S. HRG. 112–813

EXAMINING THE PROPER SIZE OF THE NUCLEAR WEAPONS STOCKPILE TO MAINTAIN A CREDIBLE U.S. DETERRENT

HEARING

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

SPECIAL HEARING

JULY 25, 2012—WASHINGTON, DC

Printed for the use of the Committee on Appropriations

Available via the World Wide Web: http://www.gpo.gov/fdsys/browse/committee.action?chamber=senate&committee=appropriations

U.S. GOVERNMENT PRINTING OFFICE

75–444 PDF WASHINGTON : 2013

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
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EXAMINING THE PROPER SIZE OF THE NUCLEAR WEAPONS STOCKPILE TO MAINTAIN A CREDIBLE U.S. DETERRENT

WEDNESDAY, JULY 25, 2012

U.S. SENATE,
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT,
COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:03 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Dianne Feinstein (chairman) presiding.

Present: Senators Feinstein, Tester, and Alexander.

OPENING STATEMENT OF SENATOR DIANNE FEINSTEIN

Senator FEINSTEIN. I'd like to convene this hearing and say good morning and welcome to the Energy and Water subcommittee's hearing "Examining the Size of the Nuclear Weapons Stockpile Necessary to Maintain a Credible United States Deterrent."

Ladies and gentlemen, we're an appropriations subcommittee. Where we come into this is the money that's spent, because this is a mandatory security part of our portfolio and the mandatory security part of the portfolio keeps growing, which pushes out other parts of the portfolio, such as energy, water, various other programs run by the Army Corps of Engineers, that kind of thing, which makes a fair distribution of assets increasingly difficult.

One of the best things about Washington is that you really have access to great minds, people who are good thinkers, people who have developed skills over the years. It's important to listen as we form our decisions. So that's really the purpose of this morning's hearing, to listen to three very prominent people, very skilled, very good thinkers, who we will introduce very shortly.

But let me just put forward a few points on the current plan for nuclear weapons modernization. It calls for $215 billion on nuclear weapons and delivery systems in the next 10 years. According to a recent Stimson Center report, the United States already spends about $31 billion a year to maintain nuclear weapons capabilities.

On Monday, I learned from the National Nuclear Security Administration (NNSA) that the cost of the B61 life-extension program is $8 billion. That's double the cost of the original estimate. An independent Department of Defense (DOD) review puts the cost at $10 billion.

Similarly, the cost of building a uranium processing facility at Y–12, with which the vice chairman and I have been dealing, has

grown from $600 million to $6 billion, 10 times more the cost projected in 2004. An independent Army Corps of Engineers assessment puts the cost of the project as high as $7.5 billion.

So increased costs and schedule delays have already had a significant impact on modernization plans. The construction of a new plutonium facility at Los Alamos has been delayed by at least 5 years. The reason for this delay was to free up funding to pay for higher priorities, such as the B61 life-extension program and the construction of the uranium facility at Y–12.

However, this delay would only save $1.8 billion over 5 years. The new B61 extension program cost estimate alone requires NNSA to find an additional $4 billion at a time when budgets are shrinking and sequestration is a real possibility.

These are some of the indicators of where we are. Into this came a report which caught my eye. The title is "Global Zero: U.S. Nuclear Policy Commission, Modernizing United States Nuclear Strategy, Forces, and Posture for the 21st Century". What also caught my eye were the authors: Retired General James Cartwright and Ambassador Thomas Pickering. They are two stellar people each in their own area, and I will introduce them a bit more fully when the ranking member completes his remarks.

The purpose of this hearing is not to make a decision. It is to receive testimony on a different way of approaching this issue in light of the fact that we are going to face an increasing financial crunch.

One of my great delights is to work with the man on my left. He's fair, he's straightforward, and he's been a good friend. So I will ask the distinguished ranking member if he has any comments he'd like to make.

STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. Thank you, Madam Chairman.

Welcome to the witnesses, distinguished folks. I agree with what the Senator from California said. This is an opportunity for us to learn, so I'll be doing a lot of listening today.

Nuclear weapons are an important component of our national defense structure. We all know that. But we have two inescapable facts ahead of us. One is that we're short of money, borrowing 42 cents of every $1 we spend, and the part of the budget that keeps getting squeezed is the part that includes everything from national defense to national parks, while the mandatory spending runs away.

So the nuclear modernization costs we're talking about are all part of what's getting squeezed. And it already, according to the Budget Control Act, is only growing at about the rate of inflation over the next 10 years. If the mandatory part of our budget were growing at the same rate as the discretionary part, we wouldn't really have a fiscal cliff to worry about in a few months. So that makes the challenge of dealing with nuclear weapons modernization very difficult.

The other inescapable fact is we have to do it. Especially if we're going to reduce our nuclear weapons, we have to make sure that what we have left works. We want to make sure that as we reduce

nuclear weapons we're not left with what amounts to a collection of wet matches.

In December 2010, the President committed to a 10-year plan to make sure our remaining weapons work. Then-Defense Secretary Gates said at the time, "There's absolutely no way we can maintain a credible deterrent and reduce the number of weapons in our stockpile without either resorting to testing our stockpile or pursuing a modernization program."

In our Energy and Water bill this year, we reported out an increased funding of $363 million for NNSA's weapons activities. That's a 5-percent increase. It's a huge increase compared to other parts of the budget. Yet it falls short of the amount called for by the President by about $372 million, and it doesn't include the new plutonium facility, the Chemistry and Metallurgy Research Replacement (CMRR) facility.

The administration has indicated that we can defer this facility for 5 years and is developing an alternative strategy for meeting plutonium requirements in the mean time. Some of the testimony you've submitted touches on this, and I'm interested to hear your comments because this has provoked a major dispute within the Congress. On the one hand, we have authorizers who don't believe the alternative strategy is acceptable, and we have appropriators who followed the administration's recommendations and are short of money.

So you can help us here in how do we reconcile making sure that the nuclear weapons we continue to have work and finding ways to save money or not to spend money that we don't have.

So I thank the chairman for her vision in putting this subject up front and for inviting distinguished witnesses, and I look forward to the testimony.

Senator FEINSTEIN. Thank you very much.

I'd like to introduce the first two witnesses and then ask Senator Alexander to introduce Dr. Payne.

General James Cartwright retired from Active Duty on September 1, 2011, after 40 years of service in the United States Marine Corps. Unique among Marines, the General served as Commander, United States Strategic Command, before being nominated and appointed as the eighth Vice Chairman of the Joint Chiefs of Staff, the Nation's second-highest military officer.

General Cartwright served his 4-year tenure as Vice Chairman across two presidential administrations and constant military operations against diverse and evolving enemies. He became widely recognized for his technical acumen, vision of future national security concepts, and keen ability to integrate systems, organizations, and people in ways that encourage creativity. He sparked innovation in the areas of strategic deterrence, nuclear proliferation, missile defense, cybersecurity, and adaptive acquisition processes.

He was both a naval flight officer and a naval aviator who flew the F–4 Phantom, the Skyhawk, the Hornet. In 1983, he was named Outstanding Carrier Aviator of the Year by the Association of Naval Aviation.

Our second witness is Ambassador Thomas Pickering. His four-decade-long career in foreign service included ambassadorships in Russia, India, the United Nations, Israel, El Salvador, Nigeria, and

Jordan. Additionally, he served as Under Secretary of State for Political Affairs from 1997 to 2000. He holds the rank of career ambassador, the highest in the United States Foreign Service.

Following his retirement from the Foreign Service in 2001, Mr. Pickering served as Senior Vice President for International Relations at Boeing until 2006. Currently, he is serving as an independent board member at the world's biggest pipe company, OAO TMK, in Moscow.

Senator, would you introduce Dr. Payne, please.

Senator ALEXANDER. Thank you very much.

Welcome to General Cartwright and Ambassador Pickering. It's good to see you again.

We're delighted to have Dr. Keith Payne. He was a member of the Congressional Commission on the United States Strategic Posture. He was Assistant Secretary of Defense in 2002 and 2003, and he's Professor and head of the Graduate Department of Defense and Strategic Studies at Missouri State University. So, Dr. Payne, welcome, glad you came.

Senator FEINSTEIN. Thank you very much.

What I'd like to do is ask each of you to confine your remarks to as close to 5 minutes as you can. It'll give us an opportunity to have a good back and forth. So we'll begin with you, General Cartwright.

STATEMENT OF GENERAL JAMES E. CARTWRIGHT, USMC, RETIRED

General CARTWRIGHT. Thank you, Madam Chairwoman and Vice Chairman, Senator Alexander.

As I sit here and reflect a little bit, the people at this table, we have been together for a lot of years, both in studies and consulting and operations. So I think you'll get a pretty diverse view here.

In context, we are a nation that's been at war for more than 10 years. That war is indicative of the conflicts that we're likely to see as we move into the 21st century, and most any study that I've seen, whether they're from the intelligence community or the academic community, forecasts a level of persistent conflict as we look to the future of the type that we're seeing. Whether they characterize it as Arab Spring or counterinsurgency, it is that low-level conflict that is rising from a population that is represented with a maldistribution of wealth, whether that be mineral wealth, homes, water, dollars. That maldistribution is out there and it's unresolved and it is leaving for many in the world a calculus that, if I can't feed my family or house my family, my risk for engaging the Government that runs the country I live in is very low, I'm going after it, I've got to find some way to do something about that.

Our strategic forces were built in the 1950s and 1960s, finished out in the 1970s. That war and that conflict they were designed for is behind us. They did what they were designed to do in the cold war and they deterred. We got up in the neighborhood of the tens of thousands of weapons in the stockpile during that period. We have come down substantially over the past 15 years and we are today under the umbrella of the New Strategic Arms Reduction Treaty (New START), which takes us down to 1,550 or less deployed weapons.

Recapitalization of that infrastructure that creates our strategic deterrent and of those weapons and delivery systems are 50-year decisions and all of them are in front of us, whether you're talking about the next generation bomber, the next generation intercontinental ballistic missiles (ICBM), the next generation submarine and submarine-launched ballistic missile (SLBM), or the infrastructure itself. All of these decisions are 50-year decisions.

So I think one thing that everybody at this table can agree on is that they shouldn't be just driven strictly by budget; they should be led by a thoughtful review of the strategy, which the administration has sought to do, but that should be joined by the academic community, by people, I guess the old people at this table, that have been around this business for a while, and the public should take some understanding of this in a way such that they understand what it is they're spending their hard-earned money on, how much of it they're willing to put against this capability, and how much of it we might need under what constructs.

The study's objective was to provide an open discussion about—using an illustrative force posture and sizing construct. So in other words, take a look at the problems that we think are reasonable to consider as you look into the future; come up with an alternative sizing construct, in other words, the number of weapons and the number of delivery platforms and the size of the infrastructure, from what we have today, that would address both what we think we know, which we're almost always wrong at, and what the future might bring to us.

So you look at what's most likely and what's most dangerous when you consider things like this. Those are the two criteria that you try to run as a litmus against any proposal that you might make.

The realities today, we have a bipolar strategic relationship with Russia, a legacy of the cold war. But we live in a multipolar, multicountry, nuclear-capable nations world. That's the reality. To some extent, our dialogue with Russia locks out realistic dialogues with other nation states that either have, aspire to have, or are thinking about moving towards the capability of nuclear weapons in their stockpiles.

The likelihood of an ICBM, strategic bomber war with Russia or China is remote, but it is possible. It is not something that should be just walked away from or discounted.

The range of threats and the lethality of those threats in today's world are growing. In other words, as we start to watch cyber come into capability, as we watch the capabilities of potential bio and chemical type weapons and nuclear weapons, more people have them and their lethality is growing.

Proliferation of the intellectual capital that's associated with these weapons is being fed by global access to information. It is no longer whether or not you can build a bomb. What is really the question today is whether you want to. In other words, they have access to the information. They can get that information.

Most nation states aspire to weapons of mass destruction as a guarantor of their sovereignty. As they think about it, if they build these weapons it is to ensure that they can maintain their sovereignty. When you come to the nexus between terrorism and nu-

clear weapons, terrorists tend to want these weapons generally for weapons that they can use to either undermine the confidence of the people of a nation or to kill as many people as possible in one bold strike, both of which tend to come together, undermining the confidence in a government in power and the killing of as many people as possible, when you put the nexus between nuclear weapons and terrorists together.

Extended deterrence, the concept that we had for many years that was the guarantor of, you don't need to build these weapons, we will put you under our umbrella and we will protect you, is losing its credibility, mainly because the threats these nations face are not threats of ICBMs or SLBMs raining down on them. They are the threats of their neighbors and short-range delivery or the potential that a terrorist might get control of one of these weapons and bring it to their country.

Their thought process is: Should I have these weapons? Do I need them? Will the United States be there when I need them, and do they have the capability of protecting me from long distances? These are the things that undermine, whether you're talking in the Pacific or whether you're talking in the Middle East or Europe. It is a question of will we actually respond in a way that they think is in their best interests for their sovereignty.

With the rise in the number of nations possessing weapons and the number of weapons in their arsenal comes also the increased likelihood that the loss of control of one of these weapons can occur. It's just the natural thing that more nations have these things, there are more weapons out there; the likelihood that one of them could be somehow stolen or lost control in some way is increasing.

The likelihood of a mishap with one of these weapons also increases. It's not through necessarily intent, but if you are a new nation, you're new at handling these weapons, you're new at the protocols of protecting these weapons, et cetera, the likelihood that you will make a mistake early on is increased. That's just the way we looked at it.

Also, the likelihood of miscalculation of the intent of a neighbor or an adversary goes up. So our systems today are aging. The systems in other nations, like Russia and China, in particular Russia, systems are aging. Their ability to characterize whether they're being attacked or whether it is something else routinely comes up, and sensors that miscalculate or mischaracterize inbound activities as potential threats. Time lines for decisions about whether or not a country does something about these inbound threats is in minutes. The likelihood of a miscalculation with the increased number of states that have these weapons is going to go up.

So these are the things that are most worrisome as we look out towards the future and the proliferation of these weapons and their capabilities.

I'm a person whose glass is half full, okay. We have the world's greatest conventional military. I'm biased. I put that right up front: They are the best. We have built the world's greatest intelligence, surveillance, and reconnaissance capability. Nobody comes close. We have built the world's greatest space capability. People aspire to it, but nobody's close yet.

We have built the world's greatest regional missile defense. Nobody comes close. It's growing. Other countries are adopting it. It is starting to be integrated into their defenses. It is starting to offer nations an alternative to an offensive-only posture, and that's important.

We have integrated all of these capabilities. We are building the world's greatest nonkinetic capabilities, whether you think about cyber or whether you think about directed energy. All of these capabilities are just on the horizon.

Our greatest strength is our people and the ability of those people to integrate all of these capabilities and use them in an integrated fashion. It is the vision of what Goldwater-Nichols brought to us, the ability to work together, to integrate all the capabilities and to never think single dimensionally.

We are looking at the strategic capabilities in this hearing, but we should not discount as nontrivial the capabilities that we have built in this Nation in defense, in missile defense, in offensive capability on the conventional side. They are tools. They are credible tools that any president would want to use before he or she ever considered using a nuclear weapon. That's important. We should not discount those capabilities. We have built them, we have spent money on them, and we should in fact understand how nuclear weapons play into this integrated force.

I'll close by just hitting a couple of the numbers that we have in the study and then we'll be ready to take questions after the other two gents have a chance to talk. The study recommends—and this is illustrative in nature; it is not a hard number. But we recommend 900 total weapons in the inventory. That's not like we have done treaties up until now, which just recategorizes weapons and we still maintain thousands of weapons in other categories. This is a total. All other weapons would be eliminated. 900 total in the inventory, not deployed. This is the total number, 900.

Of those, today we would allocate about 720 of them to the Trident force, and we would reduce that Trident force from 12 to 10. We would use the force structure that we have today, on the bomber side 18 B–2's, capable of delivering, and we would have 180 weapons in that inventory for them.

Of each of those, the 720 and the 180, only a fraction of those would be deployed at any given time. We're generally in the mode of one deployed, two in the pipeline, so to speak, either being recharacterized and going through testing and upgrading or in a hedge status that could be brought out in days or weeks if they were needed.

