VOLUME 8, NUMBER 2 FEBRUARY 2000

Science FOR Democratic Action

AN IEER PUBLICATION

Nuclear Defense and Offense: An Analysis of US Policy

BY ARJUN MAKHIJANI

Ballistic missile defenses, that is devices to shoot down missiles after they have been launched, have been advertised as serving two purposes:

- the protection of US troops in the battlefield (via theater missile defenses, such as the Patriot missile used in the 1991 Gulf War); and
- the defense of the "U.S. homeland" against missile attack (via national missile defenses).[1]

On the face of it, these goals seem unobjectionable – hence the considerable support and money that the program commands in the United States.

The United States has spent more than $100 billion on missile defense since the 1950s, of which about $60 billion has been spent since 1983, when President Reagan announced the "Strategic Defense Initiative."[2] Yet, the deployment of missile defenses will increase nuclear dangers, not reduce them. To understand the emerging dangers, it is essential to place the ballistic missile defense program in the context of the historical and current US retention of a nuclear first use and first strike option as part of its overall military and political policy.

The nuclear bombings of Hiroshima and Nagasaki were a first use of nuclear weapons against a non-nuclear state. (In

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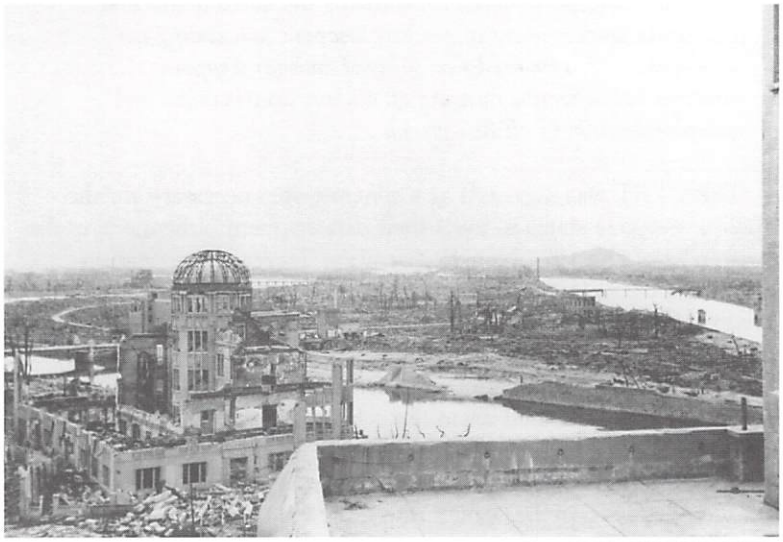

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

The nuclear bombings of Hiroshima (the aftermath of which a portion is shown here) and Nagasaki were a first use of nuclear weapons against a non-nuclear state.

EDITORIAL

The Comprehensive Test Ban Treaty: Where do we go from here?

BY HISHAM ZERRIFFI AND MICHELE BOYD

The founders of the United States "relied upon Grotius, Montesquieu and other 'foreigners' in drafting its Constitution. Two hundred years later, it needs help again to teach it about the advantages of cooperation with other countries in dealing with international security. Americans must somehow cage the beast of unbridled sovereignty espoused by radical conservatives and accept once again the idea in their Constitution that treaties with other countries are the supreme law of the land."

— George Bunn and John B. Rhinelander, "Senate CTBT Rejection Not the End," *Disarmament Diplomacy* No. 41, November 1999

The failure of the United States Senate to ratify the Comprehensive Test Ban Treaty (CTBT) last October has fundamentally changed international disarmament and non-proliferation efforts. The CTBT was established as the linchpin of efforts to

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reduce nuclear dangers. It is not only a non-proliferation treaty, raising political and technical hurdles for any country designing nuclear weapons for the first time, but also a cornerstone of efforts to achieve nuclear disarmament. This is stated very clearly and repeatedly in the preamble to the treaty, including the recognition that:

> *...the cessation of all nuclear weapon test explosions and all other nuclear explosions, by constraining the development and qualitative improvement of nuclear weapons and ending the development of advanced new types of nuclear weapons, constitutes an effective measure of nuclear disarmament and non-proliferation in all its aspects.*

The CTBT was also seen as a concrete step necessary for the nuclear weapons states to meet their disarmament obligations under Article VI of the 1970 Non-Proliferation Treaty (an obligation reinforced by an Advisory Opinion of the International Court of Justice). The NPT bound the non-nuclear weapons states to forego developing their own weapons in return for a commitment by the nuclear powers to eliminate their nuclear arsenals. That basic agreement was reiterated when the NPT was indefinitely extended in 1995 and the speedy negotiation of the CTBT was established as a step towards meeting those commitments. By rejecting the treaty, the United States Senate has called into question the core of the non-proliferation regime.

The goals of the CTBT, an end to nuclear explosions and an end to nuclear weapons development, need to be realized even without US ratification of the treaty.

One of the core arguments of CTBT opponents in the United States was that testing would, in the long run, be required for an "enduring" US nuclear arsenal, seen as essential for maintaining US "nuclear deterrence." CTBT opponents find the treaty unacceptable because it would promote disarmament.[2] Official CTBT proponents in the Clinton administration were content to argue that it would lock in the overwhelming US nuclear advantage, since, unlike the United States, the vast majority of countries have not tested nuclear weapons.

Yet the United States is obligated by Article VI of the NPT to pursue complete nuclear disarmament in good faith. By defeating the CTBT on the premise of maintaining a permanent US nuclear arsenal, the US simultaneously violated the spirit, if not the letter, of the NPT.

The Senate's failure to ratify the CTBT did more than put the NPT in jeopardy. The Senate vote came at a time of heightened tensions between the United States and other nuclear weapons states, particularly Russia and China, over issues such as the bombing of Yugoslavia and U.S. efforts to change the Anti-Ballistic Missile Treaty. These actions threaten to halt all efforts to reduce nuclear arsenals and may in fact trigger a new arms race.

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Science for Democratic Action

Science for Democratic Action is published four times a year by the Institute for Energy and Environmental Research:

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Takoma Park, MD 20912, USA
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We gratefully acknowledge our funders whose generous support has made possible our project to provide technical assistance to grassroots groups working on nuclear weapons-related issues, and our global outreach project.

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Thanks also to the *SDA* readers who have become donors to IEER. Your support is deeply appreciated. IEER would also like to acknowledge contributions made in memory of Joel Blaz.

Credits for This Issue

Production: Cutting Edge Graphics

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Editor: Lisa Ledwidge

EDITORIAL

Rule of Law or Nuclear Chaos?

BY ARJUN MAKHIJANI

The defeat of the Comprehensive Test Ban Treaty (CTBT) in the US Senate, along with other US actions in recent years, has raised a question about whether the United States wants to live within a system of laws in the world that applies to everyone, or whether it will seek some special unilaterally dictated place for itself.[1]

Specifically, the defeat of the CTBT has grievously damaged the Nuclear Non-Proliferation Treaty (NPT) (See editorial on page 1). Further, member countries of NATO are intent on maintaining a nuclear NATO indefinitely and hence are violating the spirit of the NPT. The new NATO doctrine of April 1999 reaffirmed the value of nuclear weapons and undermined the NPT by stating that they "make a unique contribution in rendering the risks of aggression against the Alliance incalculable and unacceptable. Thus, they remain essential to preserve peace" (paragraph 46).[2] If NATO, with the most powerful non-nuclear military at its command, needs nuclear weapons, why not everyone else?

Reliance on nuclear weapons is even greater in Russia. President Yeltsin has three times brandished Russian nuclear weapons in less than a year — once in December 1998 during the US-British bombing of Iraq and again during the NATO-Yugoslavia conflict in 1999, both of which were US-led actions carried out without United Nations Security Council authorization. Most recently, bristling from President Clinton's disapproval of the Russian bombing in Chechnya, Yeltsin warned Washington to remember that Russia was still a nuclear power. In the midst of this crisis, the US and Russia continue to maintain about 5,000 nuclear warheads on hair-trigger alert, increasing the possibility of a nuclear war by accident or miscalculation.

Two basic factors are at the core of the current crisis. First, the United States is the world's preeminent military and economic power, towering so much above all the rest that the French, believing the term "superpower" to be insufficient, have dubbed it a "hyperpower." The United States seems determined to have its way in world affairs, independent of its treaty commitments and with or without the cooperation of other countries. In effect, the United States is acting out a global and far more dangerous version of "Manifest Destiny" in the post Cold War period, creating new proliferation pressures as well as new tensions worldwide, not least with Russia, China, and Europe.

The United States seems determined to have its way in world affairs, independent of its treaty commitments and with or without the cooperation of other countries.

Second, the perennial economic crisis in Russia has led to the decline of its conventional military capability, which has led to a greater reliance on nuclear weapons in military strategy. The sense of lost greatness, deep frustration at the failure to develop economically along the lines of Western Europe or the United States, and US actions such as NATO expansion, are combining to make Russian nuclear policy more volatile. This instability is superposed on an already-strained, deteriorating technical infrastructure and poor military morale.

One other factor is emerging to complicate this dangerous mix – the potential competition between the European Union and the United States for global influence. Increasingly serious frictions exist between Western Europe and the United States on a wide range of issues, such as:

- the implications of NATO actions in Yugoslavia on the scope of and independent military role for the European Union
- US disregard for insistent pleas from the highest levels in Europe that it ratify the CTBT
- Genetically modified foods and other trade issues.

Ten years after the fall of the Berlin Wall, the United States, NATO and its member states, and (mainly in desperate and dangerous reaction) Russia have led the world again to the brink of nuclear destruction without a cause. The people of the world must find a way to reverse this deadly course.

The central inspiration of US history has been that, in breaking away from a monarchial system and setting up a constitutional one, the United States put forth for itself and the world the ideal of equality before the law. However imperfectly it is achieved in practice, upholding that principle and progress towards its realization has been regarded across the world as a motive force towards justice, democracy, peace, and prosperity.

