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A Chemical Attack Understanding the Threat

By Fred Burton

The threat of a terrorist attack inside the United States is intensifying. U.S. counterterrorism sources are greatly concerned about an attack this summer, as demonstrated by the May 26 government warnings, and a global effort to disrupt attack plans with public alerts domestically and a concerted push for arrests and extraditions abroad.

Passenger rail and subway systems remain vulnerable to Madrid- style attacks. In addition to the detonation of conventional explosive devices on public transport, U.S. counterterrorism officials say the possibility for a chemical attack is increasing. Chemicals could be the weapon of choice among militant operatives. Stratfor intelligence sources have expressed growing concern that militants might attempt to detonate a device to disperse toxic chemicals and cause mass casualties.

The timing of a May 21 FBI alert about suicide bombers, together with the latest public warnings of possible al Qaeda attacks, underscores the idea that a militant plot could be unfolding within the United States. The suicide bomber alert cautioned about people wearing heavy or bulky jackets on warm days, smelling of chemicals or trailing wires from their jackets; it also alerted people to more subtle indicators, such as a person with tightly clenched fists, who could be gripping a device rigged to go off when pressure is released.

The FBI alert is a positive development for law enforcement and for those engaged in corporate security. As one source close to the matter told Stratfor, "The details provide very good tactical information" to help sensitize law enforcement to a specific attack method by giving the physical descriptors of a suicide bomber. A suicide bombing could be the perfect attack against mass transportation systems, such as subways in cities such as Washington or New York. Such an attack could use conventional explosives or employ a chemical component.

At Risk: Public Transport and Chemical Storage Facilities

A major chemical attack inside the United States could create a public safety disaster on the scale of Sept. 11. An improvised explosive device (IED) could be detonated in close proximity to - - or within -- a chemical storage facility, or an IED containing a chemical agent -- such as Sarin -- could be detonated, dispersing the toxic chemicals and causing mass casualties.

Sources within the U.S. counterterrorism community are concerned about such attacks.

More than likely, chemical threat information has surfaced because of al Qaeda suspect debriefings, technical intercepts and analysis of al Qaeda's anticipated actions. Various seized documents demonstrate a significant interest on the part of al Qaeda planners and trainers in the potential for chemical attacks, although information on their actual capabilities is limited. Training manuals were found at al Qaeda training camps in Afghanistan, and some experimental training took place at camps in Chechnya and Georgia's Pankisi Gorge. Jordanian intelligence officials also claim an interdicted plot to attack intelligence service headquarters and the U.S. Embassy in Amman involved the detonation of a large "chemical bomb" that might have killed as many as 20,000 people. At least one arrested plotter backed up the chemical claims in a televised confession, though the reliability of the Jordanian claim remains questionable.

Sources indicate that the potential for the detonation of radiological materials (a dirty bomb) has decreased somewhat, but still cannot be ruled out. Intelligence sources are specifically concerned about the potential for the release of a poison gas such as Sarin, a highly toxic nerve agent that has been used in the past. At room temperature, Sarin is liquid, but it evaporates quickly into a clear, colorless, odorless and tasteless gas that kills its victims by paralyzing the muscles surrounding their lungs, causing suffocation.

The release of a toxic gas on a crowded subway is one possible scenario. Aum Shinrikyo, the Japanese apocalyptic cult, used Sarin in a 1995 Tokyo subway system attack, killing 12 people and sending more than 5,000 to the hospital. The cult filled plastic bags with the nerve agent and punctured them after they were planted in the subway.

Mass transit systems in major cities such as New York, Boston or Washington are vulnerable to this kind of attack, which would be very difficult to guard against with any reasonable security measures. Even though Sarin can be made with commercially available materials, it is not easy to produce; a sophisticated laboratory is required to produce a stable and effective weapon. But other more readily available toxic chemicals could be used in a subway attack.

The difficulties associated with securing, transporting and successfully deploying toxic chemical agents such as Sarin could encourage militants to embrace another attack scenario: Targeting a chemical storage facility near a heavily populated area with the intent of releasing toxic chemicals against the surrounding population. Such a scenario has its own set of difficulties; it would be more difficult to carry out, with more variables for possible failure than an attack on public transport. Still, it is a troubling possibility.

Targeting Stored Chemicals

Chlorine and ammonia storage facilities near populated areas could become targets. Chlorine stores at water treatment plants are a top concern because they tend to be close to cities -- and some locations have large stockpiles of liquid chlorine, the most viable form for a large-scale terrorist attack.
A wide range of facilities have large stores of toxic chemicals, and determined terrorists

could attempt to break through their security controls. Adopting tactics used in recent attacks in Saudi Arabia and the interdicted plot in Jordan, multiple vehicles could be used and operatives could shoot any visible guard force. Alternatively, an attack could come as an "inside job," similar to the May 1 assault on Western workers in Yanbu, Saudi Arabia.

