

# Trojan horse nuclear security\*

The purpose of this article is to provide factual information, dispel misconceptions and put some common sense into the issues surrounding the subject of container security. We have gleaned this information from leading American nuclear experts. Those who were privy to secret information, under potential threat of criminal prosecution, have carefully avoided revealing secret information. The information is not generally available to the public but is available to all well-educated nuclear scientists or engineers.

To the uninitiated it may appear that we are giving potential saboteurs all they need to build atomic bombs. Not so; they already have qualified experts who will learn nothing new. Our goal is to educate the uninitiated to help create a sense of urgency. We fear planning is ongoing for an attack that will dwarf 9/11.

Time is running out. In as little as six months containers could be totally eliminated as a viable delivery mode. That can

"Of course, you could just boil away the water, get plutonium nitrate crystals, and make a bomb out of the crystals. It would not be much of a bomb - only a tenth of a kiloton, say - but that's enough to knock down the World Trade Center." *Ted Taylor talking to John McPhee in 1973 (McPhee: The Curve of Binding Energy, 1973)*

be avoided if, and only if, the container industry starts acting with a unified sense of urgency.

For brevity the following acronyms are used in this article: DHS - US Department of Homeland Security; IED - improvised explosive device; INL - Idaho National Laboratory; SNM - special nuclear material (U235 or plutonium); WMD - weapon of mass destruction.

## Trojan Horse threats

Let's begin with some important facts, many of which are unknown or are contrary to popular belief. The primary Trojan Horse threat is an improvised atomic bomb detonated in one or more major cities. This can be accomplished by a saboteur team of five or less that bring together nuclear training, metal working skill, explosives training, shipping expertise, and a source of 40-100Kg of SNM.

To learn what a nuclear scientist or engineer already knows about building an improvised atomic bomb one can read the 1973 book by John McPhee, *The Curve of Binding Energy*, available from *Amazon.com* for under US\$12. On p189 of this book can be found unclassified instructions on how to build an improvised gun-type bomb (Hiroshima) and on p213 are similar instructions for an implosion bomb (Nagasaki).

The book is about Ted Taylor, the brilliant American physicist who designed the most efficient atomic bombs ever made. Taylor was convinced that a team of a few individuals could steal SNM from poorly-secured stockpiles and use non-classified information to design and build

"Taylor...was imagining someone with a glove box, a ceramic crucible, and a \$100 electric furnace molding a hemisphere of plutonium - beginning the construction of an implosion system. The metal cools and another, identical hemisphere is made. The two together form a sphere about the size of a grapefruit..." *John McPhee, ibid.*

an improvised version of his bombs. The authorities were in denial about that threat. By providing the expertise for McPhee's book, he was attempting to force an end to this folly.

## Truer than ever

Everything Ted Taylor was concerned about in 1973 is now truer than ever. A glance at the diagram of the Hiroshima atomic bomb above (*Figure 1*) should be enough to convince most sceptics.

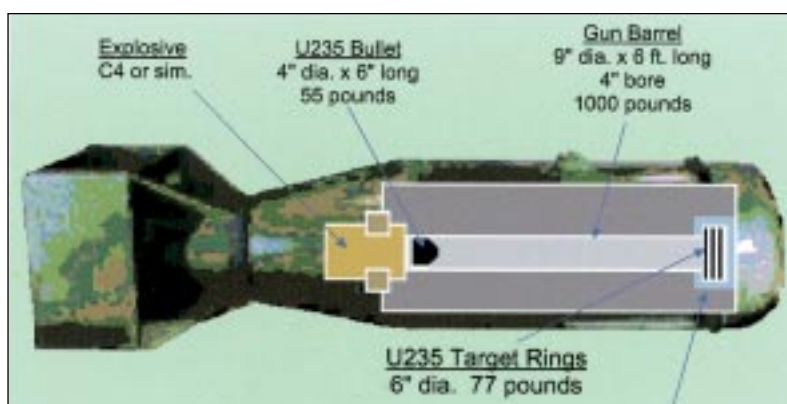
Other potential catastrophic threats are chemical and biological WMDs. They could be shipped by container but there is no necessity to do so; more likely they

*\*This article has been written by William Casper, PE, of Tacoma-based Casper, Phillips and Associates. For background on the joint work by CP&A, Paceco Corp and Idaho National Laboratory on the "Interceptor," see WorldCargo News, July 2004, p2)*

will be obtained from domestic sources or transported as air cargo.