In ratifying the NPT and urging its indefinite extension, the nuclear weapons states committed themselves to nuclear disarmament and implicitly agreed that an indefinite continuation of nuclear apartheid, in which a few countries would possess

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nuclear weapons forever while denying them to others, was wrong. The five nuclear weapons parties to the NPT cannot now legitimately claim to require nuclear weapons for their own security for the indefinite future, as NATO members have done. Such a posture is all the more egregious in the face of the World Court advisory opinion that nuclear weapons use and threats are illegal under international law.[3] Of these states, the United States bears the greatest responsibility because it is:

- by far the most powerful and wealthy country in the world;
- the *de facto* leader of the NATO alliance;
- the one nuclear weapons state that has defeated CTBT ratification (Britain and France have ratified it; Russia and China have signed it but not yet had a ratification vote);
- the one nuclear weapons state that wants to install national missile defenses even at the risk of increasing insecurity for others arising from its nuclear policy of retaining the option of first use and first strike (see main article, page 1).

We need equality before the law globally and generally, most urgently in the nuclear arena, where the world faces renewed nuclear dangers. The compliance actions that are needed now are not complex.

First, the United States and Russia must remove their nuclear weapons from hair-trigger alert. No other countries maintain their weapons on comparable alert status, ready to fire in minutes.[4] We recommend that the parties to the NPT also regard it as the minimal immediate measure of progress needed towards compliance with Article VI of the NPT. There are no technical barriers in having a time bound framework for complete de-alerting of all nuclear weapons by all nuclear weapons states. In fact, some simple measures, such as pinning open missile motor switches, can be accomplished in a day or two.

> The five nuclear weapons parties to the NPT cannot now legitimately claim to require nuclear weapons for their own security for the indefinite future.

In April and May 2000, parties to the NPT will meet at the United Nations in New York to review progress. They must carefully consider what political, economic, and diplomatic measures they are willing to take if the five nuclear weapons parties to the NPT refuse to assure the prevention of annihilation by accident or miscalculation by de-alerting their arsenals. Large numbers of NGOs are also expected to be present in New York at that time.[5] Unlike the World Trade Organization, the NPT parties have made their forum more and more open to NGOs in the past few years. Given the gravity of the situation, it is time that governments interested in enforcing Article VI of the NPT and NGOs came together to create and implement an agenda that will take us away from nuclear anarchy and towards the rule of law.

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SCOTTISH COURT ACQUITS NUCLEAR DISARMAMENT ACTIVISTS

On October 21, 1999, after an 18-day trial, a jury in Scotland acquit three women accused of damaging the Faslane Trident Submarine Base in Scotland during a demonstration last summer. The jury was instructed to acquit by the judge, Greenock Sheriff Margaret Gimblett, who based her decision on international law — specifically, on the advisory opinion of the International Court of Justice on the illegality of nuclear weapons (see SDA vol. 6 no. 4 / vol. 7 no. 1 double issue, October 1998, page 4).

The three women are part of Trident Ploughshares 2000, a campaign that employs non-violent direct action to disarm the British nuclear Trident submarine system. On June 8, 1999, the three women traveled by inflatable boat to "Maytime," a floating laboratory which provides operational support for Trident submarines. Once aboard, they damaged computers and other electronic equipment and tipped overboard logbooks, files and papers.

In her decision, the judge stated, "I have to conclude that the three accused ladies ... were justified in thinking that ... the threat or use of Trident could be construed as a threat, has indeed been construed as a threat by other states and as such is an infringement of international customary law."

The acquittal has been described as a landmark for the peace movement. Since the decision, the illegality of the Trident nuclear system has been the subject of debate in the Scottish Parliament. In October 1999, the Lord Advocate of Scotland (the principal law officer of Scotland's Crown) took the unusual step of referring Sheriff Gimblett's judgement to the High Court, Scotland's supreme criminal court, for an authoritative ruling on the law. Three High Court judges will consider the case.

As of March 1998, the British nuclear stockpile contained approximately 160 Trident submarine-launched ballistic missile warheads. The explosive yield of each warhead is 100 kilotons.

Sources: Websites of the Scottish Campaign for Nuclear Disarmament, http://ds.dial.pipex.com/cndscot/news/index.htm, and of Trident Ploughshares, http://www.gn.apc.org/tp2000/html/Intro.html, both viewed December 20, 1999; *Taking Stock: Worldwide Nuclear Deployments 1998*, by William Arkin, Robert Norris, and Joshua Handler (Natural Resources Defense Council, Washington, D.C.), March 1998.

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Second, it is essential that states respect the provisions of the CTBT[6] by respecting for the indefinite future the complete moratorium on nuclear explosions (see editorial on page 1). Third, it is essential that the Anti-Ballistic Missile (ABM) Treaty be preserved intact. There are currently only two parties to the ABM Treaty – the United States and Russia. Other governments should consider universalizing the ABM Treaty by arriving at an agreement prohibiting missile defenses unless complete and verified nuclear disarmament is first achieved. This agreement could specify enforcement mechanisms for parties to this as well as non-parties, in the manner of the Chemical Weapons Convention (CWC).[7] Such an agreement would also be a useful preventive measure against the United States, Russia, and/or European members of NATO arriving at some agreement between themselves to modify or junk the ABM Treaty, even though the security of the entire world is at stake in their actions. (See article on page 1.)

The United States has long recognized the need for enforceable nuclear treaties. As early as 1946, the Truman administration's special representative to the United Nations, South Carolina financier Bernard Baruch, stressed enforcement in presenting the US plan for disarmament to the United Nations:

> *We are here to make a choice between the quick and the dead. That is our business... If I read the signs aright, the peoples want a program not composed merely of pious thoughts but of enforceable sanctions – an international law with teeth in it.*[8]

Yet, over two decades later, when the United States made a commitment to disarmament in the NPT, it sought no enforcement provisions. Enforcement is now directed only at the non-proliferation elements of the NPT and carried out through non-NPT mechanisms, such as the UN Security Council, or unilateral, bilateral or multilateral action led by the United States, as in the US-British bombing of Iraq. The result is deep structural injustice – highly selective enforcement led by the United States, which itself refuses to subject itself to international jurisdiction for compliance with Article VI of the NPT.

History shows that such unilateralism does not even make for a successful non-proliferation policy. For instance, Baruch's idea of enforcement was thinly disguised US unilateralism. He wanted the United States to retain nuclear weapons until everyone else had disarmed completely and to be able to punish others for violations without even a UN Security Council vote.[9] Baruch's plan failed at least partly because the Soviet Union rejected the grant of such unilateral authority. The failure led to the worst and most dangerous arms race the world has known.

Unilateral dictation is even more unrealistic now with eight nuclear weapons states in the world. Moreover, materials sufficient to build large numbers of nuclear weapons exist in over a dozen countries in separated and readily usable forms. Additionally, materials to make hundreds of thousands more exist in commercial nuclear reactor spent fuel in dozens of countries, though not in readily usable form.

Unilateralism does not make for successful non-proliferation policy.

Will the United States government continue down a road where it sets itself above the law and is at the same time an enforcer of it worldwide? Or will it, for the sake of its own safety, security, and survival and that of everyone else, set for itself and others the ideal of equality under the law for governments as well as people? The fate of the world may rest on the answer. It is essential that the people of the United States and the world help the US government to set itself along that road to the rule of law and to bring the other nuclear weapons states along with it.

1 See for instance Phyllis Bennis, "Law of Empire: The US undermines international law," *Le Monde Diplomatique*, December 1999.

2 The Alliance's Strategic Concept, NATO press release, April 24, 1999, http://www.nato.int/docu/pr/1999/p99-065e.htm

3 The United Nations Charter also affirms that if the use of force is illegal in a specific circumstance, the threat of such force is also illegal.

4 See SDA vol. 6 no. 4 / vol. 7 no. 1 double issue, October 1998; Bruce G. Blair, Harold A. Feiveson and Frank N. von Hippel, "Taking Nuclear Weapons off Hair-Trigger Alert," *Scientific American*, November 1997, http://www.sciam.com/1197issue/1197vonhippel.html; and the Back From The Brink campaign web site, http://www.dealert.org.

5 For information on NGO participation, see the web sites of the NGO Committee on Disarmament, http://www.igc.apc.org/disarm/, and the Women's International League for Peace and Freedom's Reaching Critical Will project, http://www.reachingcriticalwill.org/.

6 While all countries are maintaining a nuclear test moratorium, the United States, France, and Britain are, according to IEER's analysis, in violation of the CTBT. The United States and France are building laser fusion machines designed to cause thermonuclear explosions, though Article I of the CTBT not only bans such explosions, it also prohibits all activities leading up to them. Britain is in violation because it is participating with the United States in the laser fusion project known as the National Ignition Facility. See Arjun Makhijani and Hisham Zerriffi, *Dangerous Thermonuclear Quest*, IEER, 1998. Portions of it are on IEER's web site at http://www.ieer.org/reports/fusion/fusn-toc.html.

7 The CWC has provisions for sanctions against non-parties in regard to trade of chemicals, for instance.

8 Ambassador Bernard Baruch's speech to the United Nations as quoted in Richard G. Hewlett and Oscar E. Anderson, Jr., *The New World: A History of the United States Atomic Energy Commission, Volume I, 1939-1946*, Berkeley: University of California Press, 1990, page 577.

9 Hewlett and Anderson 1990, *op. cit.*, p. 578.

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fact, Germany had been ruled out as a potential target as early as May 5, 1943 out of fear of possible German nuclear retaliation.[3]) Widespread belief about the effectiveness of those nuclear attacks in ending the war[4] and assessments of the damage and contamination resulting from the first post-war nuclear tests were central to the formulation of US nuclear policy. It was premised on continuing US nuclear superiority, if not monopoly.

