Three-pronged nuclear attack

A trio of security vulnerabilities surrounding the use of nuclear power are highlighted today in research papers online with Inderscience Publishers.

The first threat is at the source of the raw material for nuclear power itself, the uranium mine, processing plant, and transport route. Here, physical protection and security are at a much lower level than at a nuclear installation in the developed world, according to Austrian scientists writing in today's issue of the *International Journal of Nuclear Governance, Economy and Ecology*.

The second threat is from saboteurs with expertise in the industry and the security of nuclear installations. Researchers from the US Environmental Protection Agency suggest that such saboteurs on the inside could wreak havoc and cause a serious environmental and health threats with only small, shaped explosives or even no explosives at all.

Finally, at the waste end of the nuclear industry, a second US team point out that the significant quantities of spent radioactive fuel could also represent a security nightmare. The team from environmental health and safety consultants S. Cohen and Associates, in Montgomery Alabama, point out that there is no secure central repository for nuclear waste. Any one of the waste storage or processing plants could be vulnerable to a terrorist attack.

Friedrich Steinhäusler and Lyudmila Zaitseva of the Division of Physics and Biophysics, at the University of Salzburg, Austria, have investigated the potential security threats facing the industry at the initial mining and milling end of the nuclear process. At this point, terrorist or saboteur might intercept highly radioactive material. For instance, terrorists or saboteurs might instigate illegal mining of an officially closed uranium mine or diversion uranium ore from a mine or mill, or more obviously demolition of facilities with the intention of causing environmental harm.

According to the Austrian team, uranium mining took place in almost twenty countries, but 90% of world production is in just ten; seven of these states have been associated with clandestine nuclear activities.

"The current control system is inadequate as it could allow rogue nations or terrorist groups to traffic uranium or enriched yellow cake in at least 24 countries on three continents," say the researchers, "There is a critical need to counter the threats resulting from an uncontrolled acquisition of these radioactive materials in a coordinated manner."

Anthony Honnellio of the Emergency Response Branch OSSR and Stan Rydell of the Pesticides Toxics and Radiation Unit, both divisions of the US Environmental Protection Agency in Boston, realized that have been many reports on nuclear security that focus on terrorist attack from outside. However, they explain that sabotage by individuals with a detailed knowledge of security procedures, plant layout and the functional nature of the critical components of a nuclear power plant, could exploit their knowledge to catastrophic effect.

They speculate that small explosives could be smuggled in as they have been into airports, despite post-9/11 security improvements. Their concerns do not lie only with the effects of an explosion. They suggest that critical damage to facility could cause widespread, long-lasting power outages to devastating effect.

In considering nuclear waste, Edwin Sensintaffar and Charles Phillips of S Cohen and Associates highlight a recent review of security at commercial spent nuclear fuel plants, that suggests various vulnerabilities. A deliberate fire at such a facility could cause widespread radioactive contamination, with serious health and

environmental consequences. "The radioactive contamination that could be released into the environment from such an event could contaminate thousands of square kilometers, result in billions of dollars in economic impact and large numbers of both early and latent cancer deaths," the researchers say.

Three papers published this week in the Inderscience International Journal of Nuclear Governance, Economy and Ecology

Vol. 1, No. 3, 2007, p 286 - "Uranium mining and milling: material security and risk assessment" by Friedrich Steinhäusler and Lyudmila Zaitseva

Vol. 1, No. 3, 2007, p 312 - "Sabotage vulnerability of nuclear power plants" by Anthony L. Honnellio and Stan Rydell

Vol. 1, No. 3, 2007, p 278 - "Environmental impact resulting from a fire at a spent nuclear fuel storage facility" by Edwin L. Sensintaffar and Charles R. Phillips

Source: Inderscience Publishers