## Non-threats

Sophisticated atomic bombs and hydrogen bombs are not a threat unless they can be stolen intact or obtained from a rogue nation (*McPhee, p103*). So-called



"dirty bombs" are not a Trojan Horse threat. The only significant difference between a dirty bomb and a conventional IED is the panic factor.

People with an irrational fear of radiation could die in the rush to escape just as theatre and restaurant patrons have died from panic due to a fire. Politicians, bureaucrats, and promoters that list dirty bombs as a threat are just yelling "Fire!" to promote a personal agenda.

Most revealing about the dirty bomb

*Figure 1: This is an image of the bomb dropped on Hiroshima. It was basically a uranium gun where a barometric switch fired the explosive that sent the uranium bullet careening down the barrel to impact and weld the target uranium rings creating the critical mass required for the chain reaction. (Source: Acutek)*

myth is that no terrorist has ever used one even though many radioactive substances are available that could be added to an IED.

### Inspection for SNMs

Anything short of reliably inspecting 100% of all containers is an open invitation for sophisticated saboteurs. To avoid serious disruption to world commerce the latest edict from DHS stipulates an average scanning time of 7.5 secs/TEU.

Visual inspection is of no value even if a container is empty. SNMs can be made into small chunks that can be concealed in a container structure or inside a reefer housing. Cargo inside a container is often enclosed in a banded or nailed plywood box that cannot be easily opened for visual inspection. This cargo will not be visually inspected unless there are solid reasons to be suspicious.

X-ray images are unreliable for container inspections for the same numerous reasons that they are unreliable for airport inspections. A fully assembled bomb or individual SNM chunks can be packaged to resemble surrounding benign cargo.

Consider the scuba diver's lead



Figure 2: A scuba diver's lead weight, weighing 10 lbs. U-235 of the same shape would not weigh much more and, with slight modification, could function like the target rings used in the Hiroshima bomb

weight in Figure 2. It weighs 10 lbs. U-235 of the same shape would weigh 16.5 lbs. With slight modification of shape it could have a similar function to the target rings shown in Figure 1.

Image technology does not exist that would manually or automatically, in a scan time of 7.5 secs, discern such a single SNM component amongst a legitimate cargo of these lead weights.

Automated non-intrusive de-

tection comes in two basic types. Active detection scans cargo with high energy x-rays that introduce radiation safety concerns for dock workers. Passive detection depends on SNM self-emissions that special instruments can detect. Radioactivity detection is the most well-known type of passive detection. The problem is that many ordinary materials are radioactive. They cause false positives that disrupt a high throughput operation.

The fissionable material used for atomic bombs is not the ordinary radioactive material that is easily detected with radiation detection instruments. Instead, SNMs have a relatively low level of radioactivity that can easily escape radiation detectors. Fortunately SNMs have unique properties that make them vulnerable to certain active and passive automated scanning techniques.

### Neutron detection

Of these techniques only one is presently practical for container terminal applications. This technique is an active neutron detection system originally developed by INL for leisurely Cold War treaty verification and now modi-

"With modern weapons grade uranium, the background neutron rate is so low that terrorists, if they had such material, would have a good chance of setting off a high yield explosion simply by dropping one half of the material on to the other half. Even a high school student could make a bomb in short order." *Lou Alvarez, Manhattan Project physicist, (quoted by www.accutek.com)*

fied and proof-tested for reliable moderate speed container scanning. Further research has confirmed that higher energy active x-rays will reduce scanning time to acceptable levels.

### Port "security"

Most people, when they read or hear the term "port security" unconsciously translate that to mean "Trojan Horse nuclear container security." As presently implemented in the USA, the term "port security" means exactly what it says and excludes SNM security; it means policing security such as fences, lighting, cameras, patrol boats, etc. All are im-

portant protections but ports are not the only, or the most vital facilities that need security.

Hundreds of other examples such as LNG terminals, electric grids, bridges, and chemical plants go unfunded and unprotected because they lack the emotional edge that ports get from all the focus on containers. That attention will get even more intense when the media discover the potential threat of automobile imports.

Ports have used the public's fear of a nuclear attack to generate funding support. That effort has been underfunded but deservedly so, because nothing useful for nuclear security has been accomplished. Worldwide nothing has been done to prevent transporting a camouflaged, fully-assembled atomic bomb or the SNM chunks needed to build an atomic bomb.

