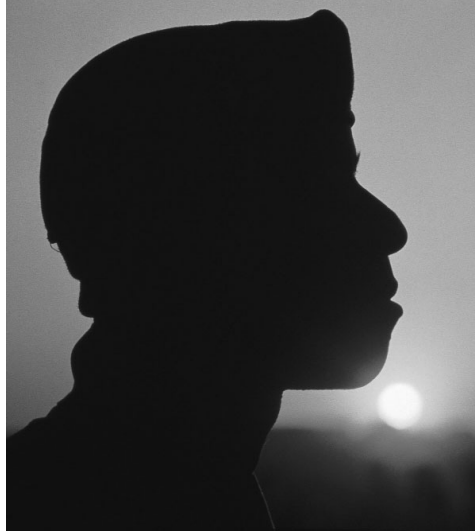


Journal of the Federation of American Scientists

## Behind the Prospect of War with Iraq: The New U.S. National Security Strategy<sup>1</sup>

*Carl Kaysen, John D. Steinbruner,  
Martin B. Malin*



On September 17, 2002, the White House, under cover of a letter from President Bush, issued a thirty-page document entitled “The National Security Strategy of the United States.” Its “Overview” states:

The U.S. national security strategy will be based on a distinctly American internationalism that reflects the union of our values and our national interests. The aim of this strategy is to help make the world not just safer but better. Our goals on the path to progress are clear: political and economic freedom, peaceful relations with other states, and respect for human dignity. . . .

Continued on page 3

## Nuclear Security Legislative Update

*Jaime Yassif*

The past year has seen a flurry of congressional action on nonproliferation programs. Funds appropriated this fall as part of the 2002 Emergency Supplemental Appropriations Bill will help secure dangerous radiological materials domestically, while the 2003 Defense Authorization Bill will address international nuclear and radiological materials security issues, as well as the US nuclear posture.

### 2003 Defense Authorization Bill

On November 13, both Houses of Congress passed the 2003 Defense Authorization Bill, authorizing funds for the Defense Department and for Department of Energy’s nuclear weapons projects. The conference report reconcil-

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## FAS Public Interest Report

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## About FAS

The Federation of American Scientists (FAS), founded October 31, 1945 as the Federation of Atomic Scientists by Manhattan Project scientists, works to ensure that advances in science are used to build a secure, rewarding, environmentally sustainable future for all people by conducting research and advocacy on science public policy issues. Current weapons nonproliferation issues range from nuclear disarmament to biological and chemical weapons control to monitoring conventional arms sales; related issues include drug policy and space policy. FAS also promotes learning technologies and limits on government secrecy. FAS is a tax-exempt, tax-deductible 501(c)3 organization.

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## Leaving a Legacy of Peace

The Federation of American Scientists hopes to continue efforts to advance sound science in public policy for generations to come. We'd like your help in accomplishing this goal.

As we move to the end of 2002, you, like many others, may be reviewing your long-term estate and financial plan. Please remember that your will, life insurance policies, retirement accounts and other planned giving vehicles may offer exceptional opportunities for leaving the lasting legacy of peace.

It is easy to provide a bequest to the Federation of American Scientists:

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Whichever methods you choose, if properly structured, your bequest will be fully deductible from your estate, thus decreasing any tax liabilities. The estate tax charitable deduction is unlimited.

We at the Federation of American Scientists would be pleased to help you and your financial advisor choose a way to support the Federation of American Scientists's important work that best fits your personal philanthropic goals. For more information about the advantages of considering the Federation of American Scientists in your estate planning, please contact Sharon Gleason at [sgleason@fas.org](mailto:sgleason@fas.org) or 202.454.4680.

## FAS Mailing Mystery Solved!

Beginning in April 2002, FAS' business reply envelopes were mistakenly held for a significant amount of time, and/or returned to senders marked as 'unclaimed.'

The glitch was finally identified and resolved, and there is no longer a problem using the envelopes we provide. Our sincerest apologies for any inconveniences this may have caused you. As always, we appreciate your continued support.

To achieve these goals, the United States will:

- champion aspirations for human dignity;
- strengthen alliances to defeat global terrorism and work to prevent attacks against us and our friends;
- work with others to defuse regional conflicts;
- prevent our enemies from threatening us, our allies, and our friends, with weapons of mass destruction;
- ignite a new era of global economic growth through free markets and free trade;
- expand the circle of development by opening societies and building the infrastructure of democracy;
- develop agendas for cooperative action with other main centers of global power; and
- transform America’s national security institutions to meet the challenges and opportunities of the twenty-first century.

These goals are admirable. Many of the means proposed for achieving them – each of which is developed in a separate chapter of the document – have been features of U.S. policy for the past half-century or more.<sup>2</sup>

## New Policies, New Realities

The new National Security Strategy is not, however, merely a continuation of past policies. Two relatively novel features of the contemporary international scene and the United States’ place in it correspond to the two most significant new elements in the policy. These

deserve more attention than they are currently receiving.

