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Dear Colleagues,

with this special Newsletter edition issued on the occasion of the *Chornobyl* +20 conference, the International Network of Engineers and Scientists for Global Responsibility (INES) and its nuclear weapons working group, INESAP, want to trigger a discussion among conference participants on the inextricable link between nuclear energy and nuclear weapons. The articles in this newsletter will hopefully help to bring to your attention a very relevant topic. As organizations originating from critical science which is very concerned about the peace-related (or proliferation-prone) aspects of nuclear energy, we want you to understand why we believe that "nuclear power powers the bomb."

The current debates about possible intentions of Iran to use "peaceful" nuclear energy as a cover to eventually build nuclear bombs (culminating in the open discussion of war scenarios to prevent such proliferation of dangerous nuclear technologies) are just the latest proof to the principal dual-use character of nuclear energy. In this context, the role of the International Atomic Energy Agency (IAEA) is to be questioned. The IAEA is supposed to prevent any misuse of nuclear technology for military purposes by means of (never quite adequate) controls and safeguards while at the same time being tasked with promoting and facilitating worldwide use of this highly proliferation-sensitive technology.

We therefore came to the conclusion – and that is what we want to promote at this congress: nuclear energy *and* nuclear weapons need to be abolished together. Our goal must be a nuclear-free world. Only when we achieve this goal, can the door be opened for shaping a peaceful world.

Claus Montonen, Chair of INES
Regina Hagen, INESAP Coordinator
Reiner Braun, Project Manager of INES

Our challenge to end the nuclear age

by David Krieger

It is crazy, actually crazy, that the human species is not doing more to eliminate nuclear weapons and war. Almost unbelievably, 15 years after the end of the Cold War, the US and Russia each maintain some 2,000 nuclear weapons on high alert, ready to be launched within moments of an order to do so.

In 1995, a failure in communications concerning the launching of a US-Norwegian weather satellite almost resulted in Russian President Yeltsin mistakenly launching a retaliatory attack against the United States. Today there remain more than 20,000 nuclear weapons in the world in the arsenals of nine countries (US, Russia, UK, France, China, Israel, India, Pakistan and North Korea).

Ever since the Nuclear Age began some 60 years ago, humankind has been at risk of annihilation by tools of its own invention. Humankind has proven that it is smart enough and technically competent enough to develop the means of its own annihilation. Now it faces the test of proving that it is collectively wise enough to keep these destructive tools from proliferating and being used again.

Albert Einstein famously said: "The splitting of the atom has changed everything save our modes of thinking, and thus we drift toward unparalleled catastrophe." Einstein was a wise man who could see the problem clearly. Our leaders today are not particularly wise, and many are greedy. Thus, we drift toward "unparalleled catastrophe."

What can be done? The starting point is to realize that we need new leaders. The risk is too great to continue to drift with leaders who fail to take action to eliminate nuclear weapons and war. One of the problems with the political leaders in the nuclear weapons states is that they follow the money, and lack the courage to

take a stand against nuclear weapons and war because they are profitable ventures.

From the outset of the Nuclear Age, the nuclear weapons states have spent obscene amounts of money, in all likelihood upwards of $10 trillion, on nuclear weapons and their delivery systems. The US alone has spent over $6 trillion. This does not include the costs to human health and life of more than 40 years of nuclear testing. Nor does it include the costs of lost opportunities to provide food to the hungry, education to the impoverished, health care to the needy, and shelter to the homeless. Nuclear weapons and war have wrung the decency out of our societies. Even today, the world wastes some $1 trillion annually on so-called defense expenditures, with the United States spending half of the total.

To make war instead of peace, to support armaments instead of education, and to continue to threaten nuclear retaliation because some countries can, is a sign of moral bankruptcy in our global leadership – political, economic, social and religious. We need a worldwide movement to rise up against such leadership and topple it. If humankind is to survive the Nuclear Age, we need leaders with vision, courage and compassion. We need leaders who stop feeding the weapons and war profiteers, and start feeding the hungry. The world cannot long endure the mediocrity and mendacity of those who make war without giving peace its due. We need leaders who are willing to disarm their minds, and open them to Einstein's call for a new way of thinking. Only such leaders can move us away from the nuclear precipice and toward a decent and just future.

Today's world is in moral crisis. Many leaders in key countries are abandoning international law in the mistaken belief that conflicts can be resolved by frontier justice. It is not likely that the leaders will change without being driven from office by people power. In China, they have a concept known as the "mandate of heaven." It means that leaders are only allowed to rule by the people when they rule justly, and when they do not the people withdraw their authority so that the rulers fall. Throughout the world, many leaders have lost the "mandate of heaven," and thus their right to rule. The power to change leadership rightly resides with the people.

If we are to find visionary leaders to replace our current leadership, we must first recognize how badly new leadership is needed. Ordinary people are going to have to wake up to the dangers of the Nuclear Age, and stay alert to these dangers. They are going to have to become participants in creating the future. They are going to have to demand peace, and stop participating and allowing their children to participate in war. They are going to have to demand that their societies stop allocating their resources to war and start allocating them to the betterment of all. They are going to have to start seeing security in human terms rather than explosive power. They are going to have to demand that leaders be held to account for crimes against peace, war crimes and crimes against humanity. Many of today's leaders deserve their day in the criminal dock, just as those at the Nuremberg Tribunal did in their day.

