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## Unstable Element

### Suddenly, Small Gaps In Nuclear Security Look Like Chasms

Sept. 11 Sparks a Scramble  
To Keep Fission, Fallout  
Out of Terrorist Arsenal

#### A Lower 'Technical Barrier'

In February, Jamal Ahmed Mohamed al-Fadi, a longtime member of Osama bin Laden's al Qaeda organization, gave some unsettling testimony in New York federal court: He helped arrange meetings in Khartoum, Sudan, in the early 1990s with the aim of helping al Qaeda acquire uranium.

Mr. al-Fadi, who testified that he was told that "it's easy to kill more people with uranium," said he didn't know whether the deal ultimately went through. His testimony came in connection with the federal indictment against Mr. bin Laden and others for their alleged roles in the 1998 bombings of two U.S. embassies in Africa.

The evidence that Mr. bin Laden's group has tried to obtain weapons-grade nuclear material is sketchy and unver-

#### Campaign Against Terror

- Officials suspect two anthrax letters may have link to Islamic terrorists, A1.
- U.S. pounds Taliban forces in one of the largest assaults of the campaign, A4.
- Bin Laden purportedly asks CNN and Al Jazeera to submit questions, A4.
- The maker of the most-used anthrax treatment plans to boost production, A4.
- Airbus begins to offer a permanent, hi-jack-resistant cockpit door, A10.
- For updates throughout the day, go to the online Journal at WSJ.com.

fied. But it has sent authorities around the world rushing to shore up security measures that are in some cases surprisingly weak. The armed guards at nuclear-weapons depots often lose in exercises with mock assailants. Materials for making a nuclear bomb are accessible enough to support a black market.

The first reaction after Sept. 11 was to tighten security. Kansas officials are keeping fishermen off a lake near the Wolf Creek nuclear plant. Japan ordered round-the-clock patrols of the waters near its nuclear plants. France, which even encouraged school trips to its many nuclear-power plants to promote acceptance, has severely restricted access to facilities. Authorities in the Czech Republic tightened airspace restrictions over nuclear power stations.

The U.S. Department of Energy briefly halted shipments of nuclear materials. Just last week, the Nuclear Regulatory Commission temporarily closed its Web site, saying that it had to review all the material as part of "our mission to protect public health and safety."

Corbin McNeill Jr., the chairman of the Chicago-based power company Exelon

*By Wall Street Journal staff reporters  
John Bmschouller in Los Angeles,  
Michael Gray in New York City,  
Daniel Machalaba in Elizabeth, N.J.,  
and Rebecca Smith in San Francisco.*

Corp., has a plan for making future nuclear plants more resistant to an airborne assault by terrorists: Bury them. He's thinking that if and when Exelon builds a new-generation nuclear plant, most of the structure and equipment will be housed below the surface of the earth. "There should be no vital components above ground," he says.

"The whole world has been turned upside down" by the events of Sept. 11, says Richard Meserve, chairman of the NRC, which oversees commercial security measures for nuclear-power plants. "We have to re-examine our entire capability to withstand a terrorist attack."

The means for carrying out nuclear attacks are scattered around the globe—in the form of hundreds of commercial nuclear plants, tens of thousands of nuclear weapons and tons of stored uranium and plutonium that could be fashioned into bombs. Efforts to make nuclear materials more secure have been hampered by tight budgets, geopolitical squabbling and inertia.

While security has frayed in many places, authorities believe that a nuclear assault by terrorists remains unlikely. Since Hiroshima 56 years ago, there have been few significant breaches of security anywhere in the world that could have produced a nuclear weapon or incident, and there have been no incidents. Besides the technical barriers to making a nuclear bomb, nuclear weapons and bomb-grade material have always been relatively well-guarded.

Authorities have long counted on the technical barrier—namely, that designing and fabricating a nuclear device remains a formidable challenge. Despite the sophistication of Mr. bin Laden's al Qaeda network, the prospect of terrorists going nuclear is still "highly unlikely," says Graham Andrew, a senior official at the Vienna-based International Atomic Energy Agency, a United Nations-related body created to prevent the proliferation of atomic weapons.

But the possibility remains. A draft report for an IAEA conference in May cited intelligence-agency and other reports of bin Laden efforts to obtain small nuclear weapons, with the devices to be possibly stored in Afghanistan. The draft report, prepared by Alex Schmid, officer-in-

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charge of the United Nations' Terrorism Prevention Branch, stated that while he hadn't seen evidence that the terrorist had succeeded, "it's clear that bin Laden is actively seeking to acquire weapons of mass destruction." Mr. Schmid declined to be interviewed. A U.S. intelligence official says intelligence sources also have reported efforts by Mr. bin Laden's organization to acquire nuclear weapons.

The technical barrier also seems to have gotten lower. A 1998 report by the Carnegie Endowment for International Peace, a foreign-policy think tank in Washington, found that "a number of American college students have come up with plausible designs based on unclassified information."

