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"Bunker Busters": Sources of Confusion in the Robust Nuclear Earth Penetrator Debate

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Summary

The Robust Nuclear Earth Penetrator (RNEP), often called a "bunker buster," is at present the subject of a cost and feasibility study to determine if either of two nuclear bombs, the B61 and the B83, could be modified, mainly by adding a heavy, pointed case, so as to be able to penetrate perhaps 10 meters into earth or rock. This penetration would increase the weapon's ability, by a factor of 20 to 50, to destroy hardened and deeply buried facilities. The Department of Defense has expressed concern that potential U.S. adversaries are using such facilities because the 1991 and 2003 wars in Iraq demonstrated that U.S. precision conventional weapons can readily destroy facilities that are above the surface or buried at shallow depth. If the study shows RNEP to be feasible and affordable, and if the President and Congress approve, RNEP could move from a study to development and, perhaps, deployment.

The RNEP debate has received much attention and spawned much confusion. This report examines sources of confusion in this debate. Part of the difficulty in analyzing this debate is that the RNEP study raises large and complex issues. Should the United States improve its ability to destroy buried targets, or are there offsetting reasons not to? What would be the targets for RNEP, and by what measures should its military effectiveness be judged? How reliable are estimates of collateral damage resulting from RNEP?

"Urban myths" have grown up around RNEP. Some commentators seem to combine several true statements into an erroneous one. Congress lifted the ban on R&D on sub-5-kiloton nuclear weapons at the Administration's request, and nuclear earth penetrators could destroy some hardened and deeply buried targets. But it is incorrect to assume that sub-5-kiloton bunker busters could destroy such targets; they could not because they have insufficient explosive force. Similarly, a kernel of truth may become transmuted through a misunderstanding of science or policy, or through a logical but unwarranted inference, into one not supported by the facts.

The debate involves some claims that are irrefutable — because they cannot be proven one way or the other. For example, supporters claim RNEP is just a study, while critics fear that it will lead to development, deployment, and perhaps testing and use. If the study finds RNEP feasible and affordable, the Administration might press to deploy the weapon. On the other hand, the study could raise doubts about RNEP, and there are reasons to question whether Congress would approve it.

Terminology adds to confusion. Protagonists debate whether RNEP will lower the nuclear threshold and make nuclear use more likely. The threshold may be seen as criteria that must be met for the President to order nuclear weapon use. RNEP would arguably not lower this threshold because it would not change these criteria. It could make nuclear use less likely if it deters actions that meet this threshold; if it does not, it could make such use more likely because RNEP, like other nuclear weapons, would expand the circumstances in which these weapons might be used.

This report will be updated from time to time.

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“Bunker Busters”: Sources of Confusion in the Robust Nuclear Earth Penetrator Debate[1]

The Robust Nuclear Earth Penetrator, or RNEP, often called a “bunker buster,” has received much attention in Congress and elsewhere this year. It has also spawned much confusion. This report discusses five sources of confusion in this debate: complex issues; facts that morph into myths; irrefutable claims; unclear terminology; and competing story lines. By way of background, RNEP is at present the subject of a study to determine if one of two existing nuclear bombs could be modified — mainly by using a heavy, pointed, hardened case — so as to penetrate several meters underground to increase by a factor of 20 to 50 its ability to destroy buried targets.[2]

RNEP has attracted attention for several reasons. Critics assert that it is the first new weapon to implement the Administration’s nuclear policies, and that a related program, the Advanced Concepts Initiative (ACI), is developing a low-yield “mini-nuke,” the second such weapon. (ACI is a program to conduct early-stage weapons-related research; its FY2005 request is $9 million.) They express concern that RNEP’s budget will grow sharply. Politically, each side of the debate gets to stress themes that resonate with its base, portraying itself as the defender of American security and common sense and the other side in less glowing terms. Issues at stake include how to maintain national security and the role of nuclear weapons in that effort. Do we still need nuclear weapons, and if so, what types, how many, and for what missions?

RNEP is one of a potential class of earth penetrator weapons (EPWs). Some such weapons could have different yields than RNEP, or different penetration capabilities, or other differences. Congress has expressed interest in EPWs generally as well as RNEP specifically, such as by calling for the National Academy of

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[1] This report is modified from a presentation by the author to a National Academy of Sciences symposium, “Post-Cold War U.S. Nuclear Strategy: A Search for Technical and Policy Common Ground,” Washington, DC, August 11, 2004.