Civil society organizations that work for peace and justice can give form and power to citizens' movements. I was involved in founding such an organization, the Nuclear Age Peace Foundation, nearly 25 years ago. If you would like more information on nuclear dangers, go to the Foundation's website at www.wagingpeace.org. You can sign up there for *The Sunflower*, a free monthly e-newsletter on nuclear dangers, nuclear disarmament and nuclear insanity. You can also sign up for the Turn the Tide Campaign to take action on specific nuclear dangers.

I also encourage you to become involved in other civil society organizations, such as the Abolition 2000 Global Network to Prevent War (www.abolition2000.org), the Mayors for Peace 2020 Vision Campaign to Ban Nuclear Weapons (http://www.mayorsforpeace.org/english/campaign/2020vision.html), the International Network of Engineers and Scientists for Global Responsibility (www.inesglobal.org), the International Peace Bureau (www.ipb.org), and Global Action to Prevent War (www.globalactionpw.org).

By participating in civil society organizations working for peace and justice, you can help give birth to a new world, a world without war and the threat of nuclear annihilation. You are needed. By becoming an active force for peace, you will become part of the solution.

The creation of nuclear weapons has made it necessary to do things that humankind has never done before. We must cooperate on a worldwide scale. We must eliminate a weapons system that could otherwise eliminate us. We must adhere to existing international law and support existing international institutions, while working to create and support new laws and institutions at the global level capable of ending war. It is a challenge unprecedented in human history, but a necessary one if human history is to continue on our precious planet.

David Krieger is president of the Nuclear Age Peace Foundation (www.wagingpeace.org).

Iran's Nuclear Programme – Civilian or Military?

By M. Kalinowski

Iran is running a nuclear programme that is a cause for concern. Iran claims that it is purely civilian. But behind the civilian programme there could be military intentions and it could also be the case that Iran already has or has had a military programme. There is, however, no evidence for this at all. Admittedly, there are many disconcerting indications that could be interpreted to mean that their intentions are more military than civilian in nature. But intentions cannot be proven when dealing with dual-use technology. Iran has provided a more or less plausible explanation for every single indication that has been discovered, claiming only civilian purposes. Iran quotes its right according to Article IV of the nuclear Non-Proliferation Treaty (NPT), whereby every party should be provided with full access to civilian nuclear technology. Because of the nature of dual-use it cannot be proven that Iran is in violation of the NPT. No activities have been found that could only serve military purposes and would therefore deliver clear proof of the existence of a secret nuclear weapons programme. However, the situation is very serious for Iran, since it has breached its NPT Safeguards Agreement with the International Atomic Energy Agency (IAEA) on several occasions.

What Is to Be Done?
Strict Adherence to All Safeguards Obligations

The discovered breaches in the past should give occasion for the IAEA to exhaust all possibilities during further monitoring of Iran that are offered by the Safeguards Agreement and the Additional Protocol. All unanswered questions and contradictions have to be completely cleared up. All signs have to be followed up. For instance, there is allegedly an extensive complex of underground tunnels near Teheran that, according to information from an Iranian opposition group, are being used for nuclear activities. These have to be inspected by the IAEA. Iran has to allow all these measures. It has to make sure that all activities are made fully transparent and disclosed and should support the IAEA in clarifying historical events.

Experience shows, however, that even if every possible verification method is exhausted, it remains an extremely difficult task to uncover undeclared installations and material. Often a hint from outside is needed in order to bring undeclared nuclear activities to light and inspect them. The early discovery of the construction of an uranium enrichment plant in Natanz was made by a civilian organisation, the National Council of Resistance of Iran (NCRI), and made known in August 2002. When Iran protracted the planned IAEA inspection, due to take place in 2002, another civilian organisation, the Institute for Science and International Security (ISIS), became active and published satellite pictures that documented the progress of construction at the site. The IAEA was not able to visit the construction site until February 2003 and confirm the suspicions. A similar process took place with the heavy water production plant in Arak and also with the uranium centrifuges tested in Abali. The IAEA then found the traces of highly enriched uranium at the latter that were the subject of debate for a long time.

Improvement of Nuclear Safeguards

The potential of existing methods and technologies used for safeguards obviously need improving as regards their chances of uncovering undeclared activities.

For this reason the General Assembly of the IAEA decided in 2004 to develop new methods and technologies, in particular to accelerate the implementation of the Additional Protocol. In order to implement this decision, the agency called on all member states to support the search for, and development of, new technologies that can enable detection of undeclared nuclear material and installations for production. Primarily, what was meant was the discovery of the undeclared operation of reprocessing or uranium enrichment plants.

The following technologies were explicitly named within the request:

- detectors based on laser diodes for UF_6 and HF gas as an indicator of unreported uranium enrichment;
- monitoring and sampling of atmospheric inert gases (in particular krypton-85) for detecting secret plutonium separation and unreported reactor operation;
- antineutrino detectors to find undeclared reactor operations;
- geophysics methods for detecting undeclared facilities such as tunnels or hidden rooms or for verifying design information;
- *in situ* analysis of environmental samples.

The Additional Protocol provides the most important legal basis for the use of these new technologies. The technical possibilities of implementing this agreement are, however, not nearly exhausted. This is because further development and adjustment of the appropriate measurement technology for use in the field has to be carried out. On the other hand, procedures are missing about how to use these verification methods and a basic understanding of their possibilities and limits. Last but not least, high development costs and limited budgets stand in the way of speedy application.