The simplest bomb to build would resemble the one used over Hiroshima. It essentially involves placing two slugs of highly enriched uranium in a tube and driving them together with an explosive charge—a design that is considered so reliable that bomb experts say it doesn't even have to be tested. Weapons experts say this sort of bomb could be built with about 125 pounds of uranium—though more-sophisticated designs require far less material.

Such a bomb would produce a blast equivalent to about 15,000 tons of TNT and, in a city, could kill more than 100,000 people, says Robert Gallucci, dean of the Georgetown University foreign-service school who worked on nuclear-proliferation issues for the State Department. Scientists estimate that the explosions and subsequent fires that took down the World Trade Center released energy the equivalent of about 1,000 tons of TNT.

#### Building a 'Dirty Bomb'

Far easier to build, and much less deadly, is a "dirty bomb," in which conventional explosives are used to spread radioactive material. The key to averting this and any other nuclear threat, security experts say, is keeping nuclear material out of terrorists' hands, particularly plutonium or highly enriched uranium, which are what is needed to create nuclear fission.

That means wiping out the shadowy black market for nuclear materials. The biggest potential source of such material is Russia and other parts of the old Soviet Union—though the IAEA considers all the ex-Soviet Republics, except Russia itself, free of nuclear weapons. Here, too, information can be incomplete and even contradictory. Take the Russian "suitcase" bombs.

Republican Congressman Curt Weldon of Pennsylvania recalls that in hearings held in 1997, retired Russian Gen. Alexander Lebed testified that Russian authorities couldn't account for dozens of portable nuclear bombs once in the Soviet arsenal and designed for use behind enemy lines to blow up specific objects, such as tunnels or power stations. Mr. Weldon said other top Russian military officials, including former Defense Minister Igor Sergeev told him directly that such devices existed. More recently, both U.S. and Russian officials have issued statements denying the Soviets ever built such weapons. Portable atomic demolition devices produced by the U.S. military were all dismantled by 1989, a Defense Department official adds.

Watchdog groups such as the non-profit Monterey Institute of International Studies in Monterey, Calif., which attempt to verify reports of nuclear proliferation, keep track of various incidents in which nuclear materials may have es-

# Now, Small Gaps in Nuclear Security Look Like Chasms

caped the grip of governments. In the Monterey files is an example from 1998 when the Russian Federal Security Service announced that it had thwarted an attempt by employees at a facility in the Chelyabinsk region to steal around 40 pounds of nuclear material. Matthew Bunn, a nonproliferation expert at Harvard University, says an official with the Russian Ministry of Atomic Energy told him the material had been highly enriched uranium. Vladislav Petrov, a spokesman for Russia's Ministry of Atomic Energy, maintains that this incident "did not happen."

Some bomb-grade material does seem to have made its way out of Russia. In 1994, Czech officials seized nearly six pounds of enriched uranium from a car in Prague. Investigators in that case believed that the material came from one of two Russian facilities. Mr. Petrov, however, says the Czechs never allowed Russia to test the material to determine its origin. The information about the theft "was created by

into the future."

Jonathan Kiell, a spokesman for the DOE, insists that major strides have been made in helping Russia secure its nuclear material and in redirecting the activities of Russian weapons scientists. However, he says, "following the attacks of Sept. 11, [the DOE] is evaluating possibilities of accelerating its [security program], based on guidance from the administration."

As the U.S. has pondered the post-Cold War nuclear threat, attention has focused on a "rogue" nation attacking the continental U.S. with a missile. But many national-security experts worry about a much simpler scenario, particularly now that the efficacy of suicide attacks in the U.S. has been proven. If overseas terrorists wanted to get a nuclear weapon into the U.S., the most likely means would be by ship, they say. About nine million shipping containers, typically 20 or 40 feet long, enter American ports each year.

For years, U.S. Customs Service inspectors have worn small devices to de-

statement last June to a congressional committee. The reductions have made it "questionable at some facilities whether the DOE Protective Force could defeat an adversary," wrote Mr. McCallum, whose outspoken criticism of security measures contributed to his departure from the Energy Department in 1999.

For years, the DOE has used mock terrorists in simulated attacks to test security at weapons plants. Often, U.S. military personnel and plant guard forces do battle with harmless laser weapons as the attackers try to make off with objects that represent containers of plutonium or uranium.

In a Sept. 13 letter to Sen. Richard Shelby, an Alabama Republican and vice chairman of the Senate Select Committee on Intelligence, Peter Stockton, a former top Energy Department security consultant, said the DOE guard forces "lose well over 50%" of the time in these mock battles—"a clear indicator that a number of facilities cannot protect" their weapons and weapons-grade material. In one case cited by Mr. Stockton, attackers at the Los Alamos Nuclear Laboratory brought along a garden cart to haul off their booty.

The Project on Government Oversight, a private watchdog group, issued a report earlier this month recommending that the government consolidate the tons of bomb-grade material from the 10 sites in two underground facilities, possibly to be protected by the U.S. military. Currently, the Energy Department contracts with private security firms.