[2] The National Nuclear Security Administration provided CRS with the estimate of a 20- to 50-fold increase in effectiveness on August 5, 2004. An article by four nuclear weapons scientists from Los Alamos National Laboratory states that “a 1 kt [kiloton] nuclear explosive detonated 7 or more meters below the surface will achieve the same ability to destroy a buried facility as a 50 kt warhead detonated at the surface.” Brian Fearey, Paul White, John St. Ledger, and John Immele, “An Analysis of Reduced Collateral Damage Nuclear Weapons,” *Comparative Strategy,* October/November 2003, p. 315.

Sciences to study EPWs and other weapons.[3] Accordingly, this report considers EPWs as well as RNEP.

The Consolidated Appropriations Act, 2005, P.L. 108-447, eliminated funds for RNEP and transferred the $9.0 requested for ACI to a new program, Reliable Replacement Warhead. The latter is intended to "improve the reliability, longevity, and certifiability of existing weapons and their components."[4] As of early January 2005, it is unclear whether the Administration will request FY2006 funds for RNEP. For history and technical aspects of RNEP, see CRS Report RL32130, *Nuclear Weapon Initiatives: Low-Yield R&D, Advanced Concepts, Earth Penetrators, Test Readiness.* For current budget and plan, see CRS Report RL32347, *Robust Nuclear Earth Penetrator Budget Request and Plan, FY2005-FY2009.*

Complicated Issues

Confusion on technical and military topics clouds debate on these larger issues. One source of confusion is simply that issues linked to RNEP are complicated. Here are some examples.

> **1. Should the United States improve its ability to destroy buried targets?** According to a report by the Department of Defense (DOD) and Department of Energy (DOE), "The Intelligence Community (IC) suspects with reasonable certainty that there are over 10,000 potential HDBTs [hard and deeply buried targets] worldwide and their numbers will increase over the next 10 years."[5] RNEP's proponents claim that we must be able to hold these targets at risk in order to deter or, if necessary, defeat an enemy. We may be self-deterred from using Cold War weapons, the argument goes: because their yield is so high, they would kill an unacceptable number of civilians.[6] An earth penetrator of a given yield would have the same effect on a buried target as a weapon with a much higher yield detonated on the Earth's surface. As a result, earth penetration greatly reduces the yield needed to destroy a buried target or, with higher yield, could destroy buried facilities that we could not reach even with our highest-yield weapons. Critics respond that we could use nonnuclear weapons and forces

[3] P.L. 107-314, National Defense Authorization Act for Fiscal Year 2003 (H.R. 4546, 16 Stat. 2458), Section 1033.

[4] U.S. Congress. Committee of Conference. *Conference Report on H.R. 4818, Consolidated Appropriations Act, 2005.* H.Rept. 108-792, 108th Congress, 2nd Session, Washington, 2004. Printed in *Congressional Record,* November 19, 2004, Book II, p. H10556.

[5] U.S. Departments of Defense and Energy. *Report to Congress on the Defeat of Hard and Deeply Buried Targets, Submitted by the Secretary of Defense in Conjunction with the Secretary of Energy in Response to Section 1044 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, PL 106-398,* July 2001, p. 8.

[6] U.S. Secretaries of State, Defense, and Energy. *An Assessment of the Impact of Repeal of the Prohibition on Low Yield Warhead Development on the Ability of the United States to Achieve Its Nonproliferation Objectives,* Report Submitted to Congress in Response to the National Defense Authorization Act for Fiscal Year 2004, Public Law No. 108-136, Section 3116, March 2004, p. 2.

to destroy or disable buried targets.[7] Target nations could thwart earth penetrators by digging deeper, dispersing WMD stockpiles, or moving leaders to undisclosed locations. Some critics doubt that we would use nuclear weapons at all, while others fear that reduced-collateral-damage weapons would make it more likely that we would use nuclear weapons; critics use both arguments against RNEP. Regarding self-deterrence, candidate RNEP weapons are the B61 and B83 bombs, weapons of substantial yield, so self-deterrence may still apply. Critics state that development of RNEP would undermine the U.S. position that other nations should not acquire nuclear weapons.[8]

2. What are the targets of an EPW? Some call these weapons "bunker busters," but that shorthand term might convey the notion of a World War II-style bunker. Is the target a single chamber buried just below the Earth's surface, or an extensive tunnel complex inside a mountain, or something else? Are many of these facilities likely to be vulnerable to an EPW?