The posture that we would advocate for is a posture that does not have these weapons on minute by minute alert. It is a posture that would have these weapons available in 24 to 48 hours. We worked hard on that activity. We believe that it is doable. There are a lot of assumptions in these numbers. There are a lot of assumptions in that posture that we would have to work our way towards.

PREPARED STATEMENT

There is no recommendation for unilateral movement to these numbers. It should be done in conjunction with the Russians. It

should be done in conjunction with other nuclear nation states, so that as we move we have an understanding of what our adversaries are doing. We potentially can start to change the character of the alert posture from one that is offensive weapons on alert to defensive weapons on alert, as we develop credible capabilities to provide that alternative.

We believe that we can be well on that path in a period of about 10 years. The savings that we would think are available here are in the $100 to $120 billion in that first 10 to 15 years, depending on the pace at which we wanted to move towards this activity. Most of that money is cost avoidance. It's cost avoidance. It's not building as many submarines, it's not building as many weapons, it's not doing as much on the life-extension program, because we don't need as many weapons. So a lot of this money is cost avoidance. I'll give you that right up front. But it is still money and we still have to think about it.

Thank you for this opportunity. I stand ready for your questions.

[The statement follows:]

PREPARED STATEMENT OF GENERAL JAMES E. CARTWRIGHT, UNITED STATES MARINE CORPS (RETIRED) AND AMBASSADOR THOMAS R. PICKERING

INTRODUCTION

Senators Inouye, Feinstein, Alexander, and other distinguished members, it's an honor and a pleasure for us to present testimony before this august committee. Thank you for inviting us and for taking an interest in the findings and proposals of the Global Zero U.S. Nuclear Policy Commission on which we served. We hope our commission report (Modernizing U.S. Nuclear Strategy, Force Structure and Posture, May 2012) and remarks here contribute to your vitally important work in protecting America's national security. Our written joint testimony highlights some of the commission's key conclusions and recommendations as well as answers some of the critical questions raised by readers after the report was released to the public.

THE GLOBAL ZERO COMMISSION AIMS AND PURPOSES

The goal of the commission was simple: conceive and articulate a nuclear strategy, force structure, and posture that best address the national security challenges our country faces in the 21st century. We first considered present and future threats across the spectrum of possibilities, ranging from deliberate or accidental nuclear attack by a nation state to terrorist nuclear attack—and everything in between. Then we assessed the role of U.S. nuclear weapons in diminishing these dangers through deterrence or war-fighting, and also weighed the potential for missile defenses, conventional forces, alliance cooperation and diplomacy to offer non-nuclear tools to our kitbag for dealing with these threats. Next we performed a net assessment of both the benefits and risks of further nuclear arms reductions and lowered launch readiness ("de-alerting"). Finally, we formulated a new construct for a 21st century nuclear strategy.

Of special interest to the commission was the paramount goal of broadening the scope of nuclear arms reductions to include all countries and all types of weapons in their possession. The nearly half-century of arms negotiations with the Russians has been an exclusively two-sided affair that has excluded some important players. These negotiations need to be extended to China and other nations that maintain existing or planned nuclear arsenals. The major risks of nuclear weapons use, proliferation and arms race instability in fact mostly lie outside the U.S.-Russian arena, particularly in Northeast and South Asia and in the Middle East. It is essential to begin a multilateral process that brings the rest of the nuclear-armed world to the negotiating table to begin to cap, freeze, reduce and otherwise constrain these third-country nuclear arms programs. We estimate that U.S. and Russian arsenals would need to be downsized substantially—900 or fewer total weapons on each side—in order to draw these third-countries into the process.

A 2022 U.S. NUCLEAR FORCE

Our net assessment concluded that the current U.S. nuclear force remains sized and organized operationally for fighting the "last war"—the cold war—even though threats from that era posed by the Soviet Union and China have greatly diminished or disappeared. Russian and China are not mortal enemies of the United States. Our geopolitical relations with our former cold war adversaries have fundamentally changed for the better.

The U.S. (and Russian) arsenal is thus over-stocked. Ample latitude exists for further nuclear cuts. The extent of such cuts, the composition of the reduced arsenals, and the number of weapons held in reserve as a geopolitical hedge against a downturn in relations are matters worthy of public debate, and of congressional hearings. There are a number of alternative force structures that would well serve to maintain a credible U.S. nuclear deterrent and advance other national security interests.

In the commission's view, one such illustrative nuclear force would be composed of 900 total strategic weapons—total deployed and reserve—on a dyad of ballistic missile submarines and strategic bombers. This would represent a steep (80 percent) reduction from the current U.S. arsenal, but it would not be a small force, nor a humble force designed for minimal deterrence. It would not entail a radical shift in targeting philosophy away from military targets to population centers. It is not a city-busting strategy. On the contrary, it would hold at risk all the major categories of facilities in all the countries of interest—a diverse set of nuclear/weapons of mass destruction (WMD) forces and facilities, top military and political leadership, and war-supporting industry. It would fulfill reasonable requirements of deterrence vis-à-vis every country considered to pose a potential WMD threat to the United States.

STRENGTHENING UNIVERSAL NUCLEAR DISARMAMENT AND NONPROLIFERATION

At the same time, an arsenal shrunk to 900 total U.S. weapons, matched by comparable Russian reductions, would represent a dramatic cut that should work to draw the other nuclear countries into a multilateral process culminating in formal arms reduction negotiations among all nations with nuclear arms.

It should also demonstrate a serious U.S. and Russian commitment to fulfilling their disarmament obligations under Article 6 of the Non-Proliferation Treaty, and thereby help rally the anti-proliferation community to greater efforts to thwart would-be proliferators. The idea is not that virtuous U.S. and Russian behavior in the form of steep nuclear arms reductions will inspire aspiring proliferators to abandon their quests. We do not subscribe to this naïve notion. Rather, there are reasons to believe that such behavior could inspire our antiproliferation partners to get tougher with recalcitrant states seeking the bomb.

REDUCING U.S.-RUSSIA NUCLEAR ARMS THROUGH NEGOTIATIONS

The commissioners agreed that cuts to 900 total nuclear weapons in the U.S. and Russian arsenals should be the aim of the next round of bilateral New START follow-on negotiations. We call upon them to reach a comprehensive, verifiable agreement that provides for equal reductions by both sides down to a total force of 900 weapons that counts all types of strategic and nonstrategic weapons—with "freedom to mix" on both sides—and that counts every individual warhead or bomb whether deployed or held in reserve.

We wish to emphasize that the commission does not call for unilateral cuts by the United States. Our view is that the only valid and useful approach should be to negotiate an agreement with the Russians. However, there may well be other ways to advance the goal of further reductions. Some unilateral steps, or parallel reciprocal steps along the lines of the 1991 Presidential Nuclear Initiatives, could facilitate the effort. For instance, Russia has already dropped below its allowed ceiling of 1,550 deployed strategic forces stipulated by the New START agreement. It may behoove the United States to follow in Russia's footsteps and take advantage of Russia's unilateral reductions to reduce U.S. forces below the allowed level as an approach designed to remove the incentive for Russia to build its forces back up and take advantage of the benefits, set out further in this presentation, of additional reductions. This would serve to lower the ceiling on deployments and maintain momentum for further reductions. It would match U.S. and Russian forces, take advantage of Russian unilateral needs to restrict its force size, maintain stability and serve as a further reinforcement of the process of mutual reductions. There is no reason why the present verification systems could not be used or adapted for use for these kinds of steps. In short, there is some scope for parallel reciprocal steps to advance the cause of bilateral arms cuts, but we would certainly pursue the cuts

through direct negotiations with the Russians, and then would seek to add the other nuclear weapons countries to this formal process.

We envision each side enjoying substantial latitude to choose the composition of their own forces according to their perceived security needs as long as they do not exceed the 900-warhead ceiling. This potential variation in the composition of forces is another reason why we characterize our proposed U.S. force structure as "illustrative." Our commission strongly supports an open debate on the appropriate make-up of U.S. nuclear forces, and acknowledges that honest differences of opinion exist. Experts differ on the relative merits of bombers, submarines and land-based missiles, for instance, and also debate whether it is necessary to maintain three different types of delivery vehicles in the U.S. arsenal.

FROM TRIAD TO DYAD: ELIMINATING THE LAND-BASED MISSILE COMPONENT

After evaluating the vulnerability, flexibility, and other key characteristics of the different delivery systems, our commission concluded that a dyad of sea- and air-based strategic weapons would meet the post-cold war requirements of deterring a WMD attack on the United States. The Minuteman land-based intercontinental ballistic missile (ICBM) would be eliminated in this scheme.

The elimination of Minuteman and consequently of the TRIAD of delivery vehicles in favor of a dyad stemmed from the fact that Minuteman is vulnerable and inflexible from a targeting standpoint.

Minuteman is vulnerable to sudden decimation unless it is launched promptly on tactical warning of an incoming Russian missile strike. The ability to launch promptly the Minuteman force (within a few minutes) is often touted as a virtue, but in reality it is a liability. In the (admittedly extremely improbable) event of a large-scale Russian nuclear missile strike against the three U.S. Minuteman fields, enormous pressure would be exerted upon the National Command Authority rapidly to authorize the immediate firing of the force en masse—the deadline for a presidential (or successor) execution decision would be 12 minutes at most. Moreover, the unleashing of Minuteman forces would necessitate unleashing other strategic missiles—notably Trident submarine missiles, because of the integrated operational nature of major attack options to assure full coverage of all intended targets.

The second severe deficiency of Minuteman is its targeting inflexibility. It is suitable for the most unlikely scenario—large-scale nuclear war with Russia—but is unsuitable for nuclear conflict with North Korea or Iran because it would have to fly over both Russia and China to reach either of them. In the very unlikely event of a U.S.-China nuclear conflict, Minuteman missiles would have to fly over Russia to reach China.

Put differently, the Minuteman force is suitable only for Russia contingencies, our least likely adversary in nuclear conflict. The other legs of the commission's proposed dyad offer means of dealing with almost any scenario involving a WMD threat to America from a nation-state adversary. Neither U.S. strategic submarine missiles nor strategic bombers are constrained by rigid flight trajectories. These are versatile platforms that offer highly flexible angles of attack against practically any target on the globe. Although a prompt global strike by Minuteman could be carried out with a single warhead, a Trident missile could perform the same mission (if a small number would be downloaded to carry a single warhead instead of the multiple warheads now carried) without risk of causing Russia to think it is under nuclear missile attack and ordering a nuclear "counter-strike" in retaliation. Moreover, ballistic missile submarines on alert patrol can be fired almost as quickly as Minuteman missiles if so desired (15 minutes versus 2 minutes), although the commission did not identify scenarios in which the prompt launch of sea-based ballistic missiles armed with nuclear warheads fulfilled any evident national security requirement.

One critic of the proposal to eliminate Minuteman (and cancel any follow-on nuclear ICBM program), the Chief of Staff of the Air Force, recently asserted that a critical virtue of this force is that it forces an enemy bent on attacking the United States to strike the American homeland. Gen. Norton Schwartz said, "Why do we have a land-based deterrent force? It's so that an adversary has to strike the homeland." In the commission's view, the optimal U.S. nuclear deterrent would ensure that the U.S. homeland is never struck with nuclear weapons in the event of war while preserving the full elements of deterrence currently available to the President.

DE-ALERTING STRATEGIC FORCES

The commission viewed unfavorably the continuing practice of keeping Minuteman and strategic submarines on launch-ready alert, and especially of gearing the nuclear command-control-communications and warning system from the President on down to the individual launch commanders for rapidly executing the forces in

the opening phase of a nuclear conflict. (The Russia system is similarly organized.) The short-fused Minuteman and strategic submarine alert forces, together with the supporting rapid reaction command system, impose a severe constraint on presidential deliberation and choice during a crisis or conflict. Public reports of past experience with short time lines for decisionmaking have shown that the process is flawed and that near cataclysmic errors have been narrowly avoided but made more likely by the rushed nature of the process. The President and his top advisors should have many more tools at their disposal, including non-nuclear options, and be afforded the time to deliberate and exercise these tools, which include diplomacy.

The day-to-day high alert posture of the United States today also represents a threat to Russia that has untoward unanticipated consequences for the United States. By dint of possessing the ability to fire U.S. strategic missiles promptly on warning ("launch-under-attack" in the operating vernacular), the United States concurrently possesses the ability to initiate a sudden massive strike against Russia (or any other country). This surprise attack option technically threatens the survival of almost all Russian nuclear forces in their day-to-day configuration unless, like the United States, Russia launches these forces out from under the attack, on warning. If coupled with U.S. missile defenses designed against Russia's strategic retaliatory forces—a current Russian fear despite American assurances that Russia is not a target of such defenses—the U.S. first-strike threat puts Russia on even greater vigilance and launch readiness.

The upshot is that both U.S. and Russian forces are kept on quick-launch alert because the other side does the same. This entwines the two countries in a proverbial "hair-trigger" dynamic that increases the risks of accidental, mistaken, inadvertent, misinformed, or unauthorized launch with devastating consequences. Launch on false warning is doubly worrisome in light of the chronic deficiencies in Russian early warning that are not going away anytime soon. This is a serious risk not to be undertaken without the greatest care to avoid it, and we believe that can be done with our proposals while still protecting the essential security interests of the nation.

These postures also set a terrible example for the other nuclear armed nations, who for various reasons have not yet adopted launch-ready postures for their own forces. As a rule, their warheads and bombs are kept separate from their means of delivery, a safe practice that greatly reduces the danger of an unintended nuclear exchange. We can imagine a multitude of grave dangers that would emerge if this practice is abandoned in favor of increasing the launch readiness of nuclear forces. Acute instability would arise if Pakistan, India, China, and North Korea adopted a quick-launch posture requiring execution decisions to be made within minutes and seconds on the basis of attack early warning indications from satellite infrared or ground radar sensors. The risks of unauthorized launch, or the terrorist capture of dispersed assembled weapons, would also grow significantly.

In short, the current launch-ready postures of the United States and Russia are major sources of instability. They not only would generate pressure on leaders to make a premature decision on the use of nuclear weapons in a crisis, but they also run a risk of unintentional strikes. The postures pose an existential threat to the very survival of the United States, and Russia perceives no less cause for concern.

The commission therefore recommended the de-alerting of U.S. strategic forces in tandem with Russian de-alerting. A negotiated agreement that cuts the Gordian knot and allows both sides to stand down their forces would well serve their vital security and safety interests. In a similar vein, we also proposed that the United States deploy only 270 U.S. sea-based strategic warheads on day-to-day patrol, a number that is below the approximate threshold of 300 warheads that constitute a first-strike decapitation threat to Russia. This reduced deployment level would further allay Russian concern over its vulnerability and encourage it to get off of its dangerous "hair-trigger" launch posture.

If the U.S. strategic arsenal required 24 to 72 hours to generate the ability to fire and the Russians followed suit, the world would be far safer and a norm would be forged to encourage other countries to maintain their current practice of keeping weapons separated from their bombers, submarines, and land-based rockets. Again, as we make clear, this is not a unilateral step but a reciprocal one with Russia to begin with and others to follow. It would be insured by the levels of reliability we have achieved and can achieve through further work on the verification systems and procedures that we have already engaged in our nuclear arrangements with Russia.

PROMPT LAUNCH CONSTRAINS PRESIDENTIAL DECISIONMAKING

While some observers may view this 24–72 hour generation requirement as a constraint that would hobble a U.S. President in a crisis, our commission found that

the current posture, which exerts pressure on the President to make a nuclear choice rapidly, is a far greater constraint. Launch-under-attack pressure severely hobbles presidential decisionmaking. It deprives our leaders of the time necessary for deliberation and of the tools needed to direct U.S. power to coherent national purpose.

NEW STRATEGY AND TOOLS TO SUPPORT PRESIDENTIAL CONFLICT DELIBERATION AND CHOICE

This commission recommendation therefore undertakes the responsibility of suggesting a strategy that would relieve the pressure on our leaders and reduce our reliance on nuclear weapons as a primary or unique choice in the face of aggression. Our report lays out the elements of this strategy, which features a growing role for missile defenses and conventional forces including a new ICBM (HTV–2) with a conventional warhead and sufficient range to reach practically any target in the world from home bases on U.S. soil without traversing Russian territory during flight. Its range and accuracy would provide an unprecedented tool for destroying critical targets globally within 1 hour. At present, the only tool available to the President for such a global quick strike is a nuclear warhead atop a land- or sea-based missile.

