonproliferation and on commitments to nonproliferation. In a letter that accompanies this 123 agreement, they have assured us that they will cooperate only with responsible states in executing Taiwan's civil nuclear program, and they reaffirmed their commitment to abide by the NPT and by all United Nations Security Council resolutions addressing nuclear activities. They stated their intent to engage in cooperation with third parties in the peaceful uses of nuclear energy, consistent with the guidelines of the Nuclear Suppliers Group.

In the nuclear proliferation assessment statement that we provided, together with the text of the 123, there is an assessment with a comprehensive analysis of the export control system of Taiwan with respect to nuclear-related matters. And this is an area in which we work very closely with Taiwan authorities, and I would be very happy to discuss our cooperation on these kinds of issues in a closed session.

Senator SHAHEEN. Well, just to follow up to try and elicit whatever you can say about the situation, as Taiwan looks to more normalize their relationships with mainland China, how concerned are we about the exchange of technology and any opportunities that might exist from the 123 agreement to share information?

Mr. COUNTRYMAN. Again, in this setting, what I would say is I would not characterize it as a concern, but it is an area where we cooperate with Taiwan and have a good, practical, and effective relationship.

Senator SHAHEEN. Thank you.

Thank you, Mr. Chairman. Perhaps we should have a classified discussion.

The CHAIRMAN. Thank you. We will certainly consider that.

Senator Rubio has deferred to Senator Johnson.

Senator JOHNSON. Thank you, Mr. Chairman.

I am new to this issue, so I just want to step back and understand a little bit more of the history, understand a little bit more of the broad range and spectrum of what different countries are doing and what the capabilities are, where they are getting their supplies, and how it has all been handled. So I will start with you, Mr. Poneman.

The chairman was talking about we have gone from the premier supplier at the end of the cold war till this point in time. Can you describe that transition for me?

Mr. PONEMAN. Thank you, Senator.

It has been a painful one to watch. In 1969, the United States had virtually 100 percent of the non-Communist fuel market in the world, and every fuel rod with a U.S. flag brings all those controls. We are now at 10 percent.

Senator JOHNSON. And who has filled that gap?

Mr. PONEMAN. Well, you have URENCO, which is providing fuel from Europe. You have countries that are developing their own capabilities. The French obviously have had their sales. And when it comes to reactors, now——

Senator JOHNSON. Let us stick on fuels. So who does not maintain a good standard when they supply that fuel?

Mr. PONEMAN. Well, in terms of a good standard versus a bad standard, I do not think anyone has the kind of controls under the Nonproliferation Act that we have in the 123. We are the only ones who have that kind of extended control over all aspects. And one fuel rod goes into the reactor and then the whole reactor is safeguarded.

Senator JOHNSON. Is it more expensive for people to comply with 123 versus getting material from other countries?

Mr. PONEMAN. Well, of course, the 123 is not a commercial arrangement.

Senator JOHNSON. I understand.

Mr. PONEMAN. But I think what is fair to say is that other competitors in the global marketplace have complete backing, including state loans and so forth, to sell their fuel. So when the Russians are out selling fuel, for example—and this is not confined to them—they can bring to bear—and people are looking for credit support. And so there are ways that they can make a more attractive commercial arrangement than is often available to a U.S. company.

Senator JOHNSON. How many countries, just in general, utilize nuclear power? We have 23 countries with the 123 agreement. How many countries actually engage in nuclear activity?

Mr. PONEMAN. About 25 or 30. We can get you the exact number. There are about 365 gigawatts installed globally. There are 70 reactors now under construction in a dozen countries, but to give you a precise answer of how many there are, we will come back to you.

Senator JOHNSON. Other than the nuclear powers, how many countries that are engaged in nuclear power actually enrich uranium themselves?

Mr. PONEMAN. China and Russia, the URENCO countries. The consortium is the Netherlands, Germany, and the U.K. Japan has a modest enrichment capacity. France and the United States, of course.

Senator JOHNSON. You said enriching uranium is very, very expensive. Can you put somewhat of a ball park dollar figure on that?

Mr. PONEMAN. Sure. It costs billions of dollars. Rough order of magnitude, you can consider $4 billion or it could be more. The MIT study of 2003 said from a commercial standpoint, it does not make sense for a country to invest in its own enrichment unless it has roughly on the order of 25,000 megawatts of installed power.

Senator JOHNSON. So how many countries would have that level of installed power?

Mr. PONEMAN. The only country outside of those that already have commercial scale enrichment that is in that ball pack would be South Korea.

Senator JOHNSON. So it does not really make sense, unless you have a very large need for nuclear power, to have any enrichment whatsoever.

Mr. PONEMAN. It makes much more sense to rely on the commercial marketplace.

Senator JOHNSON. So why would Iran try and enrich uranium?

Mr. PONEMAN. Senator, it is a very good point. And when we have the kind of proposal that Professor Moniz has before the Secretary and I put out, one of the things it does is it provides a safe

harbor for all those other countries that actually want energy, and it puts a sharper spotlight on the countries like Iran.

Senator JOHNSON. Mr. Countryman, answer the question. Why would Iran enrich uranium? There is really only one reason. Is there not?

Mr. COUNTRYMAN. There is no rational economic reason.

Senator JOHNSON. There is only one reason. Is there not?

Mr. COUNTRYMAN. Yes, sir.

Senator JOHNSON. And we should start acknowledging that as this Nation. Should we not?

Mr. COUNTRYMAN. Sure.

Senator JOHNSON. I have no further questions.

The CHAIRMAN. Thank you.

Senator Kaine.

Senator KAINE. Thank you.

Just some basics, and I will start kind of like Senator Johnson. This is the first hearing I have been to about these. So I want to make sure I understand the process. Especially the concern about whether our policies are ad hoc or not worry me. So I kind of want to understand what part of our policies are ad hoc and what are not.

The agreements we are talking about are all negotiated pursuant to a congressional statute, the U.S. Atomic Energy Act, and there are nine nonproliferation criteria in that statute that were all passed by Congress. Correct? And when a deal is negotiated, the administration has to come to Congress and specify how the deal meets each of the nine criteria. Correct?

Mr. COUNTRYMAN. Correct.

Senator KAINE. One of the criteria deals with E&R activity, but it is E&R activity based on material from the United States, and the provision is that a country cannot engage in E&R capacity with material from the United States absent a separately negotiated agreement. Correct?

Mr. COUNTRYMAN. Correct.

Senator KAINE. When the agreements come to the United States to Congress, there is a briefing of Congress and Congress can act by resolution of disapproval to disapprove an agreement. Correct?

Mr. COUNTRYMAN. A number of briefings all through the process, yes.

Senator KAINE. And has Congress disapproved any of the 23 current agreements when they have been presented to Congress?

Mr. COUNTRYMAN. No.

Senator KAINE. Has any House of Congress disapproved? Not a total disapproval, but has any House of Congress disapproved of one of the 23 earlier agreements?

Mr. COUNTRYMAN. No, sir.

Senator KAINE. The first of the 23 agreements that had a gold standard provision was the UAE agreement. Correct?

Mr. COUNTRYMAN. Yes.

Senator KAINE. So the earlier agreements did not have a gold standard provision with respect to E&R activity that is domestic as opposed to the use of U.S. material. Correct?

Mr. COUNTRYMAN. Yes, and yet they have succeeded in preventing or in discouraging those countries from pursuing E&R.

Senator KAINE. So countries that do not have the gold standard—many of them do not pursue E&R but some do as your answer to Senator Johnson indicated.

Mr. COUNTRYMAN. For the very strong economic reasons that the Deputy Secretary mentioned, it makes no sense for most countries to go down the E&R path.

Senator KAINE. With respect to the issue about ad hoc, a President can recommend or the administration can recommend to Congress an agreement that does not meet all nine criteria. There is a waiver provision that allows such a recommendation, but none of the current agreements were recommended to Congress short of meeting all nine criteria. Correct?

Mr. COUNTRYMAN. My colleague reminds me that the exception is India, which required special legislation of the Congress.

Senator KAINE. If a President were to recommend to Congress an agreement that did not meet all nine criteria, there is a special approval. It is not a resolution of disapproval in that instance. It is a resolution of approval.

Mr. COUNTRYMAN. It requires affirmative action by the Congress.

Senator KAINE. Are the agreements fixed in time with periodic renegotiation required, or are they open-ended, once negotiated, there forever?

Mr. COUNTRYMAN. We have both.

Senator KAINE. Can you just kind of generally—are half of them to be renegotiated periodically and half open-ended? Or describe that for me.

Mr. COUNTRYMAN. We could give you a list of the ones, but I think in general we are now seeking, and our partners are seeking, longer term or open-ended. I would emphasize that this does not mean that the U.S. role or the congressional role is ended.

Senator KAINE. One of the ones that you are facing right now that is not an open-ended one is the status of the South Korea 123 agreement.

Mr. COUNTRYMAN. Yes, sir.

Senator KAINE. And there is a 2014 renegotiation process underway with South Korea.

Mr. COUNTRYMAN. We are deep into the renegotiation process. I was in Seoul earlier this month for that purpose. And it is a good opportunity for me to thank the members of this committee for the action to extend the validity of the current agreement for 2 years so that we have time to complete a very complex agreement with the ROK.

Senator KAINE. So would it be fair to say that with respect to the claim that the approach to these agreements is ad hoc, that there are nine criteria that are specified by Congress that have to be met with respect to all of these agreements? And so to that extent, the framework that Congress has set up—and Congress has the ability to disapprove an agreement, which it has never done. Those are specified by Congress. They are not ad hoc.

But this issue about E&R activity that a country may pursue domestically—that is an ad hoc criteria in the sense that you were describing, that on a case-by-case basis, you negotiate. The UAE provision has it and none of the others do.

Mr. COUNTRYMAN. I think we would make a decision as to whether and how strongly and in what form to seek such a commitment specific to the country with whom we are negotiating and the position that they present. But it will always be with the purpose of meeting that very high standard of preventing proliferation of such technology.

Senator KAINE. Switching gears, to follow up on another line that Senator Johnson opened up that I think is interesting, you indicated that at an earlier period in history of the civilian nuclear capacity material sold around the world, in the non-Communist bloc we were essentially almost the sole supplier, but now we are down to about 10 percent of the supply.

Would it be a good thing for the safety of the world, in your view, if the United States share of sales of our activity in this area was increasing rather than shrinking?

Mr. COUNTRYMAN. Let me say yes, but that is not the goal with which we pursue 123.

Senator KAINE. Right. The 123 is about weapons. I understand.

Mr. PONEMAN. Yes, and I would only reinforce, Senator, to say that from a security and a safety standpoint, we believe the U.S. fuel is as good as any in the world.

And on your earlier question, I am reminded that after Tiananmen Square, Congress did pass legislation to suspend implementation of that 123 agreement.

Senator KAINE. I see. Thank you for that correction.

And then I will ask this of the second panel as well, just as my last question. If it would be in the better interests of nuclear safety for the United States to have a larger market share—and recognizing that is not the purpose of the 123 agreements—what are the current opportunities that we have, either technology opportunities or relationships with particular countries that are interested in safe nuclear power? What are the current opportunities that the United States has to maybe regain a little bit of our market share to the good of the safety of these programs worldwide?

Mr. PONEMAN. Senator, I have been around the world a lot since March 11, 2011, the Fukishima accident. And I can tell you at the IAEA, at the International Nuclear Framework for Nuclear Cooperation, there is much more interest in U.S. fuel because it is safe and reactor components as well. So because of our importance that we attach to nuclear security and nuclear safety, there is an opportunity within this horrible situation that the world has endured to emphasize that particular American advantage.

Senator KAINE. And that kind of underlies a point that Senator Cardin was making, that these are not one-way deals. The countries that are engaged in these 123 negotiations with us—they really have something to gain from these negotiations, and that can affect our sense of leverage in the negotiations.

Mr. PONEMAN. It certainly can, Senator. And again, since for us the prize is to get those legal constraints that you were talking about in place, that is why we want to get those American agreements signed up to with countries that are actually going to build these units.

Senator KAINE. Thank you. No further question, Mr. Chair.

The CHAIRMAN. Senator Rubio.

Senator RUBIO. Thank you, Mr. Chairman.

I wanted to reexamine this issue again. It is new for a lot of us that have been here just a couple of years, as Senator Johnson signaled a moment ago.

The competing equities—of course, you have the existing or the previous policy, the gold standard policy, largely driven toward nonproliferation, and then there is this notion that that now stands in the way of being able to execute some of these deals. And we want to have these sorts of transactions with these companies because it gives us more influence in terms of the direction that they are taking their energy programs.

So here is my question about this new flexible approach, and perhaps it has been raised already by some members of the committee. How is this not a house of cards? How does this not begin to now implode? For example, if you are the Jordanians and you are seeing the current negotiations with Iran or even the Saudis for that matter, how would we ever go to them and say you cannot enrich and you cannot reprocess if in fact one of their neighbors is doing so? The same with the South Koreans who would look to Japan or perhaps other parts of the world and are insisting upon the same. How is this not a house of cards? In essence, how is it that at the end of the day we actually are going to be able to pick and choose in this so-called flexibility who we negotiate the ability to enrich and who does not?

Mr. PONEMAN. Senator, I think it is important to get the premise right. The United States policy has not changed. We have always sought to minimize enrichment and reprocessing. It happened, as far as I know, once in history that a country on its own before the 123 agreement volunteered through their own white paper and so forth not to do this. So our policy has not changed, and there is no new flexibility.

And I have been personally doing this, trying to talk the North Koreans out of it. I went to Vienna and got the Iranians to agree to ship 1,200 kilograms of LEU out of Natanz. So we are absolutely consistent in trying to minimize that wherever we go. We start from different starting points. If there is a country that, unfortunately, has gotten as far down the road as Iran has, we have got to pull them back from being out there into a place more compliant with international norms. So I do not see any inconsistency.

Senator RUBIO. Let me ask you that question. What has been the impact since this recent negotiation with Iran has been announced? What has been the impact that it has had in our conversations with other countries? What impact has that had? How do they view it now in light of what appears to be the acquiescence to some sort of enrichment capability on the part of Iran?

Mr. PONEMAN. Allow me to make a brief comment and then the State Department may wish to add to this.

We have had a continuing and robust conversation with those countries, including those countries in the region, that are deeply, deeply concerned. And they have been deeply concerned about the situation in Iran. That is why when I went out to talk them into making sure their oil exports kept up so the sanctions that you all passed could be effective, they were strong partners with us. They

understand now where we are in terms of the negotiation with Iran and trying to bring them back to a much less nuclear——

Senator RUBIO. How can we, in the future or even now in the past, with some of our existing agreements ask a country, particularly a neighboring country, not to enrich if at the end of these negotiations, in fact, Iran retains any capability to do so? How do we go to an ally and say you guys are not going to get to do what a stated enemy of the United States—we have agreed to allow them to do or to acknowledge that they have the capability to do?

Mr. PONEMAN. Senator, the other problem is countries make decisions internally. They do actually not need the United States permission to do these activities. So that is why getting to the whole discussion as if this were a right for the United States to confer upon them gets us into a dangerous place.

Mr. COUNTRYMAN. Let me add. I would say that Iran has an enrichment capability whether the United States acknowledges it or not. If we succeed in the Iran negotiations——

Senator RUBIO. But they did not get it from us.

Mr. COUNTRYMAN. Correct, and that is a crucial difference between the Iran case and a 123 negotiation. If we get to the point of assuring the world and the region that Iran no longer has the capability to pursue nuclear weapons, the temptation for any other regional state to go down the economically stupid path of pursuing enrichment and reprocessing—that will be greatly——

Senator RUBIO. But the enrichment or reprocessing capability—the infrastructure of reprocessing and the infrastructure behind enrichment—once it is in place, it is basically just a policy decision at that point about whether you want to continue to move forward toward at least a threshold weapons capability. So the retention of any enrichment process or any reprocessing capability does, in fact, put a country at the threshold of making such a move in pretty quick order. No?

Mr. COUNTRYMAN. That is an argument about Iran, on which I am not leading the negotiations, but I believe we will have other testimony next week on that point.

In terms of our partners, those with whom we work, we do 123 agreements with strong assurances on enrichment and reprocessing and with strong assurances on how they can do it in an economically rational way specifically so that that infrastructure is not developed.

Senator RUBIO. But again, my point is that once that infrastructure is in place in another country—let us say the country now has access to—because you talk about these assurances. Once a country has built the infrastructure that allows them to reprocess or enrich, if in the future the future leadership of that country decides that they want to turn that capability into a weapons capability—the design of a weapon is not nearly as complicated as the creation of that infrastructure. Is that not the singular, largest hurdle that a country has to overcome, is getting the fuel?

Mr. PONEMAN. Typically, Senator, that is exactly right. That is exactly why we are doing everything we can to minimize the countries that have that material. There is not a lot of demand for these activities. We do not want to stimulate the demand by turning it into some kind of a test of national will. We are finding that if you

go to countries and say we can satisfy your fuel requirements and you will not have to spend $4 billion or $6 billion, $8 billion, most countries other than Iran will welcome that opportunity. And I think we should embrace that. It works in our favor.

Senator RUBIO. But there are countries that do want to have that capability and that will point to the fact that other countries have that capability, especially if that number has now grown, to say, well, how come you are cooperative or seem to acquiesce to this country having that capability but us not having it.

Mr. PONEMAN. You are absolutely correct. Other countries will make that argument. The agreement with Iran will not change our approach to seeking the highest nonproliferation standards in 123 agreements.

Senator RUBIO. And my argument—it may not change our approach, but it might change theirs.

Mr. PONEMAN. Yes, sir. That is correct. And that is why the United States needs to stand firm on the consistent approach that we have had to seek to limit E&R technology around the world. That is what we do today. It is what we will continue to do if and when we succeed with Iran.

Senator RUBIO. Would we not be stronger in that insistence if our stated and open position in any negotiations was Iran does not have a right to enrich?

Mr. PONEMAN. We will be stronger when we succeed in getting an agreement with Iran that gives us all confidence they cannot pursue nuclear weapons. That is the goal.

The CHAIRMAN. Thank you, Senator Rubio.

I am, unfortunately, going to have to go to the floor over the flood insurance legislation. So Senator Shaheen has graciously agreed to chair the rest of the hearing.

To our second panel, I want you to know my staff is here and we are going to be listening intently to—we have your remarks, but to some of the answers to the questions.

There are three questions that I want to pose for the record that I would like you to answer at length for the record.

One is—we got deviated because we started talking about Iran. I put a question to you, Secretary Countryman, about why Vietnam was not made to include their lesser but nonetheless important statement into a binding part of the agreement. I would like to have an answer to that.

Secondly, we may be the best in the world, which I believe we are, in this technology, but second best and far cheaper entities often win the bids. So has the administration considered filing a complaint with the World Trade Organization for unfair trading practice against these subsidized foreign competitors?

And thirdly, when China joined the Nuclear Supplier Group, a move the United States had to support since the group does so by consensus, it agreed not to provide nuclear reactors to countries that do not have comprehensive IAEA safeguards on all their nuclear activities. Yet, China continues to build new reactors in Pakistan, which does not have such comprehensive safeguards. This arguably weakens in my view the Nuclear Suppliers Group. What price should China pay for its noncompliance? And should it

be an issue when a new China cooperation agreement comes before the Congress?

I would like very significant responses to those questions.

Senator Markey is next. And, Senator Shaheen, I appreciate you taking the chair.

Senator MARKEY. Thank you, Mr. Chairman, very much.

In the 1970's, the United States was still in a bitter war with Vietnam while at the same time the Ford and Carter administrations were planning to sell six nuclear power plants to the Shah of Iran, our ally, thinking that he would stay in power forever. We would have been the supplier of the nuclear fuel, the nuclear power plants, in that country. Thank God we did not send it before the Shah fell.

Now Iran may be on the brink of developing a nuclear weapon while the administration just completed a nuclear cooperation agreement with Vietnam that does not require Vietnam to forgo the most dangerous aspects of a nuclear program.

So we should just be humble here. Iraq, Iran, North Korea. We are now living with the consequences of not having a high standard internationally on the transfer of nuclear technologies. And it is the United States that intervenes, plays the role of the policeman when these programs go awry.

So there is a fine line between peaceful nuclear energy programs producing megawatts of electricity and a deadly nuclear weapons program producing megatons that can threaten the whole world.

Sitting directly on that line are uranium enrichment and plutonium reprocessing technologies. These processes can produce both fuel for nuclear reactors and material for nuclear weapons. They have a dual identity. That is why it has been and should continue to be U.S. policy to limit the spread of enrichments and reprocessing around the world.

The nuclear industry says requiring this of nuclear cooperation agreements comes down to a choice between nonproliferation and the industry's assertion that these agreements will bring billions of dollars to the economy. But a look at the facts tell quite a different story.

Today I am releasing an analysis, which I would also request be added to the record of today's hearing, of every export license issued under nuclear cooperation agreements since 1996. It shows that exports of nuclear reactor technologies under nuclear cooperation agreements make up less than 1 percent of the nuclear industry's profits. In fact, 86 percent of all exports under nuclear cooperation agreements come from the sale of nuclear fuel, and even that amounts to a very small fraction of the industry's total annual revenues.

The industry exports nuclear fuel to almost two-thirds of the 53 countries with whom we have nuclear cooperation agreements. The way I see it is that limiting the spread of the technology that could be used to make nuclear fuel not only limits the competition for nuclear weapons but also limits competition to the main source of the industry's export revenues.

So here are my questions. I think it is pretty clear and everyone understands that in order to build a nuclear weapon, you need to know either how to enrich uranium or to extract weapons-grade

plutonium. We just stipulate that. And we do not want these countries to develop that capacity. We are very fortunate that we were not the enabler of the Shah.

We cannot predict what the status of any of these countries is going to be 20 or 30 or 40 years from now, but they will have these nuclear power plants and they will have that fuel in their countries. So this is a very important decision that we have to make.

When the administration negotiated its agreement with the United Arab Emirates, the UAE made a legally binding promise that it would not seek to acquire enrichment or reprocessing technology. That is the gold standard. They will not seek those technologies.

Is it not true that if a future agreement allowed Jordan or Saudi Arabia to enrich or reprocess, then the United Arab Emirates could demand to renegotiate its nonproliferation commitments as well?

Mr. PONEMAN. There is a most favored nation clause, Senator.

Senator MARKEY. Precisely. So here it is. We got an agreement with the UAE. That is the gold standard, but in that deal is if we lower it, that they can renegotiate and they can go lower. So that is not, I think, where the United States wants to be.

The administration has signed an agreement with Vietnam that does not require the same nonproliferation commitment that the United Arab Emirates made. So the UAE is the gold standard; Vietnam is not the gold standard.

Your negotiations right now with South Korea reportedly stalled over South Korea's desire to develop fuel-making technologies. They do not have this capacity right now. So this is a big question. Do they move in that direction? Well, I think that the terms of the Vietnam agreement are going to make it more likely that South Korea is going to demand that they be given the same status as Vietnam, a Communist country that we were at war with.

So I guess my question to you then is will you insist on South Korea having a gold standard so that Vietnam does not become the precedent that would then spread to country after country around the world.

Mr. COUNTRYMAN. Senator, I am currently leading the negotiations with the Republic of Korea on a renewal of the 123 agreement. I do not want to get into great detail about exactly what we discuss. You are quite correct that the issue about advance consent for reprocessing and enrichment is a central issue on which we have a lot more work to do before we come to an agreement.

I do not quite agree that the Vietnam agreement has a precedential value for the ROK agreement. We are already far along in our discussions and on kind of a different plane of discussion. I will simply reaffirm that with the ROK, despite the fact that it is one of our very best allies, we continue to focus not on the political, not on the economic, but on the consistent nonproliferation policy, what best strengthens the global nonproliferation regime. That remains our consistent guiding star.

Senator SHAHEEN [presiding]. Thank you, Senator Markey.

Senator McCain.

Senator MCCAIN. Well, thank you, Madam Chairman.

In other words, if we do not support this agreement, it is pretty clear that the Vietnamese have other avenues of acquiring this capability. Would you agree, Mr. Countryman?

Mr. COUNTRYMAN. Yes, sir. Of acquiring nuclear technology, a nuclear power plant, yes.

Senator MCCAIN. Yes.

And that could be France or China or Russia or who else?

Mr. COUNTRYMAN. According to the press, they have been in active discussion and signed some preliminary agreements with both Russia and Japan.

Senator MCCAIN. So it clearly would not be in our interest to see an agreement with Russia on the part of the Vietnamese.

Mr. COUNTRYMAN. Well, I think it would be in our interest, first, to make sure that they uphold all the reforms in nonproliferation they did as part of our negotiation process.

Senator MCCAIN. Do you think that that is a very likely demand that the Russians might make?

Mr. COUNTRYMAN. No. The Russians have strong export controls. What they and other suppliers do not have are the kind of language in their nuclear cooperation agreements that we have.

I do want to note that Russia and the United States cooperated on the removal of highly enriched uranium from Vietnam last year, and that was an important achievement of the negotiation process itself.

Senator MCCAIN. Tell us how it is in the U.S. national interest to see Vietnam conclude a civil nuclear cooperation agreement with Russia or anybody else. How is it in any way in the United States national security interest?

Mr. COUNTRYMAN. That is a good question. I look at it this way, that it is in our national security interest that they conclude with us. We do not necessarily want to block them from agreeing with such an agreement with anyone else.

Senator MCCAIN. I am not sure we can.

Mr. COUNTRYMAN. No, we cannot.

And they have a genuine interest in having a variety of bidders for their contracts.

What we can do, both through our agreement through the Nuclear Suppliers Group, through the G8, and other bodies, is to ensure that we are not competing with each other on a loosening of nonproliferation standards.

Mr. PONEMAN. If I might just add, Senator.

Senator MCCAIN. Could I just respond real quick? That is that if you think that these other countries would adhere to the same standards that we do I think flies in the face of past performances.

Go ahead, Mr. Poneman.