The US aim was far broader than threatening nuclear retaliation in response to a nuclear attack. Rather, the United States aimed for an integrated military force that would deter the Soviet Union and allow the United States to pursue its "vital interests" anywhere in the world without fear of Soviet interference. For instance, as a prelude to the CIA-supported coup in Guatemala in 1954, the United States sent nuclear capable bombers to Nicaragua – one of many occasions when use of US nuclear forces was threatened against non-nuclear countries.[5]

Daniel Ellsberg, a former Pentagon nuclear war planner, who revealed what became known as the "Pentagon Papers" to the press during the Viet Nam War, has pointed out that many US nuclear threats have been against non-nuclear countries. Threats actually constitute a use of nuclear weapons in the same way "that a gun is used when you point it at someone's head in a direct confrontation, whether or not the trigger is pulled."[6] The refusal of the United States to give unequivocal assurances that it will never use nuclear weapons against non-nuclear weapons states parties to the Nuclear Non-Proliferation Treaty (NPT) should be seen in the context of this history.

The US aim has been to be able to use military force whenever and wherever it chooses, unilaterally or multilaterally, with or without UN Security Council authorization, while deterring retaliation, especially with weapons of mass destruction. Since the Viet Nam war, deterring retaliation also includes a goal of keeping casualties low enough to prevent backlash against intervention from the US public. Such an exercise of power worldwide is not accompanied by a commensurate system of global accountability. It can and has led to arrogance and tragedy. The CIA-supported overthrow of the elected government of Guatemala and its replacement by repressive military dictatorships led to the deaths of 200,000 people in "acts of genocide" – in which the United States has now admitted complicity.[7]

US ballistic missile defense policy fits this pattern of unaccountable exercise of power. However, national missile defenses would actually increase nuclear dangers to people of the United States contrary to the announced intent of providing a protective shield. To other nuclear weapons states, US national missile defenses appear to be an attempt to pre-empt nuclear retaliation, leaving the United States as the only state with an effective nuclear arsenal, whether for a first strike or for retaliation. The other nuclear weapons states will, of course, do everything they can to prevent such an outcome.

The technical reasons for the probable reaction are bound up with the fact that both US and Russian nuclear weapons are accurate enough to destroy the nuclear forces of the other side before they are launched, except for those forces that are hidden deep beneath the sea, or those that are land-based but mobile (though these are still somewhat vulnerable in theory). The United States also has far more of these invulnerable strategic nuclear weapons on submarines than Russia (about 3,500 warheads compared to 1,600). Moreover, Russia is now forced to keep all or almost all its strategic submarines in port for safety reasons and also because it does not have the funds to maintain a large fleet at sea. China has about 20 land-based missiles that can reach the United States, each with a single warhead, that take a day or more to fuel. It does not yet have a deployed strategic nuclear submarine force, though it is developing one.[8]

The threat of a first strike and hence the dangers of an accidental nuclear war would be greatly aggravated by deployment of national missile defenses.

The fear of a first strike has already created a severe danger of accidental nuclear war for the United States and Russia. Both sides keep thousands of warheads on high-alert based on the theory that they should be launched before they are destroyed on the ground or in port. The threat of a first strike and hence the dangers of an accidental nuclear war would be greatly aggravated by deployment of national missile defenses.

Consider the arithmetic. Russia has almost 1,200 launchers – that is missiles and bombers — which generally contain more than one nuclear warhead each. If the United States destroyed Russia's entire nuclear strike capability except for a couple of Russia's strategic submarines, Russia could still devastate the United States with dozens of nuclear weapons. There is no way that the United States would risk this, by Russian calculation. But, if the United States could shoot down the remaining few dozen missiles with high probability after they were launched, the feasibility of a first strike by the US would be perceived to be much greater. This perceived risk would increase as numbers of weapons on the Russian side went down, since there would be fewer targets to destroy, especially if the numbers of

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US warheads do not decline, while Russia's nuclear forces decrease through attrition and lack of funds for maintenance.

Such fearful and fearsome calculations, normal in nuclear weapons establishments, are made all the worse by the advent of non-nuclear precision weapons, demonstrated during the Gulf and NATO-Yugoslavia wars. They show that the US could destroy an adversary's nuclear weapons on the ground or in port with non-nuclear precision weapons. Hence, the US could theoretically make up for a reduced number of nuclear warheads by attacking with non-nuclear precision weapons. Such calculations would make US-Russian arms reduction agreements unlikely and may even cause a reversal of past reductions. The problems as seen by China would be even more severe, since it has far fewer long-range missiles to start with.

Russia and China are therefore likely to react by increasing their offensive potential and taking measures to thwart missile defenses. Indeed, China is already moving to solid-fuel rockets that could be maintained on hair-trigger alert. Chinese fears of a first strike would be a factor in crises such as a potential US-Chinese confrontation over Taiwan.[9] The likely net

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STATEMENTS ON MISSILE DEFENSE

- "In making our determination [whether to deploy a limited National Missile Defense], we will ... review progress in achieving our arms control objectives, including negotiating any amendments to the ABM Treaty that may be required to accommodate a possible NMD deployment."

  — *Statement of US President Bill Clinton, July 23, 1999*

- "The message to Bill Clinton notes, in part, that a collapse of the Anti-Ballistic Missile treaty resulting from the deployment in the United States of systems of territorial anti-missile defense would have extremely dangerous consequences for the entire arms control process."

  —*Kremlin statement describing November 2nd letter from Russian President Boris Yeltsin to U.S. President Bill Clinton* (Reuters, *November 2, 1999*)

- "Recognizing the historical role of the [Anti-Ballistic Missile Treaty] as the cornerstone for maintaining international peace and security and strategic stability, ... [The United Nations General Assembly] calls for renewed efforts by each of the States parties to preserve and strengthen the ABM Treaty through full and strict compliance and, in this context, reiterates that there shall be no deployment of anti-ballistic missile systems for a defence of the territory of its country and no provision of a base for such defence ..."

  — *From* Draft Resolution A/C.1/54/L.1**, *"Preservation of and compliance with the Anti-Ballistic Missile Treaty," offered by Belarus, China, and Russia, October 14, 1999.*

  (The United Nations General Assembly adopted the resolution on December 1, 1999, with a vote of 80 to 4, with 68 abstentions. Albania, Israel, Micronesia, and the United States voted against it. The complete resolution may be found on the web at: http://www.clw.org/pub/clw/coalition/unabmres101499.htm.)

- "Even British Prime Minister Tony Blair, who is probably Clinton's closest ally among world leaders, is said to harbor serious reservations about US plans for ballistic missile defense."

  — Washington Post, *November 6, 1999*

- "We note that the resolution ... got the support of a wide range of states, including France, India, Mexico, Ireland, Indonesia, the Republic of South Africa and Egypt. In this connection we would like to emphasize again that ... the implementation of the ABM treaty ... affects the foundations of the security of virtually all countries."

  — *V. O. Rakhmanin, Director of the Information and Press Department, Ministry of Foreign Affairs, Russian Federation, November 10, 1999, speaking of the UN resolution titled* Preservation of and compliance with the Anti-Ballistic Missile Treaty. *Unofficial translation.*

- "We are not rejecting the concept of missile defense completely, such as air defense to protect troops. But it is the advanced systems, in space and elsewhere, that are the problem. These are a violation of the ABM treaty."

  "Any amendment, or abolishing of the treaty, will lead to disastrous consequences. This will bring a halt to nuclear disarmament now between the Russians and Americans, and in the future will halt multilateral disarmament as well."

  — *Sha Zukang, Chinese arms control negotiator* (Washington Post, *November 11, 1999*)

- "We must avoid any questioning of the ABM treaty that could lead to disruption of strategic equilibria and a new nuclear arms race."

  —*French President Jacques Chirac, November 1999* (New York Times, *December 3, 1999*)

- "There is no doubt that [US deployment of a national missile defense system] would lead to split security standards within the NATO alliance."

  —*German Foreign Minister Joschka Fischer* (Washington Post, *November 6, 1999*)

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result would be that instability and hair-trigger dangers would rise steeply.

The increased risk could also involve a range of European actions. For instance, it is possible that Germany might decide to acquire nuclear weapons capability due to the lower relative security for Europe implied by a US national missile defense system. According to the Washington Post, German Foreign Minister Joschka Fischer, recently reminded Americans that "Germany's commitment to be nonnuclear 'was always based on our trust that the United States would protect our interests, that the United States, as the leading nuclear power, would guarantee some sort of order.'"[10] As an alternative, the European Union could decide to make the nuclear forces of France and Britain into common European forces, an action that would violate the NPT prohibition of nuclear weapons sharing (Articles I and II).

In view of world tensions and nuclear history, including the fact that the United States has used nuclear weapons in war and made nuclear threats against non-nuclear states, potential adversaries are likely to consider national missile defense deployment as an part of an offensive strategy. Because of this probable reaction, ballistic missile defenses do not have to be proven to work effectively before they create dangerous new problems. The mere prospect of their deployment will increase the risk of a new arms race with both Russia and China (see box on page 7). The consequences are then likely to extend to India and Pakistan. US national missile defenses could become the central element in bringing more than four decades of arms control and arms reduction efforts to a halt. That is why the ABM Treaty is considered by many authorities as the cornerstone of nuclear arms control and reduction agreements.

Finally, there is a non-negligible chance that, if the United States does deploy missile defenses, it may make itself *more vulnerable* to a nuclear attack from a state like North Korea. (President Clinton is due to make a decision on NMD deployment in July 2000.) According to the National Intelligence Council, pursuit of ballistic missiles, in preference to non-missile means of delivery, by a country like North Korea may be influenced by considerations like "prestige" and "coercive diplomacy" rather than actual effectiveness and reliability of delivery of a weapon.[11] Were effectiveness of delivery the main criterion, the choice of delivery vehicle would more likely be a truck, commercial cargo vessel, or an aircraft – a view also shared by critics of missile defenses.[12]

The twists and turns of negotiations and agreements with North Korea indicate that North Korea is using missile technology development as a means of getting a better negotiating position with the United States, South Korea, and Japan rather than as a means of actually delivering nuclear weapons. US missile defenses could take away this negotiating chip, endangering the current policies and agreements by which North Korea has held up missile development and agreed to inspections of its nuclear facilities. In other words, missile defenses might simultaneously torpedo diplomatic agreements with North Korea and anger China into potentially greater cooperation with North Korea. This may put the United States at greater risk, since under such circumstances, North Korean nuclear strategy may rely less on diplomacy in favor of contingency plans for delivery of nuclear weapons by non-missile means.