Missile defenses and conventional offensive forces as well as other kinetic and non-kinetic (cyber) tools of warfare, and various "soft power" tools would be designed to buy time for a day or two and exert non-nuclear leverage to resolve a dispute before it could escalate to nuclear dimensions. This strategy would empower a president, not hobble him. It would extend the deadline for a nuclear decision. It would help stabilize a crisis. Again, it is the paucity of non-nuclear options and the time pressure to resort to nuclear options that represents the fundamental problem for presidential choice.

DOWNSIZING THE NUCLEAR COMPLEX; RISKS AND COST SAVINGS

Under the commission's plan, the number of different types of nuclear weapons in the U.S. active inventory would decrease from seven types today to four by 2022. The need to re-furbish weapons remaining in the stockpile would greatly diminish—almost all of weapons previously requiring it would be eliminated from the active inventory. This drastic curtailing of the life-extension program for thousands of weapons currently in the pipeline would save at least $10 billion.

The existing plutonium pit facility at Los Alamos could readily service the regular pit manufacturing demands of a 900-warhead arsenal. Assuming a 50-year pit shelf life, only 2 percent of the active stockpile, or 18 warheads, would need to be remanufactured each year. The facility has a normal throughput capacity of about 20 per year with the option to add extra staff shifts in order to raise capacity to 40 pits per year. With the addition of extra equipment (5–6 years to install), the capacity could be increased to perhaps as high as 80 per year.

This number would grow higher still if old pits could be re-used and if pits with sensitive, conventional high explosives could be re-fitted with insensitive high explosives to improve safety. Current studies underway at the U.S. national laboratories to be completed within the next couple of years should determine the feasibility of these options. Preliminary analyses suggest that upwards of 50 percent of plutonium pits in the stockpile could be swapped out in these processes, allowing for a much faster rate of pit replacement.

In an emergency in which a systemic defect in one of the four warhead types warranted a crash effort to replace those warheads, it appears feasible that upwards of 120 defective weapons per year could be remedied through a combination of pit manufacturing and pit re-use. Such a systemic defect is a low-probability event, but assuming 225 defective warheads (notionally one-fourth of the 900-warhead total) needed to be repaired, it would take approximately 2 years of full-capacity work to finish the job.

In short, the current plutonium facility with some new equipment working overtime with other partners such as the Pantex facility could probably handle an unusual emergency to replace a big chunk of the arsenal. Our commission viewed this capability of the existing facilities as obviating the need to build the multibillion dollar new facility now in early construction stage at Los Alamos. However, some small additional risk of reduced stockpile reliability must be acknowledged if we shrink the variety of warhead types from seven to four, and the margin of comfort for replacing an entire category of weapons in the event of a systemic defect is not large. On balance, our commission deemed these risks to be quite low, and acceptable, but we strongly recommend a full-scope survey by the pertinent agencies (National Nuclear Security Administration—NNSA, the national laboratories, and Strategic Com-

mand) to determine an optimal infrastructure in support of the 900-warhead arsenal outlined in the commission report.

DOWNSIZING THE NUCLEAR FORCE STRUCTURE; RISKS AND COST SAVINGS

Unforeseen Nuclear Challengers?

Some readers of our report have raised the question whether our illustrative force would be stretched thin and fall short if an unanticipated threat of major proportions emerged from an unexpected source—perhaps an unfriendly state that unexpectedly breaks out a substantial nuclear arsenal, or an existing state such as China that greatly expands its nuclear arsenal. (In China's case, its recent nuclear modernization created an infrastructure capable of substantially increasing its existing small arsenal if it chose to do so.)

The answer to this question has three parts. First, this is an intelligence challenge that warrants an intelligence estimate as to the likelihood of such break-out or rapid expansion scenarios over the next 10 years. Our commission found no grounds to believe that the intelligence community places any credence in them. A Chinese surge is unlikely to yield an arsenal much larger than 250–300 warheads. A Russian surge appears both financially and technically implausible. Although Russia has begun a strategic modernization program with upwards of $70 billion earmarked for this purpose over the next 10 years (an amount far less than the planned U.S. strategic modernization budget over the same period), the ability of its military-industrial infrastructure to deliver the goods has proven to be quite impaired. Pakistan, currently an unfriendly ally of the United States, is rapidly growing its arsenal, but its focus is India. Other candidates for such a surge are unclear to us. In short, while we do not claim clairvoyance, the prospect that any aspiring proliferator or existing nuclear-armed nation will undertake a crash build-up on a large scale is remote.

Second, it is highly doubtful that any of the hypothetical possibilities could unfold without being detected. Since the beginning of the nuclear age, no nation has ever produced enough nuclear weapons material to build a bomb without first being detected by foreign intelligence. (This applies even to the super-secret U.S. Manhattan project in the mid-1940s, before the advent of satellite surveillance or on-site inspections.) It strains credulity to project a breakout of such a magnitude over the next 10 years that the United States would wake up one morning and find itself "outgunned."

Third, in any case the proposed U.S. arsenal is sufficient to project a draconian threat of retaliation against any and all possible nuclear newcomers or late-bloomers over the next decade and beyond. It is sufficient to deter reliably any conceivable threat on the horizon.

Cost Savings

A significant cost savings would accrue if our illustrative force structure is implemented. An 80-percent force reduction that includes the elimination of all Minuteman missiles (and cancellation of its replacement), all B–52 bombers and all tactical nuclear forces in the U.S. inventory, combined with a scaling back of future strategic submarine construction from 12 to 10 boats and of the strategic bomber replacement aircraft to a minimum number of nuclear-capable aircraft (e.g., 30), would save an estimated $100 billion over the next 15 years. As noted earlier, the illustrative force would also impose lighter demands on the nuclear complex, saving an additional (est.) $20 billion during this period. The total savings for our proposed nuclear architecture is roughly estimated to be $120 billion over the next 15 years.

CONCLUSION

The nuclear strategy, force structure and posture proposed by our diverse commission of generals, diplomats, strategic arms negotiators and policymakers are not necessarily the Holy Grail for the next phase of our Nation's pursuit of security in the 21st century. We believe, however, that our recommendations promise to more squarely and effectively address the real threats that our Nation will be facing over the next decade than current U.S. nuclear policy promises. A fundamental transformation of our nuclear architecture and policy is needed to maintain a credible U.S. deterrent against classical risks of nuclear aggression by other nations while preserving strategic stability and protecting the nation against nuclear proliferation, terrorism, cyber warfare, failed states, organized crime, regional conflict and other threats the 21st century has wrought. We appreciate the opportunity to present our findings and join the debate.

Senator FEINSTEIN. Thank you very much, General.

Ambassador Pickering.

STATEMENT OF HON. THOMAS PICKERING, FORMER UNDERSECRETARY FOR POLITICAL AFFAIRS, UNITED STATES DEPARTMENT OF STATE

Ambassador PICKERING. Thank you very much, Madam Chairwoman and Senator Alexander. It's a pleasure to be here this morning and a particular pleasure to follow on General Cartwright, who chaired the commission and whose I think brilliant presentation this morning laid out for you not only the problem, but some directions toward which the illustrative figures in the report that we prepared can provide a solution.

I will follow along in his wake literally and talk about some of the political points that we believe will be important in dealing with some of the areas that he was expressing a deep concern about, which I share: the question of proliferation and also the question of the stability of forces on both sides and some of the problems that we hope will be dealt with by this particular approach in terms of the pressure for very early decision under conditions of some uncertainty, which we have had before.

Of special interest to our commission was the paramount goal of broadening the scope of nuclear arms reductions to include all of the countries and all of the types of the weapons in their possession. The nearly half century of arms control negotiations has involved us pretty exclusively with the Russians in a two-sided affair that has obviously left aside other important players, such as China, Britain, and France, among the five recognized nuclear powers. These negotiations obviously will need to be extended to China and to other nations that maintain existing or planned nuclear arsenals, and in my own view they will have to come as well to countries like India and Pakistan, Israel, and North Korea, and if, God forbid, Iran becomes such a power, with Iran.

The major risks of nuclear weapon use, proliferation and arms race instability, in fact mostly lie outside, as the General made clear, the U.S.-Russian arena. Particularly, they lie in Northeast and South Asia and in the Middle East. It is essential to begin a multilateral process that brings the rest of the nuclear-armed world to the negotiating table and that begins the process that we have long established of capping, freezing, and then reducing and otherwise constraining these third country nuclear arms programs.

Our commission estimated that the U.S. and Russian arsenals would need to be downsized substantially, to the 900 or fewer total weapons on each side that the General spoke about, in order to draw these third countries into the process. At the sake time, an arsenal shrunk to 900 total U.S. weapons, matched by comparable Russian reductions, would represent in itself a dramatic cut that should work to draw those countries into the multilateral process, culminating in formal arms reduction negotiations among all nations with nuclear arms.

It should also demonstrate a serious U.S. and Russian commitment to fulfill their disarmament obligations under Article 6 of the Non-Proliferation Treaty and thereby help to convince those that might be significantly interested in proliferation that the comparable portion of the bargain on the other side, serious reductions in the direction of elimination by the U.S. and Russia, was obvi-

ously taking place, and that greater efforts in this direction I think would be part of the background for the kind of work that we would like to take to enhance our efforts at proliferation.

The idea is not, Madam Chairwoman, that the virtuous U.S. and Russian behavior in the form of steep nuclear arms reductions will inspire aspiring proliferators to abandon their quests. We don't ascribe to that naive or somewhat naive notion. Rather, there are reasons to believe that that behavior would inspire our antiproliferation partners to get tougher on the recalcitrant states that are seeking the bomb.

The commissioners agreed that a total cut to 900 weapons in the U.S. and Russian arsenals would be the aim or should be the aim of the next round of bilateral New START negotiations to follow on the ones that were successfully completed earlier in the administration. We call upon them to reach a comprehensive, verifiable agreement that provides for equal reductions by both sides down to the total force we outlined and that counts all types, as the General made clear, of strategic and nonstrategic weapons, with the freedom to mix on both sides, that counts every individual warhead or bomb whether deployed or held in reserve.

We want to emphasize that the commission does not call for unilateral cuts by the United States. Our view is that the only valid and useful approach should be a negotiated agreement with the Russians. However, there may well be other ways to advance the goal of further reductions. Some unilateral steps or parallel reciprocal steps along the lines of the 1991 Presidential Nuclear Initiatives under President Reagan could facilitate the effort.

For instance, Russia has already dropped below its allowed ceiling of 1,550 deployed strategic forces stipulated in New START. It may well behoove the United States to follow in Russia's footsteps and take advantage of Russia's apparent unilateral reductions to reduce U.S. forces below the allowed level as an approach designed to remove the incentive for Russia to rebuild forces back up to a higher level and take advantage of the benefits, including for our own budget, if I could put it that way, set out further in our presentation of additional reductions.

This would serve to lower the ceiling on deployments and maintain momentum for further reductions. It could take advantage of Russian unilateral needs to restrict its force size while maintaining stability and serve as a further reinforcement of the process of mutual reductions. There's no reason why the present verification system could not be adapted, expanded, enlarged, and this will require some inventive work, to take care of the verification of this kind of a process.

We envisage each side enjoying substantial latitude to choose the composition of its forces to meet their perceived security needs, as long as they don't exceed the maximum allowed number, whether that be 900 or a different ceiling. This potential variation in the compositions of the forces is another reason why we characterize our proposed U.S. force as illustrative.

Much thought needs to be given, much new work needs to be accomplished, before some final view on this can be expressed. But we believe that raising it here at the hearings is an important way to begin that process, and we thank you for doing that.

I have a few final words. The commission is recommending that the United States undertake the responsibility—or that it undertake the responsibility here in the United States for suggesting a strategy that would relieve the pressure on our leaders and reduce their reliance on nuclear weapons as a primary or unique choice in the face of aggression. Our report lays out the elements of that strategy and points as well to the growing role for missile defense and conventional forces, including a new ICBM with a conventional warhead and sufficient range to reach practically any target in the world from home bases on our own soil, without traversing Russian territory during the flight. Range and accuracy of this missile would provide an unprecedented tool for dealing with critical targets globally within an hour. At present, the only tool available to the President for such global quick strike is a nuclear warhead on top of a land or a sea-based missile.

Missile defenses and conventional offensive forces, as well as other kinetic and nonkinetic tools of warfare and various soft power tools would be designed to build in time for a day or two and exert non-nuclear leverage to resolve disputes before they could escalate to their nuclear dimensions. I know you and the committee appreciate the value of all of this.

The strategy would empower a president, not hobble him with the need for rapid and excruciatingly difficult decisions under tight time deadlines. It would extend the deadline for nuclear decisions and would help stabilize crises. Again, the paucity of non-nuclear options and the time pressure to resort to nuclear options represent fundamental problems at the present time.

I won't go further into some of the other issues, except I wanted briefly to address finally the question of cost savings. A significant cost saving would accrue if our illustrative force structure or something like it is implemented. An 80-percent force reduction that includes the elimination of all Minuteman missiles and cancellation of its replacement, all B–52 bombers, all tactical nuclear forces in the U.S. inventory, combined with a scaling back of future strategic submarine construction from 12 to 10 boats as the General has outlined, and of the strategic bomber replacement aircraft to a minimum number of nuclear aircraft, would save an estimated $100 billion over 15 years.

As noted earlier in our report and in our testimony, the illustrative force would also pose lighter demands on our nuclear complex, saving perhaps an estimated $20 billion during this period. The total savings for our proposed nuclear architecture is roughly then estimated at $120 billion over the next 10 years, as an example, Madam Chairman, of the issues that you would like us to have discussed.

It's been a pleasure to make my presentation and I look forward to the questions.

Senator FEINSTEIN. Thank you very much, Ambassador.

Dr. Payne.

STATEMENT OF KEITH B. PAYNE, Ph.D., PROFESSOR AND DEPARTMENT HEAD, MISSOURI STATE UNIVERSITY, DEPARTMENT OF DEFENSE AND STRATEGIC STUDIES

Dr. PAYNE. Thank you, Madam Chairwoman. It's an honor to be here this morning.

The number of U.S. START-accountable strategic nuclear weapons has been reduced by more than 80 percent since the end of the cold war. Some analyses, such as the Global Nuclear Zero (GNZ) Commission Report, recommend further deep reductions compatible with a minimum deterrence policy. I have enormous respect for my colleagues at the table and had the pleasure of working with General Cartwright for years, but I believe there are six basic problems with this report's recommendations, as is the case with most proposals for minimum deterrence.

First, the report recommends deep U.S. reductions that would leave only a small U.S. nuclear dyad of sea-based missiles and B–2 bombers. When our understanding of opponents suggests that deterring them requires flexible targeting options and a basic threat to well-protected leaders, military forces, and internal security forces as may be the case, then this minimum deterrence dyad would not be compatible with effective deterrence. It would be dangerously vulnerable and inflexible and incapable of addressing even the extremely limited targets sets outlined in the GNZ report.

For more than five decades, all Democratic and Republican administrations have sought to avoid such a dangerous condition. The GNZ report essentially answers this concern by asserting that Russia and China are not opponents and are unlikely ever to be so again. Over the past several years, however, top Russian leaders have made numerous threats of preemptive and preventive nuclear strike against U.S. allies and friends. To claim that nuclear weapons will not be salient in contemporary or future relations with Russia or China is, I believe, an unwarranted and highly optimistic hope, not a prudent basis for calculating U.S. deterrence requirements.

Second, deterrence must work in contemporary and future crises. Yet no one knows what will be the future force requirements for a credible deterrent because opponents and threats shift so rapidly. Consequently, a priority force requirement now is sufficient flexibility and diversity to adapt deterrence to a wide spectrum of potential opponents and threats.