Environmental samples are named as particularly relevant. In the Additional Protocol there are two different categories: on the one hand, samples taken at defined locations (location-specific environmental samples), and on the other hand, the operation of a network of stations over a wide area (wide-area environmental sampling). The latter has not as yet been carried out and needs to have a new board decision from the Governors to define an appropriate procedure. The first category includes swipes from surfaces from declared installations and their subsequent analysis in certified laboratories. These are carried out by the IAEA routinely and in large numbers and have brought important successes. They show, however, the problem of measuring processes, known as nuclear forensics because the analysis of traces and their interpretation requires almost criminological skill. The reliability of a positive measurement is not easy to prove and false alarms have to be reckoned with. A country which is under suspicion can therefore cast doubt on a positive result as being a mistake in measurement. When dealing with an imported installation, the origin of an incontrovertible trace can be shifted onto the previous owner. In the case of the swipe from Abala, it was actually the case that contamination by the previous owner directed suspicion onto Iran.

Clear Signs of a Nuclear Weapon Programme Should be Seen as a Breach of the NPT

A serious weakness of the NPT verification system lies in the inability to use the fabrication of nuclear weapons components, that do not contain fissile material, as official evidence of a violation of the treaty. This is because verification specifically refers to nuclear materials. Dual-use makes it very difficult to find clear evidence of nuclear weapon production. The already mentioned example of polonium-210 exemplifies this.

The IAEA can only use pertinent indications of a possible nuclear weapon programme as a reason to more precisely conduct permitted checks on nuclear weapon grade material. Only when there is evidence of the diversion of plutonium or highly enriched uranium may the IAEA report a breach of the NPT. Indeed, if such a circumstance should occur then no excuse would be accepted. The purpose of the diversion would not be examined. Such an examination would indeed be very difficult because of the dual-use nature. So any proved diversion of at least a significant amount of weapon grade nuclear material is seen as a breach of Article II of the NPT. However, there are reprocessing plants in which occasionally even more than significant amounts remain unaccounted for during a material audit. The hypothesis of a possible diversion is not pronounced if this amount could be explained by the statistically possible errors in the measurement.

Forbidding Iran Specific Nuclear Activities or a Voluntary Renunciation?

It has been demanded by many sides that Iran should not be allowed to operate a uranium enrichment or reprocessing plant. It is feared that they would hide military intentions behind ostensibly civilian purposes. As well as dual-use there is another argument for such a measure. Should a purely civilian nuclear programme actually exist then it represents a considerable latent proliferation risk. A secret nuclear weapon programme could progress a long way before fissile material was to be used. As soon as the access to fissile material is used for building a bomb it becomes key that the diversion be recognised very quickly. The IAEA works with strict time specifications as targets for detection that are defined by the amount of time it takes for material used for making a nuclear weapon to be processed. With directly usable material such as highly enriched uranium (with more than 20% uranium-235), not more than one month is allowed to go by before it has to be detected. Several observers would like to avoid such a time-critical situation by disallowing directly usable nuclear material to exist or be produced in Iran.

A ban on certain civilian nuclear activities would, however, contradict Article IV of the NPT, according to which Iran has an inalienable right to the procurement and use of civilian nuclear technology. Some experts see this differently. They are of the opinion that a state that has come under suspicion, and in particular if it has breached its Safeguards Agreement, no longer has full rights under

Article IV of the NPT. Iran will not yield to this argument.
The dilemma between compliance with Article IV of the NPT and the military use of installations and material declared as being for civilian purposes could only be solved should Iran voluntary renounce civilian use. The EU-3 managed to convince Iran to at least suspend its uranium enrichment with the Teheran Joint Statement. But in the medium-term it seems futile to expect to sustain a voluntary renunciation, even if there are trade-offs as a motivation to do so.

Would an Internationalisation of Critical Installations Help?

Hope has been placed in the proposal of internationalising the operation of critical nuclear installations. Ideally, no one single country would then have physical control over the nuclear material. But already existing international cooperation for uranium enrichment, such as Eurodif or Urenco, have not achieved this. An earlier proposal by South Africa as well as the recent one by Russia envisage that Iran would participate in uranium enrichment without carrying it out on their own territory. Russia proposed in November 2005 that Iran could continue to carry out conversion of UF_6 in the country, but would transport the gas to Russia, where it would be enriched and processed into fuel. Iran would get a share of the profit from the sales of fuel rods.

One should not forget, however, that Iran has already had a negative experience with a similar enterprise. Iran entered into a nuclear cooperation agreement with France and bought into the European uranium enrichment consortium Eurodif as a partner. With this, Iran purchased the right to 250–300 tonnes of 3% enriched uranium. In the eighties, Iran showed no interest and did not keep up with its payment obligations under the Eurodif agreement. But when Iran wanted to receive uranium in 1991 there was a legal action with France who no longer felt bound by the contract. Since then, Iran has not got its financial share back from Eurodif and France has promised the US that it will not release the enriched uranium that Iran has a claim to. When France, together with other countries, now demands from Iran that it should not enrich uranium itself, one can guess how this is received in Iran.

Renunciation as an International Norm

The basic problem might be solved by introducing a global norm of renunciation. Doing without the use of critical nuclear technology has to become a general norm that all countries agree to. Refusing access to technology to a single country like Iran could no longer be seen as a breach of Article IV of the NPT, nor would one country be discriminated against.