Mr. PONEMAN. I was just going to say, as I said in my testimony, Senator, we are trying to avoid a race to the bottom. We have very strong nonproliferation cooperation with all of the P5, including France and Russia and everybody else. So I am not casting aspersions on them, but I am very proud of, and feel confident in, the United States that we have the best standards in the world, bar none in terms of nonproliferation, safety, and security.

Senator MCCAIN. I hope that should surprise none of us that we have the highest standards.

But again, I want to point out the important factor here is that the Vietnamese can shop in other places.

The Vietnamese are still guilty of human rights abuses, much to my dismay. And there is a number of us that continuously raise this issue with the Vietnamese and are very disappointed from time to time at some of their actions. But if you look at the Vietnam of 15 years ago and you look at Vietnam today, it is a dramatically changed nation. There are 16,000 Vietnamese students in the United States of America today studying in the United States. So as frustrated as some of us get over this human rights record—some of it just seems to be senseless like the persecution of Buddhists—the fact is that there has been dramatic improvement in Vietnamese behavior and in our relationship since we normalized relations between the two countries. Would you agree?

Mr. COUNTRYMAN. Yes, sir.

Senator MCCAIN. So this agreement is another step in what has evolved into a partnership between the United States and Vietnam, particularly given events that are transpiring now in that part of the world.

Mr. COUNTRYMAN. Yes, sir. And I think if more Americans recognized or were able to see how dramatically relations with Vietnam have improved in several different areas just in the last 20 years, it would be terribly impressive to all of us.

Senator MCCAIN. And so despite the fact that 20 years from now there may be an overthrow of the government and takeover by al-Qaeda, the fact is that they are on a path that should encourage all of us, and this agreement many of us feel is another step in the direction of a better nation with a better relationship and with, frankly, a nation that we can, to some degree, count on as times may worsen in the Asia-Pacific region.

Mr. COUNTRYMAN. I absolutely agree. And two additional quick points.

As we said before, we do not assume, in negotiating these agreements, that times never change. That is why we retain controls, inspections, and everything else.

And secondly, if al-Qaeda takes over Vietnam in 20 years—God forbid—a binding political agreement today—or legal agreement never to seek E&R will not mean a damn thing at that point.

Senator MCCAIN. I thank you.

Madam Chairman, let me say that I believe that this agreement is not a perfect agreement, and we focused on the technical details. But I think from a macro point of view, that this is an important agreement and one that we should support and one that I think will pay a benefit to us in more ways than one.

I thank you, Madam Chairman.

Senator SHAHEEN. Thank you, Senator McCain.

Thank you very much, Deputy Secretary Poneman and Assistant Secretary Countryman, for your testimony.

As Chairman Menendez has said, we have a very limited amount of time. So I am going to ask the next panel to come forward. With Ranking Member Corker's agreement, what we will do is take your statements for the record, and for those Senators who wish to remain, go right into questioning. Is that agreeable to you, Senator Corker?

Senator CORKER. That would be fine.

[The prepared statements of Mr. Fertel, Ms. Squassoni, and Mr. Sokolski follow:]

PREPARED STATEMENT OF MARVIN S. FERTEL

Chairman Menendez and Ranking Member Corker, thank you for the opportunity to testify today on this important issue. I am Marvin Fertel, President and Chief Executive Officer of the Nuclear Energy Institute[1] (NEI). Our 350 members represent all aspects of peaceful nuclear technology, from nuclear power plant operators and reactor vendors, to major architect/engineering firms, to fuel suppliers and component manufacturers, to educational and research organizations. On behalf of our members, we appreciate the opportunity to provide testimony on U.S. peaceful nuclear energy cooperation to the Senate Foreign Relations Committee.

INDUSTRY VIEW ON SECTION 123 AGREEMENTS

U.S. nuclear cooperation and commercial engagement in other countries' new and expanding nuclear power programs advance global nuclear safety, security, and nonproliferation. U.S. commercial involvement ensures the highest possible levels of nuclear power plant safety and reliability, maintains U.S. leadership in nuclear energy technology and maintains U.S. influence over global nuclear nonproliferation policy and practices. Noted national security experts agree that "one of our Nation's most powerful tools for guaranteeing that countries acquiring this [nuclear] technology continue to use it exclusively for peaceful purposes is to ensure that the U.S. commercial nuclear industry continues to play a leading role in the international civil nuclear marketplace."[2]

In order to create American jobs and support critical U.S. foreign policy interests, the United States must be fully engaged in the global expansion of nuclear energy already underway. The U.S. nuclear energy industry:

- Supports efforts to limit the spread of uranium enrichment and used fuel reprocessing (E&R) technologies consistent with current U.S. policy. The United States has a broad portfolio of bilateral and multilateral policy instruments that can be used to advance this policy, including: Nuclear Suppliers Group guidelines, assurances of fuel supply, multilateral guarantees of fuel supply and used fuel disposition, bilateral commitments, and other assurances required by the Atomic Energy Act.
- Opposes initiatives to condition U.S. nuclear cooperation on new terms that our potential partners will not accept and other supplier nations will not require. Each bilateral relationship is unique and complex. Whether and how E&R provisions should be included in a Section 123 agreement, beyond what is already in practice and in statute, should reflect the unique circumstances of each bilateral relationship. Pragmatism should continue to guide the United States as it negotiates Section 123 agreements. NEI supports the flexibility in the Atomic Energy Act that allows the executive branch to negotiate agreements based on the concerns and imperatives specific to each nation or region.
- Supports prompt negotiation of new and renewal bilateral agreements for peaceful nuclear energy cooperation. These agreements are essential for substantial U.S. nuclear exports. We are concerned that the Republic of Korea agreement has required a temporary extension to avoid a lapse and that the renewal Taiwan agreement was submitted for congressional review so late that it may lapse as well. We also note that three agreements were allowed to expire in the past 21 months[3] and that two others will almost certainly expire by July of this year.[4]

  Prompt negotiation of 123 agreements will allow Congress the necessary time to conduct deliberative and effective oversight. It will also avoid the uncertainly created by the "just in time" nature of new and renewal agreements that, according to foreign customers, casts doubt on the United States as a reliable supplier nation.
- Supports a proactive approach for the negotiation of Section 123 agreements with nations with new or expanding peaceful nuclear energy programs. It is in the U.S. national security, nuclear safety, and economic interest to secure agreements early and with a broad set of partners rather than to sit idly by as these nations partner with other nuclear suppliers. Without agreements in force, we forfeit exports, jobs, and commercial benefits, and we will fail to influence these programs in terms of their nuclear safety, security and nonproliferation norms.

THE GLOBAL NUCLEAR MARKET AND U.S. MARKET SHARE

Beginning with President Eisenhower's "Atoms for Peace" vision 60 years ago, American expertise established the world's largest nuclear energy program and fostered the use of this technology around the world. Our dedication to excellence maintains 100 U.S. reactors at world-class levels of safety and reliability. More than 60 percent of the world's 437 operating reactors are based on technology developed in the United States. Our nuclear industry has the knowledge, experience, and infrastructure to support nuclear facility construction, operation, and maintenance around the world. In addition, U.S. firms are making major investments in technology development to continue their tradition of innovation. These investments include development of small modular reactors, advanced technologies for uranium enrichment, more advanced large reactors with improved safety features and advanced manufacturing techniques to improve quality and reduce costs.

Today, there are 71 new nuclear power stations under construction worldwide, of which 5 are under construction in the United States. An additional 172 are in the licensing and advanced planning stages and virtually all of these plants will be built abroad where the demand for reliable, affordable, and clean baseload electricity is growing. Electricity from nuclear energy will help economies expand and lift hundreds of millions from poverty while having a minimal impact on the environment. But with this growing nuclear market comes growing competition from other nuclear supplier nations, which can now provide a full range of products and services.

Over the past two decades, new supplier nations have entered the growing global nuclear market and multinational partnerships and consortia have been formed to develop nuclear energy facilities. According to a 2010 GAO report, "while the value of U.S. exports of nuclear reactors, major components and minor components have increased, the U.S. share of global exports declined slightly" from 1994 to 2008.[5] Over the same period, the U.S. share in the fuel market declined sharply from one-third to one-tenth of the market.

The declining U.S. share of the global reactor, major component and minor component market is largely attributable to the growth of international competitors who began as suppliers to their domestic markets and over time expanded their offerings to the global market. For example, France's AREVA and Russia's Rosatom have steadily increased their presence in the global market. Although 11 of the reactors under construction today are U.S. designs, four are French and 16 are Russian.[6] One of the newest entrants in the global nuclear market is the Republic of Korea. In December 2009, Emirates Nuclear Energy Corporation awarded a multibillion dollar tender to a Korea Electric Power Corporation-led consortium to build the first nuclear power plant in the United Arab Emirates (UAE). In addition, there has been an expansion of indigenous technologies developed for domestic markets. For example, 20 of the 71 nuclear plants under construction globally are Chinese reactors being built in China.[7]

As additional reactors are brought into service, a growing portion of the global nuclear market is nuclear fuel: uranium, conversion, enrichment and fuel fabrication. Over the past 20 years, economically attractive supplies of nuclear fuel have become available from an increasing number of supplier nations. Australia holds the most extensive identified resources, at 31 percent of the world's total. In recent years, Kazakhstan has emerged at the world's largest uranium producer, producing over 36 percent of global primary production in 2012. Conversion, enrichment and fabrication of fuel also operate as a wide-ranging international commercial market.

STATE OF THE U.S. COMMERCIAL NUCLEAR ENERGY INDUSTRY

Although major components such as ultra-large forgings and reactor pressure vessels are no longer manufactured in the United States, the U.S. nuclear industry continues to manufacture a wide range of equipment, components, and fuel for nuclear power plants around the world. U.S. firms also supply the global market with high-value services, including site evaluation, engineering and construction, fuel supply and transport, expertise in plant operation, decommissioning and more. After a nuclear power plant is constructed, U.S. firms can remain engaged throughout its life, which can last half a century or more, thus having a physical presence at nuclear facilities and influence over safe operational practice.

For example, Westinghouse Electric Company, headquartered near Pittsburgh, PA, employs nearly 13,000 people, including engineers, technicians, and other professionals (8,000 in the United States) who support its global business to provide fuel, services, technology, plant design and equipment to electric utility and industrial customers in the worldwide commercial nuclear electric power industry. Four Westinghouse AP1000® nuclear power reactors are currently under construction in

China. Westinghouse is in discussions to contract support for an additional eight plants, with more expected. Support of these follow-on projects employs significant quantities of U.S. content from high-end precision manufacturing to instrumentation and control systems.

GE Hitachi Nuclear Energy, headquartered in Wilmington, NC, employs more than 1,500 skilled professionals in its U.S. operations. GE Hitachi designs, services, and manufactures nuclear components and fuel for the U.S. and global markets, including Taiwan and Mexico. Nearly one-fifth of nuclear reactors in operation around the world are based on GE's boiling water technology and GE Hitachi has made significant investments in advanced reactor designs and innovative uranium enrichment technology.

The U.S. nuclear industry does not just supply technology. For example, Curtiss-Wright, an American company that traces its roots back to the Wright Brothers' first flight, employs 10,000 skilled professionals with facilities in some 30 states, is a manufacturer of precision nuclear components such as reactor coolant pumps, advanced valves, and electrical components. These safety-critical components are produced to the highest quality and safety standards for customers in the United States and abroad. As with many nuclear suppliers, Curtiss-Wright's business is increasingly abroad where it supplies components to nuclear facilities around the world including China, Korea, Taiwan, Mexico, UAE and the U.K. Roughly a quarter of Curtiss-Wright's nuclear energy business comes from international markets and this is expected to grow significantly in the coming years as nuclear construction outside of the United States accelerates.

In addition to large companies, small businesses also benefit from nuclear exports. For example, Precision Custom Components of York, PA, employs 270 Americans to manufacture high-end specialized components such as reactor vessel internals and integrated head packages for the U.S. and international markets including China. Nuclear exports support manufacturing jobs in more than 30 States.

SECTION 123 AGREEMENTS OF CURRENT INTEREST

NEI and our members are grateful that this committee recently approved an extension of the current Section 123 agreement with the Republic of Korea (ROK), and will soon consider renewal agreements with Taiwan and the International Atomic Energy Agency (IAEA), and a new agreement with Vietnam. Each of these agreements has significant potential benefits for U.S. exports and U.S. jobs. For every $1 billion in exports, between 5,000 and 10,000 U.S. jobs are created or sustained.

- Republic of Korea.—South Korea is the world's fourth-largest generator of nuclear energy and a major global supplier in its own right. Nineteen of South Korea's 23 operating plants—and all of South Korea's power plants under construction, on order or planned—are based on U.S. technology.[8] South Korea's licensing of U.S. technologies and export of U.S. components, fuel and services have earned billions for U.S. suppliers. Significant U.S. content in the Korean APR–1400 power plant and other U.S.-South Korea supply relationships earned U.S. suppliers more than $2 billion in the U.A.E. tender. That project alone is supporting thousands of jobs across 17 states.[9]
- Taiwan.—Two General Electric nuclear energy facilities are under construction in Taiwan at Lungmen, and other U.S. companies provide equipment, services, and fuel to Taiwan's six operating nuclear power plants. Fuel exports to Taiwan's reactors from AREVA North America in Richland, Washington, help support the more than 650 jobs at this facility. Renewal of the bilateral cooperation agreement will result in up to $10 billion of U.S. exports.
- IAEA.—The IAEA does not operate nuclear power plants, but the IAEA agreement is commercially significant because, in combination with other agreements, it enables U.S. nuclear energy trade with Mexico. Currently, Mexico operates two General Electric-supplied Boiling Water Reactors at Laguna Verde. In 2012, the Mexican Government announced plans to explore expansion of its nuclear program with additional units at the Laguna Verde site.
- Vietnam.—Vietnam is implementing an ambitious national plan to develop up to 10,000 megawatts of nuclear generating capacity by 2030 with the first reactors coming on line in 2020. Russia and Japan have already secured agreements to develop nuclear energy projects in Vietnam, while U.S. firms have been sidelined absent this important agreement. Conclusion of a Section 123 agreement with Vietnam has the potential to result in $10–20 billion in U.S. nuclear exports.

SECTION 123 AGREEMENTS ENSURE U.S. NONPROLIFERATION AIMS

Section 123 agreements provide critical nonproliferation benefits. These include significant commitments to safeguard materials, to prevent material diversion for nonpeaceful purposes, and to provide adequate security for materials. The agreements provide for U.S. consent rights over the enrichment, reprocessing and retransfer of U.S. materials. This means that obligations are attached to these materials, which include stringent nonproliferation assurances that these materials will not contribute to weapons programs.

Within this framework, Section 123 agreements ensure that U.S. partners agree to rigorous nonproliferation and nuclear security requirements as a prerequisite to nuclear cooperation with the United States. The nine U.S. requirements include prior U.S. consent for any enrichment or reprocessing of U.S. materials and, in post-Nuclear Non-Proliferation Act agreements, consent for reprocessing of nuclear fuel that has been used in a U.S.-supplied reactor. The U.S. nuclear energy industry has always supported this approach.

U.S. nuclear energy cooperation is an essential element of the Nuclear Nonproliferation Treaty, which forms the basis of the global nonproliferation regime. Countries commit not to pursue nuclear weapons and, in exchange, are guaranteed support for their right to develop civil nuclear power and other peaceful uses of nuclear energy, subject to international supervision. The United States has relied on this framework for decades to advance its global nuclear nonproliferation agenda.

LIMITING ENRICHMENT AND REPROCESSING (E&R)

The nuclear industry supports efforts to limit the spread of E&R consistent with current U.S. policy. The United States currently has in force 23 nuclear cooperation agreements covering 50 countries, Taiwan, and the IAEA. All agreements negotiated since the Nuclear Non-Proliferation Act of 1978 provide for U.S. consent rights for enrichment or reprocessing of U.S.-flagged materials.

A unilateral and inflexible requirement that potential trading partner countries forswear their rights to E&R as a condition for a Section 123 agreement would have the perverse effect of undermining U.S. nonproliferation interests by significantly reducing the number of countries willing to engage in civil nuclear commerce with the United States.

Other nuclear suppliers—like Russia, France, Japan, and South Korea—stand ready to engage in nuclear commerce with other countries, whether or not those countries have concluded a 123 agreement with the United States. As a result, the net effect of refusing to conclude 123 agreements with countries that are unwilling to renounce E&R would be to encourage them to do business with other suppliers, thereby forgoing the economic and national security benefits of commercial nuclear engagement.

When a country like the UAE is willing, in the context of a Section 123 agreement with the United States, to renounce E&R, the United States should include that commitment in the Section 123 agreement. But when a country, which otherwise demonstrates its intent to develop an exclusively peaceful commercial nuclear energy program, makes clear that it is unwilling to renounce these rights in a bilateral agreement with the United States, it would be self-defeating to forgo the nonproliferation and other benefits to the United States of concluding a Section 123 agreement with that country.

Industry is pleased that Taiwan and UAE have committed not to develop E&R, but we believe they are special cases. Taiwan, for example, has minimal need for E&R because its fleet of nuclear power plants is small and will eventually be phased out under the current national energy policy. The United States had unusual leverage in negotiation of the renewal agreement because Taiwan relies on it to enable its nuclear trade with other supplier countries, and because of the important U.S.-Taiwan security partnership. For all of these reasons, we believe the Section 123 with Taiwan is not a realistic model for other countries.

CONCLUSION

NEI believes that the global expansion of nuclear energy infrastructure provides the United States a unique opportunity to meet several national imperatives at the same time: (1) increasing U.S. influence over nuclear nonproliferation policy and practices around the world; (2) ensuring the highest possible levels of nuclear power plant safety and reliability around the world, by exporting U.S. advanced reactor designs and America's world-class operational expertise; (3) maintaining U.S. leadership in nuclear energy technology; and, (4) creating tens of thousands of jobs and

maintaining a healthy manufacturing base for nuclear energy technology and services.

If U.S. exporters were able to capture 25 percent of the global market—estimated at $500 billion to $750 billion over the next 10 years—this would create (or sustain) up to 185,000 high-paying American jobs.

To maintain U.S. influence over global nonproliferation policy and international nuclear safety, the U.S. commercial nuclear energy sector must participate in the rapidly expanding global market for nuclear energy technologies (437 commercial nuclear reactors in operation around the world, 71 under construction, 172 planned or on order).

The U.S. nuclear industry is competitive, but we must be allowed to compete. This requires Section 123 agreements in place. The industry:

- Supports efforts to limit the spread of uranium enrichment and used fuel reprocessing (E&R) technologies consistent with current U.S. policy.
- Opposes initiatives to require new conditions for U.S. nuclear cooperation unilaterally that our potential partners will not accept and that other supplier nations do not impose. Pragmatism should continue to guide the United States as it negotiates Section 123 agreements.
- Supports prompt negotiation of new and renewal bilateral agreements for peaceful nuclear energy cooperation. These agreements are essential for meaningful U.S. nuclear exports.
- Supports a proactive approach for the negotiation of Section 123 agreements with nations with new or expanding peaceful nuclear energy programs, including the ROK, Taiwan, and Vietnam. It is in the U.S. national security, nuclear safety and economic interest to secure agreements early and with a broad set of partners rather than to sit idly by as these nations partner with other nuclear suppliers. Without agreements in force, we forfeit exports, jobs, and commercial benefits, and we will fail to influence these programs in terms of their nuclear safety, security and nonproliferation norms.

Engaging in nuclear energy markets allows the United States to promote several of its interests at the same time; disengagement is a net loss for safety, security, and the U.S. economy. Without U.S. commercial engagement, the United States would have substantially diminished influence over other nations' nonproliferation policies and practices. U.S. technology and U.S. industry form a critical engine that drives U.S. nonproliferation policies.

End Notes

[1] The Nuclear Energy Institute is responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory, financial, technical, and legislative issues. NEI members include all companies licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

[2] April 25, 2013, letter to President Obama from Senator William S. Cohen, Dr. James Schlesinger, Admiral Michael Mullen, Dr. John Hamre, General Brent Scowcroft, General James Jones, Senator Pete Domenici and Ms. Susan Eisenhower (attached).

[3] Bangladesh (June 2012), Peru (April 2012) and Columbia (September 2013).

[4] Thailand (June 2014) and Norway (July 2014).

[5] "Global Nuclear Commerce: Governmentwide Strategy Could Help Increase Commercial Benefits From U.S. Nuclear Cooperation Agreements with Other Countries," United States Government Accountability Office Report to the Committee on Foreign Affairs, House of Representatives, November 2010.

[6] International Atomic Energy Agency, 2014.

[7] Ibid.

[8] "Nuclear Power in South Korea," World Nuclear Association, December 2012.

[9] Ex-Im Bank News Release, September 7, 2012.

ATTACHMENT:

CSIS,
WASHINGTON, DC,
April 25, 2013.

President BARACK OBAMA,
The White House,
Washington, DC.

DEAR MR. PRESIDENT: We write to underscore the importance of preventing nuclear weapons proliferation, and to caution against the adoption of policies that could inadvertently weaken the ability of the United States to continue to provide international leadership on this critically important issue.

For more than half a century, the cornerstone of global efforts to prevent nuclear weapons proliferation has been the "atoms for peace" formula. With very few exceptions, the countries of the world have accepted this formula. Countries that enter into it commit not to pursue nuclear weapons, and in exchange are guaranteed support for their right to develop civil nuclear power and other peaceful uses of atomic energy, and submit to international supervision.

The Atoms for Peace formula has been very successful. Access to commercial nuclear technology was not seen as a threat to the nuclear nonproliferation regime, but rather as a sign of the health of that regime and an essential means for implementing it. One of our nation's most powerful tools for guaranteeing that the countries acquiring this technology continue to use it exclusively for peaceful purposes is to ensure that the U.S. commercial nuclear industry continues to play a leading role in the international civil nuclear marketplace. Here the news is not encouraging.

While the United States and one or two other countries had a near-monopoly on civil nuclear technology in the 1950s, today the list of countries actively competing in the international civil nuclear marketplace includes Russia, France, Canada, Great Britain, Germany, the Netherlands, Japan and South Korea. And it is likely soon that China and India will become active participants in the international nuclear marketplace. According to a November 2010 Government Accountability Office (GAO) report on nuclear commerce, the U.S. share of global exports of "nuclear reactors, major components and equipment, and minor reactor parts" fell from 11 percent to just 7 percent between 1994 and 2008. The U.S. share of global exports of nuclear fuel fell from 29 percent to just 10 percent over that same period of time.

This decline in U.S. market share translates to substantially diminished U.S. influence in such areas as nuclear nonproliferation and nuclear safety. As a result, the United States is in an increasingly weak position to unilaterally impose onerous requirements on potential buyers of civil nuclear technology, simply because buyers have so many alternatives to U.S. sources of supply. It follows that, in order to restore its nonproliferation influence around the globe, the United States Government must find ways to strengthen the competitiveness of the U.S. nuclear industry, and avoid policies that threaten to further weaken it.

We therefore urge that, as part of your export control reform initiative, streamlining of the process for licensing civil nuclear exports be made a top priority. We know that there are experts who argue that we should make access to American nuclear technology even more restrictive in the future. This would have the unintended effect of further diminishing America's competitiveness in the global nuclear marketplace. America's ability to lead the global nuclear nonproliferation regime will diminish steadily as America abandons the field.

Consistent with the Atoms for Peace policy framework, America restricts the right of other countries to buy from American nuclear suppliers unless those countries agreed to stringent security procedures and conditions (the so-called 123 process). Historically we have managed this process on a sensible case-by-case basis. If we adopt a much more restrictive approach, we will not prevent countries from acquiring nuclear technology, but instead will encourage nations to turn to suppliers that do not impose difficult standards. The nonproliferation regime is weakened in that circumstance.

We share your administration's concern about the risks associated with the potential spread of sensitive nuclear fuel cycle technologies such as enrichment and reprocessing. But as our Nation seeks to reduce these risks, we must be careful not to diminish America's influence in the international civil nuclear marketplace. America's nuclear industry exports are shrinking, and this is bad for nonproliferation policy.

The U.S. Government must recognize that the U.S. civil nuclear industry is one of its most powerful tools for advancing its nuclear nonproliferation agenda. It is critical to adopt policies that will strengthen that tool. Weakening it will merely cede foreign markets to other suppliers less concerned about nonproliferation than the United States.

Sincerely,

Senator William S. Cohen, Former Secretary of Defense; General Brent Scowcroft, Former National Security Adviser; Dr. James Schlesinger, Former Secretary of Energy, Secretary of Defense and Director, CIA; General James Jones, Former National Security Adviser; Admiral Michael Mullen, Former Chairman, Joint Chiefs of Staff; Senator Pete Domenici, Former Chairman Senate Budget Committee; Dr. John Hamre, Former Deputy Secretary of Defense; Ms. Susan Eisenhower, Chairman Emeritus, Eisenhower Institute.

PREPARED STATEMENT SHARON SQUASSONI

Mr. Chairman, Mr. Ranking Member, members of the committee, I would like to thank you for this opportunity to appear before the Senate Foreign Relations Committee to discuss U.S. policy on peaceful nuclear cooperation and specifically, the draft agreement with Taiwan recently submitted to Congress.

BACKGROUND

For almost 70 years, trade in nuclear materials, equipment, and technology has been heavily regulated by the United States and many other countries for one fundamental reason: supplies intended for peaceful purposes can be diverted to help make nuclear weapons. For almost a decade after the first atomic explosion, the United States discouraged the spread of any nuclear technology, advocating international control of nuclear materials and technology to deter or prevent their military use. The 1946 Atomic Energy Act expressly prohibited even exchanges of information until "effective and enforceable international safeguards against the use of atomic energy for destructive purposes" were in place. A few years later, the Soviet and British nuclear tests, as well as nascent nuclear weapons programs in other countries, underscored the futility of trying to keep the lid on this Pandora's box of nuclear energy, and a new approach was born: the Atoms for Peace program. President Eisenhower's December 1953 initiative boldly coupled engagement in the peaceful uses of nuclear energy with reducing the nuclear threat. The establishment of the International Atomic Energy Agency followed within a few years, but the Nuclear Nonproliferation Treaty took more than a decade to take shape.