Yet the minimum deterrence dyad recommended in the GNZ report would be the opposite of flexible and resilient. What level of U.S. forces is compatible with the requisite U.S. flexibility and resilience? In 2001 we defined 1,700 to 2,200 warhead ceiling with essentially no limits on launchers of such a force. In 2010 General Kevin Chilton, then Commander of Strategic Command, stated that the ceilings of the New START treaty are the lowest numbers that he could accept, given this need for U.S. flexibility.

Third, deterrence is not the only goal of U.S. nuclear forces. U.S. forces must also contribute to the assurance of our allies and friends. Key allies believe that the credibility of U.S. extended deterrence commitments depends on a wide variety of U.S. nuclear capabilities, their quantity, and their location, and the U.S. capability to threaten a wide variety of targets.

Yet the report's minimum deterrence force levels appear to have little or nothing to do with the quantity, types, or location of U.S. nuclear forces needed to assure our allies.

Proponents of minimum deterrence typically respond to this concern with the assertion that is repeated in the GNZ report, that

conventional forces can provide credible assurance for allies increasingly. However, some allies already openly state that if U.S. nuclear credibility wanes they will be compelled to find their own independent deterrence capabilities. That could lead to a cascade of nuclear proliferation.

Non-nuclear capabilities may some day be adequate for assurance purposes, but that day has not arrived, per the express view of key allies who are concerned about U.S. credibility at current force levels.

Fourth, the basic rationale for further U.S. reductions is to strengthen global cooperation on nuclear nonproliferation, a rationale repeated in the GNZ report. The net effect of U.S. movement toward minimum deterrence, however, may instead be to increase nuclear proliferation, as allies feel compelled to establish their own deterrence capabilities.

Fifth, proponents of minimum deterrence also claim that further deep force reductions will save scarce U.S. dollars. To state that moneys would not be needed if the triad were to be abandoned is to state the obvious. However, the real question in this regard is the net cost of deep nuclear reductions, given the corresponding necessary buildup of advanced conventional weapons, a need acknowledged by the authors of the report. Claiming savings from a transition to minimum deterrence is at best a half truth and we should never take risks with our deterrence credibility. The stakes are too high.

Sixth, the GNZ report, unlike others, justifies further deep reductions as a necessary step en route to global nuclear zero. Recall, however, that the Bipartisan Congressional Strategic Posture Commission concluded unanimously that, "The conditions that might make the elimination of nuclear weapons possible are not present today and establishing such conditions would require a fundamental transformation of the world political order." The establishment of a powerful and reliable global collective security system would be such a fundamental global transition. Further U.S. nuclear reductions would not be.

PREPARED STATEMENT

The horrific scale of warfare that the world often suffered up until 1945, including 110 million casualties in the approximately 10 years of war of World War I and II, that level has not been repeated since 1945, thanks at least in part to nuclear deterrence. Prudence suggests that we not put nuclear deterrence at risk until a reliable alternative approach to peacekeeping is in hand, which certainly is not now.

In summary, I'm skeptical of the GNZ report and further U.S. deep nuclear reductions, not for reasons of old think, but because the supposed benefits are dubious or illusory and the effects may be to undermine deterrence, to undermine assurance, and to increase nuclear proliferation in an era of great uncertainty.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF DR. KEITH B. PAYNE

The number of United States Strategic Arms Reduction Treaty (START)-accountable strategic nuclear weapons has been reduced by more than 80 percent since the end of the cold war—from more than 10,000 weapons in 1991 to fewer than 1,800 today.[1] We clearly have been well past cold war force levels and strategies for many years. There is an on-going debate regarding the wisdom of reducing U.S. nuclear forces further. Some analyses, such as the Global Nuclear Zero Commission (GNZC) report, recommend further deep reductions; others are skeptical.

The authors of the GNZC report suggest that the skeptics are driven by a continuing commitment to cold war strategies. In fact, this debate is not between "new think" and "old think." Skeptics of further deep reductions have moved well beyond cold war thinking, and I know of no one who considers the prospective employment of nuclear weapons to be anything other than a last resort option in the most extreme circumstances.

Instead, the basis for the differences between those who advocate further deep reductions and those who are skeptical reside in their fundamentally different views of deterrence, the current and future security environments, and the appropriate methods for measuring "how much is enough?" for the U.S. nuclear arsenal. The GNZC report, like similar reports promoting deep reductions, reflects a familiar approach to deterrence force sizing that dates back to the 1960s.

This approach, often called Minimum Deterrence, considers the U.S. nuclear arsenal to be adequate if it essentially is capable of threatening a relatively small number of opponent targets. The types of targets to be threatened can vary, but the fundamental measure of force adequacy is the number of weapons considered necessary to cover targets that are relatively few in number and easy to strike. The force level deemed adequate via this methodology can be manipulated easily by defining and redefining the targets deemed suitable for deterrence. By defining down the number and types of targets considered important for deterrence, the number of U.S. nuclear weapons deemed adequate for deterrence can be reduced to low levels compatible with an aggressive arms control agenda. Opponents and threats may not have eased, but deterrence metrics can be redefined by fiat to be compatible with deep U.S. nuclear reductions. For decades, proposals for Minimum Deterrence and related low force levels typically have defined the requirements for deterrence in this fashion and thereby have created the deterrence policy narrative necessary for deep nuclear reductions.[2]

In the 1960s, for example, Secretary of Defense McNamara publicly defined threats to specific percentages of Soviet population and industry as the appropriate measure for U.S. deterrence threats. This formulation facilitated relatively low U.S. nuclear force requirements because the Soviet civilian targets declared key for deterrence were relatively few in number and highly vulnerable. According to senior DOD officials at the time, the "primary purpose" of this definition of deterrence adequacy was to have a relatively easy-to-meet measure in hand to answer the question "how much force was enough".[3]

This Minimum Deterrence methodology for defining force requirements may be compatible with very low force levels, but is inadequate for six basic reasons.

First, calculating the forces adequate for deterrence is not simply a matter of identifying some preferred type of U.S. threat that is compatible with very low force

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[1] Department of States, Bureau of Arms Control, Verification and Compliance, *Fact Sheet, New START Treaty Aggregate Numbers of Strategic Arms*, April 6, 2012.

[2] Federation of American Scientists, *From Counterforce to Minimal Deterrence: A New Policy Path Toward Eliminating Nuclear Weapons*, Occasional Paper No. 7 (April 2009), *available at:* http://www.fas.org/pubs/__docs/OccasionalPaper7.pdf.

[3] "The emphasis in McNamara's statements on nuclear forces and doctrine shifted after 1963 to that of Assured Destruction. This doctrine held that a nuclear exchange would, with high probability, result in more than 100 million fatalities in both the United States and the U.S.S.R. and that attempts to limit damage through active and passive defenses could be readily defeated by improvements in offensive forces. The principal test of adequacy of the U.S. strategic force came to be the ability of our programmed force to produce civil damage, even against a greater than expected threat. The damage criterion settled on by McNamara for determining the size of the strategic force was the destruction of 20–25 percent of the Soviet population and 50 percent of its industrial capacity. The programmed forces decided on in the early 1960s readily met this test. So readily that it seemed evident that our forces were more than adequate. The primary purpose of the Assured Destruction capabilities doctrine was to provide a metric for deciding how much force was enough: it provided a basis for denying service and Congressional claims for more money for strategic forces." Henry S. Rowen [deputy assistant secretary of defense for international security affairs, 1961–1964], "Formulating Strategic Doctrine," in Report of the Commission on the Organization of the Government for the Conduct of Foreign Policy, Vol. 4, Appendix K: Adequacy of Current Organization: Defense and Arms Control (Washington, DC: GPO, June 1975), p. 227 (emphasis in original).

levels. The requirements for the most effective deterrence strategy possible should drive our preferred numbers, not vice versa.

In this regard, Harold Brown, Jimmy Carter's Secretary of Defense, rightly concluded that deterrence should be based on a credible threat to that which the opponent "considers most important." This is an initial starting point for prudently measuring "how much is enough?" Such deterrence threats will vary for different opponents, times and contingencies, and may often be incompatible with the very low, fixed number of U.S. nuclear weapons typically recommended by Minimum Deterrence. For example, if our understanding of opponents and their worldviews suggests that deterring them requires a variety of flexible options and a basic threat to well-protected leaders, military forces, and internal security forces, as was widely-thought to be the requirement vis-á-vis the Soviet Union after the 1960s, then a Minimum Deterrence-based force would not be compatible with effective deterrence in plausible scenarios, even if it would be compatible with an aggressive arms control agenda.

The GNZC report, for example, calls for the complete elimination of the ICBM leg of the traditional U.S. triad of strategic forces (bombers, ICBMs, and sea-based missiles), the elimination of the nuclear B–52 bomber and U.S. tactical nuclear weapons, and deep reductions in sea-based nuclear forces. These recommended reductions would leave a small U.S. dyad of sea-based missiles and B–2 bombers. Multiple expert assessments of a dyad consisting of sea-based missiles, B–52 and B–2 bombers have concluded that such a dyad would reduce the number of U.S. aim points for an opponent targeting of U.S. strategic forces from about 455 to 5.[4] A study by the Center for Strategic and International Studies concluded that a dyad of sea-based missiles, B–2 and B–52 bombers, "presents the worst case for survivability of all the options. In a 'bolt from the blue' attack, just five dedicated nuclear strikes could take out all three strategic nuclear bomber bases and the two submarine bases,"[5] leaving the United States with just the SSBNs at sea. The GNZC's recommended elimination of ICBMs and nuclear B–52 bombers could worsen this situation by further reducing the number of U.S. targets to only three.

The 2009 Bipartisan Strategic Posture Commission (the Perry-Schlesinger Commission) saw substantial importance in the fact that by sustaining the Triad, including the ICBM force, the United States could not be subject to an effective small-scale counterforce attack.[6] It noted that, "for the foreseeable future, there is no prospect that a significant portion of the ICBM force can be destroyed by a preemptive strike on the United States by small nuclear powers, including China."[7]

However, at the force levels recommended in the GNZC report and with reported normal U.S. operating practices,[8] only 3–4 U.S. missile carrying submarines could be expected to survive an attack by a handful of nuclear weapons, leaving 135–180 surviving U.S. warheads. That U.S. retaliatory force could be dangerously inflexible and incapable of covering even the extremely limited target sets outlined in the GNZC report. For over five decades, all Democratic and Republican administrations have sought to avoid such a condition because it could significantly degrade our deterrence strategy and create provocative vulnerabilities. Such recommendations for further U.S. deep reductions are all the more troubling in light of the recently declared Russian intention to deploy a nation-wide, missile defense "umbrella" by

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[4] Dana J. Johnson, Christopher J. Bowie, and Robert P. Haffa, "Triad, Dyad, Monad? Shaping U.S. Nuclear Forces for the Future," Presentation to the Air Force Association Mitchell Institute for Airpower Studies, Northrop, 11, *available at* http://www.northropgrumman.com/AboutUs/AnalysisCenter/Documents/pdfs/triad-brief-to-afa-121009.pdf. This discussion is adapted with permission from Mark Schneider, "The Future of the U.S. ICBM Force," Comparative Strategy, Vol. 3, No. 2 (Spring 2012), pp. 147–148.

[5] Owen C. W. Price and Jenifer Mackby, eds., "Debating 21st Century Nuclear Issues," Washington, DC: Center For Strategic and International Studies, 2007, 23, *available at* http://www.northropgrumman.com/AboutUs/AnalysisCenter/Documents/pdfs/triad-monograph.pdf. In 1998, the Defense Science Board concluded that, "Without the ICBMs, surprise attacks against a handful of bomber bases and sea-launched ballistic missile facilities, with plausible deniability, could drastically alter the correlation of forces." See General (ret.) John A. Shaud and Dale L. Hayden, "The Success of our ICBM Force: Capability, Commitment, and Communication," in *Fiftieth Anniversary of Intercontinental Missile*, Air Force Space Command, High Frontier, February 2009, 8, *available at* www.afspc.af.mil/shared/media/document/AFD-090224-115.pdf.

[6] William Perry and James R. Schlesinger, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington, DC: U.S. Institute of Peace, 2009), pp. 25–26.

[7] Ibid. p. 26.

[8] See, Schneider, "The Future of the U.S. ICBM Force," op. cit., p. 148.

2020.[9] In light of such considerations, Gen. Cartwright's previous emphasis on the value of the U.S. Triad and the ICBM force is much more prudent.[10]

The GNZC report, however, essentially dismisses this concern by asserting that Russia and China are not now opponents and are unlikely ever to be so again: "The risk of nuclear confrontation between the United States and either Russia or China belongs to the past, not the future." Such a prediction fits the narrative for further deep reductions, but it does not appear to fit Russian or Chinese actions and statements concerning their ambitions and nuclear developments. Over the past several years, top Russian leaders have made numerous threats of pre-emptive and preventive nuclear attack against United States allies and friends. Most recently, the Chief of the Russian General Staff, Gen. Nikolai Makarov threatened a pre-emptive attack against NATO States, and the threat was implicitly nuclear.[11] (Please see the attached compilation of Russian nuclear threats since 2007 by Dr. Mark Schneider at the end of this prepared statement).

Such threats challenge Western sensibilities and faith in a powerful, global nuclear "taboo," but they are within the norm of Russian behavior and doctrine regarding nuclear forces. To claim that nuclear weapons will not be salient in contemporary or future United States relations with Russia or China is an unwarranted and highly optimistic prediction, not a prudent basis for calculating U.S. deterrence strategies and forces. If wrong, Minimum Deterrence and corresponding low force levels could invite serious risk and provocations.

Second, the question of having an adequate deterrence capability cannot be answered simply by determining if we can threaten some given, contemporary set of targets. Deterrence must work in contemporary and future crises, and we will come to those crises with the forces we have in hand. No one knows with confidence "how much of what force" will be necessary for credible deterrence now, and future requirements are particularly arcane because opponents and threats can shift rapidly in this post-cold war era and the requirements for deterrence correspondingly can change rapidly. This reality complicates the task of calculating "how much is enough" for deterrence. The priority deterrence question now is whether we have sufficient force options and diversity to threaten credibly the wide spectrum of targets that opponents may value over the course of decades. In some plausible scenarios, a small and undiversified U.S. nuclear force may be adequate for deterrence, in other cases, effective deterrence may demand a large and diverse nuclear arsenal with capabilities well beyond those envisaged for Minimum Deterrence. Confident declarations that some fixed Minimum Deterrence force level will prove adequate cannot be based on substance; they reflect only hope and carry considerable risk.

Instead, the flexibility and resilience of our forces to adapt to differing deterrence requirements should be considered a fundamental requirement of U.S. force adequacy, and our standing capabilities must be sufficiently large and diverse to adapt to a variety of shifting deterrence demands. It may be convenient to pick some fixed, low number and claim that 300, 400, or 500 weapons will be adequate for deterrence now and in the future, but no one can possibly know if such statements are true. We do know that the more diverse and flexible our forces, the more likely we are to have the types of capabilities needed for deterrence in a time of shifting and uncertain threats, stakes, and opponents. But force diversity and flexibility does not come automatically. It is important that our nuclear force posture and infrastructure incorporate these characteristics and that they are manifest to opponents and allies for deterrence and assurance purposes respectively.

This need for force diversity and flexibility is one of the reasons why the bipartisan Congressional Strategic Posture Commission recommended unanimously to sustain the Triad, as did the 2010 Nuclear Posture Review and the current and recent past Commanders of Strategic Command. The Congressional Strategic Posture Commission reviewed arguments in favor of a dyad and instead unanimously highlighted the importance of the "resilience and flexibility of the triad," qualities which have "proven valuable as the number of operationally deployed strategic nuclear

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[9] Chief of the Russian General Staff, Gen. Nikolai Makarov, as quoted in Bill Gertz, "Inside the Ring," The Washington Times, January 5, 2011, *available at* http://www.washingtontimes.com/news/2011/jan/5/inside-the-ring-442522451/print/.

[10] See, U.S. Senate, *Committee on Armed Services, Hearing to Consider the Nominations of General James E. Cartwright, USMC, For reappointment to the Grade of General and Reappointment as the Vice Chairman of the Joint Chiefs of Staff*, July 9, 2009, p. 8.