The aim of such a norm of renunciation would be to make it impossible to have access to directly usable weapon grade nuclear material through nationally controlled civilian programmes. This would involve the following measures:

- no reprocessing and no further use of plutonium;
- no research reactors that are run on highly enriched uranium;
- the stockpiles of unirradiated plutonium would be burnt in suitable reactors;
- uranium enrichment would be limited to internationalised plants;
- excess stockpiles of highly enriched uranium and plutonium would be stored behind several barriers so that access is made as difficult as possible.

These measures have been proposed on earlier occasions, such as in the concept for a Comprehensive Cutoff Convention[1] and in the Model Nuclear Weapons Convention.[2]

The aspect of non-discrimination by the NPT could be better implemented if the nuclear weapons states were to fulfil their obligation under Article VI and disarm.

Conclusions
There is no evidence for the existence of a nuclear weapon programme in Iran. However, Iran did breach its obligations under the Safeguards Agreement as well as under NPT Art. III before October 2003 and conducted numerous suspicious activities without reporting them or allowing them to be

[1] See Martin B. Kalinowski, Outline of a Comprehensive Cut-Off Convention, in: Martin B. Kalinowski (ed.), Global Elimination of Nuclear Weapons, Nomos Verlag, Baden-Baden, 2000.
[2] See Merav Datan, Alyn Ware, Martin Kalinowski, Jürgen Scheffran, Victor Seidel, John Burroughs, Security and Survival. The Case for a Nuclear Weapons Convention, published by IPPNW/IALANA/INESAP, Cambridge, Massachusetts, 1999.

monitored. All nuclear material and installations that have been found in Iran are now monitored by IAEA inspectors. A cause for concern is the possibility of further or new secret nuclear activities in Iran and that these might serve a military purpose. This concern is gaining in importance because the IAEA has learnt that it could not detect most of the undeclared activities without assistance from outside. Thus efforts have been intensified to improve the capabilities to detect secret nuclear activities through using new measurement techniques.

Iran has an unalienable right under Article IV of the NPT to the procurement and operation of civilian nuclear technology. This brings with it the problem of the dual-use of nuclear technology. It acts problematically in more than one way:

- It enables military intentions to be camouflaged by a civil programme.
- It makes it extremely difficult or even impossible to recognise whether indications that are found are in fact evidence of military intentions.
- It induces fear of civilian programmes in which a latent risk of proliferation is slumbering.
- It causes irreconcilable positions that, together with the NPT deal (guarantee of civilian nuclear technology as a trade-off for the renunciation of nuclear weapons) could lead to an escalation that threatens peace.

The only solution that goes further than the current damage limitation attempts is to create a global norm of non-availability of nuclear weapon grade material and to fully implement the norm of a nuclear weapon free world.

Summary of the NPT articles referred to
Article I: No non-nuclear weapon state that is party to the teaty is allowed to produce or otherwise acquire a nuclear warhead.
Article III: (1) and (2): Non-nuclear weapon states must accept full-scope safeguards for all of their source or special fissionable material.
Article IV: Civilian nuclear technology is an inalienable right for every party to the treaty and there exists an obligation to make it available.

This is an extract of a longer article that will be published in INESAP Information Bulletin #26 (April 2006; www.inesap.org/publ_bul.htm) in full length; the complete article gives a detailed account of alledged breaches of obligations by Iran and explains the facts behind the allegations.

Translated from German by Xanthe Hall.

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Wrong Ends, Means, and Needs: Behind the U.S. Nuclear Deal With India

by Z. Mian & M.V. Ramana

President George W. Bush and Indian Prime Minister Manmohan Singh issued a joint statement on July 18, 2005, laying the grounds for the resumption of full U.S. and international nuclear aid to India. Such international support was key to India developing its nuclear infrastructure and capabilities and was essentially stopped after India's 1974 nuclear weapons test. India's subsequent refusal to give up its nuclear weapons and sign the nuclear Nonproliferation Treaty (NPT) has kept it largely outside the system of regulated transfer, trade, and monitoring of nuclear technology that has been developed over the last three decades.

The July agreement requires the United States to amend its own laws and policies on nuclear technology transfer and to work for changes in international controls on the supply of nuclear fuel and technology so as to allow "full civil nuclear energy cooperation and trade with India." In exchange, India's government would identify and separate civilian nuclear facilities and programs from its nuclear weapons complex and volunteer these civilian facilities for International Atomic Energy Agency (IAEA) inspection and safeguarding. Yet, as they consider the deal and ways to transform its broad framework into legal realities, political elites in each country have ignored some crucial issues.

Policy analysts in the United States have debated the wisdom of the deal. This debate has been rather narrow, confined to proliferation policy experts and a few interested members of Congress, and largely focused on the lack of specific details with regard to the deal, the order of the various steps to be taken by the respective governments, and the potential consequences for U.S. non-

proliferation policy. The larger policy context of a long-standing effort to co-opt India as a U.S. client and so sustain and strengthen U.S. power, especially with regard to China, has gone unchallenged. There is also little recognition of how the agreement could allow India to expand its nuclear arsenal.