There is a non-negligible chance that, if the United States does deploy missile defenses, it may make itself *more vulnerable* to a nuclear attack from a state like North Korea.

Even one or a few nuclear weapons exploding on US soil would be more devastating than anything ever experienced by the United States. Given US ambitions to act freely abroad as well as its reflex to protect itself by military means and technically sophisticated methods, rather than by international agreements, missile defenses seem to be an attractive concept. But by persisting in the illusion that it can have security unilaterally even if it increases insecurity of other nuclear weapon states and potential nuclear weapon states, the United States will aggravate nuclear dangers for everyone, including its own people. This is indicated by the continuing vulnerability of the United States after spending almost one trillion dollars on various measures to defend against nuclear weapons, of the cumulative nuclear weapons expenditure of $5.5 trillion.[13]

The strategic implications of developing defensive anti-ballistic missile systems would, of course, be different if done in the context of enduring nuclear disarmament. Such systems would no longer be part of a nuclear first strike capability. However, even in a nuclear disarmament context, such systems could be considered threatening unless, possibly, they were deployed in a globally agreed-upon framework (presumably to protect against any country breaking out of the disarmament regime). While we doubt that such systems, which are hugely expensive and likely to remain unreliable, would be a useful expenditure even in that context, their destabilizing influence on international security would

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NUCLEAR DEFENSE AND OFFENSE

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likely be lessened, at least so far as nuclear weapons are concerned.

The difference between deployment of missile defenses before and after disarmament was recognized in the plan that President Reagan proposed to President Gorbachev during the 1986 Reykjavik summit.[14] According to this plan, both the United States and the Soviet Union would disarm and destroy all of their nuclear missiles before deploying a joint missile defense system. There were many difficulties with President Reagan's Strategic Defense Initiative, including the fact that it involved nuclear weapons in space, so that it was not a plan for complete disarmament. It may have left the United States with a huge advantage – at least that was the basis for its rejection by President Gorbachev. But the Reagan plan at least implicitly accepted the principle that first strike capability must be abandoned before missile defenses could be deployed. That principle has been thrown overboard in the current rush to missile defenses. Missile defenses should not be considered outside the context of complete and verified nuclear disarmament, or at the very least, outside the context of the separation of all warheads from their delivery systems, with warheads and all weapons-usable nuclear materials stored under multilateral monitoring.

Given that nuclear materials as well as the knowledge to make nuclear weapons are now widespread, there can be no perfect security against nuclear weapons. The moment for that, if it ever existed, passed with the bombing of Hiroshima. The next best thing by far is to set a steady and firm course towards complete and enduring nuclear disarmament.

The NPT, the treaty that commits its signatories to move towards a nuclear-weapons-free world, is increasingly in peril. The US must change course towards disarmament and towards accepting the jurisdiction of international bodies, including recognition of the World Court's advisory opinion on Article VI of the NPT. (See IEER's recommendations for the NPT Review Conference on page 20).

1 Department of Defense Directive Number 5134.9, June 14, 1994, on the Internet at http://web7.whs.osd.mil/text/d51349p.txt paragraphs and subparagraphs under 3.1. The technical goals are "an effective and rapidly relocatable advanced theater missile defense capability to protect forward-deployed and expeditionary elements" of US and allied forces and "an antiballistic missile (ABM) system that is capable of providing effective defense of the U.S. homeland against limited attacks of ballistic missiles, including accidental, unauthorized launches or deliberate attacks..."

2 In 1996 dollars. Stephen Schwartz, ed. *Atomic Audit*. Washington, DC: Brookings, 1998, Chapter 4, by John Pike, Bruce Blair and Stephen Schwartz. The expenditure from 1983 to 1996 was $51 billion (1996 dollars). Budgets since that time have been about $3 billion per year. The Fiscal Year 1999 appropriation was $3.5 billion and the FY 2000 amount is $3.6 billion (both in current dollars). Details on the program are to be found of the Ballistic Missile Defense Organization home page at http://www.acq.osd.mil/bmdo.

3 Arjun Makhijani, "Japan: 'Always' the Target?", *The Bulletin of the Atomic Scientists*, May/June, 1995.

4 These claims later became more controversial. The Soviet entry into the war on August 8, for instance, had been a significant factor in the minds of the Japanese leaders who favored surrender. For instance, see Gar Alperovitz, *The Decision to Use the Atomic Bombs*. New York: Alfred A. Knopf, Inc., 1995.

5 See Barry Blechman and Stephen Kaplan, *Force Without War*. Washington, DC; Brookings Institution, 1978, p. 48 for one list of nuclear alerts.

6 Daniel Ellsberg, "How We Use Our Nuclear Arsenal,", reprinted in Donna Gregory, ed., *The Nuclear Predicament*. New York: St. Martin's Press, 1986, p. 90. For a list of nuclear threats by various nuclear-weapon states, see *Science for Democratic Action*, double issue on disarmament, October 1998.

7 Charles Babbington, "Clinton Regrets Support for Guatemala; U.S. Backed Forces of Former Regime in 36-Year War," Washington Post, March 11, 1999, p. A1. The conclusion that the Guatemalan military had committed "acts of genocide" was reached by the official Guatemalan Historical Clarification Commission.

8 Robert S. Norris and William M. Arkin, "NRDC Nuclear Notebook," Bulletin of the Atomic Scientists, January/February 1999 for US forces, March/April 1999 for Russian forces, and May/June 1999 for Chinese forces. Estimates are as of the end of 1998 for the United States and Russia and for 1999 for China.

9 Philipp C. Bleek and Frank N. von Hippel, "Missile Defense: A Dangerous Move," *Washington Post*, December 12, 1999, Page B09.

10 William Drozdiak, "Possible U.S. Missile Shield Alarms Europe," *Washington Post*, Nov. 6, 1999, pp. A1 and A22.

11 National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015*, September 1999. Web address: http://www.cia.gov/cia/publications/nie/nie99msl.html#rtoc12.

12 National Intelligence Council, *op. cit.* states as follows: "The requirements for missile delivery of WMD [weapons of mass destruction] impose additional, stringent design requirements on the already difficult technical problem of designing such weapons. For example, initial indigenous nuclear weapon designs are likely to be too large and heavy for a modest-sized ballistic missile but still suitable for delivery by ship, truck, or even airplane. Furthermore, a country (or non-state actor) is likely to have only a few nuclear weapons, at least during the next 15 years. Reliability of delivery would be a critical factor; covert delivery methods could offer reliability advantages over a missile. Not only would a country want the warhead to reach its target, it would want to avoid an accident with a WMD warhead at the missile-launch area. On the other hand, a ship sailing into a port could provide secure delivery to limited locations, and a nuclear detonation, either in the ship or on the dock, could achieve the intended purpose." A quite similar view of missile defense is expressed in a June 1995 letter to the US Senate from Hans Bethe and other prominent physicists: "National missile defenses (NMD) provide no protection against the most likely future attacks on US territory by weapons of mass destruction, which would not be delivered by missiles. The methods of delivery have already been demonstrated by the bombings of the World Trade Center in New York and the Federal Building in Oklahoma City, and the gas attack on the Tokyo subway. Such attacks are relatively cheap, low-tech, and can be accurately targeted where they will be most effective; they maximize the effect of limited arsenals and can be delivered clandestinely." (Entire letter can be found on the web site of the Union of Concerned Scientists, at http://www.ucsusa.org/missiledefense/index.html.)

13 *Atomic Audit*, *op. cit.*, Figure 1 and Chapter 4. All figures in 1996 dollars. This figure includes the $100 billion spent on missile defenses so far.

14 Ronald Reagan, *An American Life*, New York: Pocket Books, 1999 (Reprint edition).

Verification and Enforcement

What is verification?

Verification is a mechanism or procedure that seeks to determine whether a party is abiding by or fulfilling its obligations under a given agreement, and to detect those who violate their obligations. The essential basis of verification is a formal commitment by parties to engage, or not to engage, in certain activities.

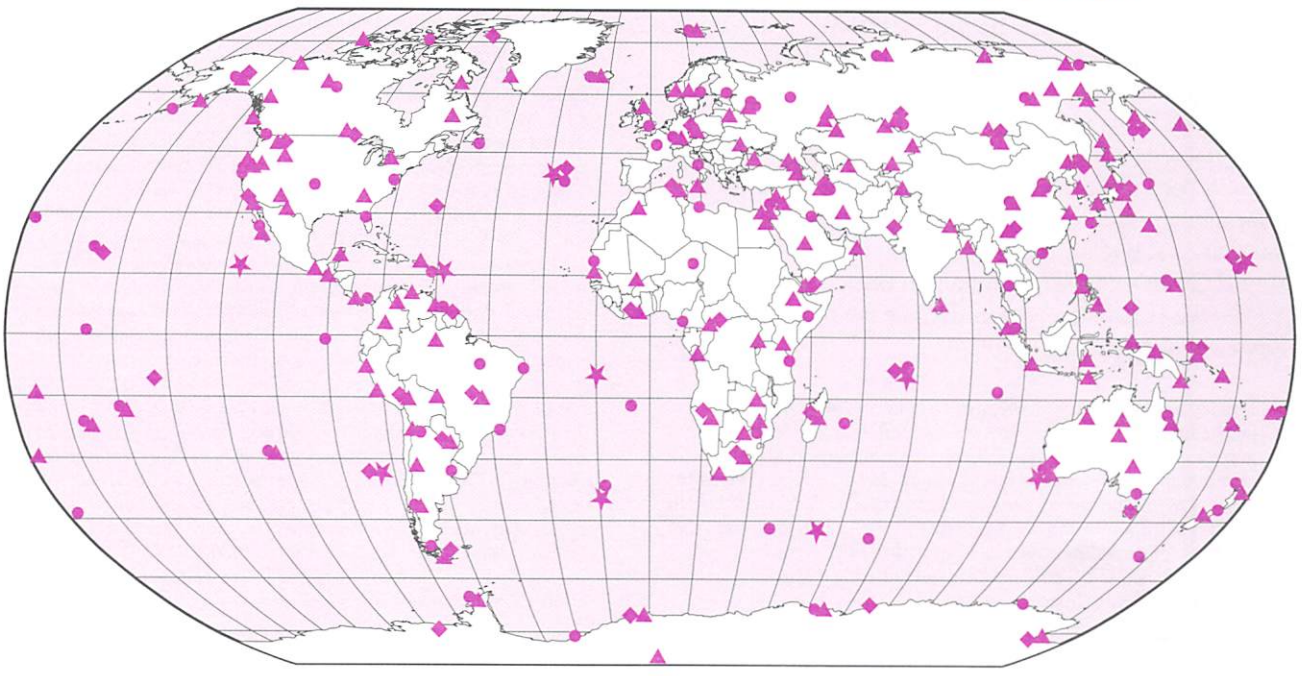
Verification has traditionally been associated with international security-related agreements. In the context of non-proliferation, arms control and disarmament, verification refers to:

