Tomsk-7/Seversk, Russia

Nuclear facility

The explosion of a nuclear reprocessing facility in Tomsk-7 dispersed large amounts of radioactivity over an area of 120 km², exposing tens of thousands of people to increased levels of radiation and contaminating air, water, and soils for many generations to come. It is considered the most serious Russian nuclear accident after Chernobyl and the Kyshtym accident at Mayak.

History
Tomsk-7 was a “secret city” in Siberia until 1992, when it reverted to its historical name of Seversk. It housed several nuclear facilities for large-scale production of plutonium and uranium for nuclear fuel and weapons, including reprocessing of spent fuel. The closed city was home to about 100,000 workers and their families. One of the worst accidents in the history of the Russian nuclear industry occurred at the Tomsk-7 reprocessing facility on April 6, 1993. That day, workers were pouring nitric acid into a tank in order to separate plutonium from spent nuclear fuel. It is not clear whether the accident was caused by human or technical error, but it is believed that a lack of compressed air caused the mixture of nitric acid, uranium and plutonium to overheat and reach critical temperatures within a few minutes. The ensuing explosion knocked down walls on two floors of the complex, started a fire and released about 250 m³ of radioactive gas, 8.7 kg of uranium and 500 g of plutonium to the environment. This amounted to about 30 Tera-Becquerel (Tera = trillion) of beta- and gamma-emitters and 6 Giga-Becquerel (Giga = billion) of plutonium-239.1 An area of 1,500 m² around the plant was severely contaminated, while the radioactive plume covered a total area of 120 km², where increased levels of radioactivity could be detected.2 The explosion at Tomsk-7 was ranked level 4 of the International Nuclear and Radiological Event Scale (INES), comparable to the Tokai-mura nuclear accident in Japan in 1999.

Health and environmental effects
Most acutely affected by nuclear fallout were the villages of Georgievka and Nadezdha. Radioactive snowfall in the days after the disaster created hot-spots with radiation levels of up to 30 µGy/h – approximately 100 times normal background radiation. Sols in the areas affected by radioactive fallout showed significantly increased levels of long-lived radionuclotides such as cesium-137 or strontium-90.3 Cesium-137 can cause solid tumors or pumped into uncovered holding pools, they fell in the days after the disaster created hot-spots with radiation levels of up to 30 µGy/h – approximately 100 times normal background radiation. Sols in the areas affected by radioactive fallout showed significantly increased levels of long-lived radionuclotides such as cesium-137 or strontium-90. Cesium-137 can cause solid tumors or genetic defects in offspring when inhaled or ingested through food or water, while strontium-90 is a known cause for leukemia. With the help of foreign specialists, initial clean-up operations were able to collect and remove about 577 g of plutonium from the area around Tomsk-7. Interestingly enough, only about 450 g of plutonium had been present in the basin before the explosion, suggesting unreported prior plutonium leaks from the facility.4 Even months after the explosion, snow samples continued to show increased levels of radioactive isotopes such as plutonium, uranium, zirconium, ruthenium, cerium, niobium and antimony, continually exposing the population to radioactivity.1 According to the Bellona Foundation, a Norwegian environmental NGO, about 30 major accidents occurred at the Tomsk-7 nuclear facility, releasing about 10 g of plutonium into the atmosphere each year. The NGO also documents large quantities of nuclear waste from 50 years of plutonium production, which have accumulated on the confines of the nuclear facility. Dumped into underground depots or pumped into uncovered holding pools, they pose a continued threat to health.5 In 2008, a study found increased levels of plutonium and cesium-137 in soils and water samples, suggesting further leaks.6

Outlook
Some reactors at Tomsk-7 were shut down in June 2008, following the 2003 agreement between Russia and the U.S. concerning the elimination of weapons-grade plutonium production. The reprocessing of spent fuel and the dumping of nuclear waste on the premises of what is now called the Siberian Chemical Combine continue to this day, however. Despite the findings of increased levels of plutonium, strontium, cesium and other radioactive particles in soil and water, no meaningful medical studies were performed on the local population. In 2001, a court ordered in Tomsk a lawsuit by contaminated inhabitants of the village of Georgievka against the Siberian Chemical Combine, deciding that the company was to pay each claimant a compensation sum equivalent of 860 US-Dollars. During the hearings, 34 of the 26 claimants passed away, according to the Bellona Foundation.2 Their health was compromised for the production of nuclear fuel and nuclear warheads. They, and everyone else in the area whose health was affected by the catastrophe at Tomsk-7, are also Hibakusha.

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