The deal has incited a wider and more intense debate in India on questions of national security, sovereignty, development, and democracy. Some would like to see as few constraints as possible on increasing the future capacity of India's nuclear weapons complex, and others question the extent to which nuclear energy can help meet India's energy needs. Despite the many claims that the social, economic, and political well-being of the people of India will be enhanced by this deal, there has been little attention paid to the issue of whether India needs nuclear weapons at all, the costly failures of the Indian nuclear energy enterprise, and the possible harm for the people of India from a continued expansion of the nuclear complex.

Misplaced U.S. Goals

The nuclear deal has to be seen in the context of efforts over the last 50 years to incorporate India into U.S. strategy in Asia. After the Chinese revolution, the United States came quickly to believe that newly independent India was the only potential regional power that could compete with China for dominance in Southeast Asia. Despite repeated U.S. efforts to use economic and military aid to promote this policy, India's first prime minister, Jawaharlal Nehru, refused to have his country play this role. He said that a free India would not be a pawn for great powers, and warned that this kind of alliance building by great powers was bad for international relations and could lead to war.

Still, U.S. hostility toward Communist China led to some extraordinary ideas about nuclear cooperation. In the wake of China's first nuclear weapons test in 1964, senior officials in the Department of State and the Pentagon considered the possibilities of "providing nuclear weapons under U.S. custody" to India and preparing Indian forces to use them. At the same time, the U.S. Atomic Energy Commission was considering helping India with "peaceful nuclear explosions," which would involve the use of U.S. nuclear devices under U.S. control being exploded in India. These plans were dropped amid growing fears of the consequences of proliferation for U.S. military and diplomatic power, and the United States turned instead to preventing the further spread of nuclear weapons.

The end of the Cold War prompted a rethinking of strategic possibilities and a now infamous 1992 draft Defense Planning Guidance prepared for then-Secretary of Defense Dick Cheney, which declared that "[o]ur first objective is to prevent the re-emergence of a new rival. This is a dominant consideration underlying the new regional defense strategy." It noted, "We must maintain the mechanisms for deterring potential competitors from even aspiring to a larger regional or global role." In other words, the geopolitical order was to be frozen as it then was, with the United States assured of maintaining its relative superiority in the different regions of the world. A key concern was China.

The first dramatic change in Indo-U.S. relations came during a March 2000 visit by President Bill Clinton to India, less than two years after India's 1998 nuclear tests. The governing coalition then was dominated by the Hindu nationalist Bharatiya Janata Party (BJP), whose views are strongly anti-Communist, aggressively pro-nuclear weapons, and opposed to the more traditional strategy of nonalignment. The joint statement issued by the two leaders declared that " India and the United States will be partners in peace, with a common interest in and complementary responsibility for ensuring regional and international security. We will engage in regular consultations on and work together for strategic stability in Asia and beyond."

Further developing the idea of the United States and India as strategic partners in managing regional and international security, the "Next Steps in Strategic Partnership," signed in January 2004, announced that the United States would help India with its civilian space programs, high-technology trade, missile defense efforts, and civilian nuclear activities. The subsequent nuclear deal is but one of the building blocks promised in this larger arrangement. The purpose of the 2004 accord was made clear by a U.S. official who said the "goal is to help India become a major world power in the 21st century.… We understand fully the implications, including military implications, of that statement." These implications became clearer with the U.S.-India Defense Relationship Agreement of June 28, 2005. The thinking behind this agreement was explained by Robert Blackwill, who served in the first George W. Bush administration as U.S. ambassador to India and then as deputy national security adviser for strategic planning. In a rhetorical question, Blackwill asked, "Why should the U.S. want to check India's missile capability in ways that could lead to China's permanent nuclear dominance over democratic

India?" Less than a month later, the nuclear deal was announced.

Recruiting India may help reduce the immediate costs to the United States of exercising its military, political, and economic power to limit the growth of China as a possible rival. More generally, the United States sees Asia as central to global politics after the demise of the Soviet Union, and it needs strong regional clients there. The search for allies and friends is all the more important at a time when the United States was criticized because of its invasion and occupation of Iraq. On all these counts, India is seen as a major prize, and support for its military buildup and its nuclear complex seems to be the price the Bush administration is willing to pay.

This goal is, it seems, to be pursued regardless of how it will spur the spiral of distrust, political tension, and dangerous, costly, and wasteful military preparedness between the United States and China, between China and India, and between India and Pakistan. This last dynamic is already coming into view, as Pakistan has demanded from the United States (and been refused) the same deal as is being offered to India, and China wants any exemptions for international nuclear cooperation and trade to be offered not only to India but to be open to others, i.e., its ally, Pakistan. In all these countries, containing about one in three people on the planet, many of whom are very poor, this will amount to a tragic distortion of values and priorities. […]

How Many Bombs Are Too Many?

In particular, the deal promises to allow India access to the international uranium market. If the deal goes through, New Delhi will be able to purchase the uranium it needs to fuel those reactors it chooses to put under IAEA safeguards. This will free up its domestic uranium for its nuclear weapons program and other military uses and would allow a significant and rapid expansion in India's nuclear arsenal. India is believed to have a stockpile of perhaps 40-50 nuclear weapons, with fissile materials stocks for as many more, and plans that reportedly involve an arsenal of 300-400 weapons within a decade. Realizing these plans will require the production of much larger quantities of fissile material and at much higher rates than India has achieved so far. Such production of fissile materials specifically for nuclear weapons is not constrained by the deal.