- **Declarations** of materials, equipment, and facilities associated with prohibited activities as well as those which could be used in conducting the prohibited activity, but which are not necessarily prohibited in and of themselves (so-called "dual-use" items).
- **On-site inspections**, usually by international inspectors. For example, the International Atomic Energy Agency conducts inspections of nuclear facilities of non-nuclear weapons states to determine compliance with the Nuclear Non-Proliferation Treaty (NPT).
- **Monitoring** of items, areas, or activities. For instance, the Comprehensive Test Ban Treaty Organization provides for seismic and radiological monitoring to help detect earth movement and air emissions from nuclear explosions (see image below). Satellite imagery is another important type of monitoring.
- **Evaluation** of the information generated by the above activities, in order to make a **judgement** whether there is credible evidence indicating that the inspected party is or is not in compliance with the given agreement.

Verification is often carried out using a combination of some or all of these mechanisms, referred to as a **verification regime**. Verification regimes of some non-proliferation treaties are described in the table on page 12.

It should be noted that uncertainty is inherent in verification. No practical set of verification measures can provide absolute assurance that a given party is or is not violating a given agreement. What verification can do is provide a degree of confidence that prohibited

NUCLEAR TEST BAN TREATY GLOBAL MONITORING SYSTEM



Worldwide, the International Monitoring System will consist of 321 monitoring facilities, most shown above, to help detect possible violations to the comprehensive nuclear test ban treaty. Approximately one-third of the planned monitoring stations are currently operational. A more detailed map can be viewed at http://www.pidc.org, the web site of the Prototype International Data Centre.

Sources: Coalition to Reduce Nuclear Dangers; US Department of Defense

activities are not being conducted. The value of verification agreements is that confidence about the status of activities is generally far greater when a verification regime has been agreed to and is functioning than when it is not.

What is Enforcement?

Enforcement is the exertion of pressure via the threat and application of penalties or loss of benefits to ensure that parties to an agreement are complying with it. Official enforcement is generally carried out by administrative, judicial or political bodies (such as the Nuremberg Court set up by the Allies after World War II, the United Nations Security Council, or the War Crimes Tribunal now operating in The Hague in regard to the former Yugoslavia). Official enforcement mechanisms have included export controls, sanctions, embargoes, military action, and, as was the case at Nuremberg, imprisonment and the death penalty.

Some international agreements include specific enforcement provisions and some do not. A generally *de facto* enforcement mechanism, usually independent of any given agreement, is the UN Security Council and resulting action under Chapter VII of the UN Charter. Action under this clause requires that no permanent member of the Security Council veto the given proposal for action. The five permanent members who hold veto power happen to be the five nuclear weapons states officially acknowledged as such under the NPT – that is, the United States, Russia, China, Britain, and France.

One can also conceive of popular pressure on governments to live up to their commitments. Examples include watchdogging government agencies and lobbying their representatives by non-governmental organizations (NGOs) and individuals. Other means of popular enforcement have included:

- **Civil disobedience and direct action**. Actions led by Martin Luther King, Jr. during the US Civil Rights movement were a factor in compelling the US government to obey the 14th amendment of the US Constitution guaranteeing equal protection under the law.
- **Citizens' inspections.** Inspections of military and nuclear weapons facilities by individuals to enforce international law, such as the Nuremberg laws and Article VI of the NPT, have been undertaken in Belgium, France, Germany, Israel, and the United States.
- **Action in the legal sphere**, such as attempts to hold governments accountable under the law. Examples include the process that led up to the World Court consideration of the legality of nuclear weapons and the application of national laws which give legal standing to individuals, enabling them to force governments to comply with environmental laws.
- **Economic boycotts.** The worldwide public boycott of French products after France tested nuclear weapons in 1995 played a role in that country's decision to stop testing and close its test site in the South Pacific.

Because corporations often exert tremendous influence over governments, shareholder action can also be an effective form of popular pressure. For instance, investors in stock of the US-based nuclear utility, Duke Power, have again introduced a shareholder resolution that opposes the company's involvement in the mixed-oxide (MOX) plutonium fuel program (for more information about MOX, see SDA vol. 5 no. 4 and *Energy and Security* nos. 1, 2, and 3). Last year, the resolution gathered enough support from Duke shareholders to re-appear on the ballot to be voted on at the company's shareholder meeting in April 2000.

There are other examples of attempts at enforcement by NGOs and governments working separately and together. One is the "Middle Powers Initiative," a coordinated campaign by a network of international NGOs, including the International Physicians for the Prevention of Nuclear War and others, to urge the leaders of middle-power states to press the nuclear weapons states to comply with international law, specifically Article VI of the NPT under which they are obligated to eliminate their nuclear arsenals.

There is also the New Agenda Coalition, seven countries (Brazil, Egypt, Ireland, Mexico, New Zealand, South Africa and Sweden) that have called on the NPT nuclear weapons states and the three others, (India, Israel and Pakistan) to agree to start work immediately on negotiating nuclear disarmament. While it may seem odd that governments would go outside of the framework of the NPT and the UN Security Council to try to secure compliance, nuclear weapons states themselves set the precedent for this. For instance, the Nuclear Suppliers Group, which restricts commercial nuclear exports, among other things, to non-nuclear weapons states parties to the NPT, is outside of the NPT framework. As another example, the bombing of Iraq by the United States and Britain since December 1998 is without specific authorization by the UN Security Council. As a final example, the US-North Korean-South Korean-Chinese agreement to provide North Korea with nuclear reactors, oil and other goods in return for a verified halt to nuclear weapons activities is also outside of the framework of the NPT and the UN Security Council.

SOME INTERNATIONAL AND BILATERAL AGREEMENTS AND THEIR VERIFICATION PROVISIONS

TREATY OR AGREEMENT	VERIFICATION PROVISIONS
Chemical Weapons Convention (CWC) Parties undertake not to produce, develop, transfer, acquire, use, or prepare to use chemical weapons, and to destroy chemical weapons and chemical weapons production facilities. Signed by 169 countries of which 126 have ratified, as of May 24, 1999. Entered into force April 29, 1997. *"The CWC provides for the most intrusive and extensive verification regime of any arms control agreement to date."* (US Congressional Research Service)	The **Organization for the Prohibition of Chemical Weapons** (OPCW) oversees verification, which includes: • **Routine monitoring and inspection** of certain military facilities and certain civilian chemical facilities. • **National intelligence resources** of the OPCW and CWC signatories. • **Lists of chemicals** identified for possible application of verification measures, for example weapons-usable chemicals or their precursors. • **Export restrictions** on certain controlled chemicals to non-states parties. • **Declaration of chemicals** and other materials by the chemical industry, which also must be prepared to receive verification inspections. • **Challenge inspections**, which can be requested by any State Party in order to clarify and resolve questions in relation to possible non-compliance.
Comprehensive Test Ban Treaty (CTBT) Bans all nuclear explosions. Signed by 155 countries of which 51 have ratified, as of October 19, 1999. Has not entered into force.	• **On-site inspections** • **International Monitoring System** • **International Data Center** • **Consultation and clarification** • **National technical means** (See page 13 for details about CTBT verification provisions.)
Nuclear Non-Proliferation Treaty (NPT) Described as "the cornerstone of international efforts to prevent the spread of nuclear weapons and promote arms control and disarmament...." (US State Dept.) 185 states are party to the NPT (includes all countries except Cuba, India, Israel, and Pakistan). Entered into force in 1970, indefinitely extended in 1995.	According to Article III, each non-nuclear-weapon State Party to the NPT agrees to accept International Atomic Energy Agency (IAEA) safeguards to verify the fulfillment of its treaty obligations. Verification can take place only on the basis of an agreement with the State in which the inspection is to occur. IAEA safeguards include: • **Regular inspections** by IAEA inspectors to nuclear installations to verify records, check instruments and surveillance equipment, and confirm physical inventories of nuclear materials. Inspectors prepare reports to the State concerned and to the IAEA. • **Containment and surveillance:** The IAEA uses surveillance cameras at certain nuclear installations to continuously record activities and uses metal seals fixed on the camera housings to prevent undetected tampering. Films and seals are analyzed by IAEA. • **Verification of nuclear material:** The IAEA regularly receives and analyzes reports from State authorities on the whereabouts of their nuclear material, including stocks of nuclear fuel and the export and import of safeguarded items. • **Field and laboratory testing:** During inspections, IAEA inspectors measure for confirmation of the enrichment level and content of nuclear material and sample certain safeguarded nuclear materials. These are later tested at the IAEA's Safeguards Analytical Laboratory near Vienna, Austria, or at some national analytical laboratories.
Strategic Arms Reduction Treaty (START) The United States and the Soviet Union agree to reduce and limit their strategic offensive arms. Signed by the US and USSR. Entered into force on December 5, 1994.	**National technical means (NTM)**, e.g. satellites. Use of concealment measures that impede verification by NTM are prohibited. **Telemetry**. Parties must provide full access to telemetric information during missile flight tests, with certain limited exceptions. Parties are obligated to exchange telemetry tapes, interpretative data and acceleration profiles for every test flight. **Data exchange and notifications.** Each side has exchanged data on numbers, locations, and technical characteristics of relevant weapons systems and facilities, and provides regular updates. **Cooperative measures**. Up to seven times per year, either party may request the other to display certain launchers and bombers at bases specified by the inspecting Party. **Continuous monitoring activities.** Each side is allowed to establish continuous monitoring at the perimeter and portals of the other side's mobile intercontinental ballistic missile assembly facilities.

