PICKETING FOR SAFETY: Russian nuclear energy workers demand unpaid wages and increased plant funding at a 1997 protest. MISHA JAPARIDZE/AP/FILE

Loose nukes

Enough nuclear material is missing worldwide to make a 'dirty' bomb. Where is it? What is being done to prevent its use by terrorists?

By Peter Grier | Staff writer

Jamal Ahmad Al-Fadl said his role in the prospective purchase of nuclear material began with a call from a senior Al Qaeda official. A man in Khartoum, Sudan, supposedly had uranium for sale. At the time, Mr. al-Fadl was an operative in Al Qaeda's terrorist army. His job: Check out the deal.

So in late 1993 or early 1994, he met with the first contact, then another, and then another, like a job applicant passing through corporate departments. Along the way, he noticed that at least one of them appeared to have been high in the Sudanese government at some point.

Finally, one morning al-Fadl drove with two men to a house north of the city. They disappeared for a moment, and then came back with a large bag, from which they pulled a cylinder two or three feet tall. They handed him a piece of paper covered with English words al-Fadl couldn't read. He recognized one phrase: "South Africa."

The demonstration phase of the sales pitch over, al-Fadl and his contacts returned to Khartoum in their jeep. He took the paper to an Al Qaeda boss.

Osama bin Laden's operatives were impressed, or at least satisfied. They told Al-Fadl to pass the word that they would pay the cylinder's $1.5 million asking price. Then they gave him $10,000 and took over the deal themselves.

"You did great job, we going to check it, and everything be fine," Al-Fadl said he was told.

This story of nuclear shopping was offered as an aside by Al-Fadl during his testimony earlier this year in the trial of Al Qaeda associates accused of bombing US embassies in East Africa in 1998. Is it a tall tale? Maybe. Al-Fadl, a self-described Al Qaeda turncoat, is far from an unimpeachable source.

Al-Fadl also said he didn't know whether this transaction ever went through. The "uranium" in the cylinder might have been a worthless prop in a

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But its details ring true to many nuclear experts. And the larger point is indisputable: The shadow army of terrorism, the force responsible for the deadliest day on American soil since Antietam, is trying, methodically, patiently, to acquire the most powerful weapon known to man.

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The US and its allies have known that intellectually for a long time. But after seeing jetliners turned into cruise missiles, perhaps the West better understands what that really means. Among Sept. 11's effects may be a phase-shift in imaginations. Few can doubt that if Mohammad Atta had access to a nuclear bomb, he would have used it.

Once throw-weights and basing modes and other aspects of strategic weaponry were the crucial issues of US nuclear security. Now patching the holes in Russia's makeshift fissile material protections may be more important. Does bin Laden have the bomb? Is Iraq enriching uranium? How secure are Pakistan's nukes?

"And so we find ourselves, at the dawn of the new century, in a new arms race," said former Sen. Sam Nunn of Georgia in a recent speech. "Terrorists are racing to get weapons of mass destruction. We ought to be racing to stop them."

New terrorists, new lapses

The old expert consensus used to be that terrorist groups were not terribly serious about getting nuclear weapons. They might try chemical or biological attack, but not nukes: They are highly dangerous, extremely expensive, and difficult to acquire. And their horror would overwhelm the essentially political nature of terrorist acts. Through history, most terrorists have wanted to maximize publicity - not casualties.

That judgment had already begun to change before the events of this fall. The rise of a new generation of terrorists, their goals unclear, their commitment total, their address unknown, saw to that.

A state such as Iraq is dangerous enough. But at least the US has some understanding of its weapons programs. A nation has assets and infrastructure that presumably even a leader such as Saddam Hussein might be loath to expose to US retaliatory attack.

Al Qaeda and its ilk are different. "The problem is, we can't target them like states," says Kimberly McCloud, a researcher at the Center for Nonproliferation Studies, Monterey Institute of International Studies.

Then add new opportunity to this equation. It's possible that South Africa could be the source of weapons material. Pakistan might be a proliferation danger, too, considering it is a nuclear-capable state with long-standing Taliban ties.

But it is Russia and the former republics of the Soviet Union that are the "Home Depot" of fissile material, in the words of one expert. The collapse of the Soviet Union threw its nuclear programs into a chaos from which they have yet to completely recover.