3. How would an EPW affect buried targets? The effects of a nuclear weapon detonated in the air are easy to visualize; everyone has seen the pictures. Ground shock is harder to visualize, and that may contribute to confusion over EPWs. In trying to understand the effects and effectiveness of EPWs, it would help to know the shape of the underground volume within which an EPW of specified yield can destroy a buried target of specified characteristics; how ground shock attenuates with distance or in different media; and how an increase in yield translates into an increase in ability to destroy HDBTs. Regarding earth penetration, it would help to know if any foreseeable technical advances would enable substantially deeper penetration than is possible at present, and consequences of deeper penetration for military effectiveness and collateral damage.

4. What is military effectiveness for an EPW? In an attack on an HDBT, must the target be destroyed, or is it sufficient to disable it, and if the latter for how long? In an attack on a facility housing chemical or biological agents, is it enough to collapse the facility, or must the weapon physically destroy these agents? Is it sufficient to destroy 75 percent of the bioagent in a facility? 95 percent?

5. What requirements must be met to achieve military effectiveness? For the weapon, these include yield, accuracy, depth of penetration, and speed and angle of impact. For the target facility, they are more complicated. How might likely variations in the geology above the facility affect how the shock wave would propagate? How deeply is the facility buried? How extensive is it? How is it laid out? Where in the facility are the key assets that must be destroyed? Might they be dispersed throughout the facility? Does it have features to increase its hardness, such as heavy springs or blast doors? Are there countermeasures, such as granite boulders above the facility or decoy facilities?

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[7] Regarding the use of fuel-air explosives or chemicals to kill biological agents, see "Written Statement of Michael A. Levi, Science and Technology Fellow in Foreign Policy Studies, The Brookings Institution, before The National Academy of Sciences Study on the Effects of Nuclear Earth-Penetrator Weapon and Other Weapons," April 27, 2004, p. 8-11.

[8] See, for example, colloquy by Senator Dianne Feinstein on Senate Amendment 3263 to the FY2005 National Defense Authorization Bill, S. 2400, in U.S. Congress. *Congressional Record*, June 3, 2004: S6427.

The decision to use a nuclear weapon would have to be made on the basis of intelligence. Do the intelligence misses at the macro level in Iran, Iraq, North Korea, and Libya, and the failure to detect Indian preparations for nuclear tests in 1998, reduce our confidence in intelligence at the micro level? RNEP, a modified bomb, would be delivered by aircraft. If the target nation got wind of the impending attack, it might have time to clear key facilities of their most important assets, such as leaders or WMD, or to launch missiles. Could we be confident of our ability to deny warning to the enemy?

6. How would EPWs affect the ability of U.S. military personnel to carry out battle damage assessment, or BDA? BDA is important to military operations in order to determine whether a target was destroyed, or if it still poses a threat and must be attacked again. Clearly, the Army would not send soldiers into a tunnel complex that had been struck by a nuclear weapon, and would probably be reluctant to send troops into a complex used for production or storage of chemical or biological weapons — whether struck by nuclear or conventional EPW — because of the high risk. However, other methods may be available for BDA. Existing sensors carried by airplanes or implanted in the ground might detect signs of activity coming from a complex. As a related matter, if the United States proceeds with RNEP and decides that it must do BDA of facilities thus attacked, should new BDA sensor technologies be developed in parallel with RNEP development?