Sources: Stockholm International Peace Research Institute; *Verifying Nonproliferation Treaties: Obligation, Process, and Sovereignty*, J. Christian Kessler (National Defense University Press: Washington, DC); US Congressional Research Service Issue Brief 94029: *Chemical Weapons Convention: Issues for Congress*, Stephen R. Bowman, updated January 6, 1997 (viewed November 30, 1999, at the website of Federation of American Scientists, http://www.fas.org/spp/starwars/crs/94-029.htm); website of the Organization for the Prohibition of Chemical Weapons, http://www.opcw.nl/guide.htm, viewed December 22, 1999; IAEA fact sheet: *International Safeguards and the Peaceful Uses of Nuclear Energy*, http://www.iaea.org/worldatom/inforesource/factsheets/safeguards.html, viewed December 22, 1999; US State Department Bureau of Arms Control, Fact Sheets on START, NPT and CTBT, http://www.state.gov/www/global/arms/factsheets/wmd/nuclear/start1/strtveri.html, ... / arms/factsheets/wmd/nuclear/start1/achieve.html, .../arms/factsheets/wmd/nuclear/npt/uscommit.html, ... /arms/factsheets/wmd/nuclear/ctbt/ctbtsigs.html, and .../arms/treaties/npt3.html, viewed December 22, 1999 and January 8, 2000; *Verification Mechanisms in International Environmental Agreements*, Vertic briefing paper 99/2, by Clare Tenner, September 1999, http://www.fhit.org/vertic/briefing/no2.html, viewed December 22, 1999.

Verification Case Study: The Comprehensive Test Ban Treaty

The Comprehensive Test Ban Treaty (CTBT) is an international treaty that obligates State Parties not to carry out any nuclear weapon test explosion or any other nuclear explosion, to prohibit and prevent nuclear explosions at any place under its jurisdiction or control, and to refrain from causing, encouraging, or participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion.

Under Article 14 of the CTBT, 44 pre-determined nuclear-capable countries must ratify the treaty before it enters into force internationally. While only 26 of these countries have ratified, the CTBT already has in place a functioning international organization and an operational and expanding verification regime.

The Comprehensive Test Ban Treaty Organization

Upon entry into force, the CTBT establishes the Comprehensive Nuclear Test-Ban Treaty Organization (CTBTO) to achieve the object and purpose of the CTBT and oversee implementation, including the verification regime. The CTBTO will be composed of the Conference of the States Parties, the Executive Council, and the Technical Secretariat, and will be located in Vienna, Austria.

Each State Party has one representative in the Conference of the States Parties, which is responsible for overseeing implementation of the Treaty, the activities of the Executive Council and the Technical Secretariat, and the State Parties' compliance with the Treaty's provisions. It is charged with considering and reviewing scientific and technological developments that could affect the operation of the Treaty, and with taking the necessary measures to ensure compliance with the Treaty and to address any situation that contravenes the provisions of the Treaty. The Executive Council, consisting of 51 members elected by States Parties from 6 geographical regions, supervises the Technical Secretariat, carries out the preparatory and follow-up work for sessions of the Conference, manages the operation of agreements relating to the implementation of verification activities, and makes recommendations to the Conference on any concern raised by a State Party about possible non-compliance. The Technical Secretariat conducts on-site inspections, supervises the operation of the International Monitoring System, and coordinates the International Data Center. The Technical Secretariat is headed by a Director-General, elected by the Executive Council for a term of four years, with a 2-term limit.

In 1996, the Preparatory Commission of the CTBTO (CTBTO PrepCom) was established in order to bridge the period until the Treaty's entry into force. The CTBTO PrepCom is financed by the States Signatories and consists of a plenary body composed of all the States Signatories (the Preparatory Commission) and a Provisional Technical Secretariat. The main task of the Preparatory Commission is to establish the global verification regime so that it will be operational by the time the Treaty enters into force. The budget was US$58.4 million in 1998 and US$74.7 Million in 1999.

The CTBT Verification Regime

The primary aim of **verification** is to increase the level of transparency to a point where a determination regarding compliance can be reliably made. In order to detect, locate and identify nuclear explosions, the CTBT establishes a global verification system, consisting of four separate but interdependent components:

- International Monitoring System;
- Consultation and clarification procedures;
- On-site inspections; and
- Confidence-building measures.

The **International Monitoring System (IMS)** for detecting and locating nuclear test explosions is to consist of 321 remote sensing stations and at least 16 radionuclide laboratories located in some 90 countries. The IMS employs four technologies for monitoring: seismological, radionuclide, hydroacoustical, and infrasound (see box on page 14). Approximately one-third of the stations are already operational, gathering information 24-hours a day, 7 days a week and reporting to the Prototype International Data Center (IDC) in Arlington, Virginia, which is temporarily housing the information collected from the IMS facilities. The International Data Center in Vienna, Austria, is expected to begin serving this function by February 2000. The IMS data will be accessible to all parties to the CTBT and will provide a way for parties with no or limited technical means to participate in the verifica-

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MONITORING TECHNOLOGIES IN THE CTBT'S INTERNATIONAL MONITORING SYSTEM

Seismic monitoring: This method detects the typical seismic waves created by nuclear tests. These are sharp, sudden jolts, distinguishable from earthquakes (see graphs on page 15). If the test is very small, the seismic waves may be too weak to detect at remote stations. The seismic waves arising from the tests would get lost in the noise of tiny earth movements, both natural and artificial. According to the London-based Verification, Research, Training and Information Centre (Vertic), seismology provides the "principal and most mature verification technique for the CTBT...." The CTBTO [Comprehensive Test Ban Treaty Organization] will have "fifty primary and 120 auxiliary seismic stations, distributed world-wide," to distinguish between earthquakes and explosions. These seismic stations will be supplemented by thousands of others around the world that are now used to detect and study natural phenomena like earthquakes.

Detection of radionuclides: This method detects tests by measuring the radioactive materials, notably fission products, in the fallout. Atmospheric tests produce a great deal of fallout and so are relatively easily detected. But underground tests also result in the release of some amounts of fission products into the atmosphere, enabling detection. The CTBTO will have at least 40 radionuclide detection stations positioned around the world that will be able to detect noble gas fission products, such as xenon-133 and krypton-85 as well as radionuclides that can be trapped on filters installed at air sampling stations. There will be 16 laboratories to analyze the filters.

Underwater listening devices (Hydroacoustic Network): There are to be 11 such stations, of which four are now operating. Three of the four are being run by the United States. They are useful for detecting underwater tests, but also for low-altitude atmospheric tests.

Infrasound instruments: Microbarographs are special microphones that use "infrasound" and can measure air pressure changes caused by atmospheric tests. According to Vertic, while this is "is the least developed of all the [monitoring]... technologies, the broader frequency ranges now available make it potentially very sensitive. Four infrasound stations are currently reporting, three of which are in the US and one in Australia."

Summarized and paraphrased with permission from *U.S. Security Benefits from Test Ban Monitoring & On Site Inspections,* Coalition to Reduce Nuclear Dangers Issue Brief Vol. 3 No. 14, September 27, 1999, written by Trevor Findlay and Oliver Meier of the Verification, Research, Training and Information Centre (Vertic), on the web at http://www.clw.org/coalition/briefv3n14.htm, viewed January 8, 2000.

VERIFICATION CASE STUDY

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tion and enforcement of the treaty. Hughes Olivetti Telecom Ltd has a $70 million contract with the CTBTO to maintain the communications infrastructure for the International Monitoring System and to ensure the flow of data from the system into the International Data Center for a ten-year period.

All four monitoring technologies have proved to be more capable than anticipated, and are continuously being updated as the IMS is being set up. The IMS was designed to detect and locate explosions down to one kiloton TNT equivalent, and has been shown to detect a test explosion of 0.1 kiloton of conventional chemical explosives conducted in Kazakhstan in August 1998. The other monitoring strategies are to be used to ensure detection below one kiloton, including on-site monitoring, which can only be applied if the Treaty enters into force.

It should be noted that relatively small nuclear explosions, ranging from a few pounds to a few hundred tons of TNT equivalent, tend to be the most technically difficult to conduct, since a minimum critical mass of fissile material is needed to set off a nuclear explosion. Hence, contrary to the impression given by some treaty opponents, there is greater technical scope for the wealthiest and most sophisticated states to conduct lower yield, undetected tests relative to those states that do not now have proven nuclear arsenals.

Consultation and clarification are intended to provide States Parties a relatively non-confrontational and inexpensive means that may resolve concerns regarding compliance with the Treaty by requesting clarification from any other State Party on any matter that may cause concern about possible non-compliance. States Parties are not required to attempt to resolve concerns through consultation before requesting an on-site inspection.