With the fall of the Berlin Wall, the closed cities where the USSR's nuclear weapons were produced changed from islands of prosperity to sinkholes of poverty. The human misery this created - especially in the early years - led some scientists to attempt desperate actions. In 1992, a large group of ballistic-missile experts from the closed city of Miass tried to reach North Korea, apparently to work in Pyongyang's intercontinental-ballistic-missile projects. Authorities caught them as they sat in a plane at Moscow's Sheremetievo-2 airport, waiting to take off.

Russian authorities insist that their estimated 30,000 actual nuclear warheads have remained under adequate control at all times. But the same cannot be said for its military and civilian fissile material.

Over decades, the Soviet Union produced enough highly enriched uranium (HEU) and plutonium to produce some 70,000 nuclear weapons. This was scattered at perhaps 100 sites throughout the territory of the former USSR. In the early '90s, some research sites were protected by nothing but padlocks and weeds. Dedicated scientists at times had to improvise defenses. When civil war broke out in the former republic of Georgia in 1992, scientists at one institute in Tbilisi took turns guarding 10 kilograms of weapons-grade HEU with sticks and garden rakes.

Much of this material was later moved to Britain for safekeeping. A cache of similar uranium elsewhere in the former republic met a different fate. In 1993, scientists at the Sukhumi research center in the Abkhazia region of Georgia piled cinder blocks around a building containing 2 kilograms of HEU, and fled oncoming fighting. A Russian team entered the abandoned building four years later, and found the material gone.

The Abkhazia affair remains the only confirmed case of missing weapons-grade fissile material in the world. To this day, no one knows where this HEU is. "It may be in the hands of the Abkhaz separatists, or it may have been stolen by or sold to others," says Matthew Bunn, of Harvard's Project on Managing the Atom.

Overall, there have been 14 confirmed, significant cases of trafficking in fissile material from the former Soviet Union, according to the Monterey Institute of International Studies.

The good news is that most of the cases date to the early and mid-'90s, before Russia stabilized and a US effort to help guard its material took off.

The bad news is that there may be more significant cases the world doesn't know about. Most of the confirmed incidents took place in Europe or what used to be the western USSR. Yet a glance at a map shows that southern Russia, and the former republics of Uzbekistan, Tajikistan, etc., are the logical place for a Middle Eastern group such as Al Qaeda to go nuke shopping.

The US has been involved in cooperative programs with Russia to control its loose nuclear weapons and material for years. Since 1991, US money has paid for the deactivation of more than 5,000 Russian nuclear warheads. It has provided security equipment for dozens of facilities, helped construct a secure storage facility for fissile material, and paid for science and technology centers intended to provide ex-weapons scientists the means to work on civilian research.

"These programs have made tremendous progress," notes Jon Wolfsthal, an associate

But much more may need to be done. Almost half of Russia's fissile material is stored in facilities that have not received US-funded protection upgrades. Russia continues to add to its stockpile of plutonium - not for military purposes, but because the reactors that produce the material also produce desperately needed electricity.

Earlier this year, a Department of Energy advisory group headed by former US Sen. Howard Baker and former White House counsel Lloyd Cutler surveyed the US effort - and found it wanting. The programs need a broader mandate, and they need more money, concluded the group.

"The most urgent unmet national security threat to the United States today is the danger that weapons of mass destruction or weapons-usable material in Russia could be stolen or sold to

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terrorists or hostile nation-states," concluded the Baker/Cutler study.

That was written before Sept. 11.

Al Qaeda and the black market

There is one point about Al Qaeda's nuclear program on which most experts agree: It does not yet have an actual atomic weapon. If it did, the chances are it would have exploded by now.

It's less certain whether the group has any radioactive material at all. Al Qaeda has been a player in fissile-material markets for years, according to intelligence reports.

In the early '90s, it allegedly scoured Kazakhstan for USSR-era material, in the belief that the high percentage of Muslims in this former Soviet republic might open doors. Apparently, the group came up empty.

Since then, Al Qaeda may have been snared by its share of scams. They were dealing, after all, in a back alley of world commerce that makes drug-dealing look both honest and inexpensive.

At least once, Al Qaeda operatives have been offered low-grade uranium reactor fuel unsuitable for weapons use without further enrichment. Along with other potential buyers, Al Qaeda also may have fallen for the widespread "red mercury" fraud. Clever criminals pitch this element as a crucial component of the Soviet weapons program.

"In the case of Al Qaida, the 'red mercury' turned out to be radioactive rubbish," concluded Gavin Cameron, a professor of politics at Britain's University of Salford, in a paper on terrorist nuclear-proliferation activities.