[11] See, "Russia's Top General Says Preemptive Strike Against Missile Shield Possible," VOA News, May 3, 2012.

weapons has declined" and "promise to become even more important as systems age." [12]

In contrast, moving to a Minimum Deterrence Dyad as recommended in the GNZC report would be the opposite of sustaining a diverse force with flexibility and resilience. Minimum Deterrence force requirements typically are intended to be compatible with deep arms control reductions, as is stated in the GNZC report, but could easily prove to be too narrow and inflexible to provide effective deterrence in a shifting threat environment.

Adm. Rich Mies, a former Commander of Strategic Command, observed recently that "every STRATCOM force structure analysis" in which he was involved yielded two general truths: "Diversity affords a hedge against single-point failures and significantly complicates a potential adversary's offensive and defensive planning considerations [and] there is tyranny in low platform numbers that greatly restricts the flexibility, survivability and resiliency of the force."[13] Indeed, a small, undiversified, Minimum Deterrence force:

—Will offer fewer choices among warheads and delivery modes, thereby limiting U.S. flexibility and the prospective effectiveness of U.S. deterrence strategies;
—Is less likely to compensate for weaknesses in one area of our nuclear force structure by strengths in another area;
—Will, vis-à-vis peer or near peer powers, inevitably move U.S. deterrence strategies toward threats against civilian targets and/or threats against a relatively small set of military targets:
  —the first such threat may well be incredible; and
  —the second inadequate;
—Eases the technical/strategic challenges for opponents who might seek to counter our deterrence strategies, now or in the future;
—Will encourage rather than dissuade some opponents to compete and challenge our deterrence strategies.

What level of U.S. forces is compatible with the requisite U.S. flexibility and resilience? This question rightly elevates the discussion of deterrence requirements beyond a fixed number of warheads to include their diversity, and the number and diversity of their launchers. In 2001, we judged 1,700–2,200 operationally deployed warheads as sufficient, with no negotiated limits on launchers in the Moscow Treaty.[14] In 2009, Gen. Cartwright stated publicly that he would "be very concerned if we got down below" 800 launchers,[15] and in 2010, Gen. Kevin Chilton, then-Commander of Strategic Command, stated publicly that the 1,550 warhead ceiling of the New START treaty was the lowest he could endorse given this need for flexibility.[16] In contrast, the GNZC report, as with most proposals for Minimum Deterrence, recommends far lower force levels for weapons and launchers.

Third, deterrence is only one among several goals by which to measure the adequacy of U.S. nuclear forces. It is impossible to measure U.S. force requirements by focusing on deterrence alone. United States forces must also contribute to the assurance of our allies and friends. This assurance goal is different from deterrence and has different specific requirements. The United States has nuclear assurance commitments to 30 or more allies and the push for Minimum Deterrence undoubtedly threatens our capability to assure allies in some important cases.

Assurance commitments establish diverse quantitative and qualitative requirements not included in Minimum Deterrence calculations. For example, President John Kennedy identified "second-to-none" as the appropriate standard for the purpose of protecting allies and friends; the Nixon administration identified "essential equivalence" as a necessary measure. And, most recently, some allied leaders have identified specific quantitative and qualitative standards for U.S. nuclear forces to provide assurance.

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[12] Perry, Schlesinger, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*, op. cit., pp. 25–26.

[13] See Adm. Richard Mies, USN (ret.), "Strategic Deterrence in the 21st Century," Undersea Warfare (Spring 2012), p. 19.

[14] Secretary of Defense Donald H. Rumsfeld, Annual Report to the President and the Congress (Washington, DC: GPO, 2002), pp. 88–89, *available at* http://history.defense.gov/resources/2002__DOD__AR.pdf.

[15] Quoted from, U.S. Senate, Committee on Armed Services, Hearing to Consider the Nominations of General James E. Cartwright, USMC, For reappointment to the Grade of General and Reappointment as the Vice Chairman of the Joint Chiefs of Staff, July 9, 2009, p. 22.

[16] Gen. Kevin Chilton, Senate Armed Services Committee, Hearing to Receive Testimony on the Nuclear Posture Review, April 22, 2010, pp. 8, 13, 14; and Gen. Kevin Chilton, House Armed Services Committee, Hearing, U.S. Nuclear Weapons Policy and Force Structure, April 15, 2010, p. 11.

For example, Japanese Defense Minister Fumio Kyuma explicitly linked quantitative and qualitative standards to the credibility of the U.S. extended nuclear deterrent: he called for "highly accurate nuclear-tipped cruise missiles," and stated that, "The strongest deterrence would be when the United States explicitly says, 'If you drop one nuclear bomb on Japan, the United States will retaliate by dropping 10 on you'." [17] More recently, key allies have argued that the credibility of U.S. extended deterrence commitments depends on specific types of U.S. nuclear capabilities, including low-yield and penetrating nuclear weapons, the U.S. capability to threaten a wide variety of targets, and the capability "to deploy forces in a way that is either visible or stealthy, as circumstances may demand." [18] Again, it is very convenient to claim that 300, 400, or 500 U.S. weapons will be adequate for assurance, but such a target-based measure may have little or nothing to do with the quantity or types of U.S. nuclear forces needed to assure our allies of the credibility of our extended nuclear deterrent. U.S. unilateral reductions to low force levels as recommended by the GNZC report certainly would destroy any remaining U.S. claims of "second to none" or "essential equivalence," and raise deep concerns among at least some key allies and friends.

Proponents of Minimum Deterrence typically respond to this concern with the assertion—repeated in the GNZC report—that conventional forces can provide assurance for allies that is "far more credible" than are U.S. nuclear forces. This narrative fits the policy line for further deep nuclear reductions, but, U.S. movement to advanced conventional strategic forces has been slow and limited, and the actual evidence is that some allies find unique assurance in a credible U.S. nuclear guarantee. They now state openly that if U.S. nuclear credibility wanes, they will be compelled to find their own independent deterrence capabilities. Japanese, South Korean and Turkish leaders have openly made this point, as have some friends and allies in the Middle East. This should not be surprising: West Germany was clear that it could agree to the 1969 Nuclear Non-Proliferation Treaty only because of the assurance it found in a credible U.S. nuclear umbrella. The same was true for South Korea.[19]

This need expressed by some allies for credible U.S. nuclear assurance is fully understandable. U.S. advanced conventional forces are very likely to contribute usefully to deterrence in some cases. But, in the context of a conventional conflict involving United States "shock and awe," the threat of "more of the same" may simply be insufficient to deter a committed aggressor.[20] In contrast, nuclear weapons pose the threat of escalation to incalculable consequences and thereby appear unique in countering the overly-optimistic expectations or high cost-tolerances that often inspire aggression. This factor may explain why nuclear deterrence appears to have been the reason Saddam Hussein did not employ chemical or biological weapons during the first gulf war. In addition, given events over the past decade, the U.S. will to engage in another high-cost, large-scale projection of conventional force into a distant theater on behalf of friends and allies may appear insufficiently lethal or credible to assure some vulnerable allies or to deter some determined or eccentric foes. Non-nuclear threats may someday be an adequate substitute for nuclear threats for assurance purposes, but that day has not arrived per the expressed views of some key allies. And, with regard to the U.S. goal of assurance, it is their views of U.S. adequacy that matter.

Fourth, the push for Minimum Deterrence puts at risk the U.S. capability to deter and to assure for the purpose of strengthening global cooperation on nuclear non-proliferation—the rationale repeated in the GNZC report. To be specific, the claim is that further U.S. nuclear reductions would somehow contribute greatly to nuclear non-proliferation. This asserted positive linkage between further U.S. nuclear reduc-

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[17] "North Korea's Nuclear Threat/Reinforcing Alliance With U.S. Helps Bolster Nuclear Deterrence," The Daily Yomiuri, 23 March, 2007.

[18] Perry, Schlesinger, American's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States, op. cit., pp. 20–21; and, testimony of Dr. Johnny Foster regarding the report of the Congressional Strategic Posture Commission, in, U.S. Senate, Senate Armed Services Committee, Hearing on the Report of the Congressional Commission on the Strategic Posture of the United States, May 7, 2009, *available at:* http://votesmart.org/speech__detail.php?sc__id=458591&keyword=&phrase=&contain=.

[19] See Keith Payne, Thomas Scheber, Kurt Guthe, U.S. Extended Deterrence and Assurance for Allies in Northeast Asia (Fairfax, VA: National Institute Press, 2010), pp. 9–10.

[20] In 1999, allies saw persistent and concerted NATO conventional air strikes fail to destroy a deep tunnel complex at the Pristina Airport in Kosovo. As a British inspector present at the time reported, "On June 11, hours after NATO halted its bombing and just before the Serb military began withdrawing, 11 Mig-21 fighters emerged from the tunnels and took off for Yugoslavia." Tim Ripley, "Kosovo: A Bomb Damage Assessment," Jane's Intelligence Review, Vol. 11, No. 9 (September 1999), p. 11.

tions and more effective non-proliferation efforts is wholly speculative, and I believe mistaken.[21] Further U.S. nuclear reductions are unlikely to improve the behavior of recalcitrant proliferators or their enablers. And, on the available evidence, it is reasonable to expect that a U.S. transition to Minimum Deterrence would increase the incentives for some U.S. friends and allies who now rely on the U.S. extended nuclear deterrent to develop or acquire their own independent means for nuclear deterrence. Consequently, the net effect of movement toward Minimum Deterrence may well be to increase nuclear proliferation rather than to strengthen nonproliferation. This would be a serious mistake from which we might not easily recover.

The GNZC report also asserts that further U.S. unilateral nuclear reductions would encourage Russia and China to consider "comparable unilateral actions." Perhaps so; but experience suggests not. Harold Brown's observation about the Soviet Union appears to apply equally to Russia and China today: "When we build, they build; when we cut, they build."

Fifth, proponents of Minimum Deterrence also claim that further deep force reductions will save scarce U.S. defense dollars. I am dubious of this claim. The United States and NATO came to rely on nuclear deterrence in general because it was judged to be a feasible and much cheaper avenue for security than the buildup of conventional forces otherwise necessary. There obviously is a cost to sustaining a flexible and diverse nuclear arsenal, including the nuclear Triad. But, to state that monies would not be needed for this purpose if we abandoned such an arsenal is to state the obvious. The real question in this regard is the net cost of further deep nuclear reductions and Minimum Deterrence given the corresponding, necessary buildup of advanced conventional arms, a buildup acknowledged by the authors of the GNZC report. I certainly support advanced U.S. conventional forces as a complement to U.S. nuclear capabilities. But to claim savings from Minimum Deterrence without also calculating the added cost for the advanced conventional forces that supposedly can substitute for deterrence purposes is a common error. I do not know how comparisons of net costs might appear at this time, but I do know that claiming savings simply from Minimum Deterrence and abandonment of the Triad is at best a half-truth.

Sixth, and finally, the GNZC report, like others, justifies the push for Minimum Deterrence as a necessary step en route to global nuclear zero—one of the Obama administration's stated priority goals. It should be recalled, however, that the bipartisan Congressional Strategic Posture Commission concluded unanimously that: "The conditions that might make the elimination of nuclear weapons possible are not present today and establishing such conditions would require a fundamental transformation of the world political order." The establishment of a powerful and reliable global collective security system for the first time in history would be such a fundamental global transformation; further, U.S. reductions would not. Winston Churchill noted along these lines: "Be careful above all things not to let go of the atomic weapon until you are sure and more than sure that other means of preserving peace are in your hands." There is no evidence at this point of movement toward a serious, reliable global collective security system; much less do we have it in hand.

Consequently, before the pursuit of nuclear zero puts at risk U.S. capabilities to deter and to assure credibly, and also threatens to increase nuclear proliferation, it is important to recall that over the course of centuries we have learned, unfortunately, that conventional deterrence periodically fails catastrophically. During the final five non-nuclear decades of the last century, the world suffered approximately 110 million casualties in just 10 years of warfare. The subsequent almost seven decades of nuclear deterrence have been much more benign by comparison (see the attached pertinent graphic by Adm. Richard Mies, used here with permission). Humankind was at the nuclear zero "mountaintop" from the beginning of history until 1945, and that condition often was ugly and brutal on a scale not repeated since 1945, thanks at least in part to nuclear deterrence. Simple prudence suggests that we not put U.S. strategies for nuclear deterrence at risk in a quest to go back to that mountaintop we so desperately sought previously to leave.

In summary, I am skeptical of the GNZC report and further U.S. deep nuclear reductions at this point not for reasons of "old think," but because the supposed benefits are dubious or manifestly illusory and the effects may be to undermine deterrence and assurance, and to increase nuclear proliferation. Gen. Larry Welsh, a former Commander of the Strategic Air Command and Air Force Chief of Staff, recently observed, "The only basis for the idea that drastically reducing the number

[21] See the pertinent discussion by Chris Ford, "Disarmament Versus Nonproliferation?" posted at the New Paradigms Forum Web site on October 29, 2010, *available at:* http://www.NewParadigmsForum.com/NPFtestsite/?p=531.

of nukes we have would magically make us safer and help eliminate other nuclear dangers is hope. But hope is not a plan, and hope is not a basis for security. Hope does not defend us." And, I will add, the unwarranted hopes reflected in the GNZC's most recent proposal for Minimum Deterrence should not be the basis for our calculations of "how much is enough?"

RUSSIAN THREATS OF NUCLEAR TARGETING, INCLUDING FIRST OR PREEMPTIVE USES OF NUCLEAR FORCES

DR. MARK SCHNEIDER
SENIOR ANALYST, NATIONAL INSTITUTE FOR PUBLIC POLICY

Then-Defense Minister, Sergei Ivanov, February 2007:

"As regard to [the] use of nuclear weapons in case of aggression, of course [it will use them in this case]. What else were they built for?" [1]

Statements by Colonel General Nikolay Solovtsov, then commander of the Strategic Missile Troops 2007–2008.

"[Correspondent] Russia has reacted sharply to the statement by the prime ministers of Poland and the Czech Republic. The commander of Strategic Missile Troops [SMT], Nikolay Solovtsov, said that if need be, our missiles would be targeted on the new ABM facilities, if they are built." [2]

"We have to take measures that will prevent the devaluation of the Russian nuclear deterrence potential. I do not rule out that our political and military administration may target some of our intercontinental ballistic missiles at the aforesaid missile defense facilities in Poland and the Czech Republic." [3]

"I cannot exclude that, in the event that the country's highest military-political leadership will make the appropriate decision, the indicated missile defense facilities in Poland and the Czech Republic and also other similar facilities in the future could be selected as targets for our intercontinental ballistic missiles", the general stated. "The RVSN is compelled to take steps, which will not permit the devaluation of the Russian nuclear deterrence potential under any conditions." [4]

Statements by General Yury Baluyevskiy, then Chief of the General Staff, 2007–2008:

"If we see that these facilities pose a threat to Russia, these targets will be included in the lists of our planners—strategic, nuclear or others. The latter is a technicality." [5]

"We do not intend to attack anyone. But all our partners must realize that for the protection of Russia and its allies, if necessary, the Armed Forces will be used, including preventively and with the use of nuclear weapons." [6]

Colonel General Anatoly Nogovitsyn, Defense Ministry Spokesman, August 2008:

"Poland is making itself a target. This is 100 percent" certain, Russia's Interfax news agency quoted General Anatoly Nogovitsyn as saying.

"It becomes a target for attack. Such targets are destroyed as a first priority," Gen Nogovitsyn was quoted as saying.

He added that Russia's military doctrine sanctions the use of nuclear weapons " . . . against the allies of countries having nuclear weapons if they in some way help them," Interfax said.[7]

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[1] "Russia Reserves Right to Preemptive Strikes," Moscow Agentstvo Voyennykh Nosostey, February 7, 2007. Transcribed in Open Source Center, Doc. ID: CEP200707950213.

[2] "General says Russia may target missile defence sites in Eastern Europe," Moscow Channel One Television, February 19, 2007. Translated in Open Source Center, Doc. ID: CEP20070219950390.

[3] "Solovtsov: Russian Missiles May Be Targeted At US ABM Sites in Europe," Moscow, Agentstvo Voyennykh Novostey, December 17, 2007. Transcribed by Open Source Center Doc. ID: CEP20071217950364.