India could use its newly unallocated domestic uranium to meet its fissile material needs in several ways. It could choose to build a large plutonium-production reactor to add to CIRUS and Dhruva, its two weapons-grade plutonium-production reactors at the Bhabha Atomic Research Centre in Bombay. CIRUS and Dhruva could continue to produce about 25-35 kilograms of weapons-grade plutonium a year. Another Dhruva-sized production reactor could yield an additional several bombs worth of such plutonium each year.

Another way in which India could increase its fissile material stockpile is to expand its small-scale centrifuge enrichment program and make highly enriched uranium (HEU) for nuclear weapons. So far, it is only believed to have enriched its domestic uranium to make fuel for the nuclear submarine that has been under development since the 1970s and has recently completed testing of its nuclear reactor. India could make HEU both for weapons and enriched fuel for its submarine if it no longer needs to rely on domestic uranium to fuel its power reactors.

There is also the possibility, as hinted at by some hawkish critics, that India's nuclear power reactors may become part of the weapons complex. For instance, if kept out of safeguards and with sufficient uranium supplies on hand, power reactors could be used to make weapons-grade plutonium by limiting the time the fuel is irradiated. Run this way, a typical 220-megawatt pressurized heavy-water reactor could produce 150-200 kilograms per year of weapons-grade plutonium when operated at 60-80 percent capacity. This could mean as much as an eightfold increase in the existing rate of plutonium production. The penalty to be paid in terms of the increased and less efficient use of uranium would be covered by access to imported uranium to be used in other power reactors. There would no longer be a trade-off between uranium for electricity generation and weapons plutonium production.

Neither does the deal constrain how India uses the weapons-useable materials produced so far. A major source of such weapons-useable material is the plutonium in the spent fuel of the unsafeguarded Indian power reactors. Over the years, some 9,000 kilograms of reactor-grade plutonium may have been produced in these reactors, though a large fraction of this plutonium is probably still not separated from the spent fuel. Even though it has a slightly different mix of the plutonium isotopes from the weapons-grade plutonium normally used for weapons, reactor-grade plutonium can be used to make a nuclear explosive. The United States conducted a nuclear test in 1962 using plutonium that was not of weapons grade, and one of India's May

1998 nuclear tests is reported to have involved such material. An estimated 8 kilograms of such plutonium is needed to make a simple nuclear weapon. If this spent fuel is not put under safeguards as part of the deal, India would have enough plutonium from this source alone for an arsenal of approximately 1,100 weapons, larger than that of all the nuclear-weapon states except the United States and Russia.

Finally, the fast-breeder reactor under construction also will be a source of plutonium. The Department of Atomic Energy has always resisted placing the breeder program under international safeguards and is doing so again when asked to do so as part of the deal. Anil Kakodkar, chairman of the Atomic Energy Commission and secretary of the Department of Atomic Energy, has said that the Prototype Fast Breeder Reactor will not be under safeguards because it is a research and development program and "any research and development programme, we are not going to put under safeguards." He has also pointed out that "only that which is clearly of no national security significance, only that part will be civilian." The department's resistance to safeguards on the breeder program begs the question as to whether this is or ever was intended only for civilian purposes.

Conclusion

If approved by Congress and India's parliament as well as the Nuclear Supplier Group (NSG), the U.S.-Indian nuclear deal will prove costly and dangerous. It will feed a cascade of mistrust, insecurity, and instability, diverting resources to a fateful military competition that will envelop China, India, Pakistan, and the United States. More broadly, it is difficult to see the deal as anything other than a fundamental rejection of the nonproliferation regime, as it abandons the assumption that access to nuclear fuel and technology must be within the terms of the regime. It undermines the aspirations of the vast majority of nations seeking global and regional nuclear disarmament.

The deal also will create the potential for the rapid buildup of a much larger Indian nuclear arsenal. It will bail out a failing Indian nuclear energy program that has had little regard either for the economics or the environmental and health consequences of its activities. It is also likely to offer little real benefit to India's poor. It is not often that so much harm may be done to so many by so few.

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This is an extract from a longer article published in Arms Control Today, January/ February2006 (www.armscontrol.org/act/2006_01-02/JANFEB-IndiaFeature.asp).
The sections omitted her deal with the (errant) debate in India, with India's nuclear energy failures, and with the question, why India needs nuclear electricity at all.

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The Inextricable Link: Nuclear Energy and the Bomb

By R. Hagen

"Nuclear power powers the bomb!" This slogan is spread across a huge inflatable nuclear power plant that has often been used for nuclear-related street events around the world.
"Nuclear power powers the bomb" means that nuclear energy makes the nuclear bomb possible in many ways. Know-how and skills, materials, technologies, processes, and methods. What is suitable for the peaceful uses of nuclear energy can also create the foundation for military uses, for building the bomb. The difference lies only in the intention.
This close link is nothing new. In its very first resolution of January 24, 1946, the United Nations General Assembly decided to install a "Commission to Deal with the Problems Raised by the Discovery of Atomic Energy." The resolution demonstrates that just five months after the use of a uranium and a plutonium bomb on the Japanese cities of Hiroshima and Nagasaki, respectively, the world community cherished the illusion that the (then) promising nuclear energy could be exploited while the terrible nuclear bomb could somehow be disposed of once and for all.
The Commission was tasked with drawing up proposals "for extending between all nations the exchange of basic scientific information for peaceful ends" and at the same time "for control of nuclear energy … to ensure its use only for peaceful purposes." Furthermore, the body was to make suggestions "for the elimination from national armaments of atomic weapons" as well as "for effective safeguards."
At that time, nuclear weapons were in the exclusive possession of the United States. The Soviet Union built its first nuclear weapons in 1949.
The inability – or the lack of will – of scientists, governments, and diplomats to acknowledge

the inextricable link between the civil and military utility of nuclear energy and the danger that nuclear weapons technology can be proliferated by means of "civil" nuclear know-how and technology plagues us to this day. According to the Swedish Peace Research Institute SIPRI, six decades after UN Resolution 1, the official and unofficial nuclear weapon states keep 26,500 nuclear warheads in their arsenals.