Al Qaeda may have been gullible, but at least the group was subtle. Contrast their approach with that of the apocalyptic Japanese religious group Aum Shinrikyo, whose members were responsible for the release of sarin nerve gas in five Tokyo subway trains on March 20, 1995.

In the early 1990s, Aum actively recruited adherents from Russia's nuclear design facilities, as well as student physicists from Moscow State University. It purchased property in Australia from which it planned to mine natural uranium for enrichment - an arduous task beyond the resources of most nations. In 1993, Aum representatives sought a meeting with then-Russian Energy Minister Viktor Mikhailov for the express purpose of discussing the purchase of a nuclear warhead. (The meeting was denied.)

But Al Qaeda's and Aum Shinrikyo's nuclear dealings share at least two similarities that experts find worrisome. One is ample funding. At the height of its influence, Aum had an estimated net worth of $1 billion, obtained largely from co-opting the assets of its members. Al Qaeda's operations have bin Laden's personal fortune - inherited from his construction-magnate father - as seed funds.

The second similarity is persistence. Following Aum's path, Al Qaeda has apparently mounted a multinational, many-leveled effort to enter the nuclear club. In recent years, there has been a steady trickle of reports from experts in Europe and the Middle East who say they have been contacted by bin Laden associates and asked for help obtaining fissile material.

Last year, a Bulgarian businessman said he had met bin Laden himself, and had been offered a role in a complex deal to transship nuclear waste to Afghanistan via Bulgaria. This month, Gul Nazir, head of organic chemistry at Kabul University, said he had turned down offers from Taliban delegations to provide substances that could be used to help make chemical weapons and mine uranium.

Then there's the curious case of Sultan Bashiruddin Mahmood. An architect of Pakistan's nuclear program, he has traveled back and forth between Pakistan and Afghanistan in recent years, allegedly to advise the Taliban on the construction of food-processing plants.

At least one expert believes a radiological attack of a sort was part of Al Qaeda's original plan for Sept. 11. In a speech delivered to a meeting of the International Atomic Energy Agency, in early November, Mr. Cameron of the University of Salford said that it is likely that the target of the hijacked United Airlines Flight 93 was a US nuclear facility.

The hijackers' intentions are essentially unknowable, he admits, because they were stormed by heroic passengers, leading to the plane's crash in rural Pennsylvania. But the plane made a sharp turn near the Pittsburgh area, and rapidly lost height, before the passengers acted. Combined with unspecific FBI warnings about threats to power plants, this evidence may point to the terrorists' intended destination.

"It now appears that one of three nuclear reactors in southern Pennsylvania - Three Mile Island, Peach Bottom, or Hope Creek, Salem - may have been the real target," Cameron told the IAEA.

When scientists conspire

On Dec. 18, 1998, an official of Russia's successor agency to the KGB, the Federal Security Service (FSB), said that agents under his command had broken up a conspiracy by employees of a major nuclear facility in the Chelyabinsk region to steal 18.5 kilograms of weapons-usable material. If it had gone through, the theft would have caused "significant damage to the [Russian] state," local media quoted FSB Maj. Gen. Valeriy Tretyakov as saying.

In the US, experts reeled.

Chelyabinsk is home to some of Russia's most important nuclear facilities, including a nuclear-weapons assembly and disassembly plant at Trekhgorny, and a weapons-design lab at Snezhinsk. If a group of insiders at one of these sensitive sites had decided to steal fissile material - well, that would be a highly serious matter. Furthermore, the material involved was apparently not some useless radioactive slurry. It was weapons-usable - meaning 18.5 kilograms might be enough to make an entire nuclear weapon.

This incident is not included on most lists of the most important nuclear trafficking incidents, for the simple reason that it was quashed in its initial phases. But it remains one of the most troubling apparent cases of attempted proliferation of all - because it matches almost exactly the US nightmare scenario for a fissile-material theft.

It wasn't ancient history. It occurred in 1998, after many facilities in the region had received US money for protection upgrades. It involved lots of stuff. And it involved a conspiracy of the knowledgeable.

"Multiple insiders are the hardest thing for any security system to address," says Mr. Bunn of the Managing the Atom project.

Consider the ramifications. Russia has a "three-man rule" in regard to its nuclear weapons. Individuals are forbidden from working alone on warheads, as are twosomes.