Ensuring that nuclear energy is used only for peaceful purposes is a sine qua non of the nuclear nonproliferation regime that has grown up since then. To do this, the regime has focused on making diversion from peaceful purposes difficult—from the legal agreements signed by recipients of technology (i.e., NPT and IAEA safeguards agreements) to implementation of accounting and inspections by the IAEA, supplier guidelines promulgated within the Nuclear Suppliers Group (NSG), multilateral and national sanctions, and finally, national export control regimes. Peaceful nuclear cooperation agreements are a mechanism for sharing the benefits of peaceful nuclear energy, but also for promoting national priorities in export control and nonproliferation. In the U.S. case, they establish the scope and guidelines for collaboration, including expectations for and demonstrations of nonproliferation.

The United States has been a leader in both the military and civilian uses of nuclear energy, but its dominance of the civilian market faded some decades ago. While early cooperation agreements envisioned the United States supplying all reactors and enriched uranium for small nuclear power programs in, for example, South Korea and even EURATOM, that kind of supplier relationship is no longer desired or possible. Today, three factors are leading to a reassessment of the role of U.S. nuclear cooperation policy: the need to renew many of the agreements renegotiated after passage of the landmark Nuclear Nonproliferation Act of 1978 (NNPA); the potential for new agreements with countries considering nuclear power for the first time; and a desire to enshrine policy restrictions on sensitive nuclear technologies like enrichment and reprocessing.

RENEWAL OF EXISTING NUCLEAR COOPERATION AGREEMENTS

The 1978 Nuclear Nonproliferation Act amended the Atomic Energy Act of 1954 in several important respects, but particularly by incorporating nine requirements in section 123 that helped to ensure that U.S. nuclear cooperation would not be diverted for military uses. India's 1974 nuclear test certainly played a role in increasing concerns that there were not enough safeguards in place to ensure that peaceful nuclear atoms were not misused for weapons, but attempts by countries like Brazil, Pakistan, and South Korea to openly acquire full fuel cycle capabilities from U.S. allies also played a role. The nine provisions, briefly, included requirements for:

1. The perpetuity of safeguards on all material and equipment supplied;
2. Full-scope safeguards (safeguards on all nuclear material in a country) for nonnuclear weapon states;
3. Assurances that nothing transferred or subsequently produced from U.S. material, equipment, or technology would be used for nuclear explosive purposes or for any other military purpose;
4. The right of return in the event a recipient state detonates a nuclear explosive device or terminates or abrogates an IAEA safeguards agreement;
5. Prior consent by the United States for any transfers;
6. Adequate physical protection;

7. Prior consent by the United States for enrichment, reprocessing, or other alteration in form or content of U.S.-supplied material or material used in or produced through the use of U.S.-supplied material equipment or facilities;
8. Approval in advance of storage facilities; and
9. Application of all the previous requirements by a recipient state to any special nuclear material, production facility or utilization facility produced or constructed by or through the use of any sensitive nuclear technology transferred under a peaceful nuclear cooperation agreement.

A detailed analysis of these requirements and how they have been applied over time and how they can be strengthened is available in a report written by Fred McGoldrick and published by CSIS entitled "Nuclear Trade Controls: Minding the Gaps" (January 2013).[1]

These requirements provided a benchmark against which the U.S. Congress could judge the adequacy of peaceful nuclear cooperation agreements and were folded into export licensing requirements. Many, but not all, existing U.S. nuclear cooperation agreements were renegotiated after the NNPA was enacted (section 404 of the NNPA required renegotiation of all existing cooperation agreements) and the few that remained outside are now up for renewal, including those with Thailand, Taiwan, and South Korea. The agreement with Taiwan was submitted to this committee on January 7, 2014, and the Senate recently voted to extend the existing South Korean agreement for 2 years.

Other agreements with approaching expirations include Norway (2014), China (2015), Egypt (2021) and Morocco (2022). The 1988 agreement with Japan has a 30-year duration but specifies that it will remain in force thereafter (2018) unless terminated by either party with 6-months notice. Since the negotiation of the agreement with Japan, subsequent U.S. nuclear cooperation agreements have adopted increasingly creative approaches to duration, with the practical impact of reducing congressional approval responsibilities. Whereas agreements written prior to the NNPA did not commonly include language on extensions of duration (for example, the Taiwanese and South Korean agreements have simple 42- and 41-year durations, respectively), those following the NNPA all refer to either mutually agreed extensions, automatic 5- or 10-year rolling extensions, or in the case of the agreement with Japan and the draft agreement with Taiwan, indefinite extensions or indefinite duration. While mutually agreed extensions may require legislative action, the automatic, rolling and indefinite extensions seem designed to circumvent the congressional approval process in the long run.

THE PROPOSED AGREEMENT WITH TAIWAN

Earlier this month, the President submitted the Proposed Agreement for Cooperation Between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office in the United States (TECRO) Concerning Peaceful Uses of Atomic Energy to this committee.

The draft agreement supersedes a 1972 agreement (amended in 1974) signed with the Republic of China (the first such cooperation agreement dates back to 1955) that is similar to the 1974 agreement signed with South Korea. It provided for all enriched uranium fuel for Taiwan's reactors at the time (ChinShan I and II) with an option to seek outside sources if the then-U.S. Atomic Energy Commission could not supply the requisite amount. It also allowed for reprocessing "in facilities acceptable to both Parties" upon a joint determination that safeguards could be applied. Taiwan would retain title to special nuclear material resulting from reprocessing. Although the Republic of China ratified the NPT in 1970, the agreement provided for U.S. safeguards and the application of IAEA safeguards under a 1964 trilateral (U.S., ROC, IAEA) that could be replaced by IAEA NPT safeguards once they came into effect. In light of what we now know about Taiwan's clandestine activities at the time, the fuel assurances on the front end and relative lack of restrictions on the back end seem too little and too late.

Although the unclassified Nuclear Proliferation Assessment Statement refers only to "the direction of the nuclear program of the authorities on Taiwan in the 1970s and 1980s" as having been "widely reported in the press," the classified version should provide this committee with the details of a Taiwanese nuclear weapons program that reportedly began in the mid-1960s and continued somewhere into the 1980s, at least according to IAEA reports of undeclared plutonium activities and other sources. The plutonium program included a research reactor (from Canada), heavy water production, and plutonium separation. U.S. official documents released under the Freedom of Information Act detail repeated demarches to Taiwanese representatives by U.S. Government officials in the mid-1970s to halt clandestine nuclear activities.[2]

With the establishment of U.S. diplomatic relations with the People's Republic of China in 1979, Taiwan's political status changed and although Taiwan is prevented from formally joining multilateral treaties and export control regimes, the authorities on Taiwan have voluntarily committed to adhering to all the major nonproliferation-related agreements and initiatives. A U.S.-Taiwan nuclear cooperation agreement is critical for Taiwan to engage in nuclear supply relationships with other countries, since the trilateral safeguards transfer agreement provides the functional equivalent of Taiwan's adoption of full-scope safeguards under the NPT. In other words, the 123 agreement with the United States is critical for Taiwan's nuclear power program as long as it intends to operate those reactors. From November 2011, authorities on Taiwan have declared they will phase out nuclear power eventually.

The current Taiwan agreement has a few notable characteristics: Article 7 provides that TECRO shall not possess sensitive nuclear facilities or otherwise engage in activities related to enrichment or reprocessing of material or alteration in form or content and it is the first agreement to specify an indefinite duration. Like the UAE agreement, there is a provision for advance consent to transfer irradiated source or special fissionable material to France or other countries as agreed for storage or reprocessing. In the Agreed Minute, the scope of the agreement specifically covers tritium, an item that is not found in many other agreements.

The Taiwan agreement has been heralded in some press reports as a victory for the "gold standard"—that is, for the United States requiring that its nuclear partners rely on the international market for fuel supply services instead of leaving future options open for domestic enrichment or reprocessing. As a country of unique political status that is overwhelmingly dependent on U.S. nuclear technology and trade, with a documented history of clandestine nuclear activities, it is hard to see how Taiwan would have otherwise reacted to a U.S. request for such restrictions. In light of Taiwan's envisioned phase-out of nuclear energy, it would also have been difficult to insist on leaving its options open for future domestic enrichment or reprocessing. Thus, while the Taiwan agreement may helpfully build a norm of countries declaring they will rely on the international market, it is hardly a bellwether for future agreements.

NEW AGREEMENTS WITH COUNTRIES AND POLICY RESTRICTIONS ON ENRICHMENT AND REPROCESSING

The rising enthusiasm for nuclear energy of the past decade, tempered somewhat by the 2011 accident at Japan's Fukushima Daiichi nuclear power plant, has spurred interest in cooperation agreements with new nuclear partners, including those in the Middle East (the United Arab Emirates, Saudi Arabia, and Jordan) and in Southeast Asia (Vietnam). Concerns about the spread of sensitive nuclear technology are particularly high in the Middle East in light of Iran's continued development of uranium enrichment technology. The conclusion of an agreement in 2009 with the UAE that incorporated language in Article 7 specifying that the UAE would not possess sensitive nuclear facilities on its soil or otherwise engage in reprocessing of spent fuel or enrichment of uranium raised expectations that the United States would require similar commitments by other nuclear partners in the Middle East, or even globally. In fact, the 1981 U.S. agreement with Egypt contains an agreed minute that any reprocessing that might in future take place would be conducted outside of Egypt, which has the same practical effect of the UAE agreement (although Egypt did not make the same commitment for uranium enrichment).

Like Taiwan, the nonproliferation "win" in the UAE case may also have resulted from other mitigating circumstances. The UAE already had a policy not to seek domestic enrichment and reprocessing, whether to burnish its nonproliferation credentials as the first state in the Middle East with nuclear power or because it simply did not make economic sense. Although it would be useful for the UAE to enlist other countries in the region to create an Enrichment-&-Reprocessing-Free-Zone, other countries currently seeking nuclear power are slow to follow. For example, Saudi Arabia reportedly has signed a memorandum of understanding with the United States to that effect, but there is no evidence that Saudi officials are eager to tout their nonproliferation credentials openly or that such language would make its way into a formal peaceful nuclear cooperation agreement. Jordan has resisted U.S. requirements for similar restrictions in its draft agreement with the United States. Outside of the Middle East, Vietnam reportedly has agreed to rely on the international market for fuel cycle services but is not eager to put such language in a legally binding agreement.

New agreements, particularly with states that have few if any nuclear power plants operating, are not an unreasonable place to begin to strengthen standards

for nuclear cooperation agreements. Since 2009, the policy debate about the "gold standard" has centered on whether, in the absence of a consistent policy that applies to all U.S. nuclear partners, the executive branch can persuade other countries that it is pursuing a politically neutral nonproliferation goal. Critics of the case-by-case approach believe that a consistent policy strengthens U.S. negotiating leverage because it cuts off debates in negotiations about prestige, national sovereignty or allies' worthiness while proponents believe that an inflexible approach will result in fewer nuclear cooperation partners for the United States, with diminished nonproliferation returns.

U.S. policy for many years has proceeded on a "case-by-case" basis in order to preserve flexibility in negotiating, despite an extended period of review under the Obama administration. Recently, administration officials have reiterated their policy goal of discouraging the spread of enrichment and reprocessing technologies. However, this has been articulated as a comprehensive policy that extends beyond the scope of peaceful nuclear cooperation agreements and officials have suggested that other policy tools to achieve this objective may be preferable to incorporating specific language in 123 agreements. Acting Under Secretary of State Rose Gottemoeller told an Atlantic Council audience in December 2013 that legally binding requirements were too inflexible and that many tools were available, referring to the 2011 revised NSG guidelines on restraint in transferring sensitive nuclear technology and to the availability of fuel banks of low-enriched uranium for fuel. Privately, administration officials have suggested that Vietnam's reported willingness to rely on the international market for nuclear fuel and the U.S. consent rights for enrichment or reprocessing are enough.

Clearly, the Obama administration should use multiple tools to discourage the spread of enrichment and reprocessing. In thinking about the broader nonproliferation tools that could be applied, however, it is important to step back and place this debate in context.

A CHANGING LANDSCAPE

The proliferation landscape has shifted over time, both in terms of the technologies that are perceived as posing significant proliferation risks and the countries (or nonstate actors) that may have clandestine intentions. For example, at the time of NPT negotiations, experts assumed that the tremendous costs, energy requirements and physical footprint of uranium enrichment plants (based on gaseous diffusion technology) would make clandestine enrichment very difficult if not impossible. This is certainly not the case today, as we have discovered with Iran and North Korea. In fact, the major difficulty is in detecting such clandestine enrichment. Looking forward, the commercial development of laser enrichment could shrink detection parameters even further.

Not all elements of the system adapt at the same time in the face of changing technical and/or political proliferation risks and some do not adapt at all. The NPT remains constant, while IAEA safeguards were strengthened in response to Iraq's nuclear weapons program in the early 1990s (i.e., with the adoption of the Additional Protocol in 1998). Although some observers might wish for stronger withdrawal provisions or penalties for noncompliance in the NPT, the tension among its states parties makes amendment a rather risky enterprise. The Nuclear Suppliers Group, for its part, responded relatively quickly to Iraq's noncompliance by finally implementing a requirement for full-scope safeguards for nuclear trade in 1992 that several members had adopted more than a decade earlier (e.g., Canada, Japan, United States, Australia). In response to revelations in 2004 about the A.Q. Khan nuclear black market network, the NSG was a bit slower: after 7 years of debate, the NSG tweaked its restrictions regarding sensitive nuclear technology transfers in 2011.

Sanctions, on the other hand, can be quite flexible, for better or worse: some U.S. sanctions imposed on Pakistan and India after the 1998 nuclear tests were famously short-lived, while imposition of other sanctions was delayed until it was no longer possible to hold them off (e.g., declaring that Pakistan was in possession of nuclear weapons). In the multilateral realm, U.N. sanctions have generally been slower to ramp up but fairly flexible: in the case of Iran, the scope of sanctions has expanded from those targeted on the nuclear program and the Iranian Revolutionary Guard to wider petroleum-related investments and trade over the course of a decade. They could shrink substantially if Iran responds well to the latest negotiated deal.

National export control regimes, including policies and laws governing nuclear cooperation and exports, can also be flexible compared to other tools and powerful if harmonized with those of other countries. In the United States, the Atoms for Peace program required a big shift from the 1946 Atomic Energy Act to allow inter-

national cooperation. Section 3e of the Atomic Energy Act of 1954 called for "A program of international cooperation to promote the common defense and security and to make available to cooperating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit." The scope of activities included: "(1) refining, purification, and subsequent treatment of source material; (2) civilian reactor development; (3) production of special nuclear material; (4) health and safety; (5) industrial and other applications of atomic energy for peaceful purposes; and (6) research and development relating to the foregoing." The United States put in place bilateral research agreements, the first of which was signed in 1955 with Turkey. According to the Congressional Research Service, the "United States established its own program for promoting the peaceful uses of atomic energy with the idea that later they would be coordinated with and even undertaken by the International [Atomic Energy] Agency."[3] By the end of 1967, the United States had 34 agreements in place with countries or groups of countries (e.g., EURATOM); of these, about two-thirds were strictly for research.

Comparing U.S. nuclear cooperation agreements of almost 50 years ago with those of today, two changes are striking: We have changed partners several times (sometimes in reaction to bad behavior and sometimes not) and we have changed what we are willing to supply. This is fairly unsurprising over a span of 50 years, but provides a few lessons.

In 1967, the United States had agreements with some countries with which it does not now have agreements: Iran, Israel, Venezuela, and Vietnam. Cooperation with the Soviet Union over the years was sporadic until a 123 agreement entered into force in 2010.[4] In addition to Iran and Israel, two others on the 1967 list of partner countries are still cooperating partners, but had at that time nuclear weapons programs that were subsequently abandoned: South Korea and South Africa.[5]

The nature of cooperation has also changed over time. First, the 1954 Atomic Energy Act allowed for cooperation in the production of special nuclear material. The Ford administration adopted the first restraint policy in the transfer of sensitive nuclear technology and facilities in 1974, prohibiting export of reprocessing and other nuclear technologies, firmly opposing reprocessing in Korea and Taiwan, and negotiating agreements for cooperation with Egypt and Israel that contained "the strictest reprocessing provisions."[6] In his 1976 statement on nuclear policy, President Ford called on all nations to join the United States "in exercising maximum restraint in the transfer of reprocessing and enrichment technology and facilities by avoiding such sensitive exports or commitments for a period of at least 3 years."[7] This policy of restraint has endured despite the fact that the Atomic Energy Act itself does not prohibit sharing of enrichment and reprocessing technologies (although the NNPA amendments ensured that any production facilities transferred would be subject to all the nonproliferation requirements outlined in section 123).

Second, for many years, the United States exported quantities of uranium enriched between 20 percent and 90 percent (in U–235), U–233 and plutonium routinely under nuclear cooperation agreements. In 1993, the U.S. Nuclear Regulatory Commission reported to Congress that the United States had exported 25 metric tons of HEU, at which time about 17 metric tons were still abroad. By 1978, the United States began a program (the Reduced Enrichment for Test Reactors program, now encompassed in the Global Threat Reduction Initiative Convert Program) to encourage the use of lower enriched uranium in research reactors abroad that continues today. The current policy of the U.S. Government is to support the minimization of HEU in civilian nuclear commerce where technically and economically feasible.[8]

The examples above illustrate that nuclear cooperation does and must shift over time to reflect changing circumstances, whether or not laws change. The trend over time largely has been to tighten restrictions. Exceptions to that trend should be undertaken only in circumstances where a country overwhelmingly has demonstrated its commitment to nonproliferation. Even then, it is far better to adopt an approach that is justifiable for how it reduces the risk of proliferation than what was simply politically possible at the time.

The current justification for adopting a case-by-case approach to U.S. 123 agreements is the need for diplomatic flexibility. But the examples above should also suggest that a principled approach could weather political changes in governments much better and help minimize the costs of walking back less restrictive policies.

THE ROLE OF CONGRESS

Although peaceful nuclear cooperation agreements tend to be treated as foreign policy initiatives, they fall squarely within the Congress' constitutional mandate to regulate trade. Activism on this issue by Congress has varied with the agreements: more controversial countries and capabilities have attracted more attention. Although early legislation may have envisioned a bigger role for committees in vetting peaceful nuclear cooperation agreements (for example, in the 30-day period after initial transmittal), many are submitted as boilerplate agreements (the India agreement notwithstanding). The NNPA's adoption of a more streamlined approval process for new agreements, as well as a relatively short (15 days) approval process for subsequent arrangements (e.g., arrangements for partner countries to reprocess U.S.-origin material) has made significant congressional involvement less likely. The fact that 123 agreements compliant with section 123 requirements enter into force unless Congress passes a law otherwise presents a serious bar for disapproval that subsequent legislation (e.g., 1984 Proxmire amendment to the Export Administration Act) has attempted to address without success.

Members of Congress may want to consider the following issues:

1. Approval of 123 agreements may become a historical relic

Administrations since the enactment of the 1978 Nuclear Nonproliferation Act have lengthened the duration of agreements, including bestowing rolling or indefinite extensions on certain nuclear cooperation partners (Australia, Canada, EURATOM, Switzerland and Turkey have 5-year rolling extensions; India has a 10-year rolling extension and Peru has one automatic 10-year extension). Japan's agreement from 1987 has such an "indefinite" extension while the Taiwan agreement duration itself is indefinite. Whether this is intended to minimize congressional interference by eliminating the need for congressional approval for renewals or whether this is the result of demands from cooperating partners is not clear. However, it seems similar to the Reagan administration's development of the practice of "advance consent" as a form of prior consent. In other words, it seems to contradict the intention of the law. Members of Congress may want to consider whether specific language regarding extensions or congressional review is desirable to protect its equities in ensuring that U.S. nuclear cooperation does not contribute inadvertently to proliferation.

2. The Atomic Energy Act does not reflect longstanding policies

There are several key nuclear nonproliferation policy initiatives that usefully could be supported and strengthened by incorporation into law.

a. Additional Protocol

The first is to require all new nuclear partners (and in renewal agreements) to have Additional Protocols in force before a 123 agreement can be approved. U.S. policy is to seek inclusion of language in 123 agreements but this could be strengthened legally. It should be noted that the NSG has not been able to make the Additional Protocol a condition of supply, despite the fact that many members do require it. Two particular holdouts are Argentina and Brazil, although there are others. Making the Additional Protocol a legally binding requirement could eventually help NSG adoption, in much the same way that countries adopted full-scope safeguards as a condition of supply before the NSG did. In addition, Congress might consider whether additional language in the AEA would be useful regarding the incorporation of improvements in the IAEA safeguards system into U.S. 123 agreements beyond the Additional Protocol. There has been talk of provisions that might amount to the "Additional Protocol Plus" in the case of Iran. Language requiring the executive branch to report on status of IAEA safeguards improvements, particularly with respect to safeguards for reprocessing and enrichment plants, including an IAEA assessment of the effectiveness of current black-boxing techniques for enrichment technology could help inform the Congress and potentially lead to some on-the-ground improvements.

b. Interim storage over reprocessing

The United States as a matter of policy prefers interim storage over reprocessing, both for itself and its partners where proliferation or security risks might be a concern. And yet, recent 123 agreements do not reflect this. In the UAE and Taiwan agreements, advance consent is given for transfer to storage or reprocessing facilities (in third countries like the U.K., France, or other). Although some flexibility with regard to the final destination for irradiated fuel may be desirable, U.S. policy clearly places priority on interim storage over reprocessing and this should be reflected in all future agreements.

3. Implementation of certain Atomic Energy Act and 1978 Nuclear Nonproliferation Act provisions are weak

a. NPAS makeover

The 1978 NNPA requires the executive branch to submit a Nuclear Proliferation Assessment Statement with each new agreement or renewal agreement. If the current trend toward indefinitely extended agreements deepens, the ability of Congress to judge the nonproliferation worthiness of partner countries will diminish even more. Even if Members of Congress see no drawback to these agreements of indefinite duration, it may be worthwhile to mandate periodic NPASs from the executive branch. Separately, the Atomic Energy Act provides no guidance to either Congress or the executive branch on the kinds of issues that should be covered in an NPAS. Some of these documents (at least the unclassified versions) do little more than recite how the agreement meets section 123 criteria. At a minimum, the Congress could require the executive branch to consult with Members on the general scope of Nuclear Proliferation Assessment Statements or about individual NPASs before they are written or more substantially, Congress could enact legislation to specify reporting requirements for NPASs.

b. Title V

Title V of the NNPA required the United States to conduct nonnuclear energy cooperation and energy assessment assistance with developing states. All countries need help pursuing low-carbon, renewable options for generating electricity. This title should be funded, implemented and monitored by Congress.

c. International fuel cycle collaboration and multilateral approaches

A holistic and multilateral approach that reduces proliferation risks from nuclear cooperation and fuel cycle activities continues to elude the U.S. Government. This, however, was not always the case. In the late 1970s, U.S. nonproliferation policies at both ends of Pennsylvania Avenue seemed to recognize that promotion of nuclear energy cannot come at the expense of nuclear nonproliferation. In the words of Henry Kissinger, "We must take into account that plutonium is an essential ingredient of nuclear explosives and that in the immediate future the amount of plutonium generated by peaceful nuclear reactors will be multiplied many times. Heretofore the United States and a number of other countries have widely supplied nuclear fuels and other nuclear materials in order to promote the use of nuclear energy for peaceful purposes. This policy cannot continue if it leads to the proliferation of nuclear explosives. Sales of these materials can no longer be treated by anyone as a purely commercial competitive enterprise."[9]

This dilemma is no longer painted so starkly. More often now, one hears the argument that if the United States adopts stricter controls, other states will step in to supply nuclear reactors and components with lower requirements, creating a lose-lose proposition for both U.S. nuclear industry and nonproliferation.

However, the nuclear industry has shrunk since the 1980s, and a truly zero-sum competitive market does not exist—there are many more interdependent suppliers than was the case decades ago. Rather than undercutting each other with government subsidies for nuclear deals, suppliers should be cooperating to encourage the sustainability of their enterprise. Fundamentally, this will require confronting nuclear waste challenges up front to provide favorable options for new recipients (like interim storage for spent nuclear fuel or space in a shared repository) and opportunities to invest in nuclear capacities they cannot themselves develop. A market-driven twist on collaborative fuel cycle approaches, if it is implemented in an equitable fashion among advanced and developing nuclear states, could overcome the inertia that has swallowed virtually all proposals to internationalize the fuel cycle and perhaps, finally, bring much-needed balance to the task of reducing proliferation risks.

End Notes

[1] Available at: http://csis.org/publication/nuclear-trade-controls.

[2] National Security Archive Electronic Briefing Book No. 221, available at http://www2.gwu.edu/nsarchiv/nukevault/ebb221/.

[3] Ellen C. Collier, "United States Foreign Policy on Nuclear Energy," Library of Congress Legislative Reference Service, May 6, 1968, p. LRS–7.

[4] Collier, op. cit., describes an arrangement in 1967 for cooperation in atomic desalination; in 1973, the United States and the Soviet Union signed a 10-year agreement for cooperation in fast breeder reactors, fusion, and fundamental research. See Mary Beth Nikitin, "U.S.–Russian Civilian Nuclear Cooperation Agreement: Issues for Congress," CRS Report, RL34655, January 11, 2011.

[5] In the case of South Africa, the U.S. first signed a 50-year nuclear cooperation agreement in 1957. Cooperation lapsed in the 1970s because of evidence of South Africa's nuclear weapons program. When South Africa dismantled its nuclear weapons and joined the NPT in 1991, the United States negotiated a new cooperation agreement that entered into force in 1997.

[6] President Ford, "Statement on Nuclear Policy," October 28, 1976, reprinted in Nuclear Proliferation Factbook, Senate Print 103–111, December 1994, pp. 48–62.

[7] President Ford, "Statement on Nuclear Policy," op. cit., page 54.

[8] ttp://www.whitehouse.gov/the-press-office/2012/03/26/belgium-france-netherlands-united-states-joint-statement-minimization-he.

[9] Henry Kissinger, "An Age of Interdependence: Common Disaster or Community," Address before the 29th United Nations General Assembly, September 23, 1974.