"The problem of nuclear energy is complicated by the fact that there is no such thing as non-weapon-grade plutonium. … The reality is [that] it is possible to make nuclear weapons out of almost any kind of plutonium at all. Every state that has a nuclear power plant produces plutonium…," says nuclear expert Zia Mian. And nuclear power or research reactors are now operated by more than fifty countries.

Civil-military dual use, however, is not limited to plutonium. Enrichment facilities used to enrich uranium to the reactor-grade level of 5-7% can easily be reconfigured for 20-90% enrichment. In addition, dozens of research reactors run on nuclear-weapons-usable highly enriched uranium, and not all of them are located in countries that are above suspicion.

Thus, what distinguishes a country with strictly civil intentions from one that fosters (secret) military ambitions is less the availability of the means rather than the will – and comprehensive safeguards that leave no loophole. The effectiveness of controls and safeguards was also presumed when the nuclear Non-Proliferation Treaty (NPT) was negotiated almost two decades after UN Resolution 1. The treaty, which entered into force in 1970, not only grants each State party the "inalienable right … to develop research, production and use of nuclear energy for peaceful purposes without discrimination", but the members to the treaty "undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy." And that is not all. The treaty also states that "Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world."

Facilitation of nuclear energy became the explicit task of the International Atomic Energy Agency (IAEA) which was founded in the context of the US "Atoms for Peace" program in 1957. It was only with Article III of the NPT that the IAEA was additionally tasked with safeguarding nuclear activities "with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices." This dual role demands a challenging balancing act from the IAEA.

Since then, awareness has increased that it is important to take "appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy", as stated in the 1994 Convention on Nuclear Safety. The convention, however, completely disregards the threat from international proliferation and makes "effective separation" a requirement only on a national basis, i.e. within a country. And even this organizational effort is required only by the minority of countries that have actually ratified the convention.

On the international level, pushed by the US and other self-declared non-proliferation guardians**,** and under the impression of more or less hidden and advanced nuclear weapons programs that were uncovered in the past (e.g. in Brazil, Iraq, Libya, North Korea, or South Africa), the IAEA attempts to prevent any breakout from the non-proliferation regime by ever more sophisticated and intrusive safeguards agreements and mechanisms. However, the debate about Iran shows that the world community does not trust even these strengthened safeguarding precautions. The way out of this dilemma is now seen to be a complete prohibition of certain nuclear activities by certain "suspected" states.

But even without a full nuclear fuel cycle – from uranium mining, milling, enrichment, and power production to "reprocessing" (with the separation of weapons-usable plutonium) and final waste disposal – and the associated risk of diversion of nuclear-weapons-usable materials, there remain considerable military nuclear dangers – dangers that are not restricted to state actors only.

Since the terror attacks on the Pentagon and the New York Twin Towers in September 2001, numerous administrative bodies have agonized over the question of just how nuclear power plants can be protected against accidents or deliberate attacks with large passenger airplanes or military jets.

To give an example: according to expert organizations, e.g. the Munich Environmental Institute, it is doubtful that any (even latest generation) German nuclear power plant would withstand the crash of a large passenger plane with sufficient fuel on board – or even an attack with a larger armor-piercing weapon. "According to the Reactor Security Commission, this scenario has so far not been

considered. After all, nuclear power plants are not explicitly designed to withstand a crash by a civilian passenger plane."
The same is true for other nuclear facilities in Germany like the industrial-scale uranium enrichment plant in Gronau; the interim storage facilities in Ahaus, Gorleben, and Greifswald; or research facilities like the one in Karlsruhe or the Garching research reactor, to name just a few.
It is true that the effects of such a deliberately provoked accident would be different from the damage caused by a nuclear bomb. The aftermath of Chernobyl, however, gives a realistic idea of the long-lasting and serious consequences of any such scenario.
Although more limited with respect to the region affected, a so-called "dirty bomb" or radiological weapon would also make an effective terror weapon. It could disperse radioactive waste, medical isotopes, or other radioactive material in a huge explosion and cause not only drastic health and environmental damage but also uncontrollable panic reactions by the population involved.
This list of nuclear technology-related security dangers is far from complete yet. Expert circles discuss the theft or unauthorized transfer of fissile materials to technologically sophisticated terror groups, which would allow them to build and use a "primitive" nuclear bomb; the theft or transfer of complete nuclear warheads; the unauthorized launch of operational missiles; nuclear blackmail; etc.
The only safeguard against such horror is consistent and complete nuclear disarmament, codified under international law in a Nuclear Weapons Convention. A further requirement is the speedy and global phasing out of civil nuclear energy, combined with the search for intelligent and sustainable solutions for the unimaginably huge masses of nuclear waste that exist already. This is truly a difficult endeavor and a dangerous heritage.
We must, however, not ignore the voice of the "next generation", which addressed the delegates at the 2005 NPT Review Conference as follows: "If you fail to take concrete steps towards a nuclear-weapon free world, how will you answer for burdening us with such a horrifying menace? You are charged with making this decision. If you fail to act, how will you look into your own mirror?" I have no doubt that this question is not only directed to the United Nations delegates, but to us all.