[4] Yuriy Gavrilov, "The Nuclear Reaction: Strategic Missile Complexes Could Be Retargeted at Poland and the Czech Republic," Moscow Rossiyskaya Gazeta, September 11, 2008. Translated by Open Source Center Doc. ID: CEP20080911358018.

[5] "Baluyevskiy Says US European Missile Defense Poses Threat to Russia," InternetWebDigest. RU, May 3, 2007. Translated in Open Source Center, Doc. ID: CEP20070504358001CEP2007054358001.

[6] "Russia will use nuclear weapons if necessary—chief of staff," Moscow ITAR–TASS, January 19, 2008. Transcribed in Open Source Center, Doc. ID: CEP20080119950015.

[7] Damien McElroy, "Russian general says Poland a nuclear 'target'," August 15, 2008, *available at*: http://www.telegraph.co.uk/news/worldnews/europe/georgia/2564639/Russian-general-says-Poland-a-nuclear-target-as-Condoleezza-Rice-arrives-in-Georgia.html>.

Nikolay Patrushev, the Secretary of the Russian Security Council October 2009:

"We have corrected the conditions for use of nuclear weapons to resist aggression with conventional forces not only in large-scale wars, but also in regional or even a local one . . . There is also a multiple-options provision for use of nuclear weapons depending on the situation and intentions of the potential enemy. 'In a situation critical for national security, we don't exclude a preventive nuclear strike at the aggressor'." [8]

Lt. General Andrey Shvaychenko, then Commander of the Strategic Missile Troops, December 2009.

In Shvaychenko's opinion, "this defines a key role played by the RVSN [the Strategic Missile Forces] and the strategic nuclear forces as a whole in ensuring Russia's security. In peacetime, they are intended to ensure deterrence of large-scale nonnuclear or nuclear aggression against Russia and its allies. In a conventional war, they ensure that the opponent is forced to cease hostilities, on advantageous conditions for Russia, by means of single or multiple preventive strikes against the aggressors' most important facilities. In a nuclear war, they ensure the destruction of facilities of the opponent's military and economic potential by means of an initial massive nuclear missile strike and subsequent multiple and single nuclear missile strikes," the commander explained.[9]

Lt-Gen Vladimir Gagarin, then-Deputy Commander of Russia's Strategic Missile Troops, December 2009:

"So, the situation is then analysed and orders are issued—either, maybe, to launch a massive nuclear strike with the use of everything involved in that initial massive nuclear strike; or it could be group strikes, that is to say with part [of the forces] used; or it could be single strikes, one or two launch systems. Once again, the authorization for the launch to be executed, to be carried out, is issued by the Russian Federation president, by our supreme commander-in-chief." [10]

Lt.-General Sergei Karakayev, Commander of the Strategic Missile Troops, December 2011:

"From a technical viewpoint, there are no restrictions on the possibility of the use of missiles by RVSN. It does not take a long time to select a target and enter it in the flight duty of an intercontinental ballistic missile," Karakayev said in response to a question as to whether changes may be made to the plans of RVSN combat use due to the creation of objects of the U.S. missile defense systems in Europe and the lack of progress in the negotiations between Russia and the U.S. on the matter.

Statements by President Putin, 2007–2008:

Just before a summit with President Bush he stated, "I draw your attention and that of your readers to the fact that, for the first time in history—and I want to emphasize this—there are elements of the U.S. nuclear capability [missile defense interceptors] on the European continent . . . If the American nuclear potential grows in European territory, we have to give ourselves new targets in Europe."

"We will have to target our missiles at sites which, in our opinion, may threaten our national security.".

3) In a press conference with the President of Poland he stated, "If such systems are deployed on the territory of Poland, which we believe will be used to attempt or to neutralize our nuclear missile potential, leading to total disruption of the strategic balance in the world and will threaten our national security, then what should we do? We will have to take some retaliatory measures, which may include retargeting some of our strike missile systems onto those facilities, which in our opinion will be a threat to us. We would not like to do this."

At a press conference President Putin said, "Our General Staff and experts believe that this system [the proposed deployment of a missile defense site in Poland] threatens our national security, and if it does appear, we will be forced to respond

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[8] "Russia to broaden nuclear strike options," Russia Today, October 14, 2009, *available at:* <http://rt.com/news/russia-broaden-nuclear-strike/>.

[9] "Russia may face large-scale military attack, says Strategic Missile Troops chief," Moscow ITAR–TASS, December 11, 2009. Translated by Open Source Center Doc. ID: CEP20091216950151.

[10] "Russian Strategic Missile Troops general details re-armament, structure—more," Moscow Ekho Moskvy Radio, September 5, 2009. Translated by Open Source Center Doc. ID: CEP20090911950207.

in an appropriate manner. We will then probably be forced to retarget some of our missile systems at these systems, which threaten us." [11]

General Nikolai Makarov, Chief of the General Staff, 2011–2012:

"'The possibility of local armed conflicts virtually along the entire perimeter of the border has grown dramatically,' Makarov said. 'I cannot rule out that, in certain circumstances, local and regional armed conflicts could grow into a large-scale war, possibly even with nuclear weapons'." [12]

"Asked about whether there existed a risk of local conflicts near Russian borders developing into a full-scale war General Makarov said, "I do not rule out such a possibility." [13]

"Taking into account a missile defense system's destabilizing nature, that is, the creation of an illusion that a disarming strike can be launched with impunity, a decision on preemptive employment of the attack weapons available could be made when the situation worsens,' Makarov said at an international conference on Missile Defense Factor in Establishing New Security Environment in Moscow on Thursday.

The deployment of new attack weapons in the south and northwest of Russia to strike missile defense sites, including the deployment of the Iskander missile systems in the Kaliningrad region, is among the possible options for destroying missile defense infrastructure in Europe." [14]

Statements by President Medvedev, 2008–2011:

"During televised remarks President Medvedev said, 'I would add something about what we have had to face in recent years: what is it? It is the construction of a global missile defense system, the installation of military bases around Russia, the unbridled expansion of NATO and other similar 'presents' for Russia we therefore have every reason to believe that they are simply testing our strength. Of course we will not let ourselves be dragged into an arms race. But we must take this into account in defense expenditures. And we will continue to reliably protect the safety of the citizens of Russia. Therefore, I will now announce some of the measures that will be taken. In particular measures to effectively counter the persistent and consistent attempts of the current American administration to install new elements of a global missile defense system in Europe. For example, we had planned to decommission three missile regiments of a missile division deployed in Kozelsk from combat readiness and to disband the division by 2010. I have decided to abstain from these plans. Nothing will disband. Moreover, we will deploy the Iskander missile system in the Kaliningrad Region to be able, if necessary, to neutralize the missile defense system. Naturally, we envisage using the resources of the Russian Navy for these purposes as well.'." [15]

"Second, protective cover of Russia's strategic nuclear weapons will be reinforced as a priority measure under the programme to develop our air and space defences.

Third, the new strategic ballistic missiles commissioned by the Strategic Missile Forces and the Navy will be equipped with advanced missile defence penetration systems and new highly effective warheads.

Fourth, I have instructed the Armed Forces to draw up measures for disabling missile defence system data and guidance systems if need be. These measures will be adequate, effective, and low-cost.

Fifth, if the above measures prove insufficient, the Russian Federation will deploy modern offensive weapon systems in the west and south of the country, ensuring our ability to take out any part of the United States missile defence system in Eu-

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[11] "Russian President Putin's uncensored and amazing Interview with G8 Newspaper Journalists," June 9, 2007, *available at*: http://engforum.pravda.ru/index.php?/topic/124795-russian-president-putins-uncensored-and-amazing-interview-with-g8-journalists/.: "Russia may target missiles at Ukraine in case of security threat—Putin," Interfax, February 14, 2008, *available at:* http://en.trend.az/news/cis/russia/1135177.; "Putin presser: Russia may have to retarget missiles at Poland," Moscow Vesti TV, February 14, 2008. Translated by Open Source Center Doc. ID: CEP20080214950197.; "Highlights from Putin's 14 Feb News Conference," OSC Feature—Vesti TV, February 14, 2008. Translated by Open Source Center Doc. ID: FEA20080215541987.

[12] Robert Bridge, "Border Alert: Nuke war risk rising, Russia warns," November 17, 2011, *available at*: http://rt.com/politics/makarov-nuclear-russia-nato-575/.

[13] "No understanding between Russia, West on missile defense—General Staff," ITAR–TASS, December 7, 2011, *available at*: http://www.itar-tass.com/en/c154/291946.html.

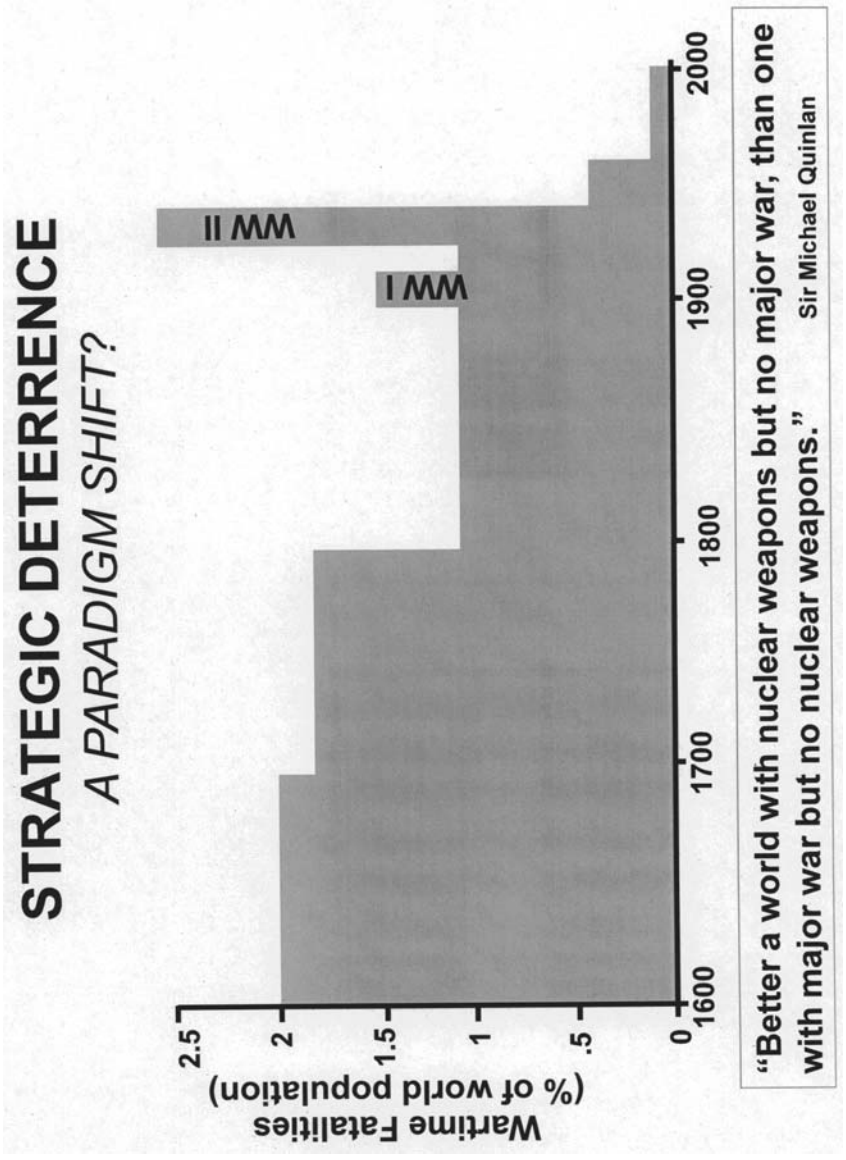
[14] "Russia Might Strike European Missile Defense Sites Preemptively—Military Official (Part 2)," Interfax, May 3, 2012, *available at*: http://www.interfax.co.uk/russia-cis-general-news-bulletins-in-english/russia-might-strike-european-missile-defense-sites-preemptively-military-official-part-2-2/.

[15] "Medvedev Russia will deploy Iskander in Kaliningrad to neutralize U.S. missile threats," *available at*: http://mishasrussiablog.blogspot.com/2008/11/medevev-russia-will-deploy-iskanders-in.html.

rope. One step in this process will be to deploy Iskander missiles in Kaliningrad Region." [16]

Statement by Defense Anatoliy Serdyukov February 2010:

"If additional threats emerge in Europe, the Iskander will be deployed (in Kaliningrad Region)." [17]



[16] "Statement in connection with the situation concerning the NATO countries' missile defence system in Europe," Office of the President of the Russian Federation, November 23, 2011, *available at*: http://eng.kremlin.ru/news/3115 able and constructive approach from our Western partners.

[17] "Russian defence minister explains missile deployment statement," Interfax, February 19, 2010, *available at*: http://wnc.dialog.com/.

Senator FEINSTEIN. Thank you very much, Dr. Payne, and thank all three of you.

We'll now begin a round of questions.

As both General Cartwright and Ambassador Pickering have pointed out, Russia is already below the New START limits on deployed strategic delivery vehicles and warheads, and this is because they're retiring their older systems faster than they're adding new systems. However, it's my understanding that Russia is considering the development of a new intercontinental ballistic missile that can carry up to 10 warheads.

So here's the question: Could reciprocal reductions or a new bilateral arms control agreement dissuade Russia from moving forward with its destabilizing nuclear modernization programs, such as a new ICBM? Who wants to take that? General Cartwright.

General CARTWRIGHT. I'll start and let the others follow on it.

Senator FEINSTEIN. Okay, we'll go down the line.

General CARTWRIGHT. I think that, one, you've characterized the Russian reductions very accurately as to the probable motive of the transition from older systems to newer systems. The development of those systems, the pace at which they're being fielded, is behind the pace at which they're retiring. We've faced much the same problem in this country. We'll go through that same evolution as we start to move forward.

I'm not sure that it's a question of dissuading them, although that may be one of the attributes of the discussion. It's probably a question of giving them to opportunity for an alternative approach, and that's what Ambassador Pickering was trying to, I think, illustrate, is that if we were to follow suit now, which would require no treaty change, but move from where we are, instead of taking 7 years to get down to 1,550, to move more quickly to match the Russians and have that dialogue with them, which requires no real change in any treaties, the demonstration of where we're heading would be confirmed for them and that may alter their calculus about how much they want to spend and how much they want to build and how much they need to modernize.

Like us, they may choose to modernize one element over another or they may choose to just have smaller forces and have them of the same character. That's really up to them. But you can see in the open press that the character of their force is moving away from strategic towards tactical. They believe the adversaries they have to worry about on the most likely side are adversaries that are much closer to their homeland. They are not the ICBM-type threats that they're worried about.

As they change the character of their force, the opportunity to have a dialogue with us to create a stable transition so that they can change the character of their force and the size of it and we can do the same I think is an opportunity, not a vulnerability.

Senator FEINSTEIN. Ambassador, do you have a comment?

Ambassador PICKERING. I would only add, I've spent a lot of time in Russia and a lot of time after having been in Russia with Russians. My sense is that they understand the enormous devastation that would result from the failure of deterrence.

They themselves have had a famous incident or two in which they were called upon seemingly to make very critical decisions on

very short notice and found it extremely difficult and very destabilizing. I think that they value highly the ability to speak with us about where and how these directions of change might be mutually advantageous. It's been true for the last 25 years.

So I agree entirely with what General Cartwright has said, that there is an opportunity for further new openings of discussion. There are extreme budgetary pressures on them as well that have in fact helped, if I could put it that way and use that word advisedly, to guide the direction of their own strategic construction, and they seem to be moving for another generation to be moving for another generation, to seem, but deliberately and very carefully, and maybe obviously wishing to solve completely all the technical problems before they invest significant amounts of new money.

That deliberation is very helpful. So your suggestion that would we find a way rapidly to convince them not to go in a particular direction is probably a conclusion that's more informed by optimism than reality. But nevertheless, the general process I think can be a very useful one, and if we look back over the 20 to 25 or 30 years we've been engaged in these processes with the Russians, I believe that it is well worth our time and our effort in investing in those kinds of conversations, to see in fact whether we can produce a more stable, more realistic, still primarily heavily biased toward defending our own interests, kind of a political and strategic set of relationships, and the effort here is to try to outline that. Obviously, it takes us beyond where we have been in traditional cold war thinking, and I think that Dr. Payne, whose views I respect very, very much, is still pretty much giving us the traditional cold war thinking about this.