But if two scientists are in cahoots, they might be able to overpower the third. To guard against this, security might have to institute a four-man, or even five-man rule. Perimeter guards might need to be doubled. The cost and complexity of protection systems escalates exponentially.

And what would be the genesis of such a conspiracy? Perhaps a group of disillusioned scientists or guards would try such a

thing on their own, but that may be unlikely, given the difficulties of marketing the stuff. It's more likely that such a theft might come in response to an enticing overture. Such as Saddam Hussein, perhaps, offering enough money for everyone in the group to buy a South Seas island.

"What I worry about is state intelligence agencies contacting these people," says Scott Parrish, an analyst at the Center for Nonproliferation Studies at the Monterey Institute.

If the Chelyabinsk conspiracy is the No. 1 worrisome incidence of potential trafficking in nuclear material, the Prague seizure might be judged No. 2.

In December 1994, an anonymous tip led Czech police to a marked car. In it, they found 2.7 kilograms of HEU enriched to 87.7 percent. The amount and purity of the recovered material was highly troubling. Worse, in two instances in 1995, Czech authorities recovered small amounts of additional HEU that appeared to be from the same source.

This suggests that there is a stock of weapons-grade HEU out there, of unknown quantity, in unknown hands.

New worries about so-called "dirty bombs," conventional explosives used to spread deadly radioactive material over a wide area, are also making some incidents of trafficking seem important in retrospect.

Earlier this year, for instance, the Russian news agency Itar-Tass reported the seizure of 5 kilograms of cesium 137 from Chechen rebels, who were allegedly loading the material into mortar shells. Most experts do not consider this incident confirmed, but the Chechens have threatened to use radiological material before. And cesium 137 is nasty stuff. Its radiation was the cause of many of the fatalities associated with the Soviet-era explosion of the Chernobyl nuclear plant.

In fact, once worries about dirty bombs multiply, the potential sources of dangerous material rapidly multiply as well. Radioactive material is used in many medical and industrial applications. Eastern Europe and the nations of the former Soviet Union even used trace amounts of plutonium in smoke detectors. "I used to joke that if Saddam Hussein placed an order in Russia for 500 million smoke detectors, we should get worried," says Dr. Parrish of the Monterey Institute.

What the U.S. is doing

Preventing a nuclear terrorist attack on the US will require a comprehensive effort far into the future, say US officials. It will be one part - arguably the most important part - of the overall commitment to homeland defense.

More narrowly, it may necessitate redoubled cooperation with the most likely source of loose nukes in the world: Russia. Warming relations between President Bush and his Russian counterpart, Vladimir Putin, today offer a window of opportunity for such an intensification, say its advocates.

There is a decent foundation of mutual effort to build on. Initiated by Sen. Richard Lugar (R) of Indiana and former Sen. Sam Nunn (D) of Georgia in 1991, the Cooperative Threat Reduction (CTR) program has grown into a $1 billion-plus effort overseen on the US side by the Departments of Energy, State, and Defense.

"These programs have achieved impressive results for a relatively minor investment," says Stephen LaMontagne, a nuclear analyst at the Council for a Livable World Education Fund.

CTR funds pay for the destruction and dismantling of Russian ballistic missiles and submarines, for instance. Last year, $57 million of US funds went toward completion of the first wing of the Mayak Fissile Material Storage Facility, which will

ultimately have the capacity to protect 6,250 dismantled warheads.

The Department of Energy's Material Protection, Control, and Accounting program has so far improved physical security at 13 Russian Navy nuclear sites and 24 civilian nuclear installations. But there are some 58 more Russian nuclear sites that need security upgrades, according to DOE figures. A program to blend HEU down into less dangerous civilian reactor fuel is moving slowly. Efforts to replace three Russian nuclear reactors that produce both desperately needed energy and plutonium have stalled in a swirl of politics.

And the Bush administration, in its first crack at drawing up a national-security budget, has slashed the funding of much of the non-proliferation effort. Bush's budget took $100 million out of the Department of Energy's side of the effort, alone.

The needs, according to the Secretary of Energy's advisory board task force headed by Mr. Baker and Mr. Cutler, include: a real strategic plan; a high-level position within the White House devoted to the issue, perhaps within the National Security Council; more money, and more urgency. Concludes the report: "There is a clear and present danger to the international community as well as to American lives and liberties."

LILIAN AKWISOMBE - STAFF

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