ORAL STATEMENT OF HENRY SOKOLSKI

Mr. Menendez, Mr. Corker, members of the committee, I want to thank you for holding this hearing. Let me start by noting that the last time Congress adjusted the Atomic Energy Act to proliferation realities of the day was over 35 years ago. After watching India set off a "peaceful" nuclear explosive with U.S. technology and materials, Congress required new deals with non-NPT states be backed by a joint congressional resolution of approval. Since then, Iraq, North Korea, Iran, Syria, and Libya all developed weapons programs in violation of their NPT pledges, used their safeguarded "peaceful" programs as covers to import nuclear technology and goods from nuclear suppliers, including the U.S., and endeavored to enrich or reprocess nuclear weapons usable fuels to make bombs.

In light of this history, the U.S. has recently insisted that the UAE and Taiwan forswear engaging in these nuclear activities in their nuclear cooperative agreements with the U.S. It now is trying to persuade South Korea to do the same. What all of this suggests is that there's a clear need for Congress to adjust, again, what kinds of agreements should require a congressional joint resolution. In trying to determine the specifics any such adjustment, this committee should focus on three points:

1. Arguments that further congressional involvement in reviewing and approving nuclear deals is unnecessary or will somehow undermine nonproliferation are dead wrong. Nuclear industry's supporters and Foggy Bottom clearly prefer the status quo. They argued against the Nuclear Nonproliferation Act (NPPA) of 1978 using the very same arguments they are now making against any additional congressional involvement in nuclear negotiations. Passage of the NNPA, though, was needed to impose controls over the export of dual use nuclear goods which, in turn, made it possible for the U.S. to persuade the Nuclear Suppliers Group (NSG) to adopt similar restraints. This now enables the Proliferation Security Initiative to track and interdict the fulsome list of nuclear goods. Getting other nuclear suppliers to uphold the Gold Standard, which is not yet the focus of our diplomacy but should be, will require no less. Foggy Bottom is hardly 100 percent behind this. As such, unless Congress makes it clear that new 123s that don't meet the Gold Standard must secure a joint congressional resolution of approval, the Executive will, in due course, give up.

2. Congressional review of the Executive's nuclear dealmaking should extend beyond what has already been proposed. Many in Congress have been frustrated in their attempts to engage the Executive over the final shape of any nuclear deal with Iran. Congress was equally frustrated a decade ago regarding the implementation of the North Korean nuclear Agreed Framework. H.R. 3677 addresses a number of needed changes to the Atomic Energy Act. In specific, it understands that 123s that don't meet the Gold Standard are more like a mutual security pact than a technical trade agreement. Yet, what 3677 does not consider is amending the act so any nuclear understanding the Executive reaches with states violating existing U.N. resolutions relating to dangerous nuclear activities, IAEA safeguards agreements or the NPT must be voted on within 30 days and secure a congressional joint resolution of approval. As with nuclear cooperative agreements that fail to meet key nonproliferation criteria, the long-term national security implications of such agreements are serious. Such agreements deserve to be treated more like treaties or laws than minor understandings that need only sit before Congress a number of days before automatically coming into force. Here, the committee's own 2001 study of teatking making done by CRS is excellent reading.

3. Finally, the primary premise for any revisions to the act should be security. Business can only be good business if it's safe. We learned this after conducting nuclear commerce under lax conditions with India in the l960s and after sharing reactor technology under the Agreed Framework with North Korea free of routine IAEA safeguards. We now are learning it with Iran and risk learning it yet with

South Korea, Japan, Turkey, the UAE, and Saudi Arabia. The hearing today should aim to prevent that.

PREPARED STATEMENT OF HENRY D. SOKOLSKI

Mr. Menendez, Mr. Corker, members of the committee, I want to thank you for holding this hearing. The principles behind U.S. nuclear export and control policies, nonproliferation, and our diplomacy efforts to reduce the spread of enrichment and reprocessing activities have been matters of keen interest for several years.[1] Generally, these matters have been discussed in the context of promoting nuclear power's further expansion overseas, of increasing the number of jobs or of concluding nuclear agreements and cooperation initiatives more generally. All of these considerations are important. They are not, however, the primarily lens that should be used for weighing these matters.

I've served in the U.S. Senate as military legislative aide to a senior member of the Senate Armed Services Committee, in the Pentagon as a deputy assistant secretary-level official responsible for nuclear proliferation matters, as a member of two congressionally mandated commissions on strategic weapons proliferation threats, as a former consultant on proliferation issues to the CIA and the Commission on Strategic Posture of the United States, and as a DOD contractor with a Pentagon office that details future threat assessments directly to the Secretary of Defense. In each of these positions, my key focus has been on clarifying the national and international security implications of the further spread of dual-use nuclear technology.

These security concerns should be the first business of our government. Certainly, the most profound contributions Congress has made to promoting and controlling truly peaceful foreign nuclear activities were premised on putting U.S. national security first. This was true in 1946 when Congress created the Atomic Energy Commission, in 1978 when it passed the Nuclear Nonproliferation Act, in the 1990s when it conditioned the Nuclear Agreed Framework with North Korea, and today as it considers legislation relating to our nuclear negotiations with Iran.

That said, the last time Congress revamped the Atomic Energy Act signficantly was over 35 years ago. That overhaul, finalized in 1978, followed Taiwanese and South Korean efforts to acquire nuclear weapons and India's explosion of a "peaceful" nuclear explosive. India's bomb used U.S. civilian nuclear technology and materials in violation of India's peaceful pledges to the United States. Given these events, Congress demanded that any future U.S. nuclear deals with states that, like India (which did not have all of its nuclear facilities under IAEA safeguards and were not members of the NPT), could only come into force with a congressional joint resolution of approval.

That was three and half decades ago. Since then, Iraq used its safeguarded "peaceful" nuclear program to develop a nuclear weapons option; India and Pakistan broke their pledges (including several to the United States) not to develop nuclear weapons or to test; North Korea developed a covert enrichment program, in violation of the Agreed Framework, and withdrew from the NPT even as it imported and perfected U.S. light water reactor technology; Syria and Libya both violated their IAEA safeguards agreements and nearly completed an enrichment plant (in Libya's case) and a plutonium production reactor (in Syria's) covertly; and Iran imported foreign and U.S. nuclear assistance (which began in 1957) under IAEA safeguards, developed a nuclear weapons option by enriching uranium claiming it is peaceful and now is negotiating to keep as much of its nuclear program as it can.

Most recently, and in light of the concerns that other states might inch closer to making bombs by enriching or reprocessing, the United States insisted that the UAE and Taiwan foreswear engaging in these nuclear activities in their nuclear cooperative agreements with the United States. It now is trying to persuade South Korea to do the same.

This is a good deal of history—more than enough to suggest that there is a clear need for Congress to adjust again what kinds of agreements should be expedited under the Atomic Energy Act and which should require a congressional joint resolution.

In trying to determine the specifics of any such adjustment, three general points are worth keeping in mind:

1. *One should resist arguments that further congressional involvement in reviewing and approving nuclear deals is either unnecessary or unhelpful.* Nuclear industry's supporters and our own government negotiators clearly prefer that no additional congressional review or voting be allowed. They argued against the Nuclear Nonproliferation Act (NPPA) of 1978 using the very same arguments they are now using for any additional congressional involvement in nuclear deal making.[2] Passage of

the NNPA, though, was critical to raise U.S. nonproliferation standards and impose controls over the export of dual use nuclear goods. This, in turn, made it possible for the United States to persuade all of the members of the international Nuclear Suppliers Group (NSG) to adopt similar restraints on their own exports. Without NSG adoption of these controls, the Proliferation Security Initiative would be unable to track the fulsome list of nuclear goods it does with so many other states. This would clearly be against our national security interests. Similarly, if as our government claims, we want other nuclear suppliers to promote the Gold Standard, we must be willing to set an example. Establishing a stronger international presumption against ever more states enriching uranium and reprocessing weapons usable plutonium certainly is unlikely unless Congress makes it clear to the Executive that if it brings new nuclear cooperative agreements to the Hill that don't meet the Gold Standard, they will not come into force until Congress votes to approve them because both Houses are persuaded that they are in the Nation's security interest. Delay in voting on these matters should not be allowed.

2. *Congressional review of nuclear deals ought to be considered beyond what has already been proposed in the House.* Congress is currently frustrated by its inability to engage the Executive over what the final shape of a nuclear agreement with Iran might look like. It was equally frustrated a decade ago regarding the implementation of the nuclear Agreed Framework with North Korea. Congresswoman Ileana Ros-Lehtinen and Congressman Brad Sherman recently reintroduced draft legislation H.R. 3677 that the House Foreign Affairs Committee first approved back in 2011. It addresses a number of needed changes to the Atomic Energy Act of 1954. What it does not consider, however, is amending the act so that any nuclear understanding that the Executive might reach with a state that is in violation of existing United Nations resolutions relating to suspect nuclear activities, IAEA safeguards agreements or the NPT need to be approved by a joint resolution of Congress before it can come into force. The rational for such a provision would be the same as for voting on nuclear cooperative agreements with states that fail to meet key nonproliferation criteria: Such agreements and their long-term national security implications should be treated not as executive agreements or as minor understandings that need only sit before Congress a number of legislative days before automatically coming into force. Instead, they should be treated as being as important as a treaty or, at the very least, as being at least as important as a law.[3] Certainly, the national security implications of the U.S.–Iran nuclear cooperative agreement of 1957 (which Congress did not even bother to hold a hearing on) now dwarfs the importance of benign trade agreements that Congress routinely votes upon. Finally, it would be useful to amend the Atomic Energy Act to require the Executive to routinely assess what the IAEA's ability is to prevent military diversions of the declared materials and activities it must safeguard and to detect undeclared covert nuclear efforts and materials. This would be in line with the recommendations of the Congressional Commission on the Prevention of WMD Proliferation and Terrorism and the most recent Defense Science Board report on monitoring nuclear threats.[4] These assessments should be shared with Congress and the IAEA. Additional routine assessments should be made of what our own intelligence system can detect. Without this baseline information, there is no way to know whether the risks of nuclear proliferation are growing or are under control.

3. *The primary point of departure for considering any revisions to the act should be security.* Any business the United Staes engages in can only be considered to be good business if it safe. If not, it's not just bad business, it's dangerous. We learned this after conducting nuclear commerce under lax conditions with India in the l960s. We learned after sharing reactor technology with North Korea with no routine IAEA safeguards in place under the Agreed Framework. We certainly are learning it now with Iran. If we do not take proper care, we may come to learn it with others including South Korea, Japan, Turkey, the UAE, and Saudi Arabia. The most recent Defense Science Board study on nuclear monitoring warns us all that the proliferation threat will be far more challenging in the future than it ever has been in the past. All of this recommends that we take our nuclear dealings and their potential security implications more seriously. We say we want South Korea not to enrich or reprocess. Yet, we have encouraged Japan to do so even now that its nuclear fleet is unlikely ever to be more than half of its pre-911 size. Worse, the State Department believes the United States should not bother taking the option of renewing its agreement with Japan even though we are insisting on doing so with our other key Asian ally, South Korea. This not only is insulting to Seoul, but reckless. If Japan ever decided to open its large reprocessing plant at Rokashho, it would be producing roughly 2,000 bombs worth of nuclear weapons usable plutonium a year. This would almost certainly prompt South Korea to initiate nuclear enrichment or reprocessing of their own as hedge or weapons option. And China? What would it do in response?

We don't know but whatever it might choose to do would likely challenge not only Japan's and South Korea's security, but our own treaty commitment to defend our Asian allies. For all these reasons, Congress should demand that our government encourage Japan to review its nuclear plans openly by calling for renegotiation of our nuclear cooperative agreement with them. We may not chose to change any of the terms of the current agreement but we should do all we can to encourage Japan to use the negotiations to clarify their own plans. More congressional review, not less will help assure the best policies are pursued.

End Notes

[1] This hearing was first requested nearly 2 years ago. See letter from Senator Richard Lugar to Senator John Kerry, February 10, 2012 available at http://www.npolicy.org/article__file/Letter__from__Senator__Lugar__to__Senator__Kerry.pdf.

[2] See Jodi Lieberman, "Nonproliferation, Congress, and Nuclear Trade: Plus ca chang, plus c'est la meme chose," CSIS Policy Perspectives (Washington, DC: CSIS November 15, 20111), available at http://csis.org/files/publication/111116__nonproliferation__congress__and__nuclear trade.pdf.

[3] U.S. Senate Committee on Foreign Relations, Treaties and Other International Agreements; The Role of the United States Senate: A Study Prepared for the Senate Foreign Relations Committee, (Washington, DC: Committee Print, January 2001), pp. 24–25. Available at http://www.gpo.gov/fdsys/pkg/CPRT-106SPRT66922/html/CPRT-106SPRT66922.htm.

[4] See Bob Graham, et. al., "World At Risk," (New York, NY: Vintage Books, 2008), pp. xx. Also see 44–46, 49–50 and U.S. Department of Defense Defense Science Board, Task Force Report: Assessment of Nuclear Monitoring and Verification Technologies, January 2014, available at http://www.acq.osd.mil/dsb/reports/NuclearMonitoringAndVerificationTechnologies.pdf.

Senator SHAHEEN. While they are changing out panels, let me just introduce the second panel who is going to be here with us. First we have Mr. Marvin Fertel, who is the president and CEO of the Nuclear Energy Institute. We have Ms. Sharon Squassoni—hopefully I am pronouncing your name correctly—director and senior fellow with the Proliferation Prevention Program at the Center for Strategic and International Studies, and Mr. Henry Sokolski—close enough? Good?—who is executive director of the Nonproliferation Policy Education Center.

Again, let me apologize to each of you for the fact that the Senate schedule has changed since this hearing was scheduled. We have four votes beginning at 11:15. So having people run back and forth probably is not the most expeditious way to do this. So if you all are agreeable, we will go right into questions.

I will pose to each of you the question that I asked Mr. Poneman. Are their potential reforms to the 123 agreement process that would improve our ability to serve what they both acknowledged was the U.S. goal? And that is to reduce proliferation of nuclear materials in the world. And I do not know who would like to answer that first.

Ms. SQUASSONI. Thank you, Senator.

May I ask? These are potential reforms for Congress to consider?

Senator SHAHEEN. You are welcome to address Congress or if you think there are things that the administration should be looking at differently, feel free to address that as well.

Ms. SQUASSONI. Well, I think members of this committee correctly identified the fact that the process itself has really limited congressional input, particularly this trend over time of increasing the duration of these agreements. So many of the agreements for the last 20 years or so have had 5-year rolling extensions, 10, and now we see the Taiwan agreement with indefinite extension.

I think that members may want to consider whether they would like to put specific language regarding extensions or some kind of congressional review. The earlier panel talked about the gold standard, should gold standard agreements have the option of

indefinite extension because that is good for nonproliferation. Deputy Secretary Poneman said, well, countries, if you have to twist their arm a little bit, might want a shorter duration. In any event, I think that Congress needs to look very specifically at that issue of duration and tie it so that there are incentives to countries.

One other point on the nuclear proliferation assessment statement. We did not talk very much about Taiwan, but Taiwan is one of the few agreements that was never renegotiated after the 1978 NNPA. And what this means for you is this is the first time that there has ever been or that you have received a nuclear proliferation assessment statement.

I would suggest—I hope that the classified version of that document details the activities that Taiwan was involved in in the 1970s and 1980s and how U.S. engagement and cooperation helped bring them back from the brink of nuclear weapons.

But what is very interesting is you might consider how you might direct the administration better to scope its nuclear proliferation assessment statements. Right now, they look almost as if they are just checking the box on all the criteria. I think you need something a little more substantial, and that is perfectly within your purview. I think that would help the process.

Senator SHAHEEN. Thank you.

Mr. Sokolski.

Mr. SOKOLSKI. First, I think it is critical that you reverse the question of how do we influence customers to stomach conditions on nonproliferation and start understanding that the real leverage is convincing other allied and friendly nuclear suppliers to come up to this plate. I think we have lost the bubble on this. Not once in the previous panel was that focused on. But that is the game. It has always been the game. It has not been the customer so much as the supplier.

In that regard, I think there have been 4 years of pleas to the Executive to be more consistent. I have a list of letters—I would love to submit them for the record—that have been sent.

Senator SHAHEEN. We will accept those for the record.

Mr. SOKOLSKI. Congress needs now to step up and say here is the deal.

I know you cannot always do this. I know there are lots of cases where we have to pay attention like India. You know, you voted for India. But the presumption has got to be if you do not do it, we are definitely going to bind us, the Congress, to review it, and that means a vote. Without a vote, you know as well as I, there have been nuclear cooperative agreements where you have not even held a hearing. I can list those if you would like.

Last of all, I think this point that Sharon has raised complies with the points that were raised by the commission I served on. Pay attention to each one of those. And I think one other.

You folks ought to expand your review. There are these deals with countries that have violated U.N. resolutions, safeguards. They are called the great frameworks. They are called interim deals. I think when that happens, you ought to be voting before they go into force. I would not tell them what they should look like. Vote on them, and believe me, they will be coming to you to ask

for your advice. Do not vote? Back of the hand. That is the way it works.

Senator SHAHEEN. Thank you.

Mr. Fertel.

Mr. FERTEL. Thank you, Madam Chairman.

I would, first of all, say I think a little bit more transparency on the process would be good for everybody, and that might even include a timeline of when they are starting and when they expect to finish and what they will be producing.

I actually would very carefully think about whether you want to be voting on this. Right now, the United States is at a disadvantage in the market. I heard what Henry said about dealing with the suppliers. The suppliers are countries, particularly the Russians who are very aggressive, the Chinese who will be aggressive. And we are competing against them.

And if I put the commercial interests aside for a second and talk about the two things that you discussed in the previous panel—mostly it was nonproliferation. My background is much more safety than nonproliferation, and I think that is a bigger risk in the near term, to be honest, than nonproliferation. You are not going to get to weapons very quickly, but you can certainly mess up in safety.

As you heard from the previous panel, we not only have the best technology from a safety standpoint, but we also have really the best safety culture, the best operating experience, and the best regulator. And us in the marketplace as a country, not just the commercial side, will make a difference on how we deal with nuclear safety, how we deal with nonproliferation, and to be honest, how we deal with addressing issues like climate change.

Senator Markey raised a number of very good points on fuels and so forth. A real advantage of the 123 process today is consent rights. So if our fuel is in a reactor, we have consent rights. It goes a little bit to what Secretary Countryman said. If they go rogue, it does not matter whether we have legal binding conditions or not. They will do what they want. But if we have consent rights, they cannot do anything without our permission. So us either providing them a reactor and they can put any fuel in it, we still have consent rights or us providing them fuel in someone else's reactor actually gives us a significant nonproliferation lever.

Senator SHAHEEN. Thank you.

Senator Corker.

Senator CORKER. Thank you, Madam Chairman.

I appreciate you being here and we apologize again for you not being able to set the tone with opening comments.

But I think there has been some allusion to this already in some of the other comments made, but do the three of you believe that the administration does have a clearly articulated approach to the 123 agreements that are being negotiated?

Mr. SOKOLSKI. In a word, no. I think they wanted to and they backed off when they realized it would cause friction with the people they were negotiating with. And if you take a look at the statements, at one point the administration officials were quoted saying, well, one standard should apply to the Middle East but we do not need to apply it to Asia. Now they have backed off that because they feel the pressure coming from this committee. Fine.

First it was about reactors. Well, we can sell reactors. Vietnam is the biggest market in Asia they claimed. Now, of course, Vietnam announced it is not even going to build its first reactor for 6 years. So now it is about fuel.

I think you need to understand that unless you bring these agreements before the committee and you exercise your authority to approve them, it does not matter what they do. They will be able to do it. And the reasoning will change country to country because Vietnam—that is an agreement about China I think and pressuring China. The agreement about the UAE. Well, there are other things going on. In other words, these agreements are poor man's mutual security pacts as much as they are about nuclear commerce. If indeed this is about selling nuclear fuel after all, you need to keep in mind there is no way on God's green earth the United States is going to dominate that market any more than it is going to dominate reactor sales. Therefore, if we do not use our leverage with the suppliers—and we do have leverage, and I can go through that if you would like—to get them to raise their standards, you have lost the ball. And you will not get the Executive to lean on those suppliers unless they realize they have to to get their agreements past you. It is hard ball, but that is the way it is played.

I have watched this as long as Mr. Poneman. He and I are contemporaries, and we both went to the same schools and we studied the same things. We ended up in different places as to how we think, but I do not think he would disagree about that point. Not at all.

Senator CORKER. Others?

Ms. SQUASSONI. Thank you. I am not a contemporary. I am younger, Henry. [Laughter.]

Senator CORKER. It is very noticeable too.

Ms. SQUASSONI. Thank you.

But I fundamentally agree with you. I understand. I did work in the Arms Control and Disarmament Agency in the State Department. I understand the need for diplomatic flexibility. But when you do not have a consistent policy, what you will come up against as a negotiator is one country, such as South Korea, arguing that we are just as good an ally as the next country. Why are you not providing us those benefits? So I think that our negotiating position would actually be stronger with a consistent policy. And it is not just on whether or not a country should foreswear enrichment and reprocessing but this issue of consent rights. That is exactly what we are—and they are very important—coming up against in the ROK agreement.

One last point. The administration should not undersell the value of building norms in our 123 agreements. A lot of the multilateral improvements that we have made came from national policies. You need those national policies such as full-scope safeguards as a requirement of supply. Countries did that individually before the Nuclear Suppliers Group managed to get it. So I think we do need more consistency.

Mr. FERTEL. I actually thought that Deputy Secretary Poneman and Assistant Secretary Countryman certainly stayed to one standard that they talked about, which was to control the fissile mate-

rial. And what they are saying is that they are looking at the toolbox for doing that.

I do not think—and again, Sharon and Henry are much more steeped in this than I am. I do not think that since the 1978 amendments, in any agreement we have signed, anybody has gone and done anything from the standpoint of weapons development. And I think that since that time, as a country and also as a world with the enhanced safeguards that IAEA has come out with and we mandate and require, we probably have improved the process.

As far as actually the committee approving things all the time, with all due respect, one of the problems that I have from a commercial business standpoint this time is the uncertainty it creates, not that you will disapprove. I am willing to accept you are allowed to do that and you might. It is the time. We are competing against really other—not just other competitors, not other suppliers but governments, and they can offer a lot of things that the United States actually cannot from the standpoint of even financing at times, even taking spent fuel back, which the Russians are willing to do. We think that would be a good thing for our country to be able to do, but until we have our own program working, it is very hard to discuss that in America.

So I would caution gravely against moving to an approval process without a lot more discussion of the impact of unintended consequences where all we would do is not get agreements or get agreements that nobody ever exercises on the other side.

Mr. SOKOLSKI. Might I add? I actually agree with Marvin. If you do law, get the vote on a time-certain basis. The idea, though, that Congress should somehow see that it is an impediment to the review process or somehow is going to be unhelpful—I do not think that is right. You can do this. You put a time limit on how you vote and you get it done. You can tighten up the current process for sure.

Senator CORKER. So we are both going to have to run for a vote. But just briefly, how much of a rub is there? First of all, I am a strong proponent of nuclear energy, and I come from a State that, generally speaking, strongly supports nuclear energy, and I hope we continue along that path here in the United States.

On the other hand, look, I have been in business too for a long time, and I understand the rubs that can exist. Is there pressure on the administration and other administrations from the nuclear industry to pursue agreements in a way that water down some of the standards in order to get them done to be able to compete appropriately against other countries? And I will ask you, Mr. Fertel, only and if you think he said something totally inappropriate, respond. Otherwise, we are probably going to bolt.

Mr. FERTEL. Thank you, Senator Corker.

The simple answer, to be honest, is no. From my personal perspective, let alone our whole industry, the last thing we ever want to see are accidents from a safety standpoint or proliferation out of control. Okay. That is absolutely the last thing we would ever want as an industry is to have that happen.

The pressure that I think we try to put on is actually timely behavior by the administration, whichever one it is, and greater transparency. But it is never to cut corners. And to be honest, in

this country we never know what they are saying anyway. They do not tell us anything. In other countries, the industry may even know because the industry is owned by the government and they do it collaboratively.

But the answer to your question, sir, is absolutely not.

Senator CORKER. Well, Madam Chairman, thank you for letting me go over a little bit.

I thank the three of you for being here, and if you do not object, since we did not really have the full kind of discussion we normally have, our office would like to follow up with you all and ask additional questions. But thank you so much for being here. I appreciate it.

Senator SHAHEEN. Thank you and thank you all very much.

Let me just point out, as Senator Corker suggested, we will leave the record open until close of business tomorrow for other questions.

Yes, sir?

Mr. SOKOLSKI. Madam Chairman, is it possible for us to submit an oral version of our statement in addition to the statement if they are different?

Senator SHAHEEN. Absolutely. If you have additional comments that you would like to submit, please do that. We will include it in the record.

Mr. SOKOLSKI. Okay, because there are several things I need to submit. Thank you.

Senator SHAHEEN. Good. Thank you.

[Whereupon, at 11:30 a.m., the hearing was adjourned.]

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

A Statement and Seven Letters Submitted by Henry Sokolski:

PREPARED STATEMENT OF VICTOR GILINSKY, ENERGY CONSULTANT AND SERVED AS A NUCLEAR REGULATORY COMMISSIONER UNDER PRESIDENTS FORD, CARTER, AND REAGAN

The issue before the committee—what standard to apply to U.S. nuclear exports—is one Congress and the Executive have struggled with since the beginning of the nuclear age.

A bit of history provides a useful perspective on current arguments.

The security dangers associated with nuclear fuel technologies were clear from the beginning. A country that can enrich uranium, or reprocess spent fuel to extract plutonium is within easy reach of the Bomb.

In the early days of the cold war, despite an awareness of the dangers, we could not resist taking political and commercial advantage of our then-leading position in nuclear technology. Atoms for Peace, launched by President Eisenhower, allowed worldwide access with minimal protection to most of our nuclear technology, including reprocessing. The 1954 version of Section 123 of the Atomic Energy Act, covering agreements for cooperation, hardly required more than a recipient's promise to stick to peaceful uses.