A May 25 fire at a swimming pool supply warehouse near Atlanta -- containing large quantities of chlorine -- highlighted the impact an attack on a chemical storage facility could have.

Tens of thousands of pounds of chlorine products were stored in the Biolab warehouse -- located approximately 10 miles east of Atlanta -- when an early morning fire started, resulting in a huge cloud of drifting, toxic smoke. Nearly 10,000 people live in the area of the warehouse, and sheriff's deputies went door to door, advising them to evacuate. Smoke caused the partial closure of Interstate 20 east of Atlanta and the removal of patients from a local hospital to another facility, beyond the smoke cloud's estimated five-square-mile reach. The wind pushed the smoke/chemical cloud away from the city of Atlanta.

Although there are no signs of foul play in the Atlanta incident, the fallout from the accident highlights the danger if such a site were to be targeted for a well-planned operation. Militants are presented with a ready supply of chemical materials, rather than having to risk gathering and storing them for later use. Members of sleeper cells might seek employment at such a business.

Photographs of the Atlanta-area site reveal why these facilities create concern as potential targets: It is adjacent to a main road, with limited visible security in place and with trees and a water tower -- which could provide cover to attackers -- looming above its perimeter wall. This is one of many similar facilities near major metropolitan areas that could be vulnerable to a concerted attack.

In the current threat environment, such facilities should, and likely are, enhancing their levels of security, particularly around their perimeters -- and especially as intelligence worries over a chemical attack inside the United States continue to grow.

How Chemical Agents Such as Sarin Can Overwhelm the Nervous System So Quickly

By Michael Allswede

How can minute quantities of chemicals such as Sarin overwhelm the nervous system of an adult human so quickly?

Michael Allswede is an emergency physician and medical toxicologist at the University of Pittsburgh and a senior research fellow at the University's Center for Biosecurity. He is the author of the RaPiD-T Program (Recognition, Protection, Decontamination, and Treatment) and has trained first responders in chemical weapon management since 1997.

The four factors that determine how a chemical will affect the human body are absorption, distribution, elimination and potency.

Absorption refers to the ability of the chemical to enter the body rapidly. In newsworthy events involving carfentanyl and Sarin, victims were dosed by way of vapor exposure. In these instances absorption occurred through the lungs, which have a huge surface area and are very efficient at taking up chemicals. Nicotine

blood levels in a smoker, for example, rise almost immediately after inhalation. In contrast, absorption through the skin or clothing requires a greater dose and more time, and may not occur at all if the chemical cannot penetrate the skin, as in the case of carfentanyl.

Distribution refers to where in the body the chemical goes to exert its effects. To infiltrate the nervous system, a chemical must possess a certain degree of lipid (fat) solubility. Carfentanyl and Sarin both rapidly penetrate the lipid brain barrier.

Elimination describes how fast the body can rid itself of the chemical and recover from its effects.

A chemical's potency is its ability to exert effects at its site of action. The most potent chemicals act on physiologic receptors within the body and the degree of binding of the chemical to the receptor determines its potency.

Carfentanyl binds to the human opiate receptor thousands of times stronger than morphine or heroin does. Indeed, the fentanyl family of synthetic opiates was developed as rapid-acting, high-potency anesthesia medication: carfentanyl overdose causes death by rapidly sedating the individual and halting breathing.

Sarin's potency stems from the inhibition of a very important enzyme in the body called acetyl cholinesterase. This enzyme acts as an 'off switch' to the part of the nervous system that controls voluntary movements such as breathing, as well as bronchial constriction secretion, urinary and bowel continence, and other involuntary functions. When acetyl cholinesterase is inhibited, the nervous system is over-stimulated and the body is paralyzed, breathing stops and the lungs no longer function. Because there is only a small amount of acetyl cholinesterase in the body, very little Sarin is needed to induce this effect.

The combination of rapid absorption through the lungs, rapid distribution to the sites of activity, and high potency produces the swiftly lethal toxic effect observed in both carfentanyl and Sarin vapor exposure. Vapor toxicity is described in terms of the lethal concentration-time product, or LCt50. LCt50 refers to the death of 50 percent of subjects exposed to a certain concentration over a certain time.