Ports are an unlikely nuclear target. Much better targets are available and are equally vulnerable. SNMs are precious materials not to be squandered on anything but the most damaging targets.

### Self-fulfilling

One of the biggest obstacles to container security is irrational fear of radiation. Dock workers fear x-rays and the public falsely believes x-rays can cause exposed materials to become radioactive; food cargo is the example that currently limits active scanning.

This irrational fear is severely handicapping the scanning technology needed to prevent nuclear attacks. A demand for zero risk is actually directly responsible for today's high probability that millions will die from atomic bomb radiation; some will be the same people that are demanding no risk from container scanning.

The solution is public education and rational risk management.

"Taylor...was warned never to repeat what he had said in public print or in a public speech, because everything he had been saying was classified. [He] replied that everything he had been saying he happened to have read in the *Encyclopedia Americana*. A bomb maker could probably get along without [that book] anyway. So many books contain information of similar value..." *(McPhee, op. cit.)*

An example is airline crew training. They learn they will be exposed to above normal level of cosmic rays every flight. They learn to respect but not fear such exposure.

### End the threat

The D P World fiasco in the US should be a warning the entire container industry. Americans and many other nationalities are terrorised by the nuclear threat. For good reason they fear containers. When the inevitable attack occurs the evidence of how the bomb was delivered will be vapourised and, true or not, the container industry will be blamed.

Containers need not be the transport mode of choice to saboteurs. The technology to take that mode away from them has already been proof-tested and could be implemented in a few months. For what this technology can accomplish it is inexpensive, safe, reliable, and compatible with normal container terminal operations.

The missing link is leadership. There isn't any. Everyone looks to Washington DC and sees blank space. It's been > 4 years and counting. It is time to face reality. Either the global container industry takes the lead or it will be essentially terminated when the inevitable attack occurs. □

## Freeport's foreign first

Hutchison will be the first foreign company to screen US-bound containers for radiation using US-built radiation detectors without US customs officials being present, at its Freeport, Bahamas facility.

The White House negotiated a no-bid, US\$6M contract with Hutchison Whampoa. Jayson Ahern, assistant customs commissioner for field operations, said the DHS originally intended to station US customs inspectors in the Bahamas, under the 2002 CSI.

The contract, negotiated by the Energy Department's National Nuclear Security Administration, has been criticised by some US lawmakers and security experts. However, Hutchison Port Holdings' managing director John Meredith remarked: "People should respect that you've got to have trusted partnerships, both with the private sector and with foreign governments."

Hutchison will operate the truck-mounted scanner under supervision of Bahamian customs. Any positive reading will set off alarms simultaneously at Bahamian customs in Freeport and at a border protection centre in northern Virginia. □

● A US Congressional Committee has rejected a White House plan to subject all containers entering US ports to radiological inspection within five years. The Republican-majority committee reasons that this is not practical and it has strong doubts whether mandatory 100% inspections could be carried out effectively.

The preamble to the performance specification for CAARS (cargo advanced automated radiography) issued by the DHS last November identifies "covert nuclear attack as the foremost threat

facing the US and is a primary focus of the war on terror." It requires the CAARS to be capable of "inspecting 100% of cargo conveyances entering the US" (ie ro-ro trucks and railcars as well as containers) and specifies a scan rate of 15 secs/40ft and a minimum throughput of 25 40fts/hour. CAARS will be deployed at all US ports of cargo entry.

The White House, meanwhile, also wants all US port employees (presently numbering some 400,000 people nationwide) to undergo "background checks," along with another 750,000 people with regular access to ports (eg truck drivers, train drivers). □

● The Port of Houston Authority (PHA) has awarded an estimated US\$189,000 construction contract to Four Seasons Development Co, Inc for the installation of US Customs and Border Protection radiation portal monitors at Ramp Point, at its Barbour's Cut Container Terminal. The project is part of the PHA's proposed US\$4-6.5M portwide radiation portal monitoring system. □

● An undercover investigation by the General Accounting Office has revealed shortcomings in US border protection procedures. Small quantities of a highly radioactive isotope used in medicine - enough to make two "dirty bombs" - were smuggled into the US with counterfeit documents.

The consignments set off alarms, but as do cat litter, bananas, camera lenses, etc, they were allowed through border crossings in Texas and Washington state. The officials also presented false papers and nuclear regulatory approvals. Customs officials at the Canadian and Mexican borders were unable to check their authenticity. □