

THE NUCLEAR TECHNOLOGY IMPACT ON SUSTAINABLE DEVELOPMENT AND SECURITY

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Abstract: *On one hand, the nuclear technologies have a positive impact on sustainable development and security, but, on the other hand, they produce insecurity and bad prejudices on the sustainable development through the risks, threats and dangers which are presented in this paper. These technologies are used within nuclear military systems, as well as within those nonmilitary nuclear systems.*

Ignoring the requirements of the sustainable development while designing, producing and using those systems are transformed into a human, national, regional and international security factor.

Keywords: *nuclear technologies, security, sustainable development, risks, threats, dangers.*

Introduction

Whether uranium is extracted from ore for nuclear weapons or peaceful use of nuclear energy, mankind faces a great dilemma: are electro-nuclear power plants reliable in operation and ensure sustainable development or do they cause too many environmental damages and therefore would require giving up this cheap form of energy because of the numerous nuclear accidents and environmental disasters?

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In any case, after the uranium is separated from the ore, the dumps are highly radioactive and their storage cannot be done easily and with low costs but with high costs and the uranium mines, after closing, remain an ecological problem requiring money from the budget. Also, the nuclear fuel, after being used, raises many environmental problems due to radioactive waste that pollute increasingly large areas. At the same time, nuclear weapons systems are not safe in operation/use and there are a lot of examples of nuclear accidents, some very serious, which also had a negative impact on the environment.

But the most serious problem for mankind is the nuclear arms race involving an increased number of states, which threatens with a nuclear catastrophe in case some nuclear weapons or nuclear materials would come into the possession of terrorist networks.

1. Provisions of international documents

According to the Kyoto Protocol to the UN Framework Convention on climate changes, the signatory states commit to take actions for sustainable development and research, and to promote environmentally-friendly technologies that minimize adverse effects, including the impact on social, environmental and economic factors.

From this point of view, nuclear technologies should be evaluated compared to other technologies, regarding their impact on climate changes, security and sustainable development. In addition, it requires the implementation of national and regional programs (European, for example), leading to the minimization of climate changes and of the negative impact on the environment and security; these programs may relate, among other things, to nuclear waste management and to adapt nuclear technologies to sustainable development.

It is also necessary that all the countries to cooperate for sustainable development, including for the transfer and access to nuclear technologies effective from the point of view of environment protection and establishing programs to effectively transfer the efficient environmental technologies.

The Kyoto Protocol defines an unpolluted development mechanism to assist states in their efforts to achieve sustainable development and to minimize the effects of climate change. For sustainable development, nuclear technologies should be evaluated in terms of environmental,

economic, social, political, military and cultural effects. In this regard, the UN and the International Atomic Energy Agency should make an increasingly efficient and effective contribution.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), adopted by the UN General Assembly on 12 June 1968, taking into account the devastating consequences of a nuclear war to all humanity, the benefits of the peaceful use of nuclear technology and the need for nuclear disarmament prohibition of nuclear experiments, promotes the strengthening of trust between states in order to terminate the production of nuclear weapons and the existing inventory by a general and complete disarmament treaty.

2. Chemical processing of nuclear fuel

In East Asia began chemical processing of nuclear fuel after using it in nuclear-power plants and recycling the recovered plutonium rarely used in Europe. But in East Asia there isn't a security architecture of this processing as in Europe. Today, Japan is the only state that doesn't have nuclear weapons and which already reprocesses nuclear fuel and already has 10 tons of plutonium (of which 1000 warheads can be manufactured). South Korea has 20 nuclear reactors, but the U.S. refused to allow access to the same rights of reprocessing Japan has.

Reprocessing is not economic and causes insecurity by the excessive irradiation of the nuclear reactors staff. The plutonium economy was a scientists' dream (Enrico Fermi invented the plutonium-breeder reactor).

There was even a plutonium production program during the Second World War. But Enrico Fermi feared that public opinion would not accept so easily a source of energy (plutonium) that produces so much radioactivity and represents the manufacturing material for atomic bombs.

In 1971, Glenn Seaborg spoke about "plutonium economy of the future" and predicted that in 2000, plutonium will be the main source of energy in our lives, which is not true.

The U.S. has already produced 80 tons of plutonium, enough for 30,000 nuclear weapons.

In 1974, India used plutonium in its the first nuclear reactor for a "peaceful nuclear explosion" which then allowed it to become a nuclear-weapon state. Consequently, the U.S. convinced France to drop the

contracts to sell its breeding plants for the separation of plutonium by irradiating uranium (to South Korea, Pakistan and Taiwan).

3. The future nuclear arms race

There are many similarities between our time (the beginning of the 3rd millennium) and 1930s regarding economic recession, increase of nuclear disarmament and the development of the Asian countries; that is the reason why the American analyst H.D. Sokolski asked himself whether we aren't drawn into a new war, warm or cold. He also contended that he didn't know. To give an answer, the author goes back half a century ago, when the U.S. had 24,000 operational nuclear weapons, Russia - 2500, and Britain and France maximum 50. Today, the United States have 1980, Russia has 4537-6537, China - 200 to 1,000, while India, Pakistan, Britain, France and Israel have each between 1 and 400. Therefore, the ratio of the number of nuclear weapons held by the U.S. and Russia and those held by other countries dropped more than 100 times and will continue to decline.