President Eisenhower rationalized that so long as projects were small, they did not pose problems. But information flow did pose a problem, and in time nuclear projects got bigger.

The shock of the 1974 Indian nuclear explosion brought home how easily plutonium separated for "peaceful purposes" can end up in a bomb. It became evident that effective nonproliferation had to include restrictions on fuel cycle technologies. In 1975 the United States took the lead in creating the Nuclear Suppliers Group as a way of informally plugging the gaps in permissive trade rules.

In 1976 President Ford changed U.S. nuclear policy to exclude plutonium separation. He urged other countries to adopt the same course until "the world community

can effectively overcome the associated risks of proliferation." President Carter continued in this direction.

The 95th Congress was powerfully affected by the discovery that India had used U.S.-supplied heavy water to produce its bomb plutonium, in violation of a peaceful uses pledge. In the 1978 Nuclear Non-Proliferation Act, Congress substantially tightened Section 123 provisions, including adding the requirements that recipients accept comprehensive IAEA safeguards on all their facilities and prior U.S. consent over reprocessing of U.S.-supplied materials.

That was the "gold standard" of the time. It required renegotiating some agreements for cooperation—a process strongly, and even bitterly, opposed by commercial interests.

It was said we would lose business and jobs to nuclear suppliers with laxer rules, and that only if we are a major exporter and apply flexible rules will we have the leverage to influence recipients to act responsibly ("you have to play the game if you want a hand in setting the rules").

We hear the same arguments repeated today in opposition to including the current "gold standard"—which requires a country buying U.S. power plants to promise not to enrich or reprocess—in future Section 123 agreements. The standard reflects our increased understanding that centrifuge technology threatens to make uranium enrichment widely available; and that there is no economic rationale for reprocessing so that it should have no place in the commercial nuclear fuel cycle.

The fundamental question before us, now as in the past, is one of priorities. Which comes first—short-term commercial gain, or long-term national security? Do we accept prevailing standards, and stamp as futile any hope of reining in dangerous nuclear technologies? Or do we set higher standards, and provide leadership to convince the rest of the world to aim higher, too?

President Ford's 1976 answer was: "We must be sure that all nations recognize that the U.S. believes that nonproliferation objectives must take precedence over economic and energy benefits if a choice must be made." We need such leadership today, because ultimately the only way we can make the gold standard stick is by persuading countries that it is in their interest.

Business and jobs are of course important, but it needs to be said that the jobs issue has been very much exaggerated. The projections of future nuclear capacity that are tossed about by opponents of tighter export standards are based on extremely bullish IAEA forecasts and equally overly optimistic estimates of the U.S. share of foreign business. Recall that India was held out as a case where U.S. nuclear business prospects were excellent if we only relaxed our export restriction. We did that in 2008—at great political cost among Non-Proliferation Treaty members—and have yet to see any business.

As to the notion that flexible export rules gain us leverage—history tells us that when the circumstances require using our leverage the flexibility proponents argue strenuously against applying it. The truth is that flexibility is just code for going with the flow.

There remains the immediate legislative question whether Congress should at least have to explicitly approve non-gold standard 123 agreements. That it should makes good sense, especially as gold standard waivers could have far-reaching national security consequences. In fact, the entire process of negotiating 123 agreements would be improved if Congress had a greater role.

This may be our last chance to craft a system of rules on the international use of nuclear energy that is compatible with international security. It's important to understand there is no technical fix. As a 2006 Bush administration nuclear strategy paper underlined (the italics were in the original), *"there is no technology 'silver bullet' that can be built into an enrichment plant or reprocessing plant that can prevent a country from diverting these commercial fuel cycle facilities to non-peaceful use."*

Our choice is to do the hard but necessary thing, or resign ourselves to a world full of countries with fuel facilities that put them within arm's reach of a bomb. It is to avoid that future that we need strict 123 agreements.

FEBRUARY 14, 2012.

Hon. BARACK OBAMA,
President of the United States,
The White House, Washington, DC.

DEAR PRESIDENT OBAMA: We write to urge you to uphold the so-called nonproliferation "Gold Standard" in all future U.S. civil nuclear cooperative agreements with countries that lack nuclear weapons. This new standard—which was created

by the U.S. civil nuclear cooperation agreement with the United Arab Emirates (U.A.E.) that President Bush began and that you finalized—requires non-nuclear-weapons states not only to forgo uranium enrichment, spent-fuel reprocessing, and other nuclear fuel-making activities, but also to open themselves up to intrusive international inspections.

The nonproliferation Gold Standard enjoys strong bipartisan support because it creates a powerful model for constructive nuclear behavior throughout the world—one that isolates Iran's dangerous efforts to acquire nuclear weapons capability in violation of its international obligations. News reports, however, suggest that your administration has decided to abandon this standard in favor of a "case-by-case review." We believe that dropping this standard is a prescription for nuclear proliferation mischief that will only embolden Iran and other potential nuclear weapons-seeking states.

The "case-by-case" approach risks displeasing our friend, the United Arab Emirates. The Emirates was asked to meet the nonproliferation Gold Standard and obliged. The U.A.E. agreement, however, stipulated that if the United States negotiates more generous terms with any other Middle Eastern state, then the Emirates has a right to demand similar treatment. If your administration takes the "case-by-case" approach in negotiating future civil nuclear cooperation agreements with Jordan, Saudi Arabia, and other countries, then this will only ensure the undoing of the new standard entirely. Undermining our good relations with the Emirates would only add insult to this injury.

More important, if the United States is willing to allow Vietnam, Jordan, or South Korea to make nuclear fuel—a process that brings nations to the very brink of acquiring nuclear weapons—how will the United States and its supporters be able to persuade other states, including Iran, to forgo such dangerous nuclear activities? The question answers itself.

The counterargument made by officials in the State and Energy Departments is that the United States must be in the nuclear export business to have any hope of controlling it, and that tightening nonproliferation conditions on U.S. nuclear exports will only reduce America's sales opportunities. This line of argument, however, is misguided and poorly informed. Certainly, after the Fukushima nuclear disasters in Japan, demand for nuclear power has declined, especially for reactors from U.S. vendors, all of whom require the prospective recipient to forswear ever suing them in the case of a nuclear accident. As such, new significant exports of controlled U.S. nuclear goods are unlikely.

Instead, the United States itself is an important market for foreign nuclear fuel-making and reactor vendors. Rather than abandon efforts to tighten nonproliferation controls on civil nuclear exports, the United States should be leveraging access to our market to encourage French, Russian, and Asian nuclear suppliers to tighten their own rules to meet the nonproliferation Gold Standard.

We stand ready to support you in making such an effort. We certainly believe the current course that you have reportedly set is the wrong one.

Sincerely,

John R. Bolton; Stephen J. Hadley; Kori Schake; Jack David; John P. Hannah; Gary J. Schmitt; Paula A. DeSutter; Robert G. Joseph; Henry D. Sokolski; Eric S. Edelman; Clifford D. May; William H. Tobey; Jamie M. Fly; Gary Milhollin; Mark D. Wallace; Christopher A. Ford; Samantha Ravich; R. James Woolsey; Victor Gilinsky; Henry S. Rowen; Dov S. Zakheim.

NOVEMBER 15, 2010.

President BARACK OBAMA,
The White House,
Washington, DC.

DEAR MR. PRESIDENT: We are writing to ask that you begin to apply a more forward-leaning policy to prevent the international spread of easy-to-militarize nuclear fuel making activities, such as uranium enrichment and spent fuel recycling. As part of this policy, we believe the U.S. Government should declare that it will not provide U.S. federal energy loan guarantees, federal contracts, or other subsidies or assistance to help foreign government-backed nuclear firms expand their nuclear business in the U.S. unless they have committed to apply the nonproliferation standards (including with respect to enrichment and spent fuel recycling) established in the U.S.-United Arab Emirates (UAE) civilian nuclear cooperation agreement in all of their future civilian nuclear cooperation agreements.

Consistent with this policy, we urge you not to grant Electricité de France (EDF), a French Government-owned utility, any federal energy loan guarantees for the construction of a new nuclear power plant at Calvert Cliffs, Maryland, unless the French Government is willing to uphold the nonproliferation standards established in the U.S.-UAE agreement in its future civilian nuclear cooperation agreements. Further, we recommend that the $2 billion conditional loan guarantee recently approved by the U.S. Department of Energy (DOE) to Areva, another French Government-owned firm, to build a uranium enrichment facility in Idaho be conditioned upon adoption by the French Government of these standards.

Some of the signatories below oppose federal loan guarantees for any energy commercialization project. A few oppose loan guarantees specifically for commercial nuclear energy; and a smaller number have taken no position on the general advisability of federal energy loan guarantees. Yet, all of us believe that it makes no sense for our government to help foreign firms expand their nuclear business in the U.S. with federal loan guarantees, government contracts, or Nuclear Regulatory Commission licenses unless they are willing to support the very toughest nuclear nonproliferation standards our own government has developed in the U.S.-UAE deal.

Under the U.S.-UAE deal, initially negotiated under the Bush administration but refined and finalized under yours, the U.S. extended nuclear cooperation and the sale of U.S.-controlled nuclear goods in exchange for the UAE promising not to enrich uranium or recycle spent fuel and to ratify a enhanced nuclear inspection agreement known as the Additional Protocol with the International Atomic Energy Agency. This set of sound nonproliferation conditions was rightly hailed as a major nonproliferation breakthrough. Unfortunately, too little was done to get other major nuclear supplier states, including close allies such as France, to adopt a similar set of nonproliferation conditions.

We are concerned that approving $9.5 billion dollars in federal loan guarantees to help the French Government expand its nuclear business here in the U.S. without first securing its commitment to support the nonproliferation standards of the U.S.–UAE agreement will set a bad precedent. First, it cannot help but be seen as a reward to a nuclear supplier that has given U.S. nonproliferation policy insufficient support. Second, a key argument that U.S. policy makers (both Democratic and Republican) have made repeatedly is that nuclear fuel making (uranium enrichment and recycling of spent reactor fuel) is unnecessary and uneconomical for emerging nuclear power programs. Certainly, our government's willingness to assume virtually all of the financial risks associated with several domestic reactors and nuclear fuel plant projects demonstrates that they are not yet commercially viable in the U.S. either. If the U.S. Government is willing to assume these financial risks, on what grounds can our government argue that other governments should not do likewise?

In this regard, limiting future federal assistance to building only power reactors in the U.S. would do little to reduce this moral hazard. The reason why is plain: First-generation nuclear fuel making facilities generally cost much less to build than new, large nuclear power plants. If our government is willing to massively subsidize the construction of new nuclear power plants, it naturally follows that the lack of profitability of much less expensive fuel making facilities should weigh even less in other governments' calculations.

These points are basic. The success of U.S. efforts to reduce the dangers of nuclear proliferation depends critically upon the U.S. upholding the standards it sets and doing all it can to encourage others to do likewise. That is why we believe that guaranteeing billions of dollars in federal loans to foreign nuclear suppliers, such as EDF, to expand their nuclear business in the U.S. without first requiring such suppliers to uphold the nonproliferation standards that U.S. nuclear vendors must live by is not just bad business, but dangerous.

Respectfully,

Henry Sokolski, Executive Director, The Nonproliferation Policy Education Center, DOD Deputy for Nonproliferation Policy under Bush (41);
Charles Ferguson, President, Federation of American Scientists;
Jamie Fly, Executive Director, Foreign Policy Initiative, NSC director for Counterproliferation Policy under Bush (43);
Jeffrey Kueter, President, George C. Marshall Institute;
Victor Gilinsky, U.S. Nuclear Regulatory Commissioner under Ford, Carter, and Reagan;
Henry S. Rowen, Hoover Institution, Assistant Secretary of Defense under Bush (41), Chairman of the National Intelligence Council under Reagan;
Daryl Kimball, Executive Director, Arms Control Association;

Stephen Rademaker, Assistant Secretary of State for Arms Control and Nonproliferation under Bush (43);
Peter Bradford, University of Vermont, U.S. Nuclear Regulatory Commissioner under Carter;
Thomas Cochran, Chief Nuclear Scientist, Natural Resources Defense Council;
Chris Ford, Hudson Institute, U.S. Representative to NPT Review Conference under Bush (43);
David Albright, President, Institute for Science and International Security;
Mark Wallace, President, United Against Nuclear Iran, U.S. Ambassador to the U.N. under Bush (43);
Gary Milhollin, Director, Wisconsin Project on Nuclear Arms Control;
Frank Von Hippel, Princeton University, Assistant Director for National Security in the White House Office of Science and Technology Policy under Clinton;
Jack David, Hudson Institute, Deputy Assistant Secretary of Defense for Combating WMD and Negotiations Policy under Bush (43).

SEPTEMBER 20, 2012.

Hon. BARACK OBAMA,
President of the United States,
The White House, Washington, DC.

DEAR MR. PRESIDENT: We are encouraged by reports that Taiwan has embraced the nonproliferation "Gold Standard" for civil nuclear activities in the forthcoming renewal of its existing nuclear cooperative agreement with the U.S., expressly giving up enriching uranium and recycling spent fuel to extract plutonium. We are concerned, however, that the State Department may not secure similar commitments in negotiations for civil nuclear cooperation agreements with Saudi Arabia, South Korea, Jordan, Vietnam, and other non-nuclear-weapon states. We therefore urge you to clarify U.S. policy on seeking such commitments before either negotiating or initialing any additional civil nuclear cooperation agreements beyond that with Taiwan.

As recent experience with Iran demonstrates, mastery of the technical steps involved in making nuclear fuel brings states perilously close to acquiring nuclear weapons. That is why the U.S. civil nuclear cooperation agreement with the United Arab Emirates (U.A.E.), which entered into force in December 2009, was path-breaking. Through this agreement, the U.A.E. pledged not only to foreswear nuclear fuel-making activities, but to sign and implement the so-called "Additional Protocol," which allows the International Atomic Energy Agency to conduct much more intrusive nuclear inspections than those permitted under standard safeguards agreements.

When the text of the U.S.-U.A.E. nuclear agreement was made public, the State Department described it as creating a new nonproliferation "Gold Standard" for civil nuclear cooperation agreements. At the time, you praised the agreement as a "tangible expression" of America's desire to cooperate to develop peaceful nuclear power with states in "the Middle East, and elsewhere" in "a manner consistent with the highest nonproliferation, safety and security standards." Yet, in an unfortunate reversal of policy earlier this year, senior officials from the State and Energy Departments told Congress in a letter that they believed efforts to universally apply the new standard would disadvantage the U.S. nuclear industry and, as a consequence, the U.S. instead would take a "case-by-case" approach.

We understand that in response to congressional and public criticism of the decision to abandon the nonproliferation "Gold Standard," the executive branch launched an interagency review, which the State Department has now completed and submitted to the National Security Council.

Defining the nonproliferation conditions the United States intends to place on its civil nuclear cooperation in general is essential to protecting U.S. interests, and we believe requiring that the "Gold Standard" be met in all U.S. nuclear cooperative agreements with states that lack nuclear weapons is the necessary set of conditions to achieve that end.

Indeed, we believe our government should not only support such requirements, but actively encourage other nuclear supplier states to do so as well. Therefore, we urge you to end the ambiguity that has arisen concerning this vital issue and to clearly state that it is U.S. policy to apply the "Gold Standard."

Sincerely,

Congressman Howard L. Berman; Ambassador John R. Bolton; Peter A. Bradford; Charles D. Ferguson; Jamie M. Fly; Congressman Jeff Fortenberry; Victor Gilinsky; Daryl G. Kimball; Jodi Lieberman; Con-

gressman Edward J. Markey; Gary Milhollin; Christopher E. Paine; Kingston Reif; Congresswoman Ileana Ros-Lehtinen; Congressman Ed Royce; Congresswomen Loretta Sanchez; Gary J. Schmitt; Congressman Brad Sherman; Henry D. Sokolski; Leonard S. Spector; William H. Tobey; Leonard Weiss.

Department of Energy
Washington, DC 20585
DEC 2 8 2010

Mr. Henry Sokolski
Executive Director
The Non Proliferation Policy Education Center
1601 North Kent Street
Suite 802
Arlington, VA 22209

Dear Mr. Sokolski:

Thank you for your November 15, 2010, letter to President Obama regarding the Department of Energy's (DOE) Loan Guarantee Program (LGP). In your letter you express concern regarding issuing of federal loan guarantees to foreign government-backed nuclear firms when those governments have not adopted the nonproliferation standards established in the U.S. – United Arab Emirates (UAE) civilian nuclear cooperation agreement. You specifically have mentioned two particular French companies who are involved in the loan guarantee process, Electricite de France (EDF) and AREVA. Your letter has been referred to me for reply.

For some background, the LGP was established by Title XVII of the Energy Policy Act of 2005 (EPAct), which authorizes DOE to issue loan guarantees to eligible projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" and "employ new or significantly improved technologies as compared to technologies in service in the United States at the time the guarantee is issued". A principal purpose of the program is to encourage early commercial use of new or significantly improved technologies in energy projects in the United States. DOE believes that accelerated commercial use of new or improved technologies will help to sustain economic growth, yield environmental benefits, and produce a more stable and secure energy supply. All loan guarantees issued by DOE must comply with EPAct, and the regulations issued to implement Title XVII (the Regulations).

The Department of Energy's Loan Guarantee Program (LGP) currently requests applications by issuing technology specific solicitations. Each application goes through a thorough review process. The purpose of this review is to establish the technical, financial, environmental, and legal soundness of the proposed project as well as the project's eligibility for a loan guarantee under the terms set forth by the program and the solicitation. Each review is conducted by experts in their field, and we strive to provide project sponsors with a response in a timely fashion.

In December 2009, a US-UAE bilateral agreement for peaceful nuclear cooperation went into force, enhancing international standards of nuclear non-proliferation, safety and security. Known as a "123 Agreement," the pact establishes a required legal framework for commerce in civilian nuclear energy between the two countries.

All governmental programs must adhere to the existing policies of the Administration. President Obama places the highest priority on ensuring that the development of nuclear energy around the world proceeds in accordance with the highest nonproliferation standards. The nonproliferation provisions contained in U.S. civil nuclear cooperation agreements, including our agreement with UAE, are a reflection of the importance that the United States places on nuclear nonproliferation. The LGP will continue to ensure that any loan issued by the Department of Energy will be done so in accordance with Administration policy.

Please note that all nuclear projects that receive a conditional commitment for a federal loan guarantee through the Loan Programs Office are required to obtain a license from the Nuclear Regulatory Commission (NRC) authorizing construction and operation prior to financial closing, which ensures adherence with the Atomic Energy Act and NRC regulations. Additionally, all safety related components of any new nuclear reactor must also meet current NRC standards.

Let me assure you that the Department is committed to promoting the objectives of the Title XVII program as well as its nonproliferation policies. The LGP is dedicated to accelerating the commercial use of technologies that will help sustain economic growth, yield environmental benefits, and produce a more stable and secure energy supply, while maintaining program objectivity and protecting the interests of the American taxpayer.

If we can be of further assistance, please do not hesitate to contact Ms. Julie Offner, External Affairs for the Loan Programs Office at (202) 586-2111.

Sincerely,

Jonathan M. Silver
Executive Director
Loan Programs Office

One Hundred Twelfth Congress
U.S. House of Representatives
Committee on Foreign Affairs
2170 Rayburn House Office Building
Washington, DC 20515
www.hcfa.house.gov

February 14, 2012

The Honorable Daniel B. Poneman
Deputy Secretary of Energy
Department of Energy

The Honorable Ellen O. Tauscher
Under Secretary of State for Arms Control and International Security
Department of State

Dear Deputy Secretary Poneman and Under Secretary Tauscher:

I write to express my great concern regarding the Administration's newly announced policy concerning nuclear cooperation agreements as outlined in your letter of January 10, 2012, particularly the decision to not require new partners to forgo the acquisition of a capability to produce nuclear fuel, either by enriching uranium or reprocessing plutonium (ENR).

This reversal on an issue of central importance to U.S. national security cannot but undermine our urgent efforts to stop Iran from acquiring nuclear weapons, as the U.S. apparently will now be in the business of promoting nuclear programs throughout the Middle East and beyond, perhaps even including countries that are interested in their use for military purposes.

As you are aware, the Administration's original policy on this issue resulted from Congressional concerns regarding the proposed nuclear cooperation agreement with the United Arab Emirates (UAE). Those concerns were prompted not only by the prospect of U.S. nuclear assistance being provided to a country with a long record as a conduit for the flow of banned items to and from Iran, but also the possibility that such an agreement would contribute to the proliferation of nuclear programs throughout the region. The Administration's response to the first concern was to secure a binding commitment by the UAE to forgo the acquisition of an ENR capability, along with other measures such as the establishment of an effective export control regime. The response to Congress' concern regarding proliferation was the adoption of a policy to require a similar no-ENR provision in future 123 agreements, especially in the Middle East, which was termed the "gold standard" by the State Department's own spokesman.

The newly announced policy almost completely reverses this. Although your letter states that the Administration will present Vietnam, and presumably all potential partner countries, with an unspecified "spectrum of options" regarding ENR, at no point does it indicate that any country will ever be required to forgo acquiring this capability. Given that it is unlikely that many countries will freely impose binding restrictions on themselves when given a choice, any request by the U.S. that they do so would be interpreted by all as little more than a pro forma exercise.

Nuclear programs are rapidly proliferating throughout the Middle East, fueled by the specter of a nuclear-armed Iran. Although all are presented as being entirely peaceful in intent, as you are aware, there is no sharp division between civilian and military programs, as much of the infrastructure, technology, and expertise needed for the former can be used for the latter. This is especially true regarding ENR, where there is virtually no dividing line at all.

I understand the importance of commercial and political considerations in evaluating nuclear cooperation agreements. However, it is a profound mistake to relegate proliferation to the sidelines, especially in so volatile an area of the world as the Middle East. I need only note that, despite the recent and well-publicized statement by Prince Turki al-Faisal that Saudi Arabia was considering the possibility of acquiring nuclear weapons, it appears that the Administration has decided to proceed with negotiations for a nuclear cooperation agreement with that country. The decision to assist a country to develop a nuclear program after a senior member of the ruling family has stated that it may be used to produce nuclear weapons is quite simply astonishing.

The Administration's new policy cannot help but undermine our efforts to prevent the proliferation of nuclear weapons throughout the Middle East and beyond and therefore is certain to have a profoundly negative impact on the fundamental interests and national security of the United States, as well as that of our allies.

For these reasons, I strongly oppose this reversal of policy and respectfully request the Administration to reconsider its decision and also to make certain that any country with which the U.S. may negotiate a nuclear cooperation agreement understands that failure to fully address this issue will inevitably result in corrective action by the Congress.

Sincerely,

ILEANA ROS-LEHTINEN
Chairman

Congress of the United States
Washington, DC 20510

August 23, 2010

The Honorable Barack Obama
President
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Dear President Obama:

We write to urge you to make any civilian nuclear cooperation agreement (123 agreement) with Vietnam contingent upon strong nonproliferation protections. We support efforts to promote a strong bilateral relationship with Vietnam. Such an agreement should, at a minimum, include provisions which follow the precedent set by the 123 agreement with the United Arab Emirates (U.A.E.). In that, the U.S. made nuclear cooperation dependent on the U.A.E.'s commitment to forgo uranium enrichment and reprocessing capabilities, which pose intrinsic risks of nuclear weapons proliferation. We are concerned by reports that an agreement with Vietnam is under negotiation which would not include such an understanding or require ratification of the Additional Protocol.

We note your statement in Prague in 2009 that, "[w]e need a new paradigm for civil nuclear cooperation that allows all countries to enjoy the benefits of nuclear power, while avoiding the spread of nuclear weapons and technologies." That new paradigm exists.

As the Under Secretary of State for Arms Control and International Security testified in July of 2009 when your administration pledged its support for the cooperation agreement negotiated with the U.A.E. by the previous administration, "In sum, the robust nonproliferation features of the U.A.E. 123 Agreement is a significant achievement and an example of a country that has concluded that indigenous fuel cycle capabilities are not needed to fully enjoy the benefits of civil nuclear energy." We agree with this statement recognizing that non-nuclear weapons states do not need enrichment or reprocessing technology to benefit from the peaceful uses of nuclear power.

While the Nuclear Non-Proliferation Treaty protects the right of parties in good standing to pursue nuclear energy, it was intended primarily to prevent the spread of technologies necessary to develop a weapons program. The export of enrichment and reprocessing technologies inherently advances the ability of foreign nations to produce nuclear weapons and should be carefully circumscribed. As you said in your 2009 Prague speech, "[i]n a strange turn of history, the threat of global nuclear war has gone down, but the risk of a nuclear attack has gone up…[t]he technology to build a bomb has spread."

We are, therefore, very troubled by reports, such as the one that recently appeared in the *Wall Street Journal,* that your "administration is in advanced negotiations to share nuclear fuel and technology with Vietnam in a deal that would allow Hanoi to enrich its own uranium…[and] would undercut the more stringent demands the U.S. has been making of its partners in the Middle East." While the memorandum of understanding between our nations on nuclear cooperation mentioned Vietnam's intent to rely on the international fuel market, we note that this language is nonbinding.

We understand that the purpose of the restrictions in the U.A.E. agreement was to prevent proliferation in the Middle East. However, the threat of proliferation is not limited to that region. Indeed, the emergence of a perceived double standard could undermine the progress made to date in the Middle East.

Failure to include similar restrictions in any deal with Vietnam could work against U.S. leadership and credibility on non-proliferation at a time when both are needed to halt Iran's illicit nuclear program, roll back the illegal program of North Korea, and convince nations like Syria and Burma not to pursue these weapons. Such a deal could send ripples through the Middle East at a time when numerous nations in the region are themselves considering nuclear power and may be hedging their bets about the likelihood that Iran's illicit program can stopped. Further, it could weaken the position of the United States with regard to the bid by the People's Republic of China to sell two new nuclear power plants to Pakistan, in violation of the obligations China agreed to in exchange for membership in the Nuclear Suppliers Group in 2004.