Glenn Podonsky, a senior DOE security official, says the agency believes its weapons-grade material is adequately guarded. While there have been some reductions in guard forces, these partly reflect changing government security requirements and the closing of some facilities, Mr. Podonsky says. As for the mock attacks, "we don't track the results on a win/lose basis," he says. Rather, they are used to evaluate protection strategies and individual responses by guards.

After the Sept. 11 attacks, DOE facilities went to a heightened state of alert and the agency is reviewing what further steps might be needed. "Sept. 11 changes a lot for everybody," says Mr. Podonsky.

At commercial nuclear-power plants, the main worry is that terrorists would turn a reactor into a sort of giant radiation-dispersal device. Disabling a plant's safety systems could lead to a catastrophic radiation release, similar to the one caused by the 1986 accident at the Chernobyl nuclear plant. There, radiation releases contaminated a huge swath of land, quickly killed several dozen people and exposed tens of thousands of others to dangerous doses of radioactivity.

Like the Energy Department, the NRC runs mock terrorist raids against power plants. The NRC won't reveal specific results, but "there have been instances where infiltrators have gotten far enough inside and stayed long enough where they could have planted bombs," says an agency spokesman.

But the NRC has halted the mock terrorist attacks, at least temporarily. "This is not a wise time to be holding exercises," says Mr. Meserve, the NRC chairman. "It could be used as the cover for an actual attack."

—Guy Chazan in Moscow  
contributed to this article.

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*'If you can smuggle heroin in containers, you may be able to smuggle a nuclear bomb,' says Charles Raymond, chief executive of CSX Lines.*

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their special services," he says, "to show that Russia isn't in control of its uranium."

One of the suspect facilities in the Czech case is the Mayak nuclear materials production complex in the Chelyabinsk region, which is home to a number of nuclear facilities. In a visit to Mayak last year, former Energy Department official Rose Gottemoeller says she found several tons of plutonium "stored in simple bucketlike containers." It would be "easy to carry," she notes, "if you could get through the wooden door or non-barred window." Although a joint Russian-U.S. venture was in the process of upgrading security at Mayak during her visit, Ms. Gottemoeller notes, it was just starting to install a perimeter fence. That fence has now been completed, according to Sarah Lennon, a DOE official. She also says windows have been bricked up and that other security improvements are in progress.

Ms. Gottemoeller also visited Russian Naval facilities in 1999 and 2000, where she said that nuclear weapons being moved on and off of ships were kept in "shacklike buildings on the base. The DOE's Ms. Lennon says there is an "aggressive program under way" to improve security measures for the Russian Navy's weapons.

## Behind on Upgrades

For the past eight years, the U.S. government has been helping the Russian government shore up security at its nuclear installations. So far, though, upgrades have been completed for less than 40% of the more than 660 tons of enriched uranium and plutonium not contained in Russia's nuclear-weapon stockpiles, says Mr. Bunn, who is also a former Clinton adviser on nuclear proliferation. In a Sept. 19 letter to President Bush and Russian President Vladimir Putin, Mr. Bunn wrote that "over the past five years, many of the major U.S.-Russian cooperative nuclear security programs have slowed" and "had their timelines unnecessarily extended

text radiation in containers. So far, the searches have found radioactive cheese from Ukraine's Chernobyl region and medical devices that use radioactivity for diagnostics. Officials also routinely review shipping documents looking for suspicious cargo, which are then subject to X-ray or physical searches.

But tearing apart containers is time-consuming and labor-intensive. On Oct. 5, for example, two customs inspectors in a warehouse at the port in Elizabeth, N.J., strained to lift and heave bags of birdseed out of a container that had arrived from Ethiopia. Another inspector removed boxes of sweatpants from Pakistan. An X-ray check had showed an oddly shaped object near the trailer door. "It could be a booby trap or a trigger for a device," said Kevin McCabe, chief inspector for the Port of New York and New Jersey. It turned out that one of the pants boxes had fallen and wedged itself against the door.

Since Sept. 11, the Customs Service has increased the number of inspectors and inspections nationally. At the New York/New Jersey port, the inspection force has expanded by more than a third to 100. The number of containers X-rayed has had an "appreciable increase" to about 500 daily, says Mr. McCabe.

However, more than 5,000 containers enter that port daily. Given this river of cargo, officials admit something could slip by. "If you can smuggle heroin in containers, you may be able to smuggle a nuclear bomb," says Charles Raymond, chief executive officer of CSX Lines, the container-shipping subsidiary of Richmond, Va.-based CSX Corp.

Some people argue that would-be nuclear terrorists can find what they need at U.S. weapons plants. With the end of the Cold War, security budgets shrunk at the weapons facilities, which are operated by the Department of Energy.

Since 1992, the number of guards at DOE facilities nationwide dropped about 40% to around 3,500, according to Edward McCallum, former director of the DOE's Office of Safeguards and Security. In a