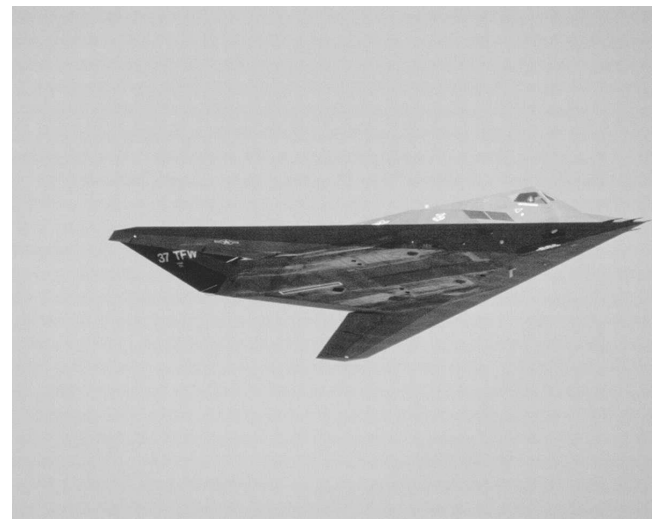
## Preponderant U.S. Military Power

First is the United States’ overwhelming preponderance of military power over any other nation or any plausible combination of nations that might oppose us. The reach and the striking power of U.S. forces far outmatch those of any others. The United States can today strike with speed and accuracy that was unheard of only a decade ago. A crude indicator of U.S. dominance: the U.S. defense budget is today larger than the combined defense expenditures of the next twenty-five largest militaries.<sup>3</sup>

Because of this condition of U.S. superiority, two questions will determine in large degree the character of the international order in the coming decades: In what manner will the United States use its military force? And for what purposes? On the question of manner, the central issue is whether U.S. force deployments will be attempted in accordance with international law and with authorization from the UN Security Council, or in defiance of legitimate international objection and in violation of legal procedure. On the question of purpose, the issue will turn on whether military force is used to serve broad national and international concerns, or to advance a parochial interest in maintaining U.S. global dominance regardless of the consequences for others.

The National Security Strategy document does not say explicitly that it is the policy of the United States to do whatever is necessary to sustain its global dominance. What it does say, in the final section on transforming American

national security institutions, is that the United States intends to build and maintain its defenses “beyond challenge.” The president had previously set this indefinite and operationally ambiguous standard in an address to the graduating class of West Point in June 2002 when he declared: “America has, and intends to keep, military strengths beyond challenge.”<sup>4</sup> The United States will retain, as it has in the past, the capability to deter threats to its vital interests and to defeat an adversary should deterrence fail. But a new criterion has been added. It is that



the U.S. military be “strong enough to dissuade potential adversaries from pursuing a military build-up in hopes of surpassing, or equaling, the power of the United States.”<sup>5</sup>

The concept of fielding a military force so dominating that it prevents

adversaries from contemplating resistance raises troubling questions. Is it justified on legitimate grounds of self-defense? Russian and Chinese officials have asked this question in response to U.S. plans for deploying a national missile defense system and aspirations for placing strike weapons in space. China has asked repeatedly that the United States negotiate at the UN Conference on Disarmament at Geneva new rules to prevent the competitive and unrestrained deployment of weapons in space. Following the U.S. withdrawal from the 1972 Anti-Ballistic Missile treaty, China was joined in its request by Russia. The United States, seeking a standard of dominance that is beyond challenge, has refused to consider the Chinese and Russian proposal for negotiated restraints.

The concept of building weapons systems that are so advanced that they cause opponents to throw up their hands and forgo defiance should also be questioned on grounds of effectiveness. No potential adversary hopes to match U.S. military might head on, in symmetrical fashion. Rather, those who would harm the United States seek cheap and easy ways of exploiting U.S. vulnerabilities. Those points of leverage grow more numerous as the United States labors to extend its military superiority abroad. And the motivation of U.S. enemies to act grows with their resentment of per-



ceived intimidation. By aspiring to a standard of dominance that would dissuade others from attempting a direct military challenge, the United States may in fact stimulate adversaries to work ever harder to exploit any number of vulnerabilities.

## Weapons of Mass Destruction and Terrorism

A second novel feature of the international environment is the development of international networks of terrorists with a demonstrated willingness to undertake violence on a massive scale. These networks flourish within and between states whose political agendas overlap with those of the terrorists, and

in countries where there is no authority capable of preventing terrorist groups from using the territories as bases, staging areas, and refuges. A grave and valid concern of the new National Security Strategy is that a terrorist group will acquire nuclear, biological, or chemical weapons and wreak catastrophic harm.

The weapons themselves are not new (though the development of new and more deadly biological weapons is particularly worrisome). Almost as soon as they were developed, the United States recognized the dangers inherent in the existence of nuclear weapons and participated in international efforts to limit their possession. Political and military leaders have shared the concerns of scientists and scholars that nuclear weapons are not simply more efficient explosives but rather a threat of an entirely different magnitude. Their dangers to civilians had to be weighed heavily in the reckoning of their usability. Similarly, biological and chemical weapons have been recognized as presenting special dangers, and international efforts to control their possession and forbid their use by law embodied in treaties had the support of the United States.



The corresponding policy in the new National Security Strategy is what the document calls “preemption” – using force in anticipation of a danger to prevent hostile states from acquiring weapons of mass destruction or harboring terrorists. The United States has been preparing in recent months to implement this policy against Iraq. In this particular case, “preemption,” as it is commonly understood, is a mischaracterization, since that term usually is taken to mean striking the first blow when war appears to be imminent and unavoidable. What the United States is proposing is more properly characterized as “preventive war,” that is, a war of choice to prevent the emergence of a threat further in the future. U.S. military advisors have contemplated preventive war before, notably against the Soviet Union at various points during the Truman and Eisenhower administrations. But such thinking was consistently rejected at the political level on both moral and strategic grounds.<sup>6</sup> Today, by contrast, it is our declared policy to maintain the capability to wage preventive war against those who may threaten us with weapons of mass destruction.

