PROFILE: TARIQ RAUF

Treading the Nuclear Fuel Cycle Minefield

Tariq Rauf has the unenviable job of making IAEA's international fuel bank work. And the clock is ticking

VIENNA, AUSTRIA—Nuclear weapons capability could spread to as many as 30 more countries in the coming decades if the trade in nuclear fuel continues on its present course, according to Mohamed ElBaradei, director general of the International Atomic Energy Agency (IAEA). But this frightening scenario might be avoided if the "haves" could agree on a better scheme for sharing fuel production with the "have-nots." A number of proposals have now been put forward to allow countries to use nuclear energy without acquiring centrifuges of their own for enriching uranium.

Hot seat. Rauf needs more backers for the fuel bank or his funding disappears.

CREDIT: IAEA

Among these is the establishment of an IAEA-controlled international fuel bank from which all countries could draw. That plan got a boost last year from the U.S.–based Nuclear Threat Initiative (NTI), an independent group backed by U.S. billionaire Warren Buffett. The NTI pledged $50 million to set up the bank, as long as IAEA secures another $100 million, or the equivalent in nuclear fuel, by September 2008.

So far, no one has put money, or fuel, on the table, and the whole idea remains intensely controversial. "Whether the U.S. would actually place its [nuclear] material under full IAEA control remains to be seen," says Frank von Hippel, a nuclear policy expert at Princeton University. Matthew Bunn, a nonproliferation specialist at Harvard University, says the bank has "a better-than-even chance" of being set up. Others, however, are not happy about the terms being offered. "Forgoing uranium enrichment in order to obtain security of supply is not an acceptable option for many nonnuclear countries," says José Goldemberg, a nuclear fuel cycle expert at the University of São Paulo, Brazil.

At the center of this storm sits Tariq Rauf, the 55-year-old head of IAEA's Verification and Security Policy Coordination section and coordinator of the IAEA fuel-bank project. *Science* met with Rauf, a Canadian with Pakistani parents, in his office at IAEA headquarters here in the Austrian capital.

–JOHN BOHANNON

Q: Why is a fuel bank needed?

This whole thing started in the fall of 2003 when our director general [Mohamed ElBaradei] drew attention to the fact that nuclear enrichment and reprocessing technology are in too many hands. Today, there are eight to 10 countries with the capability to enrich uranium and about the same number that can reprocess spent fuel to make plutonium. The question is whether fuel production will be restricted to these countries or whether new ones will enter the market. The issue is that the same technology can be used both for nuclear energy and a nuclear weapons program.

Q: Why would a nuclear hopeful nation want to enroll?

For one thing, enrichment and reprocessing are very expensive activities. Setting up an enrichment plant isn't economical unless you have eight to 10 nuclear power reactors. Some countries do not need so many. This brings up the conundrum: Do you make or do you buy [nuclear fuel]? So the [fuel bank] idea is to have a system whereby [countries] first go to the market to buy fuel, and if they are unable to because of political reasons, then they would come to these assurance-of-supply mechanisms. It's like if you have bought a ticket from an airline and that airline company goes belly-up, another airline will honor that ticket.

Q: Besides the political differences, are there technical challenges?

The challenge is to have it be multinational without a transfer of technology. For example, if you had six countries taking part, the enrichment technology might be coming from the Europeans, and [they] would run the technology. The other countries are part of the management and operational side.

Q: So scientists and technicians from every country would not be involved?

They could be involved, but they wouldn't all be sitting in the [enrichment] cascade halls. None of these multinational schemes envisions the expertise of enrichment or reprocessing being transferred to countries that don't have these technologies already. It's as if you bought shares in a company like Toyota. You're interested in the product, which in this case is the enriched uranium coming out. You really don't need to know how the production line works.

Q: What role is IAEA likely to play?

One of the criticisms is that this is a grand plan from the IAEA to expand and be a supercontrolling agency. … But we don't want to set up an empire. If we do set up an IAEA fuel bank, we would likely contract it out to industry.

Q: What might a nuclear renaissance mean for nuclear science?

The intake of people studying nuclear science in universities has been declining, which has made a smaller and smaller pool of nuclear-educated people available. That has also made life difficult for [the IAEA] because we need inspectors and other staff with nuclear expertise. Many of us hope that a nuclear renaissance will mean that nuclear will no longer be associated with being unsafe, and that this will encourage students. The world certainly needs more people with a nuclear science education.