For example, the LCt50 for isopropyl methylhosphonofluridate, or Sarin, is 100 milligrams per minute per cubic meter. (100 milligrams of pure Sarin would look like a small droplet.) That means that if a person is breathing air with a concentration of 100 milligrams per cubic meter, she will live about one minute before she has a 50 percent chance of dying. Smaller people or those breathing faster will be the most susceptible in the event of exposure.

Source: http://www.sciam.com/print_version.cfm?articleID=000488E8-5B37-10BF-9B3783414B7F0000

Army Plans to Destroy Deadly Nerve Agent

By Rick Callahan, Associated Press Writer

NEWPORT, Ind. -- In a cavernous, pipe-filled structure known simply as the Utility Building, Army contractors are getting ready to destroy a Cold War-era concoction so lethal it could kill untold millions.

After years of controversy, workers will begin chemically neutralizing 1,269 tons of the ultra-deadly nerve agent VX this summer as part of a

plan to eliminate the nation's chemical weapons stockpile.

Residents near the Newport Chemical Depot are ready to see the VX go. So are activists who keep tabs on the nation's cache of weapons of mass destruction.

"One drop the size of George Washington's eye on a quarter is enough to kill a healthy, 180-pound male. It's the most lethal chemical on the planet," said Craig Williams, director of the Chemical Weapons Working Group, a Kentucky-based watchdog organization.

But a dispute over what will become of the project's wastewater could leave the rural community about 70 miles west of Indianapolis stuck with the nerve agent's legacy.

The Army plans to heat the VX, a liquid with the consistency of mineral oil, in chemical reactors to destroy its structure. Army officials liken the resulting hydrolysate to liquid drain cleaner, and say it will contain no detectable VX at sampling levels of 20 parts per billion.

Although VX was never used by the American military in combat, there have been human exposures - but no deaths - in the United States. Its lethal potential was demonstrated in 1968 when an aerial spraying test of VX at Utah's Dugway Proving Grounds went awry, killing about 6,000 grazing sheep.

The VX stockpile was produced at the 7,000-acre Newport complex between 1961 and 1968 as a doomsday deterrent. For years after production ended, containers of the nerve agent sat rusting in a field, apparently regarded by the depot's workers as just part of the landscape.

"They used to eat lunch on top of the containers," said Lt. Col. Joseph Marquart, Newport's commander. "We don't do that anymore."

The containers now sit in heavily guarded concrete bunkers built after the Sept. 11 terrorist attacks.

Since President Nixon halted the manufacture of chemical weapons in 1969, about 31,000 tons of VX, Sarin and mustard nerve agent have been stored at Newport and seven other chemical depots in Alabama, Arkansas, Colorado, Kentucky, Maryland, Oregon and Utah.

Destruction is under way at four of the eight in compliance with the international Chemical Weapons Convention treaty.

At the Newport depot, Army contractors will open the first of 1,690 VX-filled steel containers late this summer inside a building from which no air escapes without being heavily filtered. Security cameras keep watch, and air monitoring equipment scans for trouble.

Inside, workers will drain the 6 1/2-by-3-foot containers in airtight glovebox chambers, with technicians outside the reinforced glass using thick gloves to attach a special pumping device.

The VX will then be transferred to a steel reactor where it will be neutralized by adding it over a 36-minute period to a mixture of water and sodium hydroxide heated to about` 195 degrees. Two sets of paddles will agitate the mixture to complete the reaction.

Workers will carry a VX antidote in case of an accidental release.

Neutralizing all the VX should take about 2 1/2 years. But where it will go from there is unclear.

DuPont wants to dump treated hydrolysate into the Delaware River. But fears that the chemical could ruin decades of river cleanup led Delaware Gov. Ruth Ann Minner and New Jersey Gov. James McGreevey to send the Army a letter of protest.

"There's too many questions," said Gregory Patterson, Minner's spokesman.

DuPont spokesman Anthony Farina said the company will not accept an Army contract to handle the hydrolysate until the Centers for Disease Control and Prevention and the Environmental Protection Agency complete studies of DuPont's plans.

Because of the uncertainties, the Army intends to buy 50 5,000-gallon tanks that will allow it to store at Newport about 240,000 gallons of hydrolysate - the amount expected to be produced in the first six months.

Sara Morgan, a teacher who lives a few miles from the depot, is glad the neutralization will soon begin. She led a campaign that forced the Army to drop its original plans to incinerate Newport's VX, a method some feared could release toxins into the air.

Yet she believes the project's waste should stay at Newport - not sent off to become New Jersey and Delaware's problem.

"The citizens of the area where this is going to be treated should be accepting of it," she said. "I don't think it should be shoved down their throats."