## Law vs. Force

An additional and striking novelty of the National Security Strategy document is what it omits. The international rule of law as an overarching goal of policy is nowhere mentioned. Neither is the Charter of the United Nations, a treaty that is largely of the United States’ own making and to which the United States is bound. The United Nations itself receives only a few perfunctory mentions: the most substantive one is in the penultimate paragraph of the president’s introductory letter, where it is listed with the OAS, the WTO, and NATO as examples of multilateral institutions that can “multiply the strength of freedom-loving nations.” There is an additional mention of the United Nations in the chapter on strengthening

alliances to defeat global terrorism, where it is mentioned as an example of international organizations “we will continue to work with” in rebuilding Afghanistan.

The aim of the UN Charter was to substitute law and diplomacy for force as the primary regulators of relations among nations. The primacy of law over force has been a major thread in American foreign policy since the end of World War II. From the United Nations to the World Trade Organization, the United States has led in the creation of international organizations that extend the reach of law, and seek to constrain the powerful as well as to give the weak a voice. It has all but disappeared from the fabric of national security that the administration now presents.

Indeed, the Bush administration has conducted an assault on major elements of the international legal framework that has been developed to regulate security policies and force deployments. In addition to abrogating rather than renegotiating the ABM treaty, it has forced termination of efforts to negotiate a compliance protocol for the Biological Weapons Convention. It has repeatedly denigrated and has refused to ratify the Comprehensive Test Ban Treaty, despite international consensus that a ban on nuclear testing is necessary to preserve the Nonproliferation Treaty. Senior officials have recently questioned the security assurances endorsed by all previous administrations in support of the latter treaty.

The National Security Strategy departs sharply from previous U.S. practices, and in so doing can be compared to NSC 68, the once classified national security policy statement promulgated by President Truman in 1950. Released in the wake of the North Korean attack on South Korea (though drafted earlier), that document provided a blueprint for

the conduct of the Cold War and initiated a vast U.S. military buildup, especially of nuclear weapons. The Bush administration’s National Security Strategy provides a blueprint for a perpetual series of hot wars and preventive strikes, initiated whenever it is determined that another state is accumulating threatening weapons or harboring terrorists. Is the administration’s apparent confidence in the utility of military force and our capacity to use it without unnecessarily provoking “asymmetric” retaliation, from terrorists and hostile states, justified? And has the administration adequately assessed the potential indirect costs of the strategy, in the form of alienation and even isolation from the rest of the world?

If one could directly ask all citizens of the United States to identify their core political values, freedom would probably be the most frequently mentioned word. Certainly those who seek to represent the American electorate regularly evoke it. Images of enslavement run deep in the national consciousness. The more thoughtful answers, however, and the ones best informed about historical traditions would cite the rule of law. Government by consensually formulated law is the defining feature of American democracy, and as a practical matter the threat to freedom has much more to do with the possible defects in the internal rule of law than with the actions of any external aggressor. Although they might not volunteer that latter thought, a solid majority of Americans would probably acknowledge it.

Curiously, however, and ominously, one cannot be as confident of the answer if the question is posed about political values in international relations. There is a substantial strand of opinion that believes the international order to be fundamentally anarchic and concludes

that freedom and other core interests can be protected only by the exercise of military power. That has long been a minority view, but it is an intense minority with disproportionate influence that adheres to it. In the wake of last year's terrorist attacks that view has acquired ascendancy in American policy. Most of the implications are yet to unfold, but the possibilities are quite apparent. The traditional balance between military preparation and international legal restraint has already been sharply shifted by repudiating a number of treaties that the United States itself originally sponsored. The most recent statement of policy suggests that the United States reserves the right to initiate war for reasons of its own choosing.

Based on the recent U.S. election returns, some would argue that this policy appeals to more voters than it dismays. Further, the 15–0 vote in the UN Security Council for the final U.S.-U.K. draft of the resolution on Iraq's obligations to end its program for acquiring nuclear, biological, and chemical weapons – though it does not provide, as the United States had sought, automatic authorization for the use of force if Iraq is found to be uncooperative – arguably reflects the weight of U.S. power. The United States appears to be the beneficiary of the occasional if commonly fleeting response to the amassing and exercise of power in the international arena, that of jumping on the bandwagon of the most powerful.

In a longer-term perspective, however, can the pursuit of ever more intimidating military forces, their use in preventive wars, and the neglect of international law and cooperation be the path toward our goals of a more democratic and open world of governments more responsive to their citizens and more concerned to promote their prosperity and liberty?

Before implementing the new National Security Strategy by going to war with Iraq, a clear accounting of the costs, consequences, and alternatives to that action is urgently needed.

<sup>1</sup> This article is reprinted with permission by the American Academy of Science, excerpted from "War with Iraq: Cost, Consequences and Alternatives."

<sup>2</sup> The National Security Strategy of the United States of America, September 2002, pp. 1–2, <<http://www.whitehouse.gov/nsc/nss.html>>.

<sup>3</sup> Christopher Hellman, "Last of the Big Time Spenders: U.S. Military Budget Still the World's Largest, and Growing," Center for Defense Information (4 February 2002). <<http://www.cdi.org/issues/wme/spendersFY03.html>>.

<sup>4</sup> <<http://www.whitehouse.gov/news/releases/2002/06/20020601-3.html>>.

<sup>5</sup> The National Security Strategy of the United States, 30.

<sup>6</sup> Marc Trachtenberg, "A 'Wasting Asset': American Strategy and the Shifting Nuclear Balance, 1949–1954," in Trachtenberg, *History and Strategy* (Princeton: Princeton University Press, 1991), 100–152.