For the purpose of clarifying whether a nuclear explosion has been carried out in violation of the treaty,

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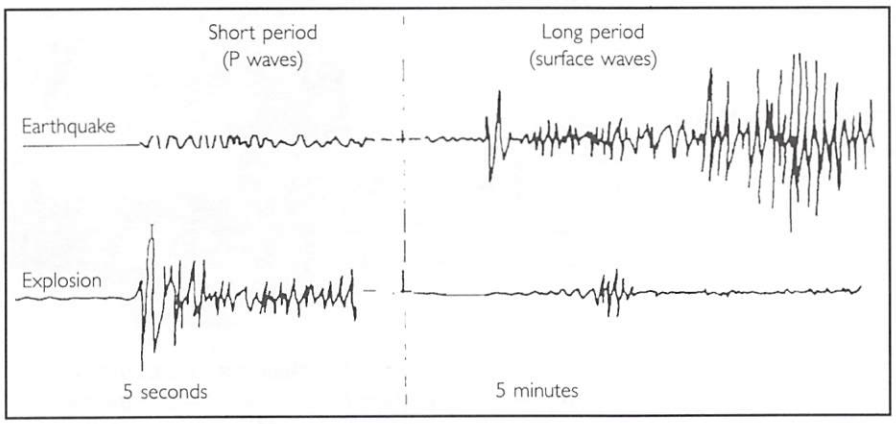
ENDNOTES ON PAGE 15



The recorded signals, or seismograms, of earthquakes and explosions often have different characteristics. For instance, note the higher ratio of P-waves (waves that pass deep through the Earth's body) to surface-waves (those that travel along the Earth's surface) for the explosion as compared to that of the earthquake.

Source: F. Ringdal, in *Seismic Verification of Nuclear Treaties*, Office of Technology Assessment, May 1998, pg. 83.

VERIFICATION CASE STUDY

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each State Party has the right to request an **on-site inspection**. Inspections must be considered and voted on by the Executive Council within 96 hours of the request and require a 60 percent majority for approval of an inspection. Subject to the Executive Council's approval, an inspection team must be dispatched by the Technical Secretariat within 6 days to the site where an ambiguous event has been detected. The inspection team would be appointed by the Director-General of the Technical Secretariat of the CTBTO. The inspection activities range from overflight information, ground surface survey, seismic aftershock detection and location, other geophysical measurement techniques, radionuclide measurements, and drilling into the suspected underground detonation point. There has been considerable tension over the issue of on-site inspections, since military personnel in all countries are reluctant to let outside parties into their secret areas. Meanwhile, these same personnel want the most intrusive inspection procedures for other parties.

States Parties also have the right to use information obtained by **national technical means** to request an on-site inspection. National technical means are methods, such as satellite photographs, employed by governments to detect activities in other countries. Governments can also install their own supplementary acoustic or seismic devices in addition to the IMS. National technical means provide an additional way in which individual countries can detect suspicious activities and ask for on-site inspections. Because some countries have better technology and more money, they are in a better position to ask for on-site inspections. Since there is considerable variation in national technical capability even among nuclear weapons states, this has been an additional source of resistance to intrusive inspection. The premise is that parties with the most sophisticated and extensive national technical means would be able to request the most frequent inspections. The potential use of such inspections for espionage purposes has been a concern.

The treaty also provides for the possibility to impose **sanctions**. The Conference is authorized to restrict or suspend a State Party's rights and privileges under the treaty if it fails to fulfill a request by the Conference or Executive Council. The Conference may also recommend to States parties collective measures that are in conformity with international law, which include but are not limited to sanctions. The issue may also be brought to the United Nations by the Conference or, if the case is urgent, by the Executive Council.

Confidence-building measures (CBMs) are also provided for in the CTBT. CBMs are cooperative procedures that seek to reduce misperceptions and misunderstandings among State Parties by enabling them to be more transparent about their intentions in specific circumstances. For instance, because the mining industry uses explosions of hundreds of tons of TNT, a confidence building measure might include advance warning to the Technical Secretariat of such explosions.

Verification matters because the success of the CTBT in preventing proliferation among non-weapons states and in reducing the development of new weapons by weapons states depends on it. There can be no perfect guarantee against cheating, just as there can be no perfect security against nuclear weapons. All we can do is make progress. In IEER's analysis, this will come from greater cooperation and nuclear disarmament, not from more weapons or "enduring" nuclear arsenals.

Sources: *Submittal of the Comprehensive Test Ban Treaty to the Senate for Ratification*. Treaty Doc. 105-28. September, 1997; *Not Quite Ready and Waiting: The CTBT Verification System*. Trevor Findlay & Oliver Meier. VERTIC Briefing Paper 99/3. September, 1999. http://www.fhit.org/vertic/briefing/no3.html; Information on the Preparatory Commission, CTBTO PrepCom Open Web Site, http://www.ctbto.org/ctbto/pcinfo.shtml

Given this situation, what are the prospects for a comprehensive nuclear test ban? The option receiving the most attention is for the US Senate to take up the CTBT again, once a new Administration enters in 2001. However, there is no guarantee that the incoming Administration will view the treaty favorably. Even with a supportive new Administration, the position of the Senate may not change dramatically enough to alter the outcome of the vote. A second rejection of the treaty would have immeasurable consequences. Even worse, given the controversy around the CTBT in the Senate, the treaty may not be passed without extensive conditions being placed on it. These conditions may not be acceptable to other parties to the CTBT without international renegotiation of the treaty. This is both unlikely and undesirable.

Without a treaty, the international norm against nuclear testing will remain an *ad hoc* prohibition and may erode over time. However, since treaty ratification cannot be assured for the foreseeable future and it will be necessary to ensure that adherence to the CTBT is universal after ratification, a second option must be pursued that preserves the core elements of the nuclear test ban without relying on the vagaries of politics. The basic elements of the CTBT can be preserved through various means of enforcement that do not require formal ratification of the treaty. Both the intent of the CTBT and the implementation of its basic policies remain an important part of the solution for reducing nuclear dangers. Thus, the goals of the CTBT, an end to nuclear explosions and an end to nuclear weapons development, need to be realized even without US ratification of the treaty. These can be accomplished by both popular pressure from civil society and by the actions of states determined to move the disarmament agenda forward.

LAWRENCE LIVERMORE NATIONAL LABORATORY

Alien spacecraft? Giant Christmas tree ornament? Neither. The photo shows workers hoisting the target chamber of the National Ignition Facility, a planned laser facility under construction at Lawrence Livermore National Laboratory in California. The US Department of Energy, along with its counterpart in Britain, hope to use the facility for conducting thermonuclear explosions for nuclear weapons research. A similar facility, called Laser Mégajoule, is planned in France.

End Nuclear Explosions

A testing moratorium is one of the most important declarations that a country can make to show it is serious about non-proliferation and disarmament. The US is the only country whose legislature has rejected ratification once it has been brought to a vote (see box on page 17), which has seriously damaged US credibility and leadership on international non-proliferation efforts. The US will only maintain what little leverage it has left as long as it does not test. In 1992, the US Congress mandated a temporary unilateral nuclear testing moratorium, which was a major factor in restarting the nuclear test ban negotiations. President Bill Clinton has twice extended this moratorium and again pledged to continue the moratorium after the Senate rejected the CTBT.

There are two other major drivers to maintain a worldwide testing moratorium until a CTBT formally enters into force: popular enforcement and foreign government pressure. In order for popular enforcement (i.e. public pressure) to be effective, the political and economic consequences of nuclear testing have to be clear to any governments considering resuming testing (or testing for the first time). The public outcry over the French test series in 1995-1996 and the accompanying boycotts of French products could be a model for future actions against states that conduct nuclear explosions. The nuclear tests by India and Pakistan also resulted in public and governmental opposition.[1] However, more important than actions taken after a country has tested, popular enforcement must be geared towards *preventing* nuclear explosions. Such action could take the form of public demonstrations of support for the moratorium, political organizing to persuade leaders, and/or the clear threat of political and economic penalties for testing from within and outside individual countries.

More important than actions taken after a country has tested, popular enforcement must be geared towards *preventing* nuclear explosions.

The New Agenda Coalition's successful efforts to pass disarmament votes in the United Nations (in

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which key NATO allies abstained rather than voting with the nuclear powers) demonstrates that political support exists for stronger action on nuclear disarmament, including a halt to nuclear testing.[2] Governmental pressure for a continued moratorium should be exerted through the United Nations, the NPT Review Conference and other fora. An enduring testing moratorium should also include support for the verification regime, strict adherence to the spirit and letter of the CTBT (see below), and closure of existing nuclear weapons test sites as well as their clean-up.

Strengthening the ties between governments and civil society in those countries where government support for a test ban is strong would significantly enhance both popular enforcement and governmental pressure. The strength of such coordinated action has already proven to be effective and was key in establishing the current test moratorium. In another field, the successful campaign for an international treaty to ban land mines is a good example of this type of governmental/non-governmental cooperation. Coordinated action by governmental and non-governmental actors advocating disarmament would be difficult for any country to ignore. The ultimate goal must be to bring all governments within the legal framework and to hold all governments equally accountable before the law. Pressure on the United States and other countries reluctant to endorse the treaty would also be greatly enhanced by the ratification of the treaty by Russia and by the signing of the treaty by India and Pakistan.

End Nuclear Weapons Development

In order to fulfill its dual purpose, a comprehensive test ban must constrain nuclear weapons development by all states, including the nuclear weapons states. For those states currently without nuclear weapons, a monitored testing moratorium would make development of a weapon far more difficult than it is today. However, placing effective constraints on the improvement of existing arsenals by the nuclear weapons states is more complex due to their extensive experience with nuclear weapons design and testing. The nuclear weapons states, most notably the United States and France, have instead tied their adherence to a CTBT with the entrenchment of their nuclear weapons design programs.

The primary reason behind these multi-billion dollar programs is ostensibly to maintain the safety and reliability of the nuclear weapons arsenals indefinitely as they age. Another objective is to "provide and demonstrate the capability to design and develop replacement nuclear weapons and associated components."[3] This is being done through vastly expanded nuclear weapons experimentation and computer modeling capabilities. However, it has been shown that these stockpile stewardship programs have little to do with safely maintaining arsenals in the context of a path towards disarmament (see IEER's report *Nuclear Safety Smokescreen*). Rather, they are explicitly designed to maintain and even expand the ability of the nuclear weapons states to design new nuclear warheads and redesign existing warheads.[4] While most components of the stockpile stewardship programs do not technically violate the CTBT, their emphasis on nuclear weapons design certainly violates the spirit of the treaty. However, the large laser fusion facilities at the center of both the US and French programs violate the letter of the treaty. The U.S. National Ignition Facility (NIF) and the French Laser Mégajoule (LMJ) are designed to create small thermonuclear explosions in the laboratory. According to IEER's analysis, they would violate Article I of the CTBT, which bans all nuclear explosions, and would effectively erase any upper limit on thermonuclear explosions if allowed to operate.[5] Britain is contributing

Ratification of the CTBT should not be connected to the funding of any program designed to maintain, expand, and exercise capabilities to design nuclear weapons.