It is crucial to international security that the United States continues its leadership in preventing nuclear proliferation. In support of this, we urge that your Administration not agree to nuclear cooperation under standards less stringent than those agreed to with the U.A.E.

Sincerely,

JON KYL
United States Senator

RUSSELL D. FEINGOLD
United States Senator

DANIEL K. AKAKA
United States Senator

JOHN ENSIGN
United States Senator

JEFF FORTENBERRY
United States Representative

EDWARD J. MARKEY
United States Representative

RICHARD G. LUGAR
INDIANA
[illegible]

United States Senate

WASHINGTON, DC 20510-1401

February 10, 2012

The Honorable John F. Kerry
Chairman
Committee on Foreign Relations
United States Senate
Washington, D.C. 20510-6225

Dear Chairman Kerry:

I write to request that the Committee hold a hearing in the near future on the Obama Administration's policy with respect to civil nuclear cooperation with foreign countries and its implications for U.S. security from nuclear threats.

Last month, Deputy Secretary of Energy Daniel B. Poneman and former Under Secretary of State for Arms Control and International Security Ellen O. Tauscher wrote to us regarding a significant development in the Administration's policy in this area. The letter stated that, in negotiating new agreements for peaceful nuclear cooperation with other countries, the Administration intends to seek on a "case-by-case basis" – rather than in all cases – commitments prohibiting uranium enrichment and the reprocessing of irradiated nuclear material.

This decision by the Administration appears to abandon insistence in such agreements on what had become known as the "Gold Standard" for nonproliferation security. This standard is reflected in the U.S. nuclear cooperation agreement with the United Arab Emirates, which was negotiated by both the Bush and Obama Administrations. It includes a commitment by the foreign government that it will neither enrich nor reprocess on its territory. If applied consistently in future agreements, this standard could become a bulwark against further countries engaging in enrichment and reprocessing and eliminate opportunities for potential proliferators to gain access to such technology and materials.

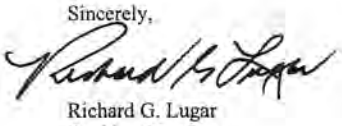
Recent media reports have identified concerns with the Administration's policy shift. An enclosed editorial from *The New York Times* (aptly titled "Shall We Call It the 'Bronze Standard'?") provides a good summary of such trepidations. Additionally, a recent article from *The Jordan Times* appears to state that the Government of Jordan believes the United States will not seek the Gold Standard in the civil nuclear cooperation agreement the Administration is negotiating with Jordan, is also enclosed. This article also suggests the possibility of negotiations with Saudi Arabia for such an agreement.

Hearings on this topic will allow members of the Committee to gain a better understanding of the implications of the Administration's policy for our nuclear cooperation and non-proliferation security objectives. These issues will be important when the Senate is called upon to consider resolutions to approve or disapprove future nuclear cooperation agreements concluded by the

Executive Branch. Members views on these matters may also help inform the Administration's approach in future negotiations about such agreements.

I appreciate your consideration of my request and look forward to working with you on this important matter.

Sincerely,



Richard G. Lugar
Ranking Member

RESPONSES OF HON. THOMAS COUNTRYMAN TO QUESTIONS SUBMITTED BY SENATOR ROBERT MENENDEZ

Question. I understand that Vietnam was willing to declare its intention, which is not legally binding, to only use foreign-supplied fuel for foreign-supplied reactors. That is close to the Gold Standard, if Vietnam cannot build its own reactors; call it, the "Silver Standard."

♦ My question is, why wasn't Vietnam required to make this lesser, but still important, statement of intent into a binding part of its new agreement? Have you asked them to do that?

Answer. Our approach to 123 agreements allows for flexibility in structuring the legal and political commitments while meeting the requirements for U.S. law and maintaining our principled stance that seeks the fewest number of additional weapons and enrichment and reprocessing facilities around the world. The United States firmly believes that it is in our national interest to enter into 123 agreements with as many countries as possible so that we can maximize the reach of U.S. nonproliferation controls, which are the most stringent in the world.

With respect to Vietnam, the United States secured a political commitment from the Government of Vietnam to rely on the existing international market to satisfy their need for nuclear fuel services, rather than acquiring sensitive nuclear technologies. Vietnam has stated that it has no intent to enrich or reprocess nuclear material, and lacks the capability to do so. Given that there is no evidence that Vietnam has interest, activity, or capability in the ENR area, the United States concluded the agreement that incorporates the Vietnamese political commitment in the context of other legally binding U.S. nonproliferation controls contained in all 123 agreements.

Along with the terms of the 123 Agreement, the United States also secured Vietnam's support for significant nonproliferation initiatives and steps. Since 2010, Vietnam has:

- Brought into force an Additional Protocol with the IAEA;
- Brought into force the Convention on the Physical Protection of Nuclear Materials;
- Endorsed the Global Initiative to Combat Nuclear Terrorism;
- Completed conversion of the Dalat reactor from using HEU fuel to LEU and returned the last of its HEU fresh fuel and spent fuel to Russia;
- Acceded to the Convention on Nuclear Safety; and
- Brought into force the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Question. When China joined the Nuclear Suppliers Group—a move that the United States had to support, since the NSG operates on consensus—it agreed not to provide nuclear reactors to countries that do not have comprehensive IAEA safeguards on all their nuclear activities. Yet, China continues to build new reactors in Pakistan, which does not have such comprehensive safeguards; this arguably weakens the NSG.

- What price should China pay for such noncompliance? Should it be an issue when a new China cooperation agreement comes to the Congress next year?

Answer. China's expanding civil nuclear cooperation with Pakistan raises serious concerns and we urge China to be more transparent regarding this cooperation.

The United States believes that the announced agreement for Chinese provision to Pakistan of new nuclear reactors extends beyond cooperation that was "grandfathered" when China was approved for Nuclear Security Group (NSG) membership in 2004. NSG Participating Governments have discussed the issue of China's expansion of nuclear cooperation with Pakistan at the last several NSG plenary sessions, with the United States and other NSG members stating that they view the Chinese supply of these reactors as being inconsistent with the NSG Guidelines. We expect that the issue will continue to be raised by Participating Governments at NSG plenary sessions until China provides a comprehensive explanation or the cooperation is halted.

The administration is currently in negotiations with China on a new 123 agreement. The issue of China's potential nuclear cooperation with Pakistan will be further addressed when the new 123 agreement package for China comes before Congress.

Question. In past section 123 agreements, we have touched upon environmental, health, and safety issues related to the use of nuclear energy. For example, in our agreement with Russia, article 17 has the parties cooperate in protecting the international environment from contamination arising from peaceful nuclear activities, and our agreements with Japan and the Republic of Korea calls on the parties to exchange information in matters of health and safety. However, these treaty requirements are quite vague.

- In light of the Fukushima disaster, should we consider changing this approach to flesh out and detail our conditions for addressing health, safety, and environmental impacts in future nuclear agreements?
- Shouldn't we be insisting that nations entering into new agreements commit to international best practices with regards to safety and protecting the environment?

Answer. The United States has always placed the highest priority on ensuring that civil nuclear power reactors are operated in the safest and most reliable manner possible. The tragic events at Fukushima served to heighten U.S. efforts in this regard.

The United States has a wide variety of means to enhance the safety of civil nuclear power. In this regard, the United States is currently working in bilateral and multilateral fora to encourage states to apply high standards of safety and environmental responsibility in conducting nuclear activities for peaceful purposes. We urge all states considering nuclear programs to take early account of the obligations of Contracting Parties under the Convention on Nuclear Safety, to become parties to that Convention, and participate in International Atomic Energy Agency peer review missions. All countries to which we have supplied a power reactor subject to one of our Agreements for Cooperation are parties to this Convention.

The United States has a robust engagement strategy to work with those countries considering nuclear power programs to help them incorporate nuclear safety standards. We work bilaterally through programs such as the safety assistance programs offered by the U.S. Department of Energy and Nuclear Regulatory Commission, and internationally through the International Atomic Energy Agency (IAEA) and regional nuclear safety organizations, such as the Asia Nuclear Safety Network. We also play a leadership role in the IAEA's safety activities, working to establish a set of internationally accepted best practices. We believe this current combination of efforts has been, and will continue to be, extremely effective in raising the bar on global nuclear safety efforts in the post-Fukushima era.

The United States also addresses the nuclear safety issues in the context of 123 agreements. In both the terms of the agreements, and the NRC's export licensing process, the United States ensures that any country engaging in civil nuclear cooperation with the United States abides by the highest nuclear safety standards in the world.

RESPONSES OF DANIEL B. PONEMAN TO QUESTIONS SUBMITTED BY SENATOR ROBERT MENENDEZ

Question. Over the last 30 years, we have seen a significant decline in the U.S share of the market and in our ability to promote national security objectives

through peaceful nuclear cooperation. What are the principle reasons behind this decline?

Answer. The reasons for the decline in U.S. share of the global civilian nuclear market are mainly due to three factors: (1) Lack of financing for U.S. technology; (2) more competition in the market; and (3) concerns about reliability of supply given the debate about the future of the U.S. civil nuclear program. While the first two elements are not within the administration's direct control, assuring our partners that U.S. companies will remain reliable suppliers is of paramount importance.

As our vendors become more engaged in finding solutions to financing concerns and buyers realize that the U.S. has the safest most reliable technology, our ability to put more 123s in place and promote our national security objectives will increase.

Question. As you know, U.S. vendors are usually outbid by state-subsidized foreign competitors; U.S. reactors may be the best in the world, but second-best and far cheaper often win the bids. U.S. reactor vendors do not play on a fair playing field: what is the administration doing about that? Has the administration considered filing a complaint with the World Trade Organization for unfair trading practices against these subsidized foreign competitors?

Answer. The administration has not considered filing a complaint with the World Trade Organization (WTO) for unfair trading practices against foreign competitors. In looking at the situation, while many competitors are partly or wholly owned by their governments, we do not believe that taking action in the WTO would be beneficial for our vendors or the global nuclear industry. Instead we are seeking ways to find financing solutions for U.S. companies to take advantage of when bidding on foreign projects. The administration has been working with Ex-Im Bank and other financial institutions to provide options that would place U.S. vendors on a level playing field with our foreign competitors.

RESPONSES OF HON. THOMAS COUNTRYMAN TO QUESTIONS
SUBMITTED BY SENATOR MARCO RUBIO

Question. Do nonnuclear weapons states have the right to enrich uranium or reprocess plutonium under the Nuclear Nonproliferation Treaty (NPT)?

Answer. The NPT does not specifically delineate rights that Non-Nuclear Weapon States have to any particular type of nuclear technology. Rather, the treaty states that all parties to the treaty have the inalienable right to develop research, production, and use of nuclear energy for peaceful purposes. However, the treaty makes an important qualification; the right to peaceful uses of nuclear energy must be exercised according to a party's nonproliferation obligations. A party, like Iran, that has repeatedly developed clandestine capabilities that could support a nuclear weapons program, remained in chronic violation of IAEA safeguards, and failed satisfactorily to explain that possible military dimensions are, in fact, part of a purely peaceful program, has not fulfilled its nonproliferation obligations under the NPT, therefore has no right to technologies—like enrichment—that otherwise could be permissible under Article IV of the treaty. NPT states party that violate the terms of their safeguards agreements are not entitled to the benefits of peaceful nuclear cooperation under the treaty.

Question. Do you think the existence of a (now internationally accepted) uranium enrichment program in Iran will make it more or less difficult to limit the spread of ENR technology?

Answer. The United States and its international partners have not "accepted" Iran's uranium enrichment program and certainly do not accept Iran's claim that it has a "right" to enrich. The Joint Plan of Action (JPOA) in no way acknowledges Iran's quest for recognition of any "right to enrichment."

In line with the Obama administration's long-standing policy opposing the spread of enrichment and reprocessing (ENR) technologies, the JPOA halts progress on the most worrisome elements of Iran's nuclear program and rolls it back in key respects, including by limiting Iran's enrichment capacity and diluting or converting Iran's stockpile of near 20 percent low enriched uranium.

As the United States conducts negotiations on a long-term comprehensive solution to provide confidence that Iran's nuclear program is exclusively peaceful, we will continue our efforts to combat the proliferation of ENR technologies, making use of the various tools at our disposal to achieve our nonproliferation goals.

Question. Do you agree with the assessment in the recently released Defense Science Board study that there is a serious and growing gap in our nuclear moni-

toring and verification capabilities to prevent further nuclear proliferation diversions from ostensibly "peaceful" nuclear programs?

Answer. The United States has long supported efforts to strengthen international verification of peaceful nuclear activities through the safeguards system of the International Atomic Energy Agency (IAEA). Thanks in no small measure to U.S. technical assistance that dates back to 1977, the IAEA has a robust technical capability to monitor declared nuclear materials and facilities.

Even with this capability, we recognize that there are limits to the capability of nuclear monitoring techniques to detect clandestine nuclear activities, especially at undeclared locations. Since the early 1990s, when Iraq's clandestine nuclear activities came to light, we have made it a priority to strengthen the IAEA's ability to respond to indications of undeclared nuclear activities, in order to fulfill its mandate to apply safeguards to all nuclear material in a given state. The international community now expects the IAEA to follow up on credible information from any source, including intelligence sources. The Additional Protocol gives the IAEA expanded information and access rights to enable it to provide an assurance of the absence of undeclared activities. Since 1997, 122 countries, including the United States, have brought additional protocols in force.

We have also redoubled our efforts to strengthen IAEA technical tools to detect clandestine nuclear activity. The State Department provided financial and technical support to the successful project to upgrade the Safeguards Analytical Laboratories. In 2008, the Department of Energy launched the Next Generation Safeguards Initiative (NGSI) to strengthen its technical capabilities to support IAEA safeguards, including by revitalizing the technology and human capital base at national laboratories.

For any comment on our intelligence posture and capabilities I would refer you to the Intelligence Community. As for the report itself we are reviewing the findings and recommendations and will continue to look for ways to enhance international verification measures.

Question. Have you or any other administration official actually asked their foreign counterparts in other key nuclear supplier states—e.g., Russia, China, Japan, Korea, Holland, Germany, France—if they would be willing to adhere to the Gold Standard in their own exports of nuclear goods?

Answer. The United States has ongoing, robust discussions with the major nuclear suppliers about efforts to strengthen the nuclear nonproliferation regime and prevent further proliferation of enrichment and reprocessing (ENR) technologies.

In 2004, the United States proposed a new initiative in the Nuclear Suppliers Group (NSG), which includes all the major nuclear supplier states, to ban new transfers of ENR technologies to states that did not already possess such fully operational facilities. It took years of U.S.-led global diplomatic efforts and a new approach to finally achieve a revision in 2011 to the NSG Guidelines that significantly tightened the criteria regarding possible ENR technology transfers. The revision limits transfers of ENR technology to only those partners that meet significant nonproliferation and economic criteria and can only be transferred in a way that does not allow recipients to gain access to key sensitive technologies (a so-called "black box.") The NSG continues to explore ways to further tighten and clarify its guidelines.

Additionally, the United States consults bilaterally with other supplier states on a regular basis, and we consistently reinforce our long-standing policy to combat the proliferation of ENR technologies and our desire for other suppliers to adopt similar measures. Through these consultations, we see no indication that other suppliers have any interest in providing these sensitive technologies to states that do not already possess them.

RESPONSES OF DANIEL B. PONEMAN TO QUESTIONS SUBMITTED BY SENATOR MARCO RUBIO

Question. Do nonnuclear weapons states have the right to enrich uranium or reprocess plutonium under the Nuclear Non-Proliferation Treaty (NPT)?

Answer. The NPT does not specifically delineate rights that Non-Nuclear Weapon States have to any particular type of nuclear technology. Rather, the treaty states that all parties to the treaty have the inalienable right to develop research, production and use of nuclear energy for peaceful purposes. However, the treaty makes an important qualification; the right to peaceful uses of nuclear energy must be exercised according to a party's nonproliferation obligations. A party, like Iran, that has

repeatedly developed clandestine capabilities that could support a nuclear weapons program, remained in chronic violation of IEA safeguards, and failed satisfactorily to explain that possible military dimensions are in fact part of a purely peaceful program, has not fulfilled its nonproliferation obligations under the NPT, therefore has no right to technologies—like enrichment—that otherwise could be permissible under article IV of the treaty. NPT States Party that violate the terms of their safeguards agreements are not entitled to the benefits of peaceful nuclear cooperation under the treaty.

Question. Do you think the existence of a (now internationally accepted) uranium enrichment program in Iran will make it more or less difficult to limit the spread of ENR technology?

Answer. The United States and its international partners have not "accepted" Iran's uranium enrichment program and certainly do not accept Iran's claim that it has a "right" to enrich. The Joint Plan of Action (JPOA) in no way acknowledges Iran's quest for recognition of any "right to enrichment."

In line with the Obama administration's long-standing policy opposing the spread of enrichment and reprocessing (ENR) technologies, the JPOA halts progress on the most worrisome elements of Iran's nuclear program and rolls it back in key respects, including by limiting Iran's enrichment capacity and diluting or converting Iran's stockpile of near 20-percent low enriched uranium.

As the United States conducts negotiations on a long-term comprehensive solution to provide confidence that Iran's nuclear program is exclusively peaceful, we will continue our efforts to combat the proliferation of ENR technologies, making use of the various tools at our disposal to achieve our nonproliferation goals.

Question. Do you agree with the assessment in the recently released Defense Science Board study that there is a serious and growing gap in our nuclear monitoring and verification capabilities to prevent further nuclear proliferation diversions from ostensibly "peaceful" nuclear programs?

Answer. The United States has long supported efforts to strengthen international verification of peaceful nuclear activities through the safeguards system of the International Atomic Energy Agency (IAEA). Thanks in no small measure to U.S. technical assistance that dates back to 1977, the IAEA has a robust technical capability to monitor declared nuclear materials and facilities.

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RESPONSES OF HENRY D. SOKOLSKI TO QUESTIONS
SUBMITTED BY SENATOR MARCO RUBIO

Question. Do you agree with the Congressional Research Service's tally of U.S.-controlled nuclear exports over the last 4 years being roughly $1.4 billion (i.e., just roughly $300–$400 million a year) and that most of these exports were nuclear fuel services (enriched gas)?

How many American jobs do you estimate are generated by these nuclear exports? Have you done a nuclear specific analysis?

Answer. The Congressional Research Service and the Government Accountability Office (GAO) and, Senator Markey recently released analyses based on official and industry trade figures and U.S. Nuclear Regulatory Commission export license records. According to the GAO 2010 report, which tracked exports from 1994–2008, the United States on average exported $1.4 billion annually in nuclear fuel and $290 million in reactor components. Using the Commerce Department figure of $1 billion in exports is worth 5,000–10,000 jobs, the number of jobs U.S. nuclear exports represents would be 8,500 to 17,000. This range, however, may need to be pushed downward because GAO determined U.S. share of global nuclear exports annually declined during this period 25 percent down to 10 percent. Also, the amount of U.S. domestic manufacturing of U.S.-designed reactor parts declined significantly during this period. So it would be likely that the exports represented U.S.-designed parts that were manufactured oversees in whole or in part much more today than in 1994. This would reduce the jobs numbers even further.

Question. Isn't it correct that given that most of the U.S. nuclear industry's business is in nuclear fuel services, the industry actually benefits when countries commit to not enrich or reprocess?

Answer. Yes. The nuclear vending industry, however, is opposed to any additional restrictions on potential future markets, perhaps, because the value of their industry will only decline unless they can convince investors that every one of the inflated number of reactor sales they claim are possible are certain and will actually occur.

Question. The nuclear industry has argued that Vietnam is the largest prospective nuclear market for U.S. companies in Asia. If so, what do you make of Vietnam's recent announcement that it is delaying the start of construction of its first Russian nuclear plant by at least 6 years to 2020?

Answer. The take away from this news is that our negotiators apparently were overeager in striking this deal with Vietnam as early as they did. It appears that, at the very least, they prematurely short on the nonproliferation conditions they might otherwise have gotten. Whether the United States could have gotten a better deal would have depended largely on whether or not our negotiators made a serious effort to convince ROSATOM, URENCO, AREVA, and Japanese and Korean nuclear vendors who either wish to do significant business in the United States or who currently do, to adopt nonproliferation conditions similar to those we asked for of the UAE and Taiwan. Since we have yet to seriously negotiate for the adoption of the Gold Standard with other nuclear suppliers, though, we don't yet know what is possible.

Question. If this is the best market for U.S. nuclear exports in East Asia, what does this tell us about the prospects for sales elsewhere? Where exactly are these U.S. reactor markets outside of countries with which we already have 123 agreements?

Answer. What it tells us is that the prospects for the United States selling any reactors to states that don't already have a 123 agreement are poor with the possible exception of Saudi Arabia. Outside of the Saudi market, U.S. reactor sales will be few and far between for quite awhile. Europe is closing down at least as many reactors as it might be interested in building and the handful of new Euro builds are more likely to be Russian and French machines than plants built by Westinghouse or GE in cooperation with Japanese nuclear vendors. Japan will not be importing new U.S. reactors nor will Korea or China. Each, moreover, has scaled back their pre-Fukushima nuclear building plans. Whatever reactors they do build will be constructed almost entirely with domestic engineers and domestic content. India, meanwhile, is unlikely to change its nuclear accident liability laws to suit the demands of any U.S. nuclear exporter. This leaves the Saudi market, which is most controversial. The Saudis, who have sovereign credit of their own, say they want to import 16 reactors by 2030. Senior Saudis, though, have also made it clear that Saudi Arabia is interested in developing a bomb option if Iran is allowed to get nuclear weapons. U.S. nuclear industry officials and State officials have not yet come out in favor yet of cutting any deal that would allow Saudi Arabia to enrich or reprocess. This possibility, however, deserves watching.

RESPONSES OF SHARON SQUASSONI TO QUESTIONS
SUBMITTED BY SENATOR MARCO RUBIO

Question. Do you agree with the Congressional Research Service's tally of U.S. nuclear exports over the last 4 years being roughly $1.4 billion (roughly $300–$400 million per year) and that most of these exports were nuclear fuel services?

Answer. Assigning a figure to U.S. nuclear exports has been difficult because of deficiencies in reporting. The November 2010 GAO report on Nuclear Commerce (GAO 11–36) highlighted the fact that the government does not track the amount and value of exports associated with U.S. peaceful nuclear cooperation agreements. The only figures available are from the industry itself, but even industry experts acknowledge that it is difficult to tally.

The U.S. has not exported reactors in the last 4 years, but it has probably exported major components and certainly it has exported services, including uranium enrichment. Its engineering, procurement and construction firms (e.g., Bechtel, URS, Shaw) have been involved in many reactor retrofits and new construction projects. In the case of reactor sales to China (AP–1000), the Westinghouse agreement allowed for significant indigenous supply, reducing the potential for U.S. exports.

Fuel exports and services (conversion, uranium enrichment) certainly constitute a significant market within the nuclear industry. Of a total market of about $25 billion annually for reactor fuel (estimate from 2009 from URENCO for 2015), the market value is broken down as follows:

Yellowcake (U3O8)—$14 billion;
Conversion—$1 billion;
Enrichment—$8 billion;
Fuel fabrication—$2 billion.

In enrichment, U.S. enrichment (USEC) was supplying about a quarter of that market, or $2 billion.

Question. How many American jobs do you estimate are generated by these nuclear exports? Have you done a nuclear-specific analysis?

Answer. I have not done an analysis of the employment implications of U.S. nuclear exports because the relative lack of data does not support a credible analysis. However, if one assumes that those exports are confined to nuclear fuel services, then one could estimate employment levels in uranium conversion (the only plant is the Honeywell-Converdyn facility in Metropolis, IL) and enrichment (USEC and the URENCO LES facility) and the percentage of that employment devoted to exports. However, the numbers are tricky because of the globalization of nuclear industry services. Although USEC supplies 25 percent of the international market, U.S. reactors constitute 25 percent of global enrichment demand. However, U.S. utilities have purchased a predominant portion of their enrichment from overseas, precisely because USEC is exporting its enrichment services. This "swap" actually serves U.S. nonproliferation policy quite well by attaching U.S. conditions on fuel that otherwise might not have such nonproliferation conditions.

Question. Isn't it correct that, given that most of the U.S. nuclear industry's business is in nuclear fuel services, the industry actually benefits when countries commit to not enrich or reprocess?

Answer. Current providers of enrichment and reprocessing services do benefit from a market wherein entry is constrained, either by virtue of the industry's oligopolistic nature or because of political commitments. Since the United States does not reprocess, it has no industry that would benefit from commitments not to reprocess. In the case of enrichment, U.S. firms would benefit as would French, Russian, and European firms. That market is characterized by high barriers to entry (in terms of investment and technology), a small number of technology holders, long-term contracts, and longstanding supply arrangements. It is very difficult for new suppliers to enter into the market. Nonetheless, this argues for emphasis on political commitments, precisely because it calls into question the economic motivations for new entrants into the fuel cycle services market.

Question. The nuclear industry has argued that Vietnam is the largest prospective nuclear market for U.S. companies in Asia. If so, what do you make of Vietnam's recent announcement that it is delaying the start of construction of its first Russian nuclear plant by at least 5 years to 2020?

Answer. Any significant growth in nuclear power globally will occur in Asia—mostly in China and Korea, with new entrants into nuclear power in Southeast Asia, like Vietnam. Since both China and Korea are moving aggressively to indigenize their own supply chains, there is likely little opportunity for U.S. fuel services. Vietnam is the first of several countries in Southeast Asia to move forward with nuclear power and is significantly more organized than other countries in the region. The extent to which this represents a market for U.S. nuclear fuel is another question. If Vietnam builds Russian VVER reactors, the first few fuel cores are likely to be sourced solely by Russia. In the future, perhaps, Vietnam could contract out for other fuel services on the front end. In any event, the postponement of construction of the first VVERs is a negative development for all nuclear suppliers involved.

Question. If this is the best market for U.S. nuclear exports in Southeast Asia, what does this tell us about the prospects for sales elsewhere? Where exactly are these U.S. reactor markets outside of countries with which we already have 123 agreements?