## StaffNews:

FAS welcomes Sharon Gleason, a Development Director who has raised monies for one of the nation's largest National Cancer Institute Centers located in Los Angeles. Sharon comes to FAS with over 6 years in development and 10 years in communications and business development. She did her undergraduate work at the Johns Hopkins University, worked at the Johns Hopkins School of Public Health and Harvard Medical School. Her graduate degrees are from Harvard University and London School of Economics. Please feel free to contact her anytime if you would like to get more involved with the Federation of American Scientists. 202.454.4680 [sgleason@fas.org](mailto:sgleason@fas.org)

ing the House and Senate versions of the bill will enhance cooperative international programs to secure nuclear and radiological materials and will affect US nuclear weapons development and test readiness posture.

## Nuclear and Radiological Materials Security

The conference report includes many of the nuclear and radiological materials security provisions adopted previously by the Senate. Several of these provisions implement recommendations made by FAS researchers in studies on radiological weapons and highly-enriched uranium.

The Senate had authorized \$40 million for the accelerated blend-down of highly enriched uranium (HEU) to a more proliferation-resistant form—below twenty percent U-235. (See “Closing the Gaps” by Robert Civiak, a recent FAS report on HEU security.) The final version of the bill authorizes \$10 million, which can be used to establish new blending facilities and centralized secure storage facilities in Russia. This provides a precedent for expanding the 1993 HEU deal, the cooperative agreement between the US and Russia which initiated the blend-down of 500 metric tons of Russian HEU. The accelerated HEU disposition provision adopted in conference will facilitate the blend-down of additional materials in Russia’s 1000-ton stockpile of excess HEU, without disrupting the original 1993 agreement.

The conference report includes the Senate provision authorizing \$15 million for research and development of technologies that could reduce the likelihood of a radiological attack or mitigate the impact should one occur. The goal of this program is to develop technologies for detection, identification, and control of vulnerable radiological materials, as well as for their disposition.

These technologies may include improved radiation detectors that could identify potentially dangerous materials as they pass through key points in the transportation system, such as borders, commercial harbors and airports. (For more information on related technologies, see “Weapons of Mass Disruption” by FAS’ Michael Levi and Henry Kelly, in the November 2002 issue of *Scientific American*.)

The conference committee also adopted the Senate’s provision to establish a Radiological Dispersal Device Materials Protection, Control and Accounting (RDDPC&A) program, and authorized the full \$5 million proposed by the Senate. The RDDPC&A program will work internationally to identify and enhance the security of materials that could be used in a radiological attack.

The conferees partially adopted the Senate’s proposal to expand the Materials Protection Control and Accounting (MPC&A) program outside the Russian Federation; the plan is designed to enhance the security of HEU stored at civilian nuclear facilities outside Russia and to accelerate the return of these materials to Russia. Instead of authorizing funds this year, the conference report requires the DOE to develop a plan that would be subject to approval during the next round of authorizations in 2003. The plan will include the projected costs and a proposed timeline for helping facility operators transport their HEU back to Russia and for providing these facilities with MPC&A security upgrades in the meantime.

The conferees partially adopted the Senate’s provisions to strengthen international safeguards for nuclear materials and operations. Of the \$35 million authorized by the Senate, \$15 million was authorized in conference. Ten million dollars were designated for the development of proliferation-resistant nuclear energy technologies in coopera-

tion with the Russian Ministry of Atomic Energy. Some of the funds will support the development of high density LEU fuels and feasibility studies for reactor conversion to this proliferation-resistant fuel. (See “Closing the Gaps” for more information on reactor conversion.)

The remaining \$5 million authorized for international nuclear safeguards will be used to strengthen export control programs in the Former Soviet Union and other regions of concern to US national security. The DOE can use these funds to provide assistance with domestic export controls on materials, technologies and expertise that could be used in the construction of a radiological or nuclear device.

## US Nuclear Posture

The House and Senate diverged on the controversial issues of new nuclear weapons development and shortened test readiness time.

The House version of the Defense Authorization Bill contained a provision that would have weakened Congress’ 1993 ban on the development of low-yield nuclear weapons, also known as “mini-nukes”, and would have allowed research to begin on their development. Opponents of “mini-nuke” development claim that their low yield—below 5 kilotons—would make them more “useable” and would therefore blur the crucial distinction between conventional and nuclear arms. Ultimately, the conference committee rejected the House version, thereby upholding the prohibition on these weapons.

The final bill did, however, authorize a feasibility study on another proposed nuclear weapon system, the Robust Nuclear Earth Penetrator (RNEP), also known as the “bunker buster.” The stated purpose of this sys-



The Off Site Source Recovery Program (OSRP) recovers and secures radioactive sources from licensees who have no other means of disposal. In this operation, the OSRP recovered an americium/beryllium source that had been used to facilitate oil well logging at a drill site in Texas.

tem is to destroy bunkers buried deep underground and protected by thick concrete walls or thick layers of solid rock. The administration requested \$15 million to fund the first year of a three-year study on the RNEP, but the Senate cut the funds from their version of the bill. The final version authorizes funds for the feasibility study, but with several restrictions. The feasibility study cannot be initiated until 30 days after the submission of a joint Defense and Energy Department report on: 1) the military requirements for the nuclear earth penetrator; 2) the nuclear weapons employment policy for the weapon; 3) the types of targets that it is designed for; and 4) an assessment of conventional alternatives that could be used to destroy the same types of targets.