CTBT RATIFICATION

For the CTBT to take effect, ratification is required from the 44 nuclear-capable countries. As of October 1999, 41 of these countries have signed the treaty (*), 26 have signed and ratified (**bold**), and one has voted down the treaty (*italics*).

Algeria*, **Argentina**, **Australia**, **Austria**, Bangladesh*, **Belgium**, **Brazil**, **Bulgaria**, **Canada**, Chile*, China*, Colombia*, Democratic People's Republic of Korea (North Korea), Democratic Republic of the Congo*, Egypt*, **Finland**, **France**, **Germany**, **Hungary**, India, Indonesia*, Iran*, Italy*, Israel*, **Japan**, **Mexico**, **Netherlands**, **Norway**, Pakistan, **Peru**, **Poland**, **Republic of Korea (South Korea)**, **Romania**, Russian Federation*, **Slovakia**, **South Africa**, **Spain**, **Sweden**, **Switzerland**, Turkey*, Ukraine*, **United Kingdom**, *United States*, and Vietnam*.

Source: Coalition to Reduce Nuclear Dangers, http://www.clw.org/coalition/bkgrsign.htm.

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to the US effort and is therefore in violation of Article I, which also prohibits encouragement and support of nuclear explosions.

Popular enforcement and governmental pressure to maintain a nuclear testing moratorium must also be extended to ending the stockpile stewardship programs of the nuclear weapons states, at least in so far as they violate the CTBT and are oriented to new weapons design. Specifically, ratification of the CTBT should not be connected to the funding of any program designed to maintain, expand, and exercise capabilities to design nuclear weapons, because such a program is inconsistent with the treaty. While a small number of NGOs have focused on ending these programs in order to achieve a more durable test ban, these efforts need a broader coalition of NGOs and governments to succeed. Sympathetic governments must use international fora to press the nuclear weapons states to comply with their obligations under the CTBT, including challenging the NIF and LMJ projects, which should be cancelled. For their part, national legislators in the nuclear weapons states can stand up to entrenched political and economic interests through their legislative, budgetary and oversight capacities.[6]

Stockpile stewardship programs could be re-designed into engineering-based programs leading to disarmament. Such programs would focus on monitoring warheads and maintaining warhead safety without an emphasis on design and production. National policies within the nuclear weapons states that prohibit the research, design, development or production of new nuclear warhead types[7] would be a significant step towards demonstrating compliance with the CTBT.

Conclusion

Despite the current situation with regards to the CTBT, the fundamental purpose of the treaty can still be achieved through concerted action. Such actions should have three main goals. First, international norms against nuclear explosions and nuclear weapons design programs should be further strengthened in order to achieve the goals of the CTBT even without a treaty in force. Second, countries outside, or on the margin, of the current legal framework (especially the United States, India, Pakistan, and North Korea) should be brought into that framework. Third, equality before the law for both nuclear and non-nuclear weapons states must be ensured. All three of these goals can only be achieved by a combination of popular, governmental, and legislative pressure, preferably in coordination with one another. Only then will the nuclear weapons beast be caged.

1 It should be noted that since neither country has signed the NPT they can claim that they are within their international legal rights to test and develop nuclear weapons. By contrast, the United States and France do have legal obligations under the NPT and the CTBT. The outcry over the Indian and Pakistani tests shows that there is a strong international norm against testing. As explained by George Bunn in "The Status of Norms Against Nuclear Testing" (*Nonproliferation Review*, vol. 6 no. 2, Winter 1999), the current norm is a combination of political and legal norms resulting from treaty obligations as well as political activities (e.g., official statements and UN resolutions). Bringing all countries into the legal framework would further codify that norm.

2 The New Agenda Coalition consists of 7 countries (Brazil, Egypt, Ireland, Mexico, New Zealand, South Africa, and Sweden). In both 1999 and 1998, the Coalition introduced successful resolutions in the UN calling for a reinvigorated disarmament process and suggesting a path forward. For more information, see http://www.acronym.org.uk.

3 US Department of Energy, *Stockpile Stewardship and Management Plan: First Annual Update.* October, 1997, page 5-8. This includes a program to demonstrate the ability to "design a replacement warhead for an existing weapon that will be producible in the future complex and certifiable without a nuclear test." page 5-9.

4 See IEER's 1996 report, *Nuclear Safety Smokescreen*, for a detailed critique of the rationale behind the stockpile stewardship plans of the United States. See the DOE's annual *Stockpile Stewardship and Management Plan* for explicit statements regarding maintaining the ability to design and certify new or modified warheads without underground testing.

5 See IEER's 1998 report *Dangerous Thermonuclear Quest*, and *Pure Fusion Weapons?* article in SDA vol. 6 no. 4 double issue (October 1998).

6 The effort of US Senator Tom Harkin of Iowa provides a good example. Senator Harkin has formally requested an explanation from the Secretary of Energy of the legal and technical justification for the U.S. position that the National Ignition Facility is exempted from the CTBT.

7 Existing warheads can be modified or repackaged to provide them with new military capabilities. For details on current and future nuclear weapon design activities in the US, see Greg Mello, "That Old Designing Fever," *Bulletin of the Atomic Scientists*, January/February 2000, page 51.

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AtomicPuzzler

In Pursuit of Nuclear Trivia

Today is Gamma's lucky day!! Gamma has been invited onto a television game show and needs to practice answering some trivia questions. Can you help?

1. Which US president advocated complete nuclear disarmament during a summit meeting in Iceland?

2. What seven countries make up the New Agenda Coalition?

3. What international organization is responsible for verifying compliance of the non-nuclear weapons states with Article II of the Non-Proliferation Treaty?

4. What international organization is responsible for verifying compliance of the nuclear weapons states with Article VI of the Non-Proliferation Treaty?

5. How many U.S. and Russian nuclear warheads are currently kept on high alert?

6. Approximately how many Chinese nuclear warheads can reach the United States and of these how many are kept on high alert?

7. How much money is being spent this year by the US government on ballistic missile defense systems?

8. What is the approximate total yield of the British Trident submarine nuclear force (as of March 1998)?

9. What are three verification technologies applicable to nuclear treaties?

10. Approximately how many nuclear test monitoring stations are currently operational?

11. How many would be operational if the CTBT enters into force?

Send us your completed puzzler via fax (301-270-3029), e-mail (ieer@ieer.org), or regular mail (IEER 6935 Laurel Ave., Suite 204, Takoma Park, MD 20912 USA), postmarked by **March 31, 2000**. IEER will award 25 prizes of $10 each to people who send in a completed puzzle (by the deadline), right or wrong. There is one $25 prize for a correct entry, to be drawn at random if more than one correct answer is submitted. International readers submitting answers will receive a copy of IEER's report *Dangerous Thermonuclear Quest* in lieu of a cash prize, due to exchange rates.

Answers to Atomic Puzzler, *SDA* vol. 8 no. 1, November 1999, "Gamma Does Dose and Risk"

1) 100,000 person-rem or 1,000 person-Sv
2) 1,000,000 person-rem or 10,000 person-Sv
3) a) 10 rem or 0.1 Sv
   b) yes
4) a) cancer risk
   b) 12.5 person-Sv
   c) 0.0025 Sv
   d) 800 cancers
5) 0.04 fatal cancers per person-Sv

The 2000 NPT Review Conference

The Nuclear Non-Proliferation Treaty (NPT) entered into force in 1970 and bound the nuclear weapons states to achieve nuclear disarmament (Article VI) and to share commercial nuclear technology (Article IV) in return for the non-nuclear weapons states forsaking the development of nuclear weapons (Article II). The treaty also established a review process in which all the parties to the treaty would meet to evaluate to operation of the treaty every five years. After twenty-five years, the parties would meet to determine the future of the treaty.

During the 1995 Review and Extension Conference, the parties to the treaty met and agreed to indefinitely extend the treaty. Among the agreements made at this extension conference was a decision to continue and strengthen the review procedures and a series of Principles and Objectives, which re-affirmed the basic obligations of all the parties to the treaty. Notably, the Principles and Objectives included a renewed commitment on the part of the nuclear weapons states to meet their Article VI obligations regarding nuclear disarmament.

In April and May 2000, the parties to the NPT will meet again in New York for the first Review Conference since the decision to extend the treaty. This Review Conference will be particularly important, not only substantively, but also in evaluating whether the Principles and Objectives are being followed. However, the preparatory meetings for the conference have been highly contentious with significant disputes arising, particularly concerning the commitment of the nuclear weapons states to disarmament. The actions of the nuclear weapons states in other arenas and the stated commitment of some states to maintain their nuclear arsenals indefinitely have further raised serious concerns about whether the nuclear weapons states are adhering to their NPT obligations (see editorial on page 1).

RECOMMENDATIONS

In order for the 2000 Non-Proliferation Treaty (NPT) Review Conference to be successful, the nuclear weapons states parties must make specific commitments towards meeting their obligations. The 2000 NPT Review Conference should affirm that:

- The interpretation of Article VI of the NPT by the International Court of Justice is binding upon the nuclear weapons states parties to the NPT, and that these states are obliged to actually accomplish nuclear disarmament "in all its aspects."
- Nuclear weapons states must complete de-alerting of all nuclear weapons, by separating all warheads from their delivery systems and storing them under multilateral monitoring, as soon as technically feasible.
- The United States and Russia, but also all other parties to the NPT, must adhere to the terms of the Anti-Ballistic Missile (ABM) Treaty as signed in 1972, since deployment of national ballistic missile systems will increase first strike potential of nuclear arsenals.
- All parties must adhere strictly to the letter and spirit of the Comprehensive Test Ban Treaty, which is both a non-proliferation and nuclear disarmament treaty, for the indefinite future.

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