

Russia's Dangerous Nuclear Legacy

Written by Richard Rousseau, Contributor | 13 June 2012

The state of Russia's civilian nuclear power should be cause the entire planet to shudder: Radioactive waste deposal sites are full to the bursting point, and many reactors are outdated and fail to meet even the most basic of safety standards. In short, as one reads between the lines, a new disaster is pending.

The now-famous disaster in Japan has taken on tragic proportions and caused massive public health problems. Explosions in Japanese atomic power plants are forcing world experts to question once more the future of nuclear energy, as well as the existing and engineered safety level for various nuclear facilities around the world. Is nuclear energy "outdated"? Is it a source of energy that should be abandoned out of safety concerns? The time has arrived once again for a cold-eyed and careful assessment of nuclear energy security in the world. This is especially pressing in the case of Russia.

Currently, 10 plants and 32 nuclear units are online within the territory of the Russian Federation. In considering the larger picture of Russia's energy generation, inherent risks, and dismal safety record, neither modern nuclear reactors nor uranium-based fuels should be considered as a panacea for the country's energy development. There are severe limitations in the development of the Russian modern nuclear energy. These are well noted in the scientific community and the mainstream media.

The accumulation of radioactive waste and spent nuclear fuel is proportional to the generation of electrical energy. In 2011 there were over 20,000 tons of spent nuclear fuel stored in Russian nuclear power plants and chemical storage sites. Only a tiny fraction of it is processed at special plants. Russia's stock of spent nuclear fuel accumulates in the highly populated European part of Russia and the total of stored quantities contains nearly 175 tons of plutonium, a substance particularly dangerous because of its harmful affect on the environment.

In fact, the current situation in Russia in terms of radioactive waste is critical. The territory of the Russian Federation is home to nearly half the total amount of atomic waste in the world. Nearly 99 percent of nuclear waste is concentrated in companies run by Rosatom (Nuclear Energy State Corporation), a state-owned company; this waste contains all high-level and a large portion of intermediate-level waste.

All current radioactive waste repositories are almost full to capacity. The remaining storage capacity for solid and liquid radioactive waste will help ensure the operation of civilian nuclear reactors only for another five to eight years. One thing is for sure in Russia: the high amount of spent fuel stored on nuclear plants' platforms reduces nuclear safety. Unfortunately, however, Russia has no laws on how to handle radioactive waste and spent nuclear fuel.

Also, the unmonitored use of fissile materials continues to be a potential threat. The nuclear energy market is not declining—quite the opposite, it is rapidly growing. This is despite the fact that, for instance, the cost of building a new unit at the Finnish Olkiluoto nuclear plant is \$3.9 billion, an amount three, five, even seven times greater than the investment needed to build a power plant that runs on fossil fuels, such as open-cycle gas turbine plants which can be built three or four times

faster than a conventional nuclear plant. But are these data taken into account in Russia in light of the fact that the construction of nuclear units has become more and more expensive?

The safety of nuclear reactors is primarily provided through the increased number of sophisticated security systems and physical barriers that limit or contain potential radiation leaks. These systems consist of a combination of natural and artificial barriers that work in tandem and complement each other in assuring the required long-term isolation of the waste by preventing or limiting the movement of radioactive substances from the infrastructure of the repository to the biosphere. However, in essence this has made nuclear plants increasingly more complex systems, which in turn drives up their construction and operation costs, while it is still impossible to achieve a 100 percent safety level. Theories and actual experience on nuclear energy have taught us that there is no absolute guarantee and that some risks will always remain.

Many Russian and foreign specialists are adamantly opposed to extending the designed working life of old nuclear units, such as nuclear units 3 and 4 of the Novovoronezh nuclear plant (Voronezh Oblast, central Russia) and units 1 and 2 of the Kolski nuclear plants (Murmansk region). The Leningrad and Smolensk nuclear plants, located in St. Petersburg and Kursk, respectively and which operate eleven nuclear units, are also too old to be given a new lease on life.

These nuclear plants do not meet modern safety requirements—based on the principle of Russian matryoshka doll—which provides for a system of superimposed barriers to prevent the release of radioactive substances into the atmosphere. Considering that management of nuclear power plants operating on Russian territory follows the rules and safety standards that were applied when first put into service—in some cases a few decades ago—none of these nuclear plants can at present fully meet modern safety requirements. Also, Russia's dismal record in coping with nuclear accidents means that another Chernobyl-like accident is not a far-fetched scenario.

Massive means and interventions are always necessary in tackling an accident at a nuclear plant. For instance, expenses incurred by countries affected by the Chernobyl disaster to minimize the environmental and social consequences exceeded over \$700 billion over a 25-year period, and will be counted into the billions of dollars on an annual basis for many more years. Ukraine is still underwriting about 5 percent of its national budget to deal with the effects of the Chernobyl's disaster; Belarus close to 10 percent and Russia from 0.5 to 1 percent.