The National Academy of Sciences will also conduct a study addressing the short and long-term effects on civilian populations if a nuclear weapon were used to destroy an underground WMD storage facility; the report will also assess the potential for conventional weapons for these purposes. (See "Fire in the Hole" by FAS's Michael Levi, a recent Carnegie Endowment Working Paper on nuclear options for counterproliferation and conventional alternatives.

A summary of this piece appears in this edition of the PIR, beginning on p. 9.)

The House and Senate also battled over shortening nuclear test readiness time. The House bill required the DOE to submit to congress a plan for achieving a one-year test readiness posture, but the final version of the bill calls for plans for test readiness within six, twelve, eighteen and twenty-four months.

## \$10 Million in Emergency Supplemental to OSRP

On September 1st, the Off-Site Source Recovery Project (OSRP), run by the Department of Energy, was granted \$10 million as part of the 2002 congressional emergency appropriation for homeland security. This program recovers commercial radioactive sources that might otherwise be abandoned by licensees who have no other means of disposal. The OSRP has recovered over 3,000 sources containing Americium-241 and Plutonium-238, but until recently has had difficulty sustaining operations due to repeated budget cuts. The new funds will ensure the continuation of the program and facilitate the recovery of an additional 5,000 sources within the next 18 months.

## Strategic Offensive Reductions Treaty

On May 24th Presidents Bush and Putin signed the Moscow Treaty on Strategic Offensive Reductions (SORT). They committed to reducing the U.S. and Russian deployed strategic nuclear arsenals to 1,700-2,200 warheads within the next ten years. The three page treaty leaves the 1991 START treaty in place and gives each side the right to withdraw upon three months written notice to the other party.

Before it can enter into force, the SORT treaty must first be approved by both chambers of Russia's Federal Assembly and ratified by the U.S. Senate. On December 7th, President Putin submitted the SORT treaty to the Duma, one month after Russian Deputy Foreign Minister Georgi Mamedov announced that the treaty would be ratified by the Russian Duma by the end of the year. The U.S. Undersecretary of State, John Bolton, issued a statement in November maintaining that the Bush administration would like the Senate to follow suit as soon as possible.

The Department of Defense stated in this year's Nuclear Posture Review (NPR) that it intends to initiate SORT reductions by retiring all 50 of its Peacekeeper ICBMs and by converting four Trident submarines from nuclear to conventional weapons.

Members of the arms control community have argued that the treaty is not sufficiently binding, citing the lack of verification provisions and the absence of requirements for warhead destruction. They have also criticized the treaty's failure to address non-operational and tactical nuclear weapons. On the right, some critics have questioned the need for an arms reduction treaty in the first place.



## Fire in the Hole

*Michael Levi*

**Editor's Note:** The following is adapted from Strategic Security Project Director Michael Levi's working paper, "Fire in the Hole: Nuclear and Non-Nuclear Options for Counterproliferation". The complete paper can be accessed on the web at <http://www.ceip.org/files/Publications/wp31.asp>. For an earlier FAS take on the issue, see Robert Nelson's "Low-Yield Earth-Penetrating Nuclear Weapons" in the Public Interest Report, 54:Jan./Feb. 2001.

### Introduction and Summary

At the end of the Gulf War, many military thinkers began to argue that precision guided munitions had made tactical nuclear weapons obsolete. Television images of bombs threaded through chimney pipes made graphic the revolutionary advance in guidance technology. With weapons able to explode within meters of their targets, the massive destructive radii of nuclear weapons were apparently unnecessary.

That argument didn't last long before the counterattack. Reacting to America's military revolution, Iraq and others began to build underground, where their facilities became easier to conceal and much harder to destroy. The proliferation of chemical and biological weapons, often built in what looked like typical industrial facilities, presented new challenges in finding targets and avoiding collateral damage during attacks. These requirements were identified by nuclear weapons designers as potential missions for new nuclear weapons.

In March 2002, portions of the U.S. Nuclear Posture Review leaked to the public revealed a renewed interest in developing a range of specialized nuclear weapons. The review identified capabilities shortfalls in attacking hardened and deeply buried targets, and facilities containing weapons of mass destruction, and suggested that nuclear weapons might have unique capabilities to address these threats. It revealed a new program to build a Robust Nuclear Earth Penetrator, a modified nuclear weapon designed to destroy deeply buried targets. But it went further, noting "Nuclear weapons could be employed against targets able to withstand non-nuclear attack, (for example, deep underground bunkers or bio-weapon facilities)."



Ultimately, however, the posture review was non-committal, leaving open a crucial question: Do the military advantages gained by development of new nuclear weapons offset the massive political liabilities (domestic and international) of their development or use? To help answer that question, we explore the military abilities development of new nuclear weapons might deliver, and compare them with what might be obtained by aggressive pursuit of non-nuclear capabilities. [See the working paper for this discussion.]

With a toolkit of potential weapons, we turn to case studies of three potential targets. We evaluate the potential of nuclear and non-nuclear weapons in attacking a shallow but hardened bunker containing biological weapons, a chemical weapons production plant tunneled several stories underground, and a nuclear facility tunneled beneath hundreds of meters of granite.

Continued on Page 10

## Case 1 - The Tarhunah Chemical Weapons Complex

In a recent article in Jane's Intelligence Review, Geoffrey Forden described the Tarhunah Chemical Weapons Complex:

"In the mid-1990s, the USA alleged that Libya had constructed an underground nerve-agent production plant, buried under at least 18m of earth, 60km southeast of Tripoli. The main difficulty with attacking this facility would not be its depth, which appears well within the reach of even sub-kiloton weapons, but uncertainty about its underground location."

