# Forget the Day After

*Intelligence, Border Security, and Forensics Will Fail. Instead, Secure DC, NYC, and Other Cities from Nuclear Attacks with Highly Enriched Uranium*

The cheapest and stealthiest way for terrorists to deliver a nuclear weapon into a metropolitan area is using commercial or private transportation. The easiest way to make a nuclear weapon is to steal from existing stocks or obtain from insiders approximately 50 kg of highly enriched uranium (HEU) to kill hundreds of thousands of people in a metropolitan area, potentially harm or displace millions of people downwind of the blast, and cause losses would be measured in trillions of dollars.

As of 2003 1900 metric tons of HEU are currently spread across roughly 50 countries. Over 55% of the world's HEU is in Russia, and 35% in the United States. The FBI director Mueller has warned, "*It was only a matter of time and economics before terrorists will be able to purchase nuclear weapons…"* An estimate by former US Defense Secretary Perry puts the risk of nuclear detonation on US targets at 50% in ten years, and Defense Secretaries McNamara, Rumsfeld, Gates, and Vice President Cheney have provided similar warnings. The CIA, FBI, and Pentagon meet weekly to assess progress on how the US can identify (attribute) the perpetrators of a nuclear terrorist attack, and US government and military leaders are participating in contingency planning exercises for a terrorist nuclear attack, and possible steps include the suspension of civil liberties.

In the last 20 years the IAEA reported 16 smuggling incidents involving HEU and Plutonium. There were at least three incidents involving kilogram quantities of HEU, and a total of 30.8 kg of HEU involved in known smuggling incidents (stolen, lost or seized). A plot to smuggle an undisclosed amount of HEU to Iran was disrupted by British authorities in early 2006 after the material had been obtained through the black market in Russia. In 1992, Russian authorities foiled an attempt to steal 18.5 kg of HEU, which may have been enough for a nuclear weapon. Also in 1992, 1.5kg was stolen by insiders of a nuclear facility in increments of 25-30g, falling within the materials accounting precision of the facility in order to evade detection. Smuggling cases detected account for an estimated 10-40% of actual HEU smuggling. A US government report argues that *"undetected smuggling of weapons-usable nuclear material has likely occurred"* in Russia.

Based on the accuracy of US intelligence estimates on foreign nuclear weapons programs during the last 50 years since Nazi Germany, we cannot expect that intelligence on foreign nuclear capabilities to be more accurate than to within +5 to -5 years in the future. Iraq was no exception, before the Gulf Wars of 1991 and 2003. Accurate warning of acquisition of nuclear materials or capabilities by terrorists or non-state actors is even harder to anticipate since they are much more numerous, employ more distributed networks of procurement and operation, and are possibly harder to infiltrate.

HEU enrichment programs and weapons programs in undisclosed locations are not hard to conceal because they are not amenable to external monitoring by satellite or monitoring devices outside the weapons facilities -- the case today with HEU enrichment programs of Iran and North Korea. It was formerly the case after the 1981 Israeli bombing of the Osirak reactor which prompted Iraq to pursue a clandestine uranium enrichment program that went undetected until after the end of the first Gulf War in 1991. This is also why China and Pakistan exceeded US intelligence estimates of the rate of their progress toward a nuclear weapon, and the South African program was not possible to be tracked closely.

Disruption of the AQ Khan network was a tactical success, but it highlights a failure to prevent widespread, clandestine proliferation of HEU enrichment technology to Libya, Iran, North Korea—without the knowledge of US intelligence for years. A gas-centrifuge plant to produce 50kg of HEU annually could be concealed in a building 50 meters long by 25 meters wide and consume only 200 kilowatts of electricity, and such a plant would not be distinguishable from air or space from other industrial buildings, nor would it leak quantities of gas to the atmosphere that would aid in remote detection to localize the position of the plant.

In a 2006 incident of a Russian smuggling HEU apprehended by Georgian authorities, judgment of US scientists was that it likely came from Russia based on the presence of U-234 and U-236, whereas Russian scientists could only estimate that the uranium was reprocessed over a decade ago. Russian scientists further insisted that there is no evidence the material originated in Russia, and *"if this uranium was produced in the 1940s-50s, it will be extremely difficult to identify the country of origin"* Had this been material recovered by a nation post-blast, the disagreement about its origins would have made it extremely difficult to make decisions to prevent further attacks whether by taking steps to seal up the material leak or threaten retaliation.

Border security is an obsolete construct. The United States has 12,034 km of land borders and 19,924 km of coastline for a total of 31,958 km of borders. Annually, an estimated half-million to several million illegal immigrants and 300-2000 metric tons of cocaine cross into the US along these vast borders– illustrating how easy it would be to smuggle kilogram quantities of HEU into the United States. The Government Accountability Office has demonstrated that they could smuggle materials for a dirty (highly radioactive) bomb across both the Mexican-US and Canadian-US borders. ABC News has demonstrated they can smuggle 6.8 kg of depleted uranium (0.2% U-235, mostly consisting of U-238 – the isotope most useful for passive detection) through the ports of New York (in 2002) and Long Beach (in 2003). Interdiction of HEU once it has arrived within US seaports or airports may be too late if the weapon is detonated in the port itself located within several miles of a major city like Washington DC or San Francisco.

Scanning all air cargo and sea cargo for nuclear devices as will be required by the 9/11 bill is a major step forward for homeland security and prevention of nuclear terrorism. How do we secure against the following types of vehicles that are fully capable of carrying a nuclear device across international borders?

1. rail cargo
2. oil tankers
3. passenger airplanes and personal luggage
4. sailboats
5. yachts
6. cruise ships
7. private jets
8. helicopters
9. underground tunnels or sewage pipes

After the attacks of September 11, 2001, the “Ring Around Washington” was reported to have been constructed to detect a nuclear weapon smuggled into the capital. The early solution proved operationally unworkable to the military—so the US backed off leaving the capital vulnerable once again.

To ensure that Washington DC is well outside the range of the prompt effects of a Hiroshima-sized nuclear detonation and is also immune to a good fraction of the radioactive fallout, the region defined by the Washington DC Air Defense Identification Zone is similar in size and concept to the region that would need to be free of HEU to secure the capital. What would it take to secure a region comparable to the DC ADIZ—roughly a circle of radius 40 miles surrounding the capital? The circumference is approximately 125 miles—call it the DC “Nuclear Defense Zone” (NDZ) encompassing all transportation pathways – ground, air, water.