Not that I would advocate being fast and loose with any of this. I think every step of the way we have to be exquisitely careful, particularly over the verification systems that will buttress and undermine our confidence that breakout is not on the mind of anybody.

Senator FEINSTEIN. Thank you very much.

My time has expired, but, Dr. Payne, I do want to give you a chance to respond, and then we'll go to Senator Alexander.

Dr. PAYNE. Thank you. I'd be happy to respond shortly to that. I see a real disconnect here, particularly with the recommendations from the commission's report, because in addition to the new heavy ICBM, Madam Chairwoman, that you rightly described, the announced Russian plans are for two other new ICBMs, a new stealthy bomber, and the deployment of new nuclear cruise missiles. There's also a report of a development of a fifth generation nuclear-carrying, nuclear missile-carrying submarine, and to carry nuclear cruise missiles. New advanced nuclear warheads are reportedly being deployed, including low-yield, low collateral damage warheads. And more recently, the Russians have announced plans to move towards nationwide ballistic missile defense, including by the year 2020.

My concern is that with that level of modernization program and with that emphasis on nuclear weapons, that the Russians have both the strategic level and at the tactical level, it would be extremely difficult to engage the Russians in negotiations if we were to follow the program outlined in the commission's report. Essentially, you have a very robust nuclear modernization program on

the Russians' side, leading towards heavily MIRVed nuclear systems, and I believe that those are a real problem, particularly if we move to a direction of a vulnerable force structure such as is presented in the commission's report.

As I said, there's a disconnect between the Russians moving in that direction, our moving in a much less robust direction, and then expecting us to be able to come up with a good arms control agreement with the Russians in that context.

Senator FEINSTEIN. Thank you very much.

Senator Alexander.

Senator ALEXANDER. Thank you, Madam Chairman.

General Cartwright, your testimony says the existing plutonium facility at Los Alamos—I believe it says this—could accommodate plutonium pit requirements in the future, producing as many as 80 pits a year; and that the new facility, which we call CMRR, wouldn't be needed. I talked not long ago with the Los Alamos director, who told me he'd be hard pressed to make more than 30 pits per year.

Can you discuss that discrepancy? Also, isn't it true that as long as we have nuclear weapons, even a lower number, that we'll still need a new plutonium facility in the future?

General CARTWRIGHT. I think we're within four, five, six of the same number. In other words, what the commission looked at was taking the planned smallest option, which was an option that got you somewhere between 30 and 40 for a single shift for a year, and going to dual shift in a crisis that would take you up to somewhere in the 70 to 80 number depending on what you could get.

The tooling, the floor space of those issues, the floor space was one of the critical issues.

Senator ALEXANDER. So you're saying it's as simple as going to two shifts?

General CARTWRIGHT. It's not simple because you have——

Senator ALEXANDER. But you're saying it could be done?

General CARTWRIGHT. Right. But it can be done in an extreme.

We would say, and I would agree with him, that you would want to stay in a production rate that was somewhere in the 15 to 20 per year, just to replace and to ensure that you protect the pedigree of the test, the quality of the material that we have today. But if you increase the number of shifts, it is believed that the floor space then becomes the constraint and that constraint would limit you to somewhere in the neighborhood of 80 per year in running the plant, so to speak, full up.

Senator ALEXANDER. Well, that's interesting. I mean, I didn't ask you about shifts, so I'll do that next.

But isn't it true that as long as we have nuclear weapons, even a lower number, we'll need a new plutonium facility in the future? Or do you think the current one we have is adequate?

General CARTWRIGHT. The current one that we have is adequate today, but I do agree that we will eventually need a facility. The question is to size it appropriately and to understand exactly why you're building it under the stockpile stewardship side of the equation also, the science part of this.

The question becomes do you need it now, number one; and then, number two, do you have existing infrastructure that could accom-

modate it or do you need a whole new facility? That's the question, and I would certainly turn to the experts to get the answer to that. But what I believe is right now the thought process is we need it now. I think the administration has demonstrated already that that's not necessarily the case.

Senator ALEXANDER. Ambassador Pickering or Dr. Payne, do you have any comment on that?

That's a very important point, General Cartwright, and one which I hadn't even considered, about the two shifts in terms of the need for the CMRR.

Are you familiar enough with that process to say whether a different sort of facility is needed, a new way? Do we need a new strategy for producing plutonium pits within the current facility? Are you familiar enough with the process to make a comment on that?

General CARTWRIGHT. No, it would be the same process. In fact, we've already invested and bought the tools for a second group to run. It is a floor space issue. This again is to the level of detail that you probably don't want to go to, but you have two buildings sitting side by side——

Senator ALEXANDER. I've seen that.

General CARTWRIGHT [continuing]. With a gap between. You can connect and increase the floor space to what people believe would get you somewhere in the neighborhood of the ability to do 80 per year.

Senator ALEXANDER. So you're basically saying that, whatever the current level of production is, whether it's 20 or 30 or you think it might be even higher than that, that if the floor space issue is solved that you can double that production within the same facility?

General CARTWRIGHT. With additional shifts.

Senator ALEXANDER. With additional shifts, would double the facility. Do you have any idea as to the cost? Is solving the floor space issue a substantial cost?

General CARTWRIGHT. No, it's not. It has been costed out by the lab.

Senator ALEXANDER. Thank you, Madam Chairman. My time is up.

Senator FEINSTEIN. Thank you very much, Senator.

Senator Tester, welcome. It's good to have you here.

Senator TESTER. Thank you, and thanks for having this hearing. I want to thank everybody for being here, of course.

You started out, General Cartwright, by saying these are 50-year decisions and I don't really know where to start, so I'm going to start 50 years ago. In 1962 I was entering elementary school, my first year, and I live in the neck of the woods in north central Montana where they were building ICBMs, where the teacher would tell us what we were to do in the case of a nuclear attack, head to a bomb shelter.

I remember this stuff very vividly, where when we were out riding horses we'd see tinfoil that looked like it was shredded and wrapped in paper, that my folks said: Don't touch that; that's radioactive and it could have some impacts on you. The Cuban nuclear crisis was evident.

So what I want to talk about, because the deterrent value of these nuclear forces has been something that has been part of what I've, quite frankly, lived through since I can remember, and the ICBMs have been a big part of that deterrent. Not to put you on the spot, but 3 years ago, General Cartwright, you had testimony that endorsed the value of the triad, the nuclear triad, and our ICBM force, saying it was a key priority for our military to preserve that triad. What has changed in the last 3 years?

General CARTWRIGHT. Three years ago we were still developing missile defense. We did not have what I would call a robust technical line towards a conventional alternative to the ICBM force that we have today, in other words, the same missiles with conventional warheads. That has changed. It's not ready for fielding yet, but it is real and in the test programs.

We did not have the nonkinetic capabilities that we have today. We had a very capable conventional force 3 years ago. That part of the capability had come. But the passive defenses were also not in place, and when I talk about passive defenses I'm talking about the things that protect the buildings, that go underground to protect the leadership, things that you would bring in on a natural basis, that not only address the strategic side, but address the terrorist side of the equation—standoff distances from buildings and what-not.

So you have now what in the last two administrations prior to this were the things that they wanted to see built out, which the commission that Keith, Dr. Payne, had referred to, were the things that we did not have in a credible state of capability at that time.

Over the next 10 years, where we are today, it's reasonable to expect that our missile defenses are in fact going to be capable and are capable today, particularly at the regional level. We are not trying to make them capable yet at the strategic level. That's something we've avoided for stability reasons.

Conventional capabilities that are prompt global strike in nature, that allow us to address problems that today we can only address with nuclear weapons, give us plausible alternatives. So it is that stack-up, in addition to the fact that our infrastructure and our delivery systems need to be reconstituted over the next 10 to 15 years as we start into that program, that this is the time to have that discussion. So that in general is the reason.

Senator TESTER. Let me kick it, because this has been a nice discussion—let me kick it over to Dr. Payne. You heard what the General just said. Where do you disagree with that?

Dr. PAYNE. I agree with General Cartwright's endorsement of ballistic missile defense and advanced conventional weapons, very much so, as he knows. My concern with the recommendations from the report, however, are that the reductions identified would leave U.S. retaliatory forces vulnerable to a handful of nuclear weapons. It's probably the worst of all worlds, is to have a lethal capability that is very vulnerable to an opponent.

The force structure that is recommended in the report would be quite vulnerable, because it eliminates the ICBM, it eliminates the B–52. Essentially what you're doing is reducing down to essentially a handful of targets that an opponent might envision, envisage, as the target set to strike the United States. That strikes me as a

very dangerous condition to put the United States in, and it's something, as I said in my opening remarks, that all Republican and Democratic administrations have sought to avoid for 50 years.

Senator TESTER. Okay. I don't know if I'll be around for the next round because I've got a meeting at 11:15. I would just say this. I think things have changed. One of the things I don't understand is why the ICBMs, which were the most cost-effective of the triad, are the ones that are being eliminated, number one.

Number two, I think we do have different challenges than we had when I was growing up. I mean, Russia was going to lob them over on us, we would lob them on them, and so it was mutual destruction for both of us, and so nothing happened. And it's why, as you pointed out, we haven't had the kind of losses—or maybe it was Dr. Payne—since World War II.

On the other side of the coin, it is a different world now in that terrorists and people can figure out how to make these bombs, and how do we stop that? Along with what Chairman Feinstein talked about, the fact that Russia—and you guys, too—may be developing new weapons that we need to be concerned about. When they say they're reducing their stockpile, are they really? You know what I mean? I mean trust and verify stuff.

Thank you guys very much.

Senator FEINSTEIN. Thank you very much, Senator Tester. If you want to take more time, you're welcome to do it.

Senator TESTER. Well, I would love that. If I could just ask, why the ICBM? We're going from a triad to a dyad—why the ICBMs when they're the most cost-effective of the triad?

General CARTWRIGHT. A couple of things that we looked at. The first is that the ICBM in a conventional form is something we ought to retain, but not at the numbers we have of the nuclear. I mean, we're talking somewhere in the neighborhood of 25 to 50 is probably the maximum that we want. That would be an alternative.

Senator TESTER. In a conventional form?

General CARTWRIGHT. In a conventional form. In the strategic form that they exist in today, which is termed as their launch positions in those States is set up for a minimum energy trajectory, what it's called, but a basic arc from point A to point B. That arc must traverse Russia in order to get anyplace else in the world. When you lay the map out flat, you must traverse Russia.

That means that any time you contemplate using the ICBMs as they're currently based today, you run the risk of the Russians misinterpreting and retaliating. It's a very difficult scenario, but we've played it out I don't know how many times certainly in my time, and Keith I think in the time that he's worked on it.

So that's one of the issues that we're concerned about, is the malpositioning of the basing. It was done appropriately for the time, but today it doesn't address the rest of the world and it puts in jeopardy the potential of a mischaracterization of any activity.

So you would have to reconstitute the basing concept also. Our illustrative scenario of force structure does not foreclose ICBMs. It just used the ICBMs because you have these problems of basing, location, and overflight issues that make it difficult to use it

against the broad range of targets that we may need to be able to address in the future.

Senator TESTER. I got you, okay. I understand. I'm putting different countries through my head and you're correct. Is it true with North Korea, too?

General CARTWRIGHT. It is true, yes. You do have to come down across.

Senator TESTER. Okay.

General CARTWRIGHT. That's one of the problems that we have with missile defense for North Korea, is that the intercept occurs over Russian territory.

Senator TESTER. Okay. Dr. Payne, do you want to respond? And I don't mean to leave you out, Ambassador Pickering. If you want to join in, please do.

Go ahead. I could ask the question to you first and then cut out General Cartwright, too. But go ahead, Dr. Payne.

Dr. PAYNE. Again, there's no disagreement between General Cartwright and myself on the orbital mechanics involved. But the issue is, with regard to the ICBM, that there are enormous advantages to it, which is why I disagreed with the report's recommendation to eliminate the ICBM.

Senator TESTER. But specifically what he talked about—and I'm a big proponent of ICBMs because I was raised with them. He talked about the fact that if you use them Russia may misinterpret their use. Could you respond to that?

Dr. PAYNE. Sure. This is an example of, I think, conflating issues of deterrence and issues of warfighting. Remember that deterrence is all about withholding the weapon, not about using the weapon. So I'm looking at the ICBM as a withheld weapon for the purposes of deterrence. As a withheld weapon, it gives the President the most time to consider options because it is prompt. So it gives the most time for the consideration of options by the President, which I think is a very good thing.

It's cost-effective, as I believe you mentioned, Senator. Absolutely, it's the most cost-effective part of the triad. And I think most importantly, it denies any opponent a relatively easy theory of destroying the majority of U.S. forces with a very small counterforce shot.

Without the ICBMs, you're looking at a target structure that could be attacked with a handful of weapons. So that's a really important consideration when we're thinking about stability and instability and deterrence in general. And by the way, that's not limited to a cold war concept. That's very much a current concept that we need to remember.

Senator TESTER. Go ahead, Ambassador.

Ambassador PICKERING. General Cartwright may have his own views on this, but as long as we maintain the sea-based force—and we're here looking at an illustrative force posture for 10 years—the best information I have is that we have a highly reliable, highly survivable deterrent force.

Senator TESTER. Once again, I want to thank the panel, and I want to respectfully thank Madam Chair. Thank you very much for your flexibility.

Senator FEINSTEIN. Thank you very much.

I'd like to just ask another question and it's on the need for a hedge. I think, General Cartwright, you spoke about a hedge and maintaining a larger nuclear weapons stockpile is to hedge against geopolitical or technical surprise, and that we currently maintain two to three weapons in reserve for every actively deployed weapon.

Now, as I understand your recommendation, it's to have 450 strategic weapons deployed and 450 in reserve, which means a ratio of only 1-to-1 for deployed and reserve warheads. So how do you overcome those concerns about the geopolitical and technical surprise?

General CARTWRIGHT. I think this is a really important point, and it is a judgment issue that we need to consider. But in the 1950s when we put together the construct for the national labs for building weapons, for deploying weapons, et cetera, it was a time industrially so that you built the weapon as a single entity, not as components. So if one weapon failed, you took that weapon off line and you put another weapon in its place, either of the same make or of a different make, and you used diversity in your inventory to protect you at the end item level and you used large numbers—or a large inventory to assure that your hedge was available and credible when you needed it.

Manufacturing has moved a long way since the 1950s. Today we work at the component level, and we get diversity at the component level to protect us against either geopolitical or technical risk that could occur. In other words, a particular component within the weapon all of a sudden at a certain age dies, malfunctions, whatever the issue is.

So the money that you have put towards the industrial base, so to speak, the labs' capabilities, is to move from end item sparing and large inventories of weapons to component sparing. So you have less of the end items and you have more component diversity to allow you to do that. It's just a manufacturing logistics, inventory management system that is much more effective.

Several studies have indicated, both at NNSA and inside of our federally funded research and development center (FFRDC) structure, that you could get down to a 1-to-1 or a 1-to-1.12 level of sparing, which is substantially below where we are today, protect the test pedigree that we have, and have a combination of the 80-pit construct if it were an emergency and the ability to mix and match existing pits in the stockpile to increase the number of weapons that not necessarily were available but are available to be used.

So the belief is, through these studies, is that that's the method by which you bring the hedge down, don't have a large part of your force characterized as being a hedge and therefore not counted, and you manage your inventory in a way that's fundamentally different than we do today.

NNSA is trying to move in that direction and they believe it will take you somewhere, the last I heard from them was, somewhere in the 15- to 20-year timeframe to get all of the components updated, cleaned up, and spareable.

Senator FEINSTEIN. Are you saying that there is one generic pit that will fit the different warheads?

General CARTWRIGHT. Actually what I'm saying is that there is more than one, but you don't need to have two separate weapons to be able to bring them together. In other words, the test pedigree will allow you to mix and match in ways that we have not in the past, and that's the theory behind augmenting the 80 per year.