Forden argues that a five kiloton ground-penetrating nuclear weapon could be used to destroy the facility. He notes one caveat:

"Other geologic formations in the area could significantly reduce the effectiveness of such a nuclear weapon. For instance, deep crevasses, if they lay between the explosion and the underground facility, would effectively neutralize the destructive power of the bomb."

Another factor weighing against use of nuclear weapons for destruction of this facility would be the fallout produced. The precise nature of the fallout would depend on whether the weapon was detonated inside the facility or in the surrounding earth, but to be conservative, military planners would have to assume the latter. Based on our calculations, this would result in one-hundred percent lethality over approximately fifteen square kilometers. Though this zone would not reach Tripoli, fallout concerns would require medical monitoring for civilians up to twenty kilometers downwind from the blast. If American troops were in this area, they would have to halt operations or take the

risk of being exposed to fallout. Troops could not enter the immediate facility area to inspect damage or collect intelligence, even with protective gear.

Many non-nuclear approaches might also be used to destroy or neutralize the complex:

- A single earth penetrating conventional bomb could reach the facility if the target's location was precisely known. If the facility was operating, seismic sensing methods might be used to detect the locations of active machinery. An earth penetrating missile the length of the current GBU-28 penetrator, modified to impact the earth at twice the GBU-28's current impact speed, could penetrate the eighteen meter cover of soft rock and reinforced concrete and destroy the facility using conventional explosives.
- If the facility is not able to be precisely localized (and this seems to be the likely case), several penetrator missiles used simultaneously could mimic the area effect of a small nuclear weapon. Extending the small diameter bomb concept to missiles the length of the GBU-28 would allow up to twenty-four penetrating missiles to be delivered simultaneously; several would be expected to penetrate the facility. Alternatively, multiple sorties could be used to cover the entire suspected facility area.
- If it were determined that no available bombs could penetrate the facility, cruise missiles could be used to temporarily block its entrances. This would not, however, keep personnel and equipment out of the facility an extended period.
- A no-personnel or no-vehicle zone

could be established around the facility. A range of American intelligence assets would be trained on a designated area surrounding the complex, and any attempt to move material to or from the facility would be stopped. While the facility itself might continue to produce weapons, those weapons could not be removed and used on the battlefield.

- If the facility were operating, conventional electromagnetic pulse weapons might be applied to destroy or disable equipment inside. Because the pulse can easily travel down a bunker's power and ventilation ducts, equipment inside would be vulnerable to attack. Such a weapon could be delivered by cruise missile.

In each case of applying conventional weapons, collateral damage due to chemical dispersal would be minimal outside the facility. Inside, chemical agents would be dispersed, but U.S. troops inspecting the area could mitigate the dangers from these by wearing protective gear.

## Case 2-Iraqi Surface Bunker Containing Anthrax

Iraq is suspected of retaining stockpiles of weaponized anthrax and is known to use hardened bunkers extensively. Here, we consider a hypothetical cut-and-cover bunker built with 5-meter-thick walls and a roof of reinforced concrete, buried under an additional 5 meters of earth. The facility, 5 kilometers south of Baghdad, covers an area measuring 400 square meters and is 20 meters high. Built during the absence of United Nations weapons inspections, the bunker's existence became known to American intelligence through satellite imagery captured during its construc-

tion. It is believed to contain several tons of anthrax in storage barrels, though, in the absence of a continuing ground presence, this cannot be confirmed.

Early in a campaign against Iraq, military planners ask whether it would be possible to destroy the bunker's contents. A review of available penetrating weapons shows that conventional weapons can easily breach the facility, but military and political leaders are concerned that an attack would simply spread anthrax about the countryside. They ask for a review of options that would minimize collateral damage, and are presented with the following:

- If it were developed, a 20-ton penetrating nuclear weapon, detonated at the floor of the facility, could incinerate the bunker's contents, preventing the dispersal of anthrax. It would, however, spread nuclear fallout. Deaths from acute radiation poisoning would be expected as far as 1 kilometer downwind. People nearer than 4 kilometers downwind would, if they were not evacuated quickly, receive a radiation dose greater than that received by a nuclear worker over a single year.
- If the stress of bomb impact caused the nuclear weapon to malfunction, the conventional explosives might detonate, but with no nuclear yield and, although unlikely, anthrax could be dispersed from the bunker without being neutralized. Alternatively, the nuclear bomb might detonate, but at its "natural" yield of 10 kilotons, in which case radioactive fallout would then kill people as far downwind as 30 kilometers, perhaps including many in Baghdad.
- A penetrating bomb carrying a fragmenting warhead and incendi-

ary materials could be used. The fragmenting warhead would break the anthrax out of exposed containers, and the heat from the incendiary materials would neutralize the anthrax. If containers were heavily shielded, they would not break open and, while the anthrax would not be destroyed, neither would it be released. The bunker would remain intact.

- A penetrating bomb carrying submunitions and neutralizing chemicals could be used. The submunitions would spread throughout the bunker and break the anthrax out of its containers, even if it were stored behind barriers, but the neutralizing chemicals would render the anthrax inert. The bunker would probably remain intact, but it could be breached if it had been poorly constructed.
- A watch could be placed on the facility using satellite imagery coupled with armed unmanned aerial vehicles. Anything attempting to enter or leave the bunker would be destroyed, making the anthrax inside unusable.