Regina Hagen is INESAP Coordinator and an international campaigner for a nuclear (weapons) free world.

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The work of INESAP *By R. Hagen*

The International Network of Engineers and Scientists Against Proliferation (INESAP) is a non-profit, non-governmental network organization with participants from all over the world. It is part of the worldwide activities of the International Network of Engineers and Scientists for Global Responsibility (INES). The decision-making body of INESAP is the Coordinating Committee which has seven members from four continents.

Working for a Nuclear-Weapons-Free World
INESAP's central objective is to promote non-proliferation and disarmament of all kinds of weapons of mass destruction and relevant delivery systems. In particular the goals are to extend and tighten existing arms control and non-proliferation regimes and to devise and promote the implementation of new approaches.

INESAP promotes critical analyses of technical, scientific, and political issues associated with nuclear and other weapons of mass destruction. It also works to develop disarmament concepts. In particular, its members contribute their scientific expertise to efforts aimed at transforming the currently inadequate arms control and non-proliferation regimes into a nuclear-weapon-free and eventually into a weapons-of-mass-destruction-free world. Further, the network contributes to exploring alternatives to ballistic missile defense and weapons in space.

INESAP seeks to accomplish these objectives through a program that combines research, networking, and activities aimed at promoting the development of responsible national and international policies.
New Project: Detection of Clandestine Production of Fissile Materials
In spring 2006, INESAP launched a major new project which is funded by the Chicago-based John D. and Catherine T. MacArthur Foundation, the *independent Group of Scientific Experts (iGSE) on the detection of clandestine nuclear-weapons-usable materials production.*
The iGSE project will address the most significant gap and largest challenge for verification of nuclear non-proliferation: the detection of clandestine weapons-usable materials production. A network of excellence will develop and demonstrate technologies and procedures for remote environmental sampling for clandestine nuclear-weapons-usable materials and other novel methodologies.
The unique features of this project are the combination of the required expertise; the independence of scientists from governmental,

diplomatic, and organizational interests; real demonstrations in field tests; coordinated research efforts; and public availability of the project results.

Publications
INESAP publishes the bi-annual INESAP Information Bulletin. At irregular intervals, INESAP Briefing Papers cover topics of particular relevance in more detail. Two peer-reviewed Technical Reports and the INESAP webpage (www.inesap.org) complement INESAP publication activities.

For more information, contact INESAP at <inesap@hrzpub.tu-darmstadt.de> or write to: INESAP, Darmstadt University of Technology, Hochschulstrasse 4a, 64287 Darmstadt, Germany.

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The work of INES

By G. Krauskopf

The **International Network of Engineers and Scientists for Global Responsibility (INES)** is an independent non-profit organization founded in 1991 concerned about the impact of science and technology on society. INES' efforts focus on

- disarmament and international peace
- ethics, values and education
- justice
- sustainable development.

INES is affiliated with the United Nations (Department of Public Information) as a Non-Governmental Organization (NGO). We have about 100 member organizations and individual members in 50 countries.

Support INES – become a member
You or your organization are invited to join our growing international network. Everyone who shares our common goals and wants to support us in promoting these goals is welcome to become a member.
INES members are encouraged to attend INES workshops and congresses. Information relevant to the work of INES is provided through a quarterly newsletter and fortnightly update.
Individual members and those involved in INES member organizations are welcome to initiate or join projects within the network that put the objectives of the network into practice.
For founding statement, statutes and member-ship application please go to:
www.inesglobal.com/about us

Communication and information services within INES
The quarterly newsletter gives INES members and member organisations the possibility to publish their articles and is one of the major communication means of INES. As INES member you can, next to reading the newsletter online, sign up for a printed copy

Our forthnightly information service "What's New in INES (WNII)"gives INES and INES member organisations an overview about relevant articels and new development in the six main areas: * War and peace; * Sience and ethics; *Sustainability; *Nuclear and renewable energies, *Conferences and activities; *Documentations
Members also have the possibility to publish in this medium.

INESNET - electronic mail communication among INES members

Some INES events 2006
INES holds a seminar on „Science and peace" ast the European Social Forum (ESF) in Athens, May 2006.
INES participates the 17th world congress of IPPNW and holds its Annual Council Meeting in Helsinki, September 2006.
INES will publish a book on Nobel Prize Laureate Prof. Dr. Joseph Rotblat end of 2006.

Participants of the **Chernobyl 20 conference**: some copies of the 2005 published book: Einstein-Peace now! are available with INES speaker Reiner Braun in Kiev.
Contact: Reiner Braun (co-editor), workshop II C: Nuclear proliferation, Monday, April 24th 2006

For further information please contact the INES office, Glinkastr. 5, 10117 Berlin, Germany. Fon: +49 (0)30 20653831
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Sign the INES - appeal to European and world leaders to eliminate the nuclear weapons threat!
The appeal is disseminated at the conference and can also be found on our website: www.inesglobal.com
You may sign online or fax it to the INES office: +49-(0) 30-20 65 38 37

Gabriele Krauskopf is the Executive Secretary of INES.