Answer. The countries most likely to build nuclear power plants in the next 10 years include Saudi Arabia, the UAE, Turkey, and Jordan. The United States has 123 agreements with the UAEA and Turkey, but no agreements yet with Saudi Arabia or Jordan. Those two countries are unlikely to agree to a clause in their 123 agreements restricting enrichment and reprocessing. In fact, the delay in signing agreements with those countries is in part due to negotiations over such provisions.

Responses of Marvin S. Fertel to Questions Submitted by Senator Marco Rubio

Question. Do you agree with the Congressional Research Service's tally of U.S.-controlled nuclear exports over the last 4 years being roughly $1.4 billion (i.e., just roughly $300–$400 million a year) and that most of these exports were nuclear fuel services (enriched gas)?

Answer. We disagree for the following reasons:

- The CRS tally is $9.1 billion over the last 4 years. The only recent Congressional Research Service (CRS) tally of commercial nuclear exports of which we are aware is dated November 19, 2013. It totals $9.1 billion for 2009 to 2012 ($7.7 billion in natural and enriched uranium and plutonium and $1.4 billion in nuclear reactors and major components) or roughly $2.3 billion per year. Although the CRS tally indicates that there were more substantially more exports under specific commodity codes for natural uranium (284410) and enriched uranium/plutonium (284420) than for nuclear reactors (8401), the report does not specify that "most of these nuclear exports were nuclear fuel services (enriched gas.)" If your question refers to a different assessment, please forward it and we would be happy to provide you with feedback.
- Both GAO and CRS note data omissions. The November 2013 CRS tally aims to update a 2010 GAO analysis of U.S. nuclear exports from 1994 to 2008. The GAO analysis indicates that "no single federal agency systematically tracks and reports the data necessary to determine the amount and value of U.S. nuclear exports . . ." (p.10). The GAO adopted a methodology which uses U.N.

Comtrade data as a proxy for nuclear exports and notes further that there was "no available data regarding exports of services." The CRS memo also mentions significant inconsistencies in the data available to assess nuclear exports. It specifically cites the absence in U.N. Comtrade data of Taiwan as an importer of U.S. nuclear products or components. During CRS' data period, GE-Hitachi has been constructing two nuclear power plants in Taiwan, and the United States is the main exporter of nuclear components, fuel and services to Taiwan. Coupled with the acknowledged lack of services data, it appears that the U.N. Comtrade data (on which both the CRS tally and GAO report are based) contains significant omissions.

- GAO and CRS methodology does not accurately reflect the scope of nuclear exports. Both the GAO report and the CRS memo count exports based only on a limited subset of the items that are typically included in the export scope of a nuclear energy project. Depending on the maturity of the nuclear market, the project scope can include many elements from the Nuclear Island, Turbine Island, Balance of Plant and Construction and Site Preparation (see attached list of components in a typical nuclear plant). In addition to components, such things as project management services, engineering and design, construction management, commissioning, training, licensing and other ongoing service and support are typically exported as part of a nuclear power project's full scope.

  U.S. nuclear exports to China provide a good example of the difference between the U.N. Comtrade's reported value of a narrow set of exports (8401) and the total value of nuclear exports associated with a project's scope. U.N. Comtrade indicates the total value of Chinese imports from the United States under code 8401 from 2009 to 2012 at less than $100 million, yet the U.S. manufactured equipment and manpower scope for just the four Westinghouse AP1000 units in China exceeds $3 billion. Coupled with the data limitations noted above, this clearly demonstrates that the GAO and CRS tallies underestimate the value of U.S. nuclear exports by a substantial degree.

Question. How many American jobs do you estimate are generated by these nuclear exports? Have you done a nuclear specific analysis?

Answer. Although no nuclear-specific analysis exists, the Department of Commerce estimates that each $1 billion in exports creates or sustains 5,000 to 10,000 jobs. If U.S. exporters were able to capture 25 percent of the global nuclear market—estimated at $500 billion to $750 billion over the next 10 years—this would create (or sustain) up to 185,000 high-paying American jobs.

Question. Isn't it correct that given that most of the U.S. nuclear industry's business is in nuclear fuel services, the industry actually benefits when countries commit to not enrich or reprocess?

Answer. As stated above, the U.N. Comtrade data that GAO and CRS selected omit all high-value service exports and many high-value component exports. Based on these omissions and the other flaws in the data noted above, it is not possible to conclude that exports of nuclear fuel services are greater than other types of nuclear exports.

We are aware of claims by foreign critics of binding restrictions on enrichment and reprocessing (such as the so-called "gold standard") that the U.S. Government is promoting such restrictions in order to advance the economic interests of the U.S. civil nuclear industry. While we cannot speak for the U.S. Government, we have no reason to believe that the U.S. Government is promoting such restrictions for reasons other than nuclear nonproliferation. And like the U.S, Government, the U.S. nuclear industry has a vested interest in ensuring that peaceful nuclear technology is not diverted for other purposes. As I stated in my testimony, the nuclear industry supports efforts to limit the spread of uranium enrichment and used fuel reprocessing (E&R) consistent with current U.S. policy. But all indications are that a unilateral and inflexible requirement that potential trading partner countries forswear E&R as a condition for a Section 123 agreement would have the perverse effect of undermining U.S. nonproliferation interests by significantly reducing the number of countries willing to engage in civil nuclear commerce with the United States.

Other nuclear suppliers—like Russia, France, Japan and South Korea—stand ready to engage in nuclear commerce with other countries, whether or not those countries have concluded a 123 agreement with the United States, and in many cases whether or not they intend to refrain from E&R. As a result, the net effect of refusing to conclude 123 agreements with countries that are unwilling to renounce E&R would be to encourage them to do business with other suppliers, thereby forgoing the economic and national security benefits of commercial nuclear engagement.

When a country like the United Arab Emirates (U.A.E.) is willing, in the context of a Section 123 agreement with the United States, to renounce E&R, the United States should include that commitment in the Section 123 agreement. But when a country, which otherwise demonstrates its intent to develop an exclusively peaceful commercial nuclear energy program, makes clear that it is unwilling to renounce E&R in a bilateral agreement with the United States, it would be self-defeating to forego the nonproliferation and other benefits to the United States of concluding a Section 123 agreement with that country.

Industry respects the decisions by Taiwan and U.A.E. to commit not to develop E&R, but the circumstances that led these governments to make that commitment will not be present in all cases. Taiwan, for example, has minimal need for E&R because its fleet of nuclear power plants is small.

The United States also had unusual leverage in negotiation of the renewal agreement because Taiwan relies on the United States to enable its nuclear trade with other supplier countries, and because of the important United States-Taiwan security partnership.

Question. The nuclear industry has argued that Vietnam is the largest prospective nuclear market for U.S. companies in Asia. If so, what do you make of Vietnam's recent announcement that it is delaying the start of construction of its first Russian nuclear plant by at least 6 years to 2020?

Answer. We have seen media reports that the Vietnamese Government has decided to delay the construction of two VVER–1000 reactors supplied by Russia's AtomStroyExport at Ninh Thuan and may also delay the Japanese-supplied units at Vinh Hai. Although some early reports mentioned a delay of up to 6 years, recent statements indicate that the delay is expected to be only 2 or 3 years.

News reports and public statements attribute this delay to technology selection and ensuring that nuclear energy is developed in a safe manner. The U.S. nuclear industry places paramount value on nuclear safety and stands ready to assist the Vietnamese in developing a world-class, safe and secure nuclear energy program. We see the obvious priority Vietnam is attaching to nuclear safety as an encouraging sign for future U.S. nuclear cooperation. We therefore commend the Vietnamese Government for placing a very high priority on ensuring nuclear safety, and we also laud the International Atomic Energy Agency (IAEA) for its leadership in ensuring that new nuclear nations have the support needed to understand the true requirements of implementing a nuclear energy program.

Question. If this is the best market for U.S. nuclear exports in East Asia, what does this tell us about the prospects for sales elsewhere? Where exactly are these U.S. reactor markets outside of countries with which we already have 123 agreements?

Answer. Worldwide, 172 nuclear power plants are planned or on order. According to the World Nuclear Association, over 45 countries are, as of January 2014, actively considering embarking on nuclear power programs. These range from sophisticated economies to developing ones. Multiple countries planning to develop nuclear energy for the first time lack a Section 123 agreement with the United States. Among these countries, Saudi Arabia has the most ambitious development plans—16 nuclear power plants at an estimated cost of $112 billion. In addition to Vietnam and Saudi Arabia, nations like Jordan and Malaysia have near-term plans for nuclear development. Longer term, nations like the Gulf States, Chile, and the Philippines have expressed interest in developing nuclear energy programs. Further, several existing nuclear trading partners have Section 123 agreements that require renewal in the next 2 years. These include China and the Republic of Korea. All of these markets provide excellent prospects for U.S. nuclear exports if we are allowed to participate in them.

Question. Mr. Fertel, given the stakes if countries seeking civilian nuclear programs exploit that technology and knowhow to develop a nuclear weapons program, what, if any, additional congressional oversight is the U.S. nuclear industry willing to accept to mediate the proliferation risk?

Answer. Section 123 of the Atomic Energy Act (AEA) provides Congress with substantial oversight responsibilities. Congress may request briefings, hold hearings, and report a recommendation to approve or disapprove agreements for civil nuclear cooperation. Our industry would be pleased to provide briefings or testimony on the merits of any specific agreement. If Congress finds an agreement lacking, Section 130i of the AEA provides expedited procedures for a resolution of disapproval to be filed and acted on.

As stated in my testimony, securing these agreements early and with a broad set of partners serves the U.S. national security, nuclear safety, and economic interest.

Any change in the process introduces additional obstacles or delays will increase the risk that these nations will partner with other nuclear suppliers. Without agreements in force, we forfeit exports, jobs, and commercial benefits, and we will fail to influence these programs in terms of their nuclear safety, security, and nonproliferation norms.

There may, of course, be room to improve the consultative process between Congress and the executive branch as 123 agreements are negotiated, but as an industry we defer to those two branches of government to work out any improvements to that process.

Question. Mr. Fertel, what nuclear deal or commerce would be jeopardized if Congress was allowed to vote on any new nuclear cooperation agreement that did not meet the Gold Standard?

Answer. It is my belief that a requirement for affirmative approval of Section 123 agreements will discourage their entry into force. And certainly supporters of this idea acknowledge that their intention is to make it harder to bring into force certain 123 agreements. Nothing in current law prevents Congress from voting to disapprove or modify a Section 123 agreement. As stated above, Section 130i of the AEA provides expedited procedures to facilitate a vote. In the past, Congress has taken the initiative to legislate on Section 123 agreements with China, India, and most recently the Republic of Korea.

As stated in my testimony, we believe that few potential export markets will be willing to follow the United Arab Emirates and Taiwan in renouncing E&R in a bilateral 123 agreement with the United States. In practice, a statutory requirement that Congress vote on agreements without the "gold standard" would require an affirmative vote on most future Section 123 agreements. The delay and uncertainty associated with an affirmative vote requirement would send a discouraging signal to prospective partners, and cause an immediate decline U.S. exports, jobs and influence on global nuclear safety, security, and nonproliferation.

ATTACHMENT: LIST OF COMPONENTS IN A TYPICAL NUCLEAR POWER PLANT

Nuclear Manufacturing Standards and Quality Assurance Requirements

Many components of a nuclear plant, particularly those critical to reactor safety, are subject to specific manufacturing standards. These standards ensure that the structures, systems, components and controls of a facility can be relied on to remain functional and follow design basis under rigorous conditions.

Components subject to these standards are often referred to as "nuclear-grade" or "safety-related" components. Facilities that manufacture them must have Quality Assurance (QA) programs in place to ensure that the standards are met.

Throughout the document, all components have been footnoted to indicate their QA requirements:

Safety-related products

Safety-related products are marked with one asterisk. The manufacture of these components requires a Quality Assurance program. Alternately, vendors could work under the QA program of the prime vendor, utility or purchaser.

Supplemental quality products

Supplemental quality products are marked with two asterisks. The purchaser of these products will typically set the specific quality requirements that must be met.

Standard quality products

All other products are typically considered standard quality products and are not marked with an asterisk. Purchasers for these products will usually set any specific expectations or requirements that must be met. No Quality Assurance program is necessary.

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Stairs
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Structural Precast Concrete, Purchase
Structural Precast Concrete, Purchase*
Structural steel*
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* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

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Radwaste Processing
Off-Gas
Resin Processing
Ion Exchange Systems
Compactors

Radiochemical Lab
Monitoring Equipment
Sampling Equipment
Analysis Equipment
Sampling Sinks
Fume Hoods
Sample Changers
Titration Systems
Counting Systems

Fire Protection
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Fire Rated Structures*
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Instrument Air
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Air Dryers*
Receivers*
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Lighting
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* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

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Control Rods*
Control Rod Drives*
Boron Control Systems*
Emergency Shutdown Systems*

Steam Generator
Channel Heads*
Transition Cones
Wrapper Shell*
Barrels
AVBs
Tubing*
Tube Sheet*
Feed Ring
Primary Separators*
Secondary Separators*
Nozzles*
Manways*

Pressurizer
Pressure Vessel*
Heaters*

Reactor Coolant Pump
Reactor Coolant Casing*
Reactor Coolant Motor*
Impeller
Pump Seals*

Pressure Relief Valves/ Safety Valves*

Health Physics Equipment and Supplies
Anti-contamination Clothing
Respiratory Protection
Personal Dosimetry
Portable Radiation Survey Instruments
Area Rad Monitors
Personal Communications Devices

Electrical Equipment

AC Power

Power Supplies

Transformers

Switchgear
Instruments and Meters*
Load Centers*
Circuit Breakers*
Motor Control Centers*

Starters*
Contactors*
Electrical Interlocks and Controls*
Racking Devices
Grounding Devices

Cable and Raceways
High Voltage Cable*
Medium Voltage Cable*
Low Voltage Cable*
Cable Tray Covers*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Electrical Equipment (cont'd)

Cable and Raceways (cont'd)
Supports*
Conduit*
Radiation Resistant Insulation*

DC Power
Batteries*
Battery Chargers*
Inverters*

Uninterruptable Power Suppliers

Emergency Diesel Generator

Subcomponents, Commodities and Consumables

Bus Duct*
Coil*
Conduit*
Connectors*
Disconnects/Reclosures*
Electrical Switches*
Feedthroughs*
Fuses*
Greases*
Junction Boxes*
Plugs*
Programmable Logic Controllers*
Receptacles
Solenoids*
Splices*
Terminal Boards*
Unistrut*
Wiring*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Mechanical Equipment

Class 1 Piping
Piping Assemblies*
Snubbers*
Supports*

Class 2 Piping
Piping Assemblies*
Snubbers*
Supports*

Class 3 Piping
Piping Assemblies*
Snubbers*
Supports*

Pumps
Centrifugal*
Positive Displacement*
Diaphragm*
Rotary*
Vacuum*
Air Operated*
Hydraulic*
Slurry*
Reciprocating*

Valves
Containment Isolation*
Motor-operated*
Air-operated*
Hydraulic Operated*
Solenoid-operated*
Manual*
Check*
Stop-check*
Gate*
Water Relief*
Steam Relief*
Control*
Globe*
Throttle*
Pressure Seal*

Valve Operators
Motor-operators*
Air-operators*
Hydraulic-operators*
Solenoid-operators*
Manual*
Explosive Squib-operated*

Tanks
Rupture Disks*
Manways*
Gaskets*

Sumps and Drains
Equipment Drains
Floor Drains
Drain Cover Plates
Leak Detectors*

Subcomponents, Commodities and Consumables

Bar Stock*
Bearings*
Belts*
Brackets*
Couplings*
Elbow*
Fasteners (Bolts, Nuts, Quick Throws, Studs, Washers)*
Filters*
Flanges, Pipe*
Flanges, Pressure Vessel*
Forgings*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Insulation, Mirror*
Insulation, Piping*
Limit Switch*
Low Alloy Steel*
Lubricants*
Mechanical Switches*
Metal Bellows*
Orifices*
O-rings*
Packing Materials*
Packings*
Piping Materials*
Piping Wall Sleeves*
Pulsation Dampeners*
Pump, Air Operated*
Pump, Centrifugal*
Pump, Diaphragm*
Pump, Hydraulic*
Pump, Positive Displacement*
Pump, Reciprocating*
Pump, Rotary*
Pump, Slurry*
Pump, Vacuum*
Refractory Materials*
Retaining Rings*
Rupture Disks*
Seals*
Seamless Carbon Steel*
Springs*
Stainless Steel*
Tags and Labels*
Unions*
Venturis*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Instrumentation & Controls Equipment

Process Computer
Computer*
Control Stations*
Data Point Feeds*
Display Software*

Simulator
Computers
Control Stations
Mockup Facility
Control Panels
Alarm Panels

Process Instrument Detectors
Control Rod Position*
Low Range Neutron Power*
Intermediate Range Power*
Reactor Power Range Power*
Reactivity*
Fluid Level*
Pressure*
Temperature*
Seismic Activity*
Vibration*
Fire Detection*
Fluid Flow*
Mass Flow*
Chemicals/Gas*
Contamination
Radiation
Meteorological
Differential Pressure*
Valve Position*
Reactor Period*

Monitors, Controls and Alarms
Meter Indicators*
Recorders*
Transmitters*
Annunciator Panels*
Protective Functions*
Alarms*
Safety Parameter Display System*

Tubing and Wiring
Tubing*
Wiring*
Terminal Blocks*
Connectors*
Splices*

Isolation Valves and Fittings

Communications Systems
Telephone
Alarms/Sirens
Announcing
Process Alarms*
Voice Communications

Subcomponents, Commodities and Consumables

Amplifiers*
Analyzers*
Cable Ties*
Condensing Pots*
Counters*
Fiber Optic Cable*
Fiber Optic Devices*
Fittings*
Micro Switches*
Pre-amplifiers*
Programmable Logic Controllers*
Rate Meters*
Rectifiers*
Reed Switches*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Relays*
Resistance Temperature Detectors*
Scalars*
Semiconductor Devices*
Signal Generators*
Surge Suppression Devices*
Thermocouples*
Thermo Wells*

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Turbine Island Structural

Structural Components
Turbine Building Structure
Penetrations
Doors and Hatches
Shielding
Secondary Containment Structure
Electrical Feedthroughs

Cranes and Hoists
Turbine Building Bridge Crane
TB Secondary Bridge Crane
Monorail Hoists
Mobile Systems
Crane Safety Systems

Turbine Building Interior
Interior Walls
Shielding
Stairs
Elevators

Miscellaneous Building Materials

Adhesives
Anchor Bolts
Bolts
Clips
Coatings
Columns
Concrete
Dunnage
Embeds
Fasteners
Form Work
Girders
Gratings
Grout
Insulated Concrete Panels
Insulated Metal Panels
Ladders
Misc Steel
Nuts
Paint
Plate
Platforms
Ply Form Lumber
Precast Concrete Panels
Precast Concrete, Purchase
Precast Concrete, Installation
Rebar
Shoring
Siding
Silicone
Stairs
Structural Bolts
Structural Precast Concrete, Purchase
Structural Precast Concrete, Purchase*
Structural Steel
Wide-flange Beams

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Secondary Support Systems

Heating and Ventilation
Ductwork
Dehumidifiers
Dampers
Heating Units
HEPA Filters
Chillers
Compressors
Controllers
Fans
Blowers
Louvers
Filters
Evaporative Coolers
Expansion Joints

Rad Monitoring
Airborne Particulate
Inert Gas
Liquids Processing

Radwaste Processing
Off-gas
Resin Processing
Ion Exchange Systems
Compactors
Standby Gas Treatment
Main Stack Discharge

Radiochemical Lab
Monitoring Equipment
Sampling Equipment
Analysis Equipment
Sampling Sinks
Fume Hoods
Sample Changers
Titration Systems

Fire Protection
Fire Barriers**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Fire Water System**
Fire Alarm Panel**
CO2 & Halon Fire Suppression Systems**

Oil Mitigation and Recovery System
Oil Separators
Oil Interceptors

General Area Lighting
Normal Lighting
Emergency Lighting**

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Secondary Steam Cycle

Main Turbine
Main Steam Piping
Reflective Metal Insulation
Control Valves
Turbine Bypass Valves (Steam Dump)
Exciter Cabinet
High Pressure Rotors
Low Pressure Rotors
Shaft Journal Bearings
Lub Oil System
Turbine Gland and Shaft Seals
Shaft Thrust Bearing

Main Generator
Stator
Rotor
Isophase Bus Duct
Isophase Cooling
Stator Water Cooling
Electrical Output
Main Transformer

Main Condenser
Condenser Tubing
Air Ejectors
Exhaust Boot
Vacuum Breaker Valves
Condensate Booster Pumps
Hotwell Level Control
Condensate Pumps
Condensate Polishing Filters

Moisture Separator-Reheater
Safety/Relief Valves

Feedwater Heaters

Feed Pumps
Main Feed Pump
Start-up/Shutdown Feedwater Pump

Feedwater Regulating Valves

Feedwater Control System
Automatic Recirc Valves

Health Physics Equipment and Supplies
Anti-contamination Clothing
Respiratory Protection
Personal Dosimetry
Portable Radiation Survey Instruments
Area Rad Monitors
Personal Communications Devices

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Electrical Equipment

Class 1E Electrical System

Engineered Equipment

AC Power

Power Supplies

Transformers

Switchgear
Instruments and Meters
Load Centers
Circuit Breakers
Motor Control Centers
Starters
Contactors
Electrical Interlocks and Controls
Racking Devices
Grounding Devices
Fast Transfer Devices
Automatic Bus Transfer Devices
AC Ground Detection System

Cable and Raceways
High Voltage Cable
Medium Voltage Cable
Low Voltage Cable
Cable Tray Covers
Supports
Conduit
Insulation

Uninterruptable Power Suppliers

DC Power

Batteries

Battery Chargers

Inverters

DC Ground Detection System

Non-Class 1E Electrical Equipment

Subcomponents, Commodities and Consumables

Bus Duct
Coil
Conduit
Connectors
Disconnects/Reclosures
Electrical Switches
Feedthroughs
Fuses
Greases
Junction Boxes
Plugs
Programmable Logic Controllers
Receptacles
Solenoids
Splices
Terminal Boards
Unistrut
Wiring

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Mechanical Equipment

Class 1 Piping
Piping Assemblies*
Snubbers*
Supports*

Class 2 Piping
Piping Assemblies*
Snubbers*
Supports*

Class 3 Piping
Piping Assemblies*
Snubbers*
Supports*

Pumps
Heater Drain
Sump Pumps
Chilled Water Transfer Pumps
Booster Feedwater Pump Pkg
Make-up Pumps
Sample Pumps
Rotary Gear Pump

Vertical Heat Exchangers

Horizontal Heat Exchangers

Valves
Air-operated
Automatic Recirc
Auxiliary Relief
Ball
Butterfly
Containment Isolation Valves*
Control
Explosive Charges
Extraction Steam Non-return
Globe
Hydraulic-operated
Manual
Motor-operated Gate
NFPA Code Valves
Plug
Pressure Regulating Globe
Pressure Seal
Solenoid-operated
Steam Relief
Stop-check
Three-way
Throttle

Valve Operators
Motor-operators
Air-operators
Hydraulic-operators
Solenoid-operators
Manual

Tanks
Rupture Disks
Manways
Gaskets

Sumps and Drains
Equipment Drains
Floor Drains
Drain Cover Plates
Leak Detectors

Subcomponents, Commodities and Consumables

Bar Stock
Bearings
Belts
Brackets

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Couplings
Elbow
Fasteners (Bolts, Nuts, Quick Throws, Studs, Washers)
Filters
Flanges, Pipe
Flanges, Pressure Vessel
Forgings
Insulation, Mirror
Insulation, Piping
Limit Switch
Low Alloy Steel
Lubricants
Mechanical Switches
Metal Bellows
Orifices
O-rings
Packing Materials
Packings
Piping Materials
Piping Wall Sleeves
Pulsation Dampeners
Pump, Air Operated
Pump, Centrifugal
Pump, Diaphragm
Pump, Hydraulic
Pump, Positive Displacement
Pump, Reciprocating
Pump, Rotary
Pump, Slurry
Pump, Vacuum
Refractory Materials
Retaining Rings
Rupture Disks
Seals
Seamless Carbon Steel
Springs
Stainless Steel
Tags and Labels
Unions
Venturis

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Instrumentation & Controls Equipment

Local Control Stations

Local Alarm Panels

Process Instrument Detectors
Fluid Level
Pressure
Temperature
Seismic Activity
Vibration
Fire Detection
Fluid Flow
Mass Flow
Chemicals/Gas
Contamination
Radiation
Meteorological
Differential Pressure
Valve Position
Strain Gages

Monitors, Controls and Alarms
Meter Indicators
Recorders
Transmitters
Annunciator Panels
Protective Functions
Alarms
Safety Parameter Display System

Tubing and Wiring
Tubing
Wiring
Terminal Blocks
Connectors
Splices

Instrument Isolation Valves & Fittings

Communications Systems
Telephone
Alarms/Sirens
Announcing
Process Alarms
Voice Communications

Control Room Instrument Panels

Subcomponents, Commodities and Consumables

Amplifiers
Analyzers
Cable Ties
Condensing Pots
Counters
Fiber Optic Cable
Fiber Optic Devices
Fittings
Micro Switches
Pre-amplifiers
Programmable Logic Controllers
Rate Meters
Rectifiers
Reed Switches
Relays
Resistance Temperature Detectors

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Scalars
Semiconductor Devices
Signal Generators
Surge Suppression Devices
Thermocouples
Thermowells
Transducers
Tubing

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

BOP Island Structural

Structural Components
Circ Water Intake & Discharge Structure
Penetrations
Doors and Hatches
Shielding
Secondary Containment Structure
Electrical Feedthroughs

Misc Building Interior
Interior Walls
Shielding
Stairs
Elevators

Intake Canal Earthwork

Discharge Canal Earthwork

Cranes and Hoists
Bridge Cranes
Secondary Bridge Crane
Monorail Hoists
Mobile Systems
Crane Safety Systems