### Case 3-North Korean Nuclear Weapons Complex at Kumchangri

In a recent Congressional Research Service report, Larry Nicksch describes the North Korean Kumchangri underground complex, built in the side of a mountain:

"U.S. intelligence agencies reportedly became aware of the Kumchangri underground facility in the second half of 1996. The Defense Intelligence Agency (DIA) reportedly prepared a classified report at the end of 1997, which concluded that the facility, located about 25 miles north of Yongbyon [50 kilometers north of Pyongyang], "possi-

bly could be a nuclear weapons-related facility by 2003." The report stated that: "The function of this site has not been determined, but it could be intended as a nuclear production and/or storage site..." The Clinton Administration responded to the disclosure by pressuring North Korea to allow the United States access to the Kumchangri facility. An agreement was reached on March 16, 1999, providing for multiple inspections of the site in return for at least 500,000 tons of new U.S. food aid for North Korea. . . . Administration officials declared that no evidence of nuclear activity was found. However, previous reports indicated that North Korea had removed equipment from the facility."

Had the United States or North Korea rejected a diplomatic solution, and had the United States concluded that the facility was being used to build nuclear weapons, what military choices would have been available for destruction or neutralization of the facility? The depth of the facility is not publicly known, but given it is tunneled into the side of a mountain, the main facility could quite possibly be deeper than 200 meters, putting it out of the range of even megaton-sized, earth-penetrating nuclear weapons. Even if the facility were only 150 meters underground, a 1-megaton penetrating nuclear weapon would be required to destroy it, and the resulting nuclear fallout would have enormous consequences:

- If the wind were blowing southwest, residents of Pyongyang, 80 miles away, would have to be evacuated within hours of detonation to prevent the death of more than 50 percent from radiation poisoning.
- If the wind were blowing north or northwest, residents of several

large cities in China would have to be evacuated within hours of detonation to avoid numerous radiation deaths.

- If the wind were blowing south, residents of several large cities in South Korea would have to be evacuated within hours of detonation to avoid numerous radiation deaths, and U.S. troops stationed in the DMZ would have to be evacuated.

These consequences would almost certainly deter any U.S. leader from launching such an attack. Instead, military planners might seek to disable, rather than to destroy, the facility. The following options might be considered:

- A nuclear weapon might be used to deposit radioactive contamination at the entrances to the complex and thus to isolate the facility. However, a weapon small enough not to entail fallout problems would be unlikely to keep workers out of the facility for more than a period of weeks, especially since workers would be exposed only when outside the facility—once

inside, the surrounding rock would shield them from radiation.

- Cruise missiles could be used to collapse entrances to the bunker. The entrances might be reopened quickly, and as with radiological area denial, the effect would likely be brief.
- Thermobaric weapons could be used to send high-pressure shock waves down the tunnels, possibly destroying equipment inside the facility.

Again, these options are unlikely to be satisfactory. If a military solution were still desired, the information-umbrella-type approach could be applied. The United States, possibly together with allies, would declare that no North Korean vehicles would be allowed to come near the facility, and would use land mines and train surveillance assets in the Kumchangri area to monitor this curfew. Any vehicle attempting to enter or leave the facility would be destroyed.

There are non-nuclear solutions to most military problems for which

nuclear weapons are hyped. Still, we find that excessive constraints on current non-nuclear programs for addressing HDBT and WMD problems could lead to otherwise avoidable shortfalls in important capabilities. We recommend that planners:

**1. Invest in Intelligence:** Since adversaries can dig deeply and can hide WMD activities in industrial settings, simple pursuit of powerful weapons will never solve the HTBT and Agent Defeat problems. The ability to locate and characterize threat facilities is the foundation of any efforts in this area, and must be our first priority.

**2. Use the Flexibility Provided by Air Superiority:** The original driver for enemies' pursuit of HDBT and WMD capabilities is American airpower dominance. Yet constraining requirements such as the ability for all weapons to be deliverable by tactical fighter jet, or for target destruction to be accomplished in a single aircraft pass, are driven by the belief that air superiority will not exist. If enemies' actions are driven by our air superiority, we should use that same advantage in countering these actions.



**3. Focus on Biological over Chemical Agents:** Our current approach seeks a single weapon that can neutralize both chemical and biological agents. But while biological agents are much more strategically important targets, chemical agents are much harder to destroy. Our present approach leads to shortfalls in our ability to neutralize biological agents because the requirement that the same technology be able to destroy chemical agents unnecessarily constrains it.

**4. Evaluate Weapons in a Battlefield Context:** While conventional weapons are tested in war-games and vetted with military chiefs, nuclear weapons are judged mainly by their political implications. The taboo against the use of nuclear weapons perversely shields these weapons from the same scrutiny during their development that all other weapons receive. If civilian leaders decide to consider pursuit of new nuclear weapons, uniformed military must confront these weapons concepts with the same scrutiny they apply to other weapons systems.



## Non-Lethal Chemical and Biological Weapons<sup>1</sup>

November 2002

*Barbara Hatch Rosenberg*

Biomedical sciences and the pharmaceutical industry are in the midst of a revolution in the science and technology of drug discovery that will significantly complicate the control of chemical and biological weapons (CBW). The Chemical Weapons Convention (CWC), the Biological and Toxin Weapons Convention (BWC) and the Geneva Protocol are thus challenged by these technological developments. Scientists contributing to this revolution need to understand the implications of their work, and arms controllers must recognize that there are profound changes underway that will affect the technical landscape of CBW control.

The drivers of this revolution are new methodologies that make the process of drug discovery less empirical and more rational, and therefore much faster—a trend that will accelerate as our physiological understanding deepens. These developments likewise speed the identification and development of new potential CBW agents, most of which, like drugs, are physiologically active agents. The new methods are opening up entirely new areas for investigation, including new physiological targets for CBW agents.