In 1961 there were four powers (state) nuclear, with 6 possible strategic relationships, and today there are seven major nuclear powers, with 21 such relations between them. So from this point of view, the complexity has grown more than three times without taking into account other states that have fewer nuclear weapons (apart from those 7 countries, there are 10 more states possessing nuclear weapons).

Russia, China and North Korea have tunnels under mountains for their nuclear weapons that cannot be destroyed, which means that they are prepared for a nuclear war. Thus, Russia and Pakistan have planned to be the first ones to use nuclear weapons to defeat the enemy conventional forces.¹

So a few nuclear powers of the world still believe that they may be involved in major wars where nuclear weapons will be used.

In 1961, only the USSR and the U.S. had ballistic missiles that could carry nuclear bombs of 500 kg at 300 km away, and today 27 states have these missile systems and at least 9 of them can send satellites into orbit,

¹ Sokolski, *The next arms race*, 2012, SSI (ISS), p. 9.

meaning that they can develop intercontinental ballistic missiles but their number is growing.²

4. Nuclear incidents and errors

According to the opinion of the analyst H.D. Sokolski, the list of incidents and errors on nuclear safety is quite long.

Here are some of them:

- In 1962, during the Cuban missile crisis, the alarm went off accidentally because a bear entered a restricted area, and at the Volk Airfield, due to a malfunction, the warning went off for a nuclear attack; two days later, a U.S. radar discovered a unidentified aerial object in space while the installation work was executed and, by mistake, they believed that a missile had been launched from Cuba to Florida;
- In 1966 in China, during the struggles for power, the political factions tried to seize nuclear weapons;
- In 1970 in a NATO nuclear base, was discovered that soldiers with a history of alcohol and drugs were in the guard units;
- In 1977, the procedures for launching the intercontinental ballistic missiles were not observed;
- In 1979, in the USA, the air raid siren and the launching siren were set off by mistake;
- In 1980, after the shooting of president Ronald Reagan, the nuclear identification codes went missing;
- In 1981, French president Francois Mitterand left the launching codes in the suit he had worn before;
- In 1988, the president of Pakistan decided to keep the nuclear program secret file instead of giving it to the prime minister;
- In the 1990s, the A.Q.Khan network succeeded in copying the sketches of three Pakistani warheads and delivered them to other states including Libya;
- In 1990, the rebels in Azerbaijan attacked a Russian army base and tried to steal nuclear weapons;
- In 1991, after the coup attempt against Mikhail Gorbachev, the nuclear “key” was stolen from him;

² Ibidem, p. 11.

- In 1991, Ukraine ordered a study of breaking the nuclear launching codes;
- In 1993, Pavel Gracev, the Russian defence minister, came into possession of the nuclear key belonging to marshal Şapaşnikov of C.S.I;
- In 1993, during a coup in Moscow, was attacked the General Staff building where the nuclear command and control center was;
- In 2007, a B-52H American aircraft accidentally carried 6 nuclear missiles to another location;
- After 2000, Pakistani terrorists attacked several facilities where they believed were nuclear weapons or nuclear research equipment;
- In January 2010, European anti-nuclear activists broke into a NATO nuclear base in Belgium.

5. The chain of errors that could lead to a nuclear catastrophe

Two American researchers³ presented four case studies (China, France, Pakistan and the USSR) on nuclear safety risks during the political and security crisis of nuclear weapons, including coups (military takeovers) or failed attempts and major institutional crises, in essence it is about major severe political crisis that seriously affected the control activities and the nuclear safety of the 4 states. The novelty of the scientific approach presented here is the analysis of the chain of errors and mishaps that can lead to nuclear disaster; our hypothesis is that political instability in the nuclear-weapon states affects nuclear safety.

There is a chain of errors/crimes that can lead to serious nuclear insecurity/nuclear disaster:

- missile crisis (Cuba) and air and nuclear sirens set off by mistake (human or technological);
- political instability;
- military and/or political people with a history of alcohol, drugs or medical conditions who deal with the use or command of nuclear weapons;
- power struggles between political factions trying to take control of nuclear weapons;
- terrorist attacks;
- breaking the missile launch codes;

³ H.D.Sokolski, B. Tertrais, *Nuclear weapons security crisis: what does history teach us?*, p.12

- nuclear procedure errors of presidents, governments, high-rank officers etc;
- control/inspection/assessment procedures incorrectly performed;
- nuclear insecurity

In a state or military coup it is possible that a radical/terrorist government take possession of nuclear weapons and trigger a nuclear crisis in the best case or a nuclear war in the worst case.

Conclusions

Although a terrorist government has never had (in history) nuclear weapons, there are historical precedents, which in future could be related in a cascade of incidents/errors/crimes that lead to a nuclear crisis/nuclear disaster/nuclear war. The question is not whether this scenario is possible, but when this chain of events that confirms this scenario will occur. There is a possibility that some nuclear weapons fall into the hands of unauthorized persons during political crises. It has been shown that more technology does not necessarily mean more safety (security) and that effective learning from past errors/incidents is very difficult, if not impossible. Nuclear safety procedures and controls are as strong/accurate as the people who perform them, people who have their weaknesses (primarily the states' leaders).

There are also happy cases. For instance, in 1961, General Jean Thiry, the commander of nuclear tests in the Sahara, refused to obey the orders of the Algerian rebels who had taken the lead in the country and who asked him to hand over the nuclear device that would have been tested.



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