7. Perspective can affect judgments on weapon effectiveness. In studies calculating the effectiveness of nuclear weapons to destroy bioagents, physicist Hans Kruger of Livermore and physicist Michael May and mathematician Zachary Haldeman of Stanford used "physicist-friendly" scenarios: they assumed a target — a large area on or near the surface holding many barrels containing anthrax in aqueous solution — that was vulnerable to nuclear attack and that permitted ready calculation of the effects of gamma rays, neutrons, and neutron-induced gammas on the target material.[9] The calculation was that these effects were reliably lethal to aqueous anthrax to perhaps 10 to 50 meters for a 10-kiloton (kt) weapon. But Jonathan Tucker, an expert on biological weapons with the Center for Nonproliferation Studies, raised problems with the scenario.[10] Aqueous anthrax, he said, would not be stored for a long time because after several months the spores clump together and become much less useful militarily. A nation that could manufacture aqueous anthrax would therefore probably not have huge quantities sitting in a warehouse waiting to be attacked, but might manufacture it close to the time of use. On the other hand, a nation that had the more advanced technology to produce dry powdered anthrax, which could be stored for longer periods, would need far less of the material and could easily disperse it. It is thus important to have experts from several disciplines cross-examine such scenarios.

8. How reliable are estimates of collateral damage? A B61 or B83 bomb — the two weapons being considered for RNEP — detonated a few meters

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[9] See H. Kruger, *Radiation-Neutralization of Stored Biological Warfare Agents with Low-Yield Nuclear Warheads*, UCRL-ID-140193, August 21, 2000, p. 1-4, [http://www.llnl.gov/tid/lof/documents/pdf/238391.pdf]; and Michael May and Zachary Haldeman, "Effectiveness of Nuclear Weapons against Buried Biological Agents," May 2003, p.13-15, [http://www.ciaonet.org/wps/mam09/mam09.pdf].

[10] Personal communication, September 30, October 1, and October 4, 2003.

underground, as would be the case for RNEP, would cause a very large amount of fallout. A calculation cited in the debate is that this fallout could kill many thousands of civilians.[11] Yet there is the risk of a numbers game. Key uncertainties affect collateral damage estimates, everything from wind and rain to depth of detonation, type of rock or soil, population distribution, ability of the population to move rapidly away from the contaminated area, and how many people live near the target. The number of fatalities for an attack might vary by a large factor, depending on something as simple as which way the wind blows. A related issue is whether a nuclear earth penetrator could be designed that would reduce the radioactivity of the fallout, perhaps by reducing the amount of fissile material used or adding neutron-absorbing material to the heavy case around the nuclear explosive.

9. Would collateral-damage estimates affect a decision to use RNEP? RNEP, if used, could cause massive collateral damage. Yet, some would argue, a President who felt RNEP was the only way to stop an imminent threat to the United States might decide to use that weapon regardless of collateral damage.

Facts, Myths, and Morphs

Uncle Remus said that it's not what you don't know that gets you in trouble — it's what you knows for sure that ain't so. Many "urban myths" have grown up around the EPW issue, leading to misunderstandings, uncertainties, and contradictions. Some of these myths seem to flow from the mixing together of four true statements. (1) The Administration sought, successfully, in the FY2004 budget cycle to have Congress lift the ban on R&D on low-yield (sub-5-kiloton) nuclear weapons. (2) Nuclear earth penetrators could be used to destroy some hardened and deeply buried targets. (3) Some in DOD and DOE have suggested using nuclear weapons to destroy chemical and biological agents. (4) It is desirable to minimize collateral damage and, for attacking HDBTs, a low-yield earth penetrator will produce less fallout than a surface-burst weapon of yield high enough to have equivalent effectiveness.

Combining statements 1 and 4, one could conclude that RNEP would be a low-yield weapon, and that fallout from it will be totally contained underground. This is not the case. John Gordon, then Administrator of the National Nuclear Security Administration (NNSA), said in 2002 that the emphasis is on "a more standard yield system called an enhanced penetrator ...There's no design work going on low-yield nuclear weapons."[12] In June 2004, NNSA Administrator Linton Brooks said, "it became part of the conventional wisdom that there were Administration plans to develop new, low yield weapons. There are no such plans."[13] Further, there is no

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[11] "A one kiloton earth-penetrating 'mininuke' used in a typical third-world urban environment would spread a lethal dose of radioactive fallout over several square kilometers, resulting in tens of thousands of civilian fatalities." Robert Nelson, "Low-Yield Earth-Penetrating Nuclear Weapons," *Science and Global Security,* 10: 2002, p. 1.