Switchyard Structural
Roads
Pads
High Voltage Towers
Control Houses
Paint (Electrical Spec)
Substation Security Fencing
Substation Security Alarms

Preformed Concrete Ductwork

Underground Cable

Underground Piping

Cathodic Protection System

Auxiliary Boiler Building
Steam Heating Units

Emergency Diesel Generator Structure

Emergency Planning Structures
Technical Support Center**
Emergency Off-site Facility
Emergency Communications Networks**
Emergency Planning Siren Towers
Emergency Planning Sirens

Heat Tracing

Freeze Protection

Prefabricated Buildings

Subcomponents, Commodities and Consumables

Adhesives
Anchor Bolts
Bolts
Clips
Coatings
Columns

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

BOP Island Structural (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Concrete
Dunnage
Embeds
Fasteners
Form Work
Girders
Gratings
Grout
Insulated Concrete Panels
Insulated Metal Panels
Ladders
Misc Steel
Nuts
Paint
Plate
Platforms
Ply Form Lumber
Precast Concrete Panels
Precast Concrete, Purchase
Precast Concrete, Installation
Rebar
Shoring
Siding
Silicone
Stairs
Structural Bolts
Structural Precast Concrete, Purchase
Structural Precast Concrete, Purchase*
Structural Steel
Wide-flange Beams

BOP Support Systems

Heating and Ventilation
Blowers
Chillers
Compressors
Controllers
Dampers
Dehumidifiers
Ductwork
Evaporative Coolers
Expansion Joints
Fans
Filters
Heating Units
HEPA Filters
Louvers
Plenums

Fire Protection
Fire Barriers**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Fire Water System**
Fire Water Pump (Centrifugal)**
Fire Water Pump (Diesel)**

Switch Yard (Substation)

Circuit Breakers
Air Circuit Breakers
Oil Circuit Breakers

High Voltage Insulators

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

BOP Support Systems (cont'd)

High Voltage Disconnect Switches

Ground Switches

Transformers
Large
Current
Potential
Step-Up 230 KVA
Step-Up 345 KVA
Step-Up 500 KVA
Auxiliary Transformers (Unit, Station, Reserve)*

Control Panels
SCADA Controls System
Local Control System

Communications Systems

Switchyard Security Fencing

Switchyard Security Alarms

High Voltage Fuses

Sudden Pressure Relays

Lightning Arrestors

Physical Security System
Structural Road and Gate Barriers
Fencing
Monitoring and Alarm Systems
Security Control Structures
Alternate Security Control Structure
Security Staff
Armed Guard Force Equipment
Electronic Detection Systems

Water Treatment System

Waste Treatment System

Oil Mitigation and Recovery System
Oil Separators
Oil Interceptors

General Area Lighting
Normal Lighting
Emergency Lighting**

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Mechanical Equipment

Safety-Related Piping
Piping Assemblies*
Snubbers*
Pipe Supports*

Pumps
General Purpose Pump (Water)
Sump Pumps
Chilled Water Transfer Pumps
Jockey Pumps
Make-up Pumps
Sample Pumps
Rotary Gear Pump
Vertical Make-up Pumps

Non-Safety-Related Pumps

Non-Safety-Related Piping
Piping Assemblies
Snubbers
Pipe Supports

Vertical Heat Exchangers

Horizontal Heat Exchangers

Valves
Air-operated
Auxiliary Relief
Ball
Butterfly
Check
Containment Isolation Valves*
Control
Extraction Steam Non-return
Globe
Hydraulic Operated
Manual
Manually Operated Gate
Motor-operated Gate
NFPA Code Valves**
Plug
Pressure Regulating Globe
Pressure Seal
Solenoid-Operated
Steam relief
Stop-check
Three-way
Throttle
Vacuum Breaker Valves

Valve Operators
Motor-operators
Air-operators
Hydraulic-operators
Solenoid-operators
Manual

Tanks
Rupture Disks
Manways
Gaskets

Compressed Gas Storage and Transfer

Sumps and Drains
Equipment Drains
Floor Drains
Drain Cover Plates
Leak Detectors

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables

Bar Stock
Bearings
Belts
Brackets
Couplings
Elbow
Fasteners (Bolts, Nuts, Quick Throws, Studs, Washers)
Filters
Flanges, Pipe
Flanges, Pressure Vessel
Forgings
Insulation, Mirror
Insulation, Piping
Limit Switch
Low Alloy Steel
Lubricants
Mechanical Switches
Metal Bellows
Orifices
O-rings
Packing Materials
Packings
Piping Materials
Piping Wall Sleeves
Pulsation Dampeners
Pump, Air Operated
Pump, Centrifugal
Pump, Diaphragm
Pump, Hydraulic
Pump, Positive Displacement
Pump, Reciprocating
Pump, Rotary
Pump, Slurry
Pump, Vacuum
Refractory Materials
Retaining Rings
Rupture Disks
Seals
Seamless Carbon Steel
Springs
Stainless Steel
Tags and Labels
Unions
Venturis

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Circulating Water Cycle

Ultimate Heat Sink

Traveling Screens
Motors
Controls

Trash Rakes
Motors
Controls

Circ Water System
Circ Water Pumps
Strainers
Butterfly Valves
Other Circ Water Valves
Circ Water Piping

Service Water System
Service Water Pumps
Heat Exchangers
Coolers

High Pressure Service Water
High Pressure Service Water Pumps*
Heat Exchangers*

Emergency Service Water
Emergency Service Water Pumps*
Heat Exchangers*

Tanks
Condensate Storage Tank
Refueling Water Storage Tank*
Diesel Fuel Oil Storage Tank*
Emergency Service Water Reservoir/Tank*

Cooling Towers
Bulk Concrete**
Cooling Tower Fill Material**
Spray Pond
Spray Nozzles

Discharge Canal
Canal Discharge Gate Monitors

Environmental Monitoring System
Analysis
Analyzers
Counters
Data Loggers
Detectors
Filters
Indicators
Meteorological Equipment
Meters
Pumps
Radiation Monitors
Sampling Systems
Seismic Monitoring
Separators
Skimmers
Transducers

Control and Service Air
Accumulators
Compressors
Air Dryers
Receivers
Pressure Regulators
Filters
Flex Hose

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Electrical Equipment

Safety-Related Class 1E Electrical System*

Engineered Equipment

AC Power

Power Supplies

Transformers

Switchgear
Instruments and Meters
Load Centers
Circuit Breakers
Motor Control Centers
Starters
Contactors
Electrical Interlocks & Controls
Racking Devices
Grounding Devices
Fast Transfer Devices
Automatic Bus Transfer Devices
AC Ground Detection System

Cable and Raceways
High Voltage Cable
Medium Voltage Cable
Low Voltage Cable
Cable Tray Covers
Supports
Conduit
Insulation

Uninterruptable Power Suppliers

DC Power

Batteries

Battery Chargers

Inverters

DC Ground Detection System

Indoor Lighting

Outdoor Lighting
Normal Lighting
Emergency Lighting**

Non-Class 1E Electrical Equipment
Normal Lighting
Emergency Lighting**

Subcomponents, Commodities and Consumables

Bus Duct
Coil
Conduit
Connectors
Disconnects/Reclosures
Electrical Switches
Feedthroughs
Fuses

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Electrical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Greases
Junction Boxes
Plugs
Programmable Logic Controllers
Receptacles
Solenoids
Splices
Terminal Boards
Unistrut
Wiring

Instrumentation & Controls Equipment

Local Control Stations

Local Alarm Panels

Process Instrument Detectors
Fluid Level
Pressure
Temperature
Seismic Activity
Vibration
Fire Detection
Fluid Flow
Mass Flow
Chemicals/Gas
Contamination
Radiation
Meteorological
Differential Pressure
Valve Position
Strain Gages

Monitors, Controls and Alarms
Meter Indicators
Recorders
Transmitters
Annunciator Panels
Protective Functions
Alarms
Safety Parameter Display System*

Tubing and Wiring
Tubing
Wiring
Terminal Blocks
Connectors
Splices

Instrument Isolation Valves & Fittings

Communications Systems
Telephone
Alarms/Sirens
Announcing
Process Alarms
Voice Communications

Control Room Instrument Panels

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables

Amplifiers
Analyzers
Cable Ties
Condensing Pots
Counters
Fiber Optic Cable
Fiber Optic Devices
Fittings
Micro Switches
Pre-amplifiers
Programmable Logic Controllers
Rate Meters
Rectifiers
Reed Switches
Relays
Resistance Temperature Detectors
Scalars
Semiconductor Devices
Signal Generators
Surge Suppression Devices
Thermocouples
Thermowells
Transducers
Tubing

* These components are typically safety-related
** These components are typically supplemental quality
All other components are typically standard quality

Site Development & Construction

Site Preparation & Structures

Transportation Infrastructure
Railway
Road - Ballast
Road - Base Course
Road - Top Surface
Parking Areas
Waterway
Marinework
Barges
Barge Slips
Airports

Construction Equipment
Concrete Batch Plants
Batch Plant-Concrete*[1]
Batch Plant-Concrete
Concrete Works*[1]
Concrete Works

Blowers
Portland Cement Concrete*
Portland Cement Concrete

Portable Tanks and Pumps
Material Testing Services for Concrete and Earthwork*
Material Testing Services for Concrete and Earthwork

Earthwork Infrastructure
Slope Protection and Stabilization
Pond and Reservoir Construction
Furnishing Water Wells
Security Fencing and Installing
Temporary Fencing
Earthwork, Grading and Structural Backfill*
Excavation, Backfill and Compaction Of Trenches/Pipe and Elec. Duct*
Grading and Site Prep
Piles and Caissons*
Piers, Drilled*
Intake Structure and Tunnel
Concrete and Earthwork*
Concrete and Earthwork

Construction Facilities
Armed Guard Force Facility
Construction Buildings
Fabrications Shop
First Aid Building
Materials Assembly Areas
Materials Lay Down Areas
Prefabricated Buildings
Testing Shop
Trailers
Warehouses
Welding Shop

* These components are typically safety-related
** These components are typically supplemental quality
[1] The plant would be non-safety-related, the cement and aggregate for safety-related structures and foundations would be safety-related material.
[2] If the SSC is safety-related, the fire detection and protection equipment may be safety-related, most of the equipment will be supplemetal quality.
All other components are typically standard quality.

Site Development & Construction

Construction Equipment & Supplies

Concrete Batch Plants
Batch Plant-Concrete*[1]
Batch Plant-Concrete

Concrete Works
Concrete Works*[1]
Concrete Works
Portland Cement Concrete*
Portland Cement Concrete
Material Testing Services for Concrete and Earthwork*
Material Testing Services for Concrete and Earthwork

Safety Items
Fire Watch Staff
Fire Detection**[2]
Fire Alarms**[2]
Fire Barriers**[2]
Fire Extinguishers
Fire Rated Structures**[2]

Consumables
Welding Gas Supplies
Welding Rods*
Cleaning Agents

Site Logistics
Emergency Electricity Supply
Fuels
Internet
Lubricants
Normal Electricity Supply
Portable Electric Generators
Telephone
Water Supply
Sanitation Services

Temporary Ventilation
Blowers
Portable Ventilation Hoses

Heavy Equipment
Excavating Equipment
Lifting Equipment
Chains and Hoists
Earth Rolling Equipment
Flatbed Trucks
Dump Trucks
Cement Trucks

Equipment
Portable Tanks and Pumps
Scaffolding
Tools

Construction Materials

Adhesives
Anchor bolts
Bolts
Clips
Coatings
Columns
Concrete
Dunnage
Embeds
Fasteners
Form Work
Girders
Gratings
Grout

* These components are typically safety-related
** These components are typically supplemental quality
[1] The plant would be non-safety-related, the cement and aggregate for safety-related structures and foundations would be safety-related material.
[2] If the SSC is safety-related, the fire detection and protection equipment may be safety-related, most of the equipment will be supplemetal quality.
All other components are typically standard quality.

Site Development & Construction

Construction Materials (cont'd)

Insulated Concrete Panels
Insulated Metal Panels
Ladders
Misc Steel
Nuts
Paint
Plate
Platforms
Ply Form Lumber
Precast Concrete Panels
Precast Concrete, Purchase
Precast Concrete, Installation
Rebar
Shoring
Siding
Silicone
Stairs
Structural Bolts
Structural Precast Concrete, Purchase
Structural Precast Concrete, Purchase*
Structural Steel
Wide-flange Beams
Structural Precast Concrete, Purchase*

Construction Support Services

Geotech Services
Bathymetry / Hydrographic Survey*
Surveying
Dewatering/Monitoring
Seismic Data Collection and Analysis*
Technical Specification for Sheet Piling (Provide and Install)

Quality Assurance
Quality Assurance*
Nondestructive Examination (NDE)*

Rigging and Heavy Hauling

Freight Services
Ocean Freight Services
Air Freight Services
Inland Freight Services

Agents
Agents, Freight Forwarding
Agents, Export Packing
Agents, Customs Clearance
Agents, Port Handling

Leased Equipment
Scaffolding (Leased/Job Owned)
Shoring, Furnish (Leased/Job Owned)

Transportation/Logistics Services
Freight Services
Ocean Freight Services
Air Freight Services
Inland Freight Services
Agents, Freight Forwarding
Agents, Export Packing
Agents, Customs Clearance
Agents, Port Handling

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Site Development & Construction

Construction Supply Services (cont'd)

Temp Labor, Staff Augmentation and Engineering
Background Investigation, Screening
Configuration Management*
Drug Screening
Materials Testing Services*

Purchasing
Buying
Commercial Dedication*

Other
Records Management*
Rodent & Insect Control
Security Service
Janitorial Service
Temporary Food Services
Training*

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[1] The plant would be non-safety-related, the cement and aggregate for safety-related structures and foundations would be safety-related material.
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ANALYSIS OF EXPORT LICENSES UNDER NUCLEAR COOPERATION AGREEMENTS
SUBMITTED BY SENATOR EDWARD J. MARKEY

Analysis of Nuclear Industry Exports Associated with Nuclear Cooperation Agreements

Prepared by the Staff of Senator Edward J. Markey (D-Mass.) January 30, 2014

Summary: *The US nuclear industry states that additional nuclear cooperation agreements could lead to 185,000 American jobs worth more than $125 billion in the next decade*[1]*. These statements, however, are not supported by an analysis of the economic impacts of existing nuclear cooperation agreements. Since 1996, exports of nuclear reactor technology and nuclear fuel have made up less than 4 percent of industry's annual revenue. Moreover, only one of the fourteen newly concluded or renewed agreements since 1996 has led to any nuclear reactor technology exports at all. Exports of nuclear reactor technology alone comprise less than 0.6 percent of the sector's annual revenue.*

By contrast, nuclear fuel is exported to about two-thirds of the 53 countries with which the U.S. has nuclear cooperation agreements and comprises as much as 86 percent of the sector's export-related revenues. Although exports of nuclear fuel make up the vast majority of the sector's exports, they are still worth less than 3.4% of the industry's total annual revenues.

The U.S. nuclear industry has consistently opposed legislative efforts to ensure that nuclear cooperation agreements prohibit countries from developing the technologies needed to make nuclear fuel. Because the vast majority of the small amount of revenue the industry derives from exports comes from the sale of nuclear fuel, nuclear cooperation agreements which allow a country to learn how to make its own nuclear fuel have the potential to significantly erode the primary source of the U.S. nuclear sector's export-related revenues.

Background: Enrichment and reprocessing (ENR) are the two critical steps in the nuclear fuel cycle where it is possible to create both the technologies needed to fabricate nuclear reactor fuel and the fissile material needed for nuclear weapons. Therefore, it has long been U.S. policy to limit the number of enrichment and reprocessing sites around the world. The Atomic Energy Act (AEA) of 1954 requires the establishment of peaceful nuclear agreements with countries seeking to import nuclear technology from the United States. Currently the United States has nuclear cooperation agreements with 53 countries and the IAEA (28 of these are European countries under a single agreement with Euratom).

The Nuclear Energy Institute[2] estimates that U.S. nuclear industry's revenue from electricity sales and from the procurement of materials, fuel and services from domestic suppliers total $54-$64 billion each year, and has also informed Senator Markey's staff that this total does not

[1] http://www.nei.org/CorporateSite/media/filefolder/IssuesinFocusNuclearExports.pdf?ext=.pdf
[2] http://www.nei.org/Issues-Policy/Policy-Resources/Testimony/Testimony-for-the-Record-for-the-Energy-Tax-Reform and private communications with Senator Markey's staff

include revenues from vendor-to-vendor services, which makes a very significant contribution to the sector. It also has argued that nuclear cooperation agreements are important to the success of its industry. This analysis is an effort to ascertain whether the industry's arguments are supported by data.

Markey Analysis of NRC Export Licenses: According to Nuclear Regulatory Commission (NRC) export license records provided to Senator Markey's office, since 1996, the United States has implemented new or renewed expiring nuclear cooperation agreements with 14 countries: Argentina, Australia, Brazil, China, India, Kazakhstan, Morocco, Romania, Russia, South Africa, Switzerland, Turkey, United Arab Emirates, and Ukraine. For a complete list of countries with nuclear cooperation agreements in force at any time since 1996 see Table 1.

Only one of these agreements – with China – resulted in new export licenses for nuclear technology (defined as nuclear reactors, components, and equipment). The nuclear cooperation agreement with China allowed Westinghouse to export four reactors for $2.5 billion and a reactor vessel head for an unspecified amount. In addition, Curtiss-Wright Electro-Mechanical Corp sold China reactor coolant pumps for an unspecified amount.

The only other export licenses issued for nuclear technology during this time were under pre-1996 agreements with South Korea, Taiwan, Colombia, Thailand and Spain. Combustion Engineering sold South Korea four reactors for $700 million. Westinghouse also obtained export licenses to sell South Korea $800,000 worth of reactor components. General Electric sold Taiwan two reactors for an unspecified amount[3]. Colombia and Thailand purchased research reactors from the Department of Energy for $550,000 and General Atomics for $50 million, respectively. Finally, FirstEnergy Nuclear Operating Company sold Spain a reactor vessel head for an unspecified amount. In summary, during the past 17 years, the United States has exported nuclear reactor technology or components to only six (eleven percent) of the 53 countries with which it has nuclear cooperation agreements.

The NRC export license records also indicated licenses for the export of nuclear fuel. Licenses have been granted to export nuclear fuel to 34 of the 53 entities (64 percent) with nuclear cooperation agreements (see Table 1). Because the data from the NRC does not report whether nuclear fuel was actually exported, it is not possible definitively to quantify the financial impact of these licenses.

GAO Analysis: A General Accounting Office (GAO) report[4] released in 2010 also attempted to quantify the value of nuclear exports to the United States by analyzing data from the United Nations Commodity Trade Statistics database for the 15 years from 1994 to 2008. The report found that the U.S. share of nuclear exports had decreased over that time period from one-quarter

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[3] Total $7.54 billion, but split between GE and Mitsubishi. (http://www.world-nuclear.org/info/Country-Profiles/Others/Nuclear-Power-in-Taiwan/)
[4] http://www.gao.gov/assets/320/311924.pdf

of the world market to less than one-tenth of the world market. In sum, the U.S. has become a net importer of nuclear reactor technology and fuel. Over the time period investigated the US exported, on average, $1.4 billion / year in nuclear fuel and $290 million / year in nuclear reactor technology. The report cites the Department of Commerce estimates that $1 billion in U.S. exports is equivalent to 5,000 – 10,000 jobs. Therefore, exports from the nuclear industry under 123 agreements annually represent 8,500 – 17,000 jobs using GAO's export data, 17 percent of which come from the export of nuclear technology and 83 percent of which come from the export of nuclear fuel.

CRS Analysis: Congressional Research Service (CRS) attempted to extend GAO's analysis in a memo[5] that they distributed "in response to multiple congressional requests." This memo states that from 2009 to 2012, the U.S. industry exported an average $1.9 billion/year in nuclear fuel. The memo also says that, from 2009 to 2012, the industry exported $350 million/year, on average, in nuclear reactor technology. These numbers seem roughly in agreement with the trends from the GAO report and were obtained using the same United Nations database. CRS also utilized additional statistics obtained from the Global Trade Atlas (GTA) database, a private proprietary database. This database shows that during the time period considered in the GAO report (1994 to 2008) the U.S. exported $1.3 billion/year in nuclear fuel and $209 million/year in technology. The difference between this and the GAO report may be accounted for by the fact that GAO adjusted their number for inflation and reported results in constant 2010 dollars. For 2009 to 2012, the GTA database reports U.S. nuclear exports were comprised of $1.6 billion/year (84 percent) in nuclear fuel and $316 million/year (16 percent) in nuclear reactor technology.

Conclusion: This analysis shows that nuclear cooperation agreements do not lead to substantial exports of nuclear reactor technology. Very few reactors or components thereof have been exported under these agreements and none of the new or renewed agreements since 1996, other than the one with China, have led to nuclear reactor technology exports. Based on various reports the economic value of these exports is anywhere from $209 to $350 million per year.

The export of nuclear fuel, however, is much more significant and ranges anywhere from $1.3 to $1.9 billion per year. In addition nuclear fuel is exported to 64 percent of the countries with which we have nuclear cooperation agreements. For a full list please see Table 2.

If the value for the exports of nuclear reactor technology and fuel is combined, the total revenue from nuclear exports is $1.5 to $2.3 billion/year. This represents 7,500 to 23,000 jobs on a yearly basis. This means the U.S. nuclear energy industry's annual revenue from electric sales, the procurement of materials, fuel and services from domestic suppliers, and exports is totals $55.5 - $66.3 billion/year. This total does not include all revenues to the entire nuclear sector, which are not currently available. Therefore, exports account for less than two – four percent of its annual revenue. Of the revenues from exports, however, the export of nuclear fuel represents 83 – 86

[5] "United States Exports of Nuclear Reactor Technology and Uranium, Top Foreign Country Consumers: 2009 Through 2012" January 7, 2014

percent of the industry's revenue from exports. This means the export of nuclear technology represents less than 0.6 percent of the industry's annual revenue.

Based on this data, it is clear that nuclear exports are a very small portion of the nuclear energy industry's yearly revenue. However, most of this revenue is generated through the sale of nuclear fuel. Therefore, adding requirements to nuclear cooperation agreements to limit the development of enrichment and reprocessing sites around the world would serve both U.S. nuclear nonproliferation goals and benefit the U.S. nuclear energy industry by limiting the competition to their main source of nuclear export revenue.

Table 1: 123 Agreements In Force At Any Time Since 1996

Country	Most Recent Agreement Signed	Entered into Force	Expiration	Nuclear Technology Exports	Nuclear Fuel Exports
Argentina	February 29, 1996	October 16, 1997	October 16, 2027	NO	YES
Australia	May 4, 2010	December 22, 2010	December 22, 2040	NO	YES
Bangladesh	September 17, 1981	June 24, 1982	June 2012	NO	NO
Brazil	October 14, 1997	September 15, 1999	September 15, 2029	NO	YES
Canada	June 23, 1999	December 13, 1999	January 1, 2030	NO	YES
China	July 23, 1985	December 30, 1985[6]	December 30, 2015	Four reactors ($2.5 billion), one reactor vessel head, and reactor coolant pumps. Export licenses issued in 2005 and 2009.	YES
Colombia	January 8, 1981	September 1983	September 17, 2013 (future coop under IAEA agreement)	One research reactor ($550,000). Export license issued in 1996.	NO
Egypt	June 29, 1981	December 29, 1981	December 29, 2021	NO	YES
European Atomic Energy Community (Euratom)	November 7, 1995	March 29, 1996	March 29, 2026	Reactor vessel head for an unknown amount.	YES
India	October 10, 2008	December 6, 2008	December 6, 2048	NO	NO
Indonesia	June 30, 1980	December 30, 1981	December 30, 2031	NO	YES
International Atomic Energy Agency (IAEA)	May 11, 1959	August 7, 1959	August 7, 2014	NO	YES

[6] The US-China agreement entered into force on December 30, 1985. However, it could not be implemented until the President certified China was in compliance with certain conditions. This certification did not occur until 1998. http://crs.gov/pages/Reports.aspx?PRODCODE=RL33192&Source=search

Japan	November 4, 1987	July 30, 1988	July 30, 2018	NO	YES
Kazakhstan	November 18, 1997	November 5, 1999	November 5, 2029	NO	YES
Republic of Korea	November 24, 1972	March 19, 1973	March 19, 2014	Four reactors ($700 million) and components ($800,000). Export license issued in 1997.	YES
Morocco	May 30, 1980	May 16, 1981	May 16, 2021	NO	YES
Norway	January 12, 1984	July 2, 1984	July 2, 2014	NO	NO
Peru	June 26, 1980	April 1982	April 2012	NO	YES
Russian Federation	May 6, 2008	January 11, 2011	January 11, 2041	NO	YES
South Africa	August 25, 1995	December 4, 1997	December 4, 2022	NO	NO
Switzerland	October 31, 1997	June 23, 1998	June 23, 2028	NO	YES
Taiwan	April 4, 1972	June 22, 1972	June 22, 2014	Two reactors for an unknown amount. Export license issued in 1997.	YES
Thailand	May 14, 1974	June 27, 1974	June 27, 2014	One research reactor ($50 million). Export license issued in 1998.	NO
Turkey	July 26, 2000	June 2, 2008	June 2, 2023	NO	YES
Ukraine	May 6, 1998	May 28, 1999	May 28, 2029	NO	YES
United Arab Emirates	May 21, 2009	December 17, 2009	December 17, 2039	NO	NO

Table 2- Estimates of Value of US Nuclear Exports Under 123 Agreements

		1994 - 2008		2009 - 2012	
		Fuel	Technology	Fuel	Technology
Totals ($ billion)	GAO Report (UN Database)	20.70	4.39	N/A	N/A
	CRS Memo (UN Database)	N/A	N/A	7.69	1.42
	CRS Excel Data (GTA Database)	19.01	3.13	6.48	1.26
Yearly Average ($ billion)	GAO Report (UN Database)	1.38	0.29	N/A	N/A
	CRS Memo (UN Database)	N/A	N/A	1.92	0.35
	CRS Excel Data (GTA Database)	1.27	0.21	1.62	0.32

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