The decommissioning of nuclear plants after exhausting their resources will put an enormous strain on Russian state budget. Largely for this reason, Rosatom is making every effort to prolong their operational life, knowing quite well that there will be economic shockwaves in the industry should nuclear units be closed; this would be a great loss to employees of the nuclear industry.

Of all known sources of energy, nuclear energy entails the highest destructive potential. In the age of terrorism, nuclear power plants are possible prime and high-profile targets for terrorist and transnational criminal groups. The nuclear threat poses a very specific problem for the world, whether it is the acquisition of plutonium and highly enriched uranium, acts of sabotage or attempted sabotage at a nuclear facility, or the intensive use of radioactive materials for the fabrication of "dirty" bombs.

In January 2007, Oleg Khinsagov, a resident of Vladikavkaz in North Ossetia, a Russian region that borders Georgia, tried to sell a small amount (3.5 ounce) of nuclear-bomb grade uranium that he carried in a plastic bag in his jacket pocket. The Russian had crossed the Russian-Georgian border to

meet a middleman in Tbilisi who would have paid him \$1 million and delivered the material to a Muslim man from “a serious organization,” the Georgian authorities said. This case underscores concerns about the poor reliability of Russia’s security agencies in monitoring and controlling nuclear material located on its own territory.

The destruction of a nuclear power plant has the potential to cause much more harm to a country than any other energy facilities. For instance, the detrimental impact of a plane crash, a tsunami, or a missile attack on a nuclear waste repository is no less terrifying than an accident at a nuclear power plant. There is a strong correlation between risks of a nuclear accident and a society’s socio-political stability and economic development. All it takes for nuclear energy to be deemed unacceptable by society is the occurrence of one or several large accidents. Only a few instances of mismanagement need to be recorded and reported for the public to gain the impression that nuclear power plants are an unreliable and dangerous source of energy.

The human factor is an essential variable in ensuring safety at nuclear sites. As highly advanced and cutting-edge technology systems are, they are limited in their reliability, as it is always humans who ultimately have to run them. As long as the human factor is paramount in operating nuclear power plants, the nuclear industry will never be totally mistake free. For instance, in February 2011, five out of 32 operating reactors on Russian territory had to be shut down for emergency repairs and at least a dozen leaks of contaminated material were recorded. Nuclear power generation is in great need of new scientific ideas and technological innovations. One of today’s major concerns in the nuclear field is the loss of knowledge, expertise, and especially technology and engineering skill to handle radioactive material and deal with other radiation applications.

Nuclear power remains the electricity production technology with the lowest production costs. Nuclear renaissance is a worldwide trend: there are now over 60 new nuclear power plants under construction, all based upon different technologies. However, countries benefiting from the nuclear energy produced today must take steps to ensure that the wastes are dealt with responsibly and without unduly burdening future generations. While nuclear energy represents one of the various forms of energy supply, states must continue their research with a view to developing other forms of energy, particularly from renewable sources.

The post-Cold War world has an elusive international structure. Powerful global corporations, as well as international terrorist organizations, can frustrate a search for clarity and efficiency in fighting illicit activities in finance, economy, the organized crime, or smuggling of nuclear material. In Russia, the main culprit is Rosatom. This relic of the Soviet system still operates largely without independent oversight, especially since June 23, 2010, when President Dmitry Medvedev signed a decree that stated that Rostekhnadzor (the Federal Service for Ecological, Technological and Nuclear Supervision) would be henceforth under the direct control of the government. Rosatom reports to no one in justifying how hundreds of millions of dollars are spent.

In 2002, a Russian scientist, well aware of covert activities by Russian authorities, declared to the Boston Globe that Rosatom is a “super-Mafia.” Secrecy is omnipotent within the governmental organization. A product of the Stalinist era and an embodiment of Cold War-style secrecy, Rosatom is a web of Soviet-era reactors, laboratories and secret “closed cities” where nuclear energy is designed, built, and mass-produced. In 2005, the head of Rosatom, Evgeny Adamov, was arrested in Switzerland after the U.S. State Department complained about the disappearance of \$9 million it had earmarked for Russian nuclear security measures. After being convicted in Moscow in 2008, he managed to have the ruling overturned.

Since the signature of the START I treaty in 1991, the U.S. government has spent billions of taxpayer dollars to upgrade nuclear security in Russia. In January 2002, however, a report issued by Russia's Accounting Chamber brought to light the disappearance of \$270 million in U.S. assistance earmarked for cleaning up and building safe storage for the country's radioactive waste. In this same report, it was revealed that tens of millions of dollars had also been diverted to "research projects" that remain a mystery to this day.

Russia, in many respects, is a "failed nuclear post-Soviet state." The likelihood of terrorists getting their hands on nuclear bomb-making material on the Russian black market is extremely high.

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