[12] U.S. Congress. Senate. Committee on Armed Services. Hearing: Nuclear Posture Review. February 14, 2002, n.p. Transcript prepared by eMediaMillWorks, Inc.

[13] Linton F. Brooks, Administrator, National Nuclear Security Administration, "U.S. Nuclear

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way that fallout from even a low-yield nuclear earth penetrator could be contained. Combining statements 2 and 3, one could arrive at the idea that nuclear earth penetrators could destroy biological weapons housed in HDBT. However, the intervening earth and rock would shield HDBTs from neutrons and gamma rays produced by the detonation that would be lethal to bioagent. Combining statements 1 and 2, one may conclude that sub-5-kt EPWs could destroy HDBTs — but much more yield would be needed. Combining statements 1 through 4, one may arrive at the idea that RNEP is a low-yield weapon that can destroy bioagent in HDBTs with no collateral damage.

Many erroneous statements have entered the debate. Where did they come from? One possible explanation is that a kernel of truth becomes transmuted through a misunderstanding of science or policy, or through a logical but unwarranted inference or extrapolation — a "morph chain." Here are five examples. Each chain ends with an assertion made in the debate, then looks backward to start with a kernel of truth, then posits a logic train leading from the fact to the assertion.

- Penetration matters — > penetration matters, not yield — > the key is to make nonnuclear penetrators burrow deeper into the earth — > nonnuclear bunker busters can be as effective as nuclear weapons in destroying HDBTs. (Flaws: yield matters; there are severe limits on depth of penetration; increasing depth of penetration of a nuclear weapon buys little in terms of target destruction.)

- The Administration sought to lift the ban on sub-5-kiloton R&D — > The Administration sought to lift this ban in order to develop sub-5-kt weapons — > ACI does some early-stage weapons-related research — > ACI would be the program to develop new weapons — > ACI is developing sub-5-kt mini-nukes. (Flaw: NNSA states that the United States is not conducting R&D on low-yield nuclear weapons.[14])

- In the past, new nuclear weapons were tested — > Putting an existing physics package[15] in a different case and using it for a new mission creates a new weapon — > RNEP and mini-nukes will require testing — > The Administration wants to reduce the time needed to conduct a test in order to pave the way for testing RNEP and mini-nukes. (Flaws: RNEP is intended not to require testing; modifying the B61-7 bomb into the B61-11, the current U.S. nuclear EPW, did not require testing; no mini-nuke is under development.)

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[13] (...continued)
Weapons Policies and Programs," address presented to the Carnegie International Nonproliferation Conference, Washington, D.C., June 21, 2004, p. 8.

[14] David Ruppe, "U.S. Has No Plans to Research Low-Yield Nuclear Weapons, Brooks Says," *Global Security Newswire,* May 12, 2004.

[15] The "physics package" is the explosive component of a nuclear weapon, as distinct from its aerodynamic case, arming and firing systems, and the like.

- ACI and RNEP spur technical innovation — > These programs are essential for technical innovation. (Flaw: stockpile stewardship, an NNSA program to maintain U.S. nuclear weapons without testing, is a $6.6-billion program (FY2005 request); technical innovation would continue even in the absence of two programs totaling $36.6 million.)

- Nuclear weapons could destroy chemical and biological agents — > These agents might be hidden in HDBTs — > Earth penetrators could destroy chemical or biological agents in HDBTs — > Chemical and biological agents in HDBTs are intended targets of RNEP. (Flaws: chemical and biological agents are not targets of RNEP; RNEP could not destroy such agents buried deep underground.)

This last point merits emphasis because it is frequently misunderstood. The official in the Office of the Secretary of Defense responsible for developing (in collaboration with other agencies) the HDBT-defeat mission area, which includes RNEP as an option, stated that the goals for RNEP's effects have always been to defeat functions and operations protected by hard and deeply buried complexes.[16] The specific neutralization of any WMD agent — chemical, biological, radiological, or nuclear — has never been a part of these objectives because, under some attack scenarios, it could not be expected to be fully accomplished. The RNEP concept has been intended solely to be among options to defeat HDBTs and their operations, not to destroy WMD agents they may contain.

