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Makings of a 'Dirty Bomb'

Radioactive Devices Left by Soviets Could Attract Terrorists

By Joby Warrick
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Monday, March 18, 2002; Page A01

Six months ago, they were mere Cold War trash: hundreds of small radioactive power generators scattered across the Soviet Union decades ago and largely forgotten, except when the odd lumberjack turned up with severe radiation burns.

But in the aftermath of Sept. 11, these aging but potentially lethal devices are being viewed in a troubling new light: as possible components in a weapon to be used in a terrorist strike. Even more troubling, some of them have vanished.

In Georgia, on the Black Sea, a search is underway for at least two of the devices, called radiothermal generators, or RTGs, believed to have been abandoned and then stolen after the closing of a Soviet military base. Just before Christmas, three woodcutters in northwestern Georgia suffered massive injuries after stumbling upon a similar device in the middle of a forest.

In the far-eastern Russian region of Chukotka, investigators discovered a complete breakdown in controls over 85 radiothermal generators placed along the arctic coast by the Soviets in the 1960s and '70s. Some of the machines had been vandalized for scrap metal, others were literally falling into the surf and at least one could not be found, according to Russian government documents obtained by The Washington Post.

"The generators are placed on open land, are clearly visible from the sea and are visited by staff no more than once a year (in recent years, staff has not visited the sites at all)," said a report by a Russian commission that inspected the generators in 1997. "They would be easy targets for a terrorist attack, the consequences of which could be extremely serious."

Vladimir Yetylin, a legislator from Chukotka, located on the Bering Sea, said in an interview Friday that he suspected some generators were still missing and planned to press for an investigation.

"At the time, there was not enough money to gather up these [power] sources," said Yetylin, a member of the lower house of the Russian parliament, the State Duma, blaming the chaos that followed the collapse of the Soviet Union in 1991.

The RTGs, used by the Soviets to power navigational beacons and communications equipment in remote areas, each contain up to 40,000

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curies of highly radioactive strontium or cesium. Even a tiny fraction of a single curie of strontium has a high probability of causing a fatal cancer, according to a calculation by the Institute for Energy and Environmental Research (IEER), a nuclear watchdog group. While cesium and strontium cannot be used to make nuclear weapons, the two heavy metals could contaminate large areas if combined with conventional explosives in a radiological weapon or "dirty bomb."

"This stuff can be just ghastly to clean up," said Federation of American Scientists President Henry Kelly, a physicist who testified this month at a Senate hearing on dirty bombs. Such a bomb detonated in a large city could render several blocks uninhabitable, he added.

There are literally hundreds of places where terrorists could obtain material for such a bomb, including former dumping grounds for medical waste in this country. But the recent discoveries in the former Soviet Union have further heightened international concerns about the possibility of nuclear theft. The RTGs in particular offer high concentrations of radioactivity with minimal controls -- and sometimes no controls, according to officials of the International Atomic Energy Agency (IAEA), the nuclear watchdog of the United Nations.

"After the Soviet Union broke up so abruptly, the newly formed nations had no use for these things and no infrastructure," said Melissa Fleming, an IAEA spokeswoman in Vienna. "They didn't have the means or even the information to locate, recover and dispose of them."

The IAEA classifies the Soviet RTGs as "orphaned" nuclear sources and has called for a major international effort to find them and lock them up. "They are a problem, from the point of view of terrorism," Fleming said. But she added: "Since we can't find them, presumably it would be hard for terrorists to find them as well."

RTGs are self-contained power sources that convert radioactive energy into electricity. Compact and relatively small -- Soviet models are between two and four feet in length and weigh between 1,000 and 3,000 pounds -- they are ideal for remote areas with little access to traditional fuels. The Soviets are known to have built more than 300 of the devices, most of them to power navigational beacons along arctic shipping lanes.

The U.S. government also built RTGs; some were used to power spacecraft, but at least 10 of the devices were installed at remote military listening posts in Alaska in the 1960s and '70s. After a brush fire threatened one of the devices in 1992, the Air Force began replacing them with diesel-powered generators.

In Soviet-made RTGs, the device's core typically is a flashlight-size capsule of strontium 90, surrounded by thick lead to absorb the radiation. When the lead cladding is intact, the generator is essentially harmless. But if the shielding were missing or cracked, someone standing nearby would receive a fatal dose of radiation within hours, IAEA officials said.

It was the strontium core that the Georgian woodcutters discovered in December while working in a remote forest in the northwestern region of Abkhazia. According to IAEA officials, the metal cylinder caught the men's attention because its heat had melted the surrounding snow. Oblivious to the risk, the men took the device back to their campsite.

Within hours the men suffered severe skin burns and internal organ damage. Nearly three months later, two of them are still critically ill in hospitals in Moscow and Paris, while the third has recovered.

Last month, an international team led by the IAEA recovered the strontium core and a sister device that had been abandoned in the same area. Even though special one-ton lead shields were constructed for the recovery effort, the workers were allowed to approach the cores for only 40 seconds at a time. The cores were trucked to the Georgian capital, Tbilisi, where they are being temporarily stored along with four others that have been recovered since 1998.

Still far from clear, the IAEA says, is how the cores ended up in the woods -- or how the Georgian government eventually will dispose of them. According to the IAEA, Georgian officials are convinced that more remain unaccounted for.

"Based on inventories, we think there are two more," Fleming said. "And there is some information that suggests still other sources in

Georgia."

In other corners of the former Soviet Union, the fact that officials know the location of the devices has done little to ease local safety concerns.

The Russian government commission that visited Chukotka in 1997 set out in ships to inspect 85 radiothermal generators believed to be scattered along the region's northern coast. The officials were unable to reach about a third of the devices because of harsh terrain and bad weather. But of the 52 RTGs inspected, nearly half no longer functioned, and only three had any sort of fencing or protection.

The commission's report describes six of the devices as heavily damaged and leaking potentially lethal amounts of radiation. One of the generators was nearly buried in frozen mud, it said, a second was lying in water and at least one could not be located.

"This lack of control means that it is entirely within the realm of possibility that . . . one or several RTGs might have been lost," said the report, signed by the province's chief health inspector, G.B. Lebedev, and chief inspector, Yuri Skobelev.

The generators had long sparked concern among local health officials and international wildlife groups worried about the potential for radiation leaks. But even before the Sept. 11 attacks, environmentalists who visited the region expressed concern about the apparent lack of security for the devices.

"It was just sitting in a wooden hutch -- I could have walked right up to it," said David Kleine, director of the World Wildlife Fund's Alaska field office, who passed within a few yards of one of the generators during a 1991 Bering Sea trip.

Still, there is an enormous difference between finding an abandoned generator and successfully carting it away to create a weapon, nuclear experts say. IEER President Arjun Makhijani said an amateur tampering with such a device would put his own life in peril. But for someone with proper training and a bent for terror, the generators could be a means for inflicting significant harm.

"If you don't know what you are doing, it will kill you first," Makhijani said. "But if you know what you're doing, it will do an extreme amount of damage."

Staff writer Alan Cooperman contributed to this report.

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