The new technologies include combinatorial chemistry, genomics, microarrays, proteomics, toxicogenomics, and

database mining. These technologies are supported by an immensely sophisticated and rapidly growing micro-scale instrumentation and computational base. Computer-controlled production and analytical devices are critical components, and all the laboratory technologies depend on computers for the collection and analysis of data. Bioinformatics can hardly keep up with the flood of genomic and proteomic data that threatens to overwhelm the capacity to integrate and understand it.

An immense amount of time and money are being invested in work using these methodologies. The intellectual momentum is immense and clearly unstoppable. Thus, a very large number of new, highly toxic compounds with precisely understood and controllable physiological effects will soon be discovered. Many of these will enter production as drugs or as research agents. The range of known, potential CBW agents will thus broaden by a very large factor in a very short period of time. Most of them will be synthesized from precursors that are not currently regulated under the CWC.

For a review of the technologies and their relevance to CBW control, see the original article by Mark Wheelis on which this commentary is based.

### The Problem of Non-Lethal Agents

The CWC prohibits development and possession of chemical agents that “can cause death, temporary incapacitation or permanent harm to humans or animals,” except where intended for purposes not prohibited under the Convention. “Purposes not prohibited are specified and include only one purpose that may involve combat: “law enforcement including domestic riot control.” However, riot control agents, defined as chemicals that rapidly

Continued on Page 14

produce physical effects which disappear within a short time following exposure, cannot be used as a method of warfare.

Some CWC States Parties are interpreting the Convention's wording as limiting the prohibition of non-lethal agents to interstate armed conflict, and are consequently pursuing their development and the development of munitions to deliver them. These actions raise urgent questions: will there be an attempt to justify the use of non-lethal agents in attacking Iraq? Should the use of riot control agents in military operations that may involve armed conflict, such as counterterrorism, peacekeeping, monitoring and the like, be permissible as "law enforcement?" The ambiguities that arise are illustrated by the recent use of fentanyl to subdue hostage-takers in a Moscow theater. Was it law enforcement, counterterrorism, or interstate conflict? Is fentanyl, or similar agents, permissible for law enforcement? It is not a "riot control agent," since its effects do not disappear within a short time and it is demonstrably not "non-lethal." Unless the States Parties to the CWC can reach consensus on the nature and limits of the Convention's prohibitions, there is certain to be uncontrolled development of semi-lethal weapons.

In fact, a categorical distinction between lethal and non-lethal agents is not scientifically feasible. Not only are certain individuals more susceptible to some agents, but synergy between two different non-lethal agents may make their combination highly lethal to everyone. Rational strategies to discover such synergistic pairs will soon be available.

Thus, the development of multiple non-lethal agents may provide a lethal CW capability, in clear violation of the Convention. Even without synergism, stockpiles of non-lethal weapons and munitions would defeat a fundamental goal of the Convention, to exclude

completely the possibility of the use of chemical weapons by preventing states from entering a war with a stockpile of CW whose use is proscribed, but which might nevertheless be employed under pressure of military necessity.

A variety of new "non-lethal" agents is on the horizon. Neuropharmacology is one of the areas in rapid expansion; the toll of mental illness, and the growing promise of chemical treatment, make it certain that a wide range of new psychoactive chemicals will be discovered. In the near future, agents will be developed that affect perception, sensation, cognition, emotion, mood, volition, bodily control, and alertness. Further, the International Committee of the Red Cross has just issued an *Appeal on Biotechnology, Weapons and Humanity* which cites the possibility of ethnic targeting and of covertly-spread agents that would alter consciousness, behavior, fertility and heredity. Given the great potential for such agents to be abused, it would be foolish, even suicidal, not to analyze carefully their long-term implications before deciding whether to permit the exploitation of non-lethal agents by the military establishments of the world.

For agents that fall under both Conventions, the BWC closes the loophole in the CWC that permits chemical agents for law enforcement. There is general agreement that "other biological agents, or toxins" in Article I of the BWC covers all the biochemical products of living organisms that in abnormal doses could be used as toxins, including bioregulators, neurotransmitters, and hormones, as well as their analogs and synthetic derivatives. All the types of potential non-lethal agents discussed here are analogs of naturally-occurring biochemicals, because their physiological activity depends on their ability to bind at the same sites as the natural biochemicals do. The term "biochemical weapon agent" can be used for

all the toxic agents covered by both Conventions.

The BWC also prohibits development or possession of means of agent delivery designed to be used for hostile purposes, which is a broader category than armed conflict or warfare and would include many counterterrorism, peacekeeping and law enforcement activities. Thus, there are several reasons for concluding that the non-lethal agents discussed here are definitively prohibited by the BWC.

## Conclusion

The interest of some States Parties in the development of non-lethal CBW for purposes they classify as law enforcement threatens to undermine both the Chemical and the Biological Weapons Conventions. Given the new technologies that are promoting the rapid emergence of non-lethal agents with a horrendous potential for abuse, it would be a wise human move to nip the development of these weapons in the bud. States Parties need to affirm decisively that both Conventions prohibit all military use of so-called non-lethal agents, except perhaps for tightly-specified agents and purposes. The use of national intelligence, coupled with a strengthened BWC and a willingness to employ challenge inspections, could serve as a deterrent. In the end, however, the only effective long-term solution is a universal norm against CBW, which can only be reached via sustained efforts for universality of the Conventions, transparency in chemical and biological defense activities, and public understanding of the stakes.

<sup>1</sup> Based on an article entitled "Biotechnology and Biochemical Weapons" by Mark Wheelis in *The Nonproliferation Review*, Spring 2002.

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