Collapsing a buried facility likely would prevent enemy operators from using any WMD in that facility but might not destroy WMD agents themselves. The difference could be consequential. For example, under certain circumstances WMD might escape, such as chemical or biological agent seeping to the surface through fissures created in the ground by the weapon's explosion. As another example, if a large underground complex were targeted but the attack did not collapse a specific chamber containing WMD (perhaps because it was buried deeper than expected or hardened more than expected, or because attack planners chose an incorrect aim point), operators in other parts of the complex might be able to access the chamber and retrieve the WMD. Accordingly, attack planners, when targeting a facility, must address intelligence uncertainties about details of the facility that could result in an attack that was less than fully successful.

Irrefutable Claims

A couple of irrefutable claims are made in the debate on RNEP. They are irrefutable because they can't be proven one way or another.

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[16] Personal communication, September 1, 2004.

Simply Study vs. "Slippery Slope". In 2002, Secretary Rumsfeld said that RNEP "is a study. It is nothing more and nothing less."[17] Congress included a provision in the FY2004 defense authorization act (P.L. 108-136, sec. 3117) barring DOE from starting engineering development, or subsequent development phases, of RNEP "unless specifically authorized by Congress." Secretary Abraham has said about RNEP, "We are doing the research on that, nothing more, and would require congressional endorsement to move to an engineering level."[18] Critics see the RNEP study as leading down a more dangerous path, expressing concern that it will lead to development and deployment of a new generation of nuclear weapons, and perhaps to nuclear testing and nuclear use.[19]

Critics might ask, why spend $71 million or so on a four-year study if a favorable outcome does not lead to development of the weapon? And why spend perhaps hundreds of millions of dollars developing the weapon without planning to deploy it? Supporters might respond that the study could find that RNEP would be less effective or more costly than anticipated. Potential adversaries might counter RNEP in various ways, as discussed in **Complicated Issues,** above. Nor is there any assurance that Congress would approve its development. While the House and Senate defeated amendments to the FY2005 defense authorization bill to eliminate RNEP and ACI funds, the vote was close in the House, 214-204, and the same House voted 370-16 to approve the FY2005 energy and water development bill largely as reported by the House Appropriations Committee, with no funds for ACI or RNEP. Indeed, as noted earlier, P.L. 108-447, Consolidated Appropriations Act, 2005, eliminated RNEP funds.

Security Through Deterrence or Nonproliferation? Supporters focus on RNEP's role in deterrence, asserting that deterrence must adjust to changing threats. They view HDBTs as an increasing threat; adversaries may use them to shelter leaders, key communications nodes, or WMD facilities. RNEP would enable us to hold at risk these targets, which we cannot now do. Supporters believe that weapons like RNEP must be usable; as Representative Mac Thornberry said, "we do not deter anybody if they know we are not going to use a weapon."[20] Supporters believe further that failure to update the deterrent would have serious consequences. As Senator Wayne Allard said, "if the United States does not show that it is serious about ensuring the viability of our entire military capability, including our weapons of last resort, we might not be able to dissuade potential adversaries from developing

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[17] U.S. Department of Defense, "DoD News Briefing — Secretary Rumsfeld and Gen. Myers," May 20, 2003. At [http://www.defenselink.mil/transcripts/2003/tr20030520-secdef0207.html].

[18] Testimony of Secretary of Energy Spencer Abraham, in U.S. Congress. Senate. Committee on Armed Services. "FY2005 Department of Energy Defense-Related Activities Budget Request," hearing held March 23, 2004, transcript by FDCH e-Media, Inc., p. 16.

[19] Colloquy of Senator Edward Kennedy on National Defense Authorization Act for Fiscal Year 2005, in U.S. Congress. *Congressional Record,* June 15, 2004: S6751-S6752.