Let's just say that 100 weapons all of a sudden were malfunctioned in some way. The ability to reconstitute could be a combination of your ability to build new and a combination of taking old and putting it in in different combinations inside the weapon. That's the theory behind it, and it's more than theory. This has been a lot of intellectual work and a lot of work on the part of the scientists at the two main labs to believe and to set out and to actually prove that they could protect the test pedigree and still do this.

Senator FEINSTEIN. I didn't know that. I didn't know that that was a possibility, that you could essentially use the same pit.

General CARTWRIGHT. In a different weapon.

Senator FEINSTEIN. Senator, did you have a question?

Senator ALEXANDER. I only have one, Madam Chairman.

Senator FEINSTEIN. Okay.

Senator ALEXANDER. In April, Secretary Kissinger and General Scowcroft wrote an op-ed about nuclear weapons reduction and they said, "Lower numbers of weapons should be a consequence of strategic analysis"—which you've said to us today—"not an abstract preconceived determination. Strategic ability is not inherent with low numbers. Excessively low numbers could lead to a situation in which surprise attacks are conceivable."

Dr. Payne, what's your reaction to that comment?

Dr. PAYNE. I certainly concur with the authors' emphasis on the need for flexibility and for the survivability of the forces that we have to pose a retaliatory deterrent. Again, that's one of the reasons why I have the concern with the recommendations of the report, because the recommendations of the report, the force structure that would follow, would be, as I said, highly vulnerable to a very small strike.

Madam Chairman, that gets back to your point about the hedge, because there really isn't a hedge in the force structure that's identified in the report. Essentially, the only thing that would be—the only part of that force structure that would be survivable would be the boats, the submarines at sea with nuclear missiles. And if you look at the numbers, that would probably be down to as low as four or five, given publicly acknowledged operating practices by the Navy, which would lead to as few as 180 warheads under the terms of the report that would be survivable, and no hedge would necessarily be there because everything else would be rather vulnerable to a strike.

So my concern falls exactly along the lines that the article that you mentioned, Senator Alexander, lays out, and it gets back to your question about the hedge, Madam Chairwoman. The basic point about the hedge is that the more viable the industrial and NNSA infrastructure, the lower the need for a standing arsenal of reserve forces for a hedge. But what we do have needs to be survivable, particularly the hedge. And the recommendations from the report I believe have the risk that I just outlined, leaving both the

forces and the hedge vulnerable to a very small number of weapons.

Senator ALEXANDER. Ambassador Pickering or General Cartwright, do you have a comment on the concern of Secretary Kissinger and General Scowcroft that low numbers could lead to a situation in which surprise attacks are conceivable?

Ambassador PICKERING. Well, I think that one can figure a set of circumstances that does produce vulnerability. I think Dr. Payne plays a little fast and loose with our figures, but we'll leave that for the report and for you to digest.

But my own sense is of course that's true. It depends very heavily on things like verification. It depends heavily on the kind of assurance you have the other side is behaving. You don't want to put yourself in a position where you put all your eggs in a basket and say, here they are, come and get them. We all understand that.

So there has to be, I think, a lot of careful thinking given to the question at any level, but particularly at these levels, of how and in what way you deal with the problem of vulnerability. None of our proposals, I believe, put us into a position of excessive vulnerability. That was not our intent and we certainly looked at that very, very carefully.

The problem of one or two strikes should be something we contemplate very, very carefully and guard against, and the kind of force that we have and the dispersion of the weapons and the dispersion of the launch vehicles, I think, gives us some more than adequate hedge against that, particularly if you look carefully at the numbers we propose and the in-commission and in-service rates of the weapons systems engaged.

Senator ALEXANDER. General Cartwright.

General CARTWRIGHT. I think it's been covered pretty well, that you've got both sides of that. The only piece that I would probably add to this is that I go back again to the infrastructure side of the equation, because it's important that if a nation decides to break out and build larger arsenals, that we may need to adapt our arsenal. So having the ability to do that with a viable infrastructure, rather than building inventory needlessly—you can call it minimalist, but the reality here is that that inventory—we learned it in the conventional side: If you build an airplane for a conflict, you have it for 5 years and then the conflict comes, you're going to have to update that airplane for the conflict you're actually in.

We're probably going to have to make adjustments as we go to the future. But you do not want to build this huge inventory that you have to make adjustments with as some sort of an artificial edge for the last conflict and not have what it is you need to be able to build for what you're really facing.

So this subcommittee really sits on that adaptability, it really does. It's that infrastructure, it's that intellectual capital at the labs, along with the ability to adapt and look at what we have and move forward, and are we building them the cushion, I think is what certainly Dr. Kissinger and Perry are looking at, key.

Could you sneak in in the middle of the night and attack? The idea that only 300 nuclear weapons or 200 or whatever it is is insignificant if they're launched against somebody is wrong, it's just patently wrong. Any president—it doesn't matter whether they call

it tactical or strategic. If it blows up, it is a catastrophic event in this world, and we shouldn't undercharacterize that.

So the likelihood of somebody launching 300 missiles over the pole at us and what-not should not be dismissed. But the retaliation capability that we're preserving here—and you can mix and match; you can have more ICBMs and less of something. But the retaliatory capability of 300 nuclear weapons on anybody's territory is catastrophic, catastrophic.

Senator FEINSTEIN. The sizes are all classified, and when you know the sizes then you see the catastrophe. That's the hard part.

Senator ALEXANDER. I have no more questions, Madam Chair.

Senator FEINSTEIN. In any event, are there any final comments that anyone would like to make? I think this has been a very useful discussion and we've all learned something. Dr. Payne, would you like to make a comment? I'll give everybody an opportunity for a closing comment.

Dr. PAYNE. If I might, and thank you, Madam Chairwoman.

I've been accused of many things, but never of being fast and loose before. So I sort of appreciate that.

Let me suggest that the points that I was——

Ambassador PICKERING. I say it with the greatest respect.

Dr. PAYNE. Indeed.

The point is not that 200 to 300 weapons would be insignificant. But again, deterrence is not warfighting and warfighting is not deterrence. They're two different things. What we're talking about for deterrence is a withheld threat. The requirement for deterrence over decades is to have as flexible and resilient capability as you can, so the President can adapt the force to very different circumstances.

The force structure recommended in the report would indeed leave the United States with only 200 or so survivable weapons, all SLBMs. That is the opposite of a flexible and resilient force. So it's not that 2 to 300 weapons wouldn't cause enormous catastrophic damage. That's easily recognized, absolutely true. General Cartwright and I are in complete agreement on that. That's not the question.

The question is would it provide a robust, reliable, credible deterrent for decades? And my answer to that is it would not be flexible, it would not be resilient, and therefore we would be putting at risk our ability to deter war possibly for decades. This isn't something that we want to minimize. We want the best deterrent that we can, and that calls for a force structure, I believe, that's flexible and resilient and very different from the one recommended in the commission's report.

Senator FEINSTEIN. Thank you.

Ambassador Pickering.

Ambassador PICKERING. I would only say the following, that we've given the most careful consideration to the force structure that we are advocating. It's illustrative at the moment. It isn't something that we would say every piece of every point of every presentation we made is fixed in concrete somewhere. But we believe overall it provides an extremely solid and resilient and careful perspective.

Dr. Payne wants us to look ahead several decades. General Cartwright has made it clear that what we have put on the table has to be adaptable, it has to be available to be adapted, it has to be rebuildable if other circumstances come none of us are clairvoyant enough to know. We have taken a look for 10 years in our illustrative proposal, and we believe that what we have provided provides the stability and the security and the resilience over that period of time. We have taken a look at how to go from that into the next 10 years and beyond, and General Cartwright I think explained that extremely well.

So we believe that this is a force very much worth looking at. It is a force that will, we hope, begin to help to move in the direction that you set out, Madam Chairwoman, at the beginning of the effort of can we be smarter and more capable and indeed more effective in defending our country.

Senator FEINSTEIN. Thank you very much.

General Cartwright, why don't you give your wrap-up comments?

General CARTWRIGHT. I don't disagree with the attributes that Keith is putting out. We're very much aligned there. I believe that flexibility is gained through an adaptable infrastructure that can respond to the threats as they emerge and through the other arms, like conventional forces, missile defense.

But it's a question, and it's debatable, and all of those will be adjusted because if we move to a multipolar, multilateral type of construct, then we have to be able to convince—because deterrence is, as Keith said, is really in the mind of your adversary. It's do they believe that you hold something they hold dear at risk and that you are willing to actually use it. So you have to talk about the warfighting side. Otherwise you really lose the element of deterrence that is the credibility, which is at the essence.

I would bring up just two other subjects here that we haven't talked about, just so that it's there for consideration. One is in fact our undeclared strategy for using these weapons. There are nations in the world today that would like to see us and others move to a no-first-use policy. We've debated it in this country. The question is, with the changing of times and the changing of the threat, is it time to go back and look at that again?

Much of what you have in this arsenal is to protect you against something that happens in the middle of the night and a whole bunch of weapons that come raining down on you in a first strike, decapitating our Government or whatever. Those things could be the things of future treaties and verifiably watched, such that if you could remove that kind of capability you could in fact, or reduce it, you could in fact change your posture in significant ways. We ought to explore that more. That's a policy issue rather than a technical issue, but it has technical ramifications.

The second is that as we go forward the costs that have been associated, as you laid out in your testimony, Madam Chairwoman, of the B–61—we have to get our arms around how to cost these extension programs, because we are going to do them for the next 50 years. The likelihood of going to zero is probably not inside that window. So we have to find a way to understand what it costs, what the implications of a large inventory are versus a small inventory, and do a good business case.

Even though it is warfighting and it is strategic and it is our security, it should not escape the business case of how you do it and how you think about the trades that you have inside of it. I think we have not gotten that business case nailed down, just based on the cost growth that we have today. So I just throw that on the table.

ADDITIONAL COMMITTEE QUESTIONS

Senator FEINSTEIN. Let me just briefly respond to you about that, because Senator Alexander and I have been very concerned about that. The inability to keep these programs within initial budget confines, they go up exponentially, is a problem. So we are on that.

Senator Alexander has specifically suggested that we look at root causes. As late as yesterday afternoon, we met with NNSA and Mr. D'Agostino and others with some questions we have and, I think, set into motion at least a process where we will be able to have regular reports on a monthly basis from one person who is in charge of these systems and begin to understand, if there are problems, what are they going to do about the problem, because you can't go on and estimate something at $600 million and have it come in at $6 billion. So that what you've pointed out is a very acute problem that we are aware of and doing our best to solve.

Do you want to make a comment?

Senator ALEXANDER. No.

[The following questions were not asked at the hearing but were submitted to the witness for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO GENERAL JAMES CARTWRIGHT, USMC, RETIRED

QUESTIONS SUBMITTED BY SENATOR SUSAN COLLINS

Question. In your report, you discuss bilateral U.S.-Russia negotiations as the only legitimate means to reduce the level of both nations' current stockpiles to 900 weapons. You mention China as a player in future reductions, but discuss its participation only when the stockpile reaches 1,000 weapons. In my view, the report underestimates the importance of Chinese participation in future rounds of arms reductions. By some accounts the size of their arsenal could already be approaching 3,000 weapons. I am also not certain that Chinese participation can be assumed, despite claims by the Foreign Ministry that China aspires to nuclear disarmament. More so than any time in its history, the image of a monolithic Chinese Government is more fiction than fact. There are multiple competing interests within the government, many of which would oppose any effort to reduce its own stockpile.

What is the basis for taking China at its word and assuming that it is ready or willing to enter into disarmament negotiations?

Answer. In the area of nuclear weapons policy, China has not deviated from its traditional position, harking back to Mao Zedong's guidance a half century ago, emphasizing "minimal deterrence" and requiring only a small survivable nuclear force. The governing nuclear unit—the 2nd Artillery—under the Chinese General Staff has adhered strictly to this time-honored doctrine and the other relevant components of the Chinese Government—the Central Military Commission, the Party, and the Foreign Ministry—appear to be "as one" in this regard. The policy reflects a unified and "monolithic" constellation of actors and historically produced a relatively small nuclear arsenal. Without venturing into the classified domain, suffice it to say that that scholarly estimates in the public domain put the size of China's arsenal at approximately an order of magnitude smaller that the number you cite (300 versus 3,000). China's nuclear modernization is qualitatively impressive, however.

The report intended to emphasize that China's future participation in future nuclear arms control is very important. The thrust of the report is that it is critically important to broaden the scope of nuclear arms control to include China and other nuclear weapons countries. The historical bilateral framework served its purpose but multilateral nuclear negotiations must be initiated soon to address effectively

the multitude of nuclear risks and threats that lie outside the U.S.-Russian relationship. Although there are reasons to believe that China would participate in such multilateral talks, there doubtless exists some internal interests that oppose entering into a nuclear disarmament process. Thus we should not assume but rather test China's willingness to join the process. Our commission considered, and did not reject, the notion of linking the very deep cuts in U.S. and Russian arsenals to China's commitment to constrain its arsenal. We were and remain open to ideas for drawing China into the process.

Question. I am concerned that tactical nuclear weapons are not thoroughly discussed in your report. While the New START treaty strengthened nuclear nonproliferation efforts, it did not address the significant disparity between the number of nonstrategic nuclear weapons in Russia's stockpile compared to our own. Your report, likewise, describes the value of tactical nuclear weapons as "virtually nil" to U.S. operational plans. The Perry-Schlesinger Strategic Posture Commission reported that Russia had an estimated 3,800 tactical nuclear weapons remaining in its arsenal, but you advocate that Russia should be encouraged to move these weapons into storage as part of a future agreement.

Given the lack of any meaningful dialogue with Russia on tactical nuclear weapons during the New START negotiations, what confidence do you have that Russia would accede to discuss tactical weapons, or their removal as a tactical tool from operational bases, in the next round of disarmament talks?

Answer. A previously published Global Zero report by a different commission composed of highly experienced European, Russian, and American members (including former senior military members) thoroughly examined the issues surrounding U.S.-NATO and Russian tactical nuclear weapons deployed on the European continent. It discusses the diminished role of U.S.-NATO tactical weapons after the end of the cold war, and recommended their complete withdrawal from combat bases to central storage in tandem with comparable Russian re-location. (See http://www.globalzero.org/files/gz__nato-russia__commission__report__-__en.pdf.)

The report to which I testified before your subcommittee considers the omission of tactical nuclear weapons from the U.S.-Russian nuclear talks to be a very serious deficiency in need of rectification for the next round. Our view is that future talks should be comprehensive and include all categories of weapons—strategic deployed, strategic reserve, and tactical—in an effort to regulate the total number of nuclear weapons in each arsenal while allowing each side the freedom to mix these categories in whatever fashion they deem best suited to their national security interests.

Russia's primary concern today is conflict on her borders and Russia's perceived conventional inferiority in some scenarios (e.g. conflict with China) increases the importance of tactical nuclear weapons for foiling an enemy attack. Russia's tactical nuclear arsenal is thus much larger than the U.S. arsenal. Russia will be very cautious in cutting its active tactical stockpile—the size of which is uncertain given the deficiency noted above that to date excludes them from regulation and verification. (Estimates in the range of 1,500–2,000 active weapons appear to be reasonable.) However, it is clear to me that Russia does not need thousands of tactical nuclear weapons to perform this mission. A recent Russian study conducted in response to the Global Zero report, chaired by a former Chief of Staff of the Russian Strategic Rocket Forces, indicated that Russia could safely reduce to 500 total active tactical nuclear weapons. This number is comparable to the size of today's U.S. tactical nuclear arsenal. In exchange for deep cuts in Russia's tactical arsenal, the United States could deeply cut our nondeployed strategic stockpile, which greatly outnumbers Russia's reserve strategic stockpile. Whether or not a deal along these lines could be negotiated remains to be determined, but our study concluded that such an approach has merit and promise.

CONCLUSION OF HEARING

Senator FEINSTEIN. Well, let me then say thank you all very much. I think it's been a very interesting morning. I'm very grateful both for your mind and your willingness to be here and share your thoughts with us. So thank you.

The hearing is adjourned.

[Whereupon, at 11:31 a.m., Wednesday, July 25, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

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