[20] Colloquy of Representative Mac Thornberry on National Defense Authorization Act for Fiscal Year 2005, in U.S. Congress. *Congressional Record,* May 20, 2004: H3416.

weapons of mass destruction and deter those adversaries from using those weapons they already have."[21]

Critics question the deterrent value of RNEP. They argue that it cannot deter terrorists because they have no fixed address, and rogue states could counter an EPW by deeper burial, camouflage, or dispersal. They see RNEP as an ineffective deterrent because, as Representative Thomas Allen stated, "In the real world, no President or operational commander is going to be launching a nuclear device to strike a deep bunker."[22] Even continuing to develop RNEP, critics believe, will undercut worldwide cooperation on nonproliferation, weakening our security. Senator Frank Lautenberg asked, "How can we credibly ask North Korea and Iran to stop their own nuclear programs while at the same time we develop mini nukes and bunker busters?"[23]

An open question is the strength of the link between deterrence and proliferation on the one hand, and RNEP and ACI on the other. Regarding proliferation, most may find it hard to imagine countries "going nuclear" on grounds that the United States is continuing RNEP, which is at present just a cost and feasibility study on modifying an existing warhead into a second EPW. Yet most may find it equally hard to imagine North Korea, Iran, Pakistan, or India giving up its nuclear program because we stop RNEP. Developing a nuclear program takes decades and vast sums of money. India conducted a nuclear test in 1974, and North Korea has been working on its nuclear programs since at least the 1960s. Nations make this investment for reasons of their own security. It is also possible that the U.S. debate may be imputing to other nations the intense detail of analysis typical of the United States even though other nations may simply not make such calculations.

Confusing Terminology and Competing Story Lines

Threshold vs. Use. Critics claim that RNEP will lower the nuclear threshold and make it more likely that nuclear weapons will be used. Yet it is important to differentiate between threshold and use. The nuclear threshold may be seen as a set of criteria any one or more of which must be met in order for the President to order the use of nuclear weapons. Examples include a nuclear attack on the United States, and perhaps an attack on U.S. allies with nuclear weapons, a biological-agent attack on the United States, or positive intelligence that an attack by terrorists or a rogue state was imminent. The existence of RNEP would not lower the nuclear threshold because the weapon arguably would not change the **criteria** that would merit a nuclear response. But RNEP could affect the **likelihood** that nuclear weapons would be used. If RNEP turned out to be a deterrent, as its supporters suggest, then it would reduce the likelihood of nuclear use. The same nuclear threshold criteria would exist,

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[21] Colloquy of Senator Wayne Allard on National Defense Authorization Act for Fiscal Year 2005, in U.S. Congress. *Congressional Record*, June 15, 2004: S6753.

[22] Colloquy of Representative Thomas Allen on National Defense Authorization Act for Fiscal Year 2005, in U.S. Congress. *Congressional Record*, May 20, 2004: H3417.

[23] Colloquy of Senator Frank Lautenberg on National Defense Authorization Act for Fiscal Year 2005, in U.S. Congress. *Congressional Record*, June 15, 2004: S6757.

but fewer events would meet these criteria because those events would have been deterred. On the other hand, if RNEP turns out not to have a deterrent effect, then nuclear use would be more likely. RNEP could arguably be used in more circumstances than existing nuclear weapons. If RNEP did not add capabilities beyond those of the current U.S. nuclear arsenal, thus expanding the envelope of circumstances in which nuclear weapons could be used, what would be the point of building it?

Pointillism vs. Connect-the-Dots. Pointillism was a style of painting in which the artist used dots or points of differing colors to form an image. The Administration has presented decisions on low-yield R&D, ACI, RNEP, and nuclear test readiness as four separate dots. As Administrator Brooks put it in regard to the low-yield ban, ACI, RNEP, and the possibility of U.S. preemptive attacks to head off WMD attacks, "some concluded these separate things were part of an overall strategy; that we were emphasizing 'nuclear preemption' in U.S. military doctrine. I assume you all understand this is nonsense."[24] Instead, the Administration and other RNEP supporters used the following arguments. (1) The low-yield ban barred R&D that could lead to production of a sub-5-kiloton nuclear weapon. Because this wording could be read as covering R&D on weapons even above 5 kilotons, it had a "chilling effect on scientific inquiry."[25] (2) NNSA intends to use ACI funds "to investigate new ideas, not necessarily new weapons."[26] It will also be "very helpful in training the new [weapons] designers.[27] (3) Regarding RNEP, "the current inventory [of nuclear weapons] inventory only has a limited capability for holding hardened underground facilities at risk. The country's only nuclear earth penetrating weapon, the B61, Mod 11, cannot survive delivery into certain types of terrain in which such facilities may be located."[28] (4) Our current nuclear test readiness posture is unacceptable. As Secretary Abraham said, "if some day in the future it were determined that we had uncertainty, it would take us a minimum of 3 years to conduct a test to determine whether or not the stockpile was reliable. That is too long."[29]

In contrast, these elements seem to have fused, among critics, into the following proposition: The Administration sought to lift the low-yield ban in order to develop low-yield battlefield weapons — "mini-nukes" — through ACI. The Administration is developing RNEP to destroy chemical and biological weapons in hard and deeply

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[24] Linton Brooks, "U.S. Nuclear Weapons Policies and Programs," p. 8.

[25] Ibid.

[26] U.S. Congress. House. Committee on Appropriations. Subcommittee on Energy and Water Development. *Energy and Water Development Appropriations for 2005.* Hearings, 108th Congress, 2nd Session, 2004; testimony of Linton Brooks, p. 141.

[27] Linton Brooks, response to a question submitted by Representative Peter Visclosky for the record, in ibid., p. 291.

[28] Bryan Fearey et al., "An Analysis of Reduced Collateral Damage Nuclear Weapons," p. 312.

[29] Spencer Abraham, Secretary, U.S. Department of Energy, statement before the House Committee on Appropriations, Subcommittee on Energy and Water Development, March 11, 2004.

buried targets. Because RNEP and the mini-nukes are new weapons, they will require underground nuclear tests. These tests will release radioactive fallout that will threaten citizens much as the atmospheric tests of the 1950s and early 1960s did. These weapons will make nuclear use more likely by lowering the nuclear threshold.

Each element of the above proposition could be questioned. Nonetheless, it is a more compelling story line to say the dots are connected than to say they are not, and, as the preceding statements show, the Administration has not connected the dots to form its own story. Unlike pointillism, separate dots do not form an image; connected dots do. As a result, one could argue that the critics' story line appears more credible. The critics' story line also links to the deepest public fears in the nuclear arena — nuclear-weapon use and radioactive fallout. It gains added traction because public trust on things nuclear was shattered by the government, decades ago, downplaying concerns over fallout. The bitter residue from that breach of trust persists to this day. In part because of constituent concerns, Senator Robert Bennett of Utah had planned to offer an amendment to the FY2005 defense authorization bill to require specific congressional authorization for a full-scale underground nuclear test of RNEP,[30] and Representative Jim Matheson of Utah introduced a bill, H.R. 3921, to protect public health and safety should U.S. nuclear testing resume. This issue has particular resonance among residents downwind from the Nevada Test Site, the only U.S. nuclear test site. Representative Matheson himself has stated, in introducing his bill, that his father died "from a type of cancer associated with exposure to radioactive fallout."[31]

Some argue that not only has the Administration not connected the dots, but also that it seems to have some uncertainty as to what the dots are. Congressional staff have provided examples of disconnects between DOD and DOE, and within DOD, about earth penetrators in general, and RNEP in particular. They have indicated that some in DOD think of RNEP as low yield, while others think of it as high yield. On at least one occasion, a DOD official told staffers that RNEP would be low yield so as to contain fallout, while there is no evidence that DOE has ever claimed that any feasible EPW would be able to contain fallout. Congressional staff stated that some in DOD and DOE told them that the ability to destroy biological agents is a rationale for RNEP, while the DOD official associated with the RNEP program, cited earlier, stated that the goal of RNEP is to destroy HDBTs.

Conclusion

Decisions on nuclear weapons made by Congress and the Administration have always been consequential because they affect international perceptions of the United States, deterrence, the ability to respond to threats, and thus the security of the nation. While it is the case that the Administration requested FY2005 RNEP funds only for a study, RNEP is closely watched, and serious issues are at stake. The many

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[30] The text of Senate Amendment 3403 to S. 2400 is in U.S. Congress. *Congressional Record,* June 7, 2004: S6565. Colloquy concerning Senator Bennett's decision not to offer the amendment is in *Congressional Record,* June 22, 2004: S7274-S7275.

[31] "Cong. Matheson Introduces Safety from Nuclear Weapons Testing Bill," press release, March 9, 2004; available at [http://www.house.gov/matheson/pr040309.html].

misperceptions embedded in the debate, however, may impair our ability to make informed policy on this issue. Strengthening the factual and analytic foundation on which policy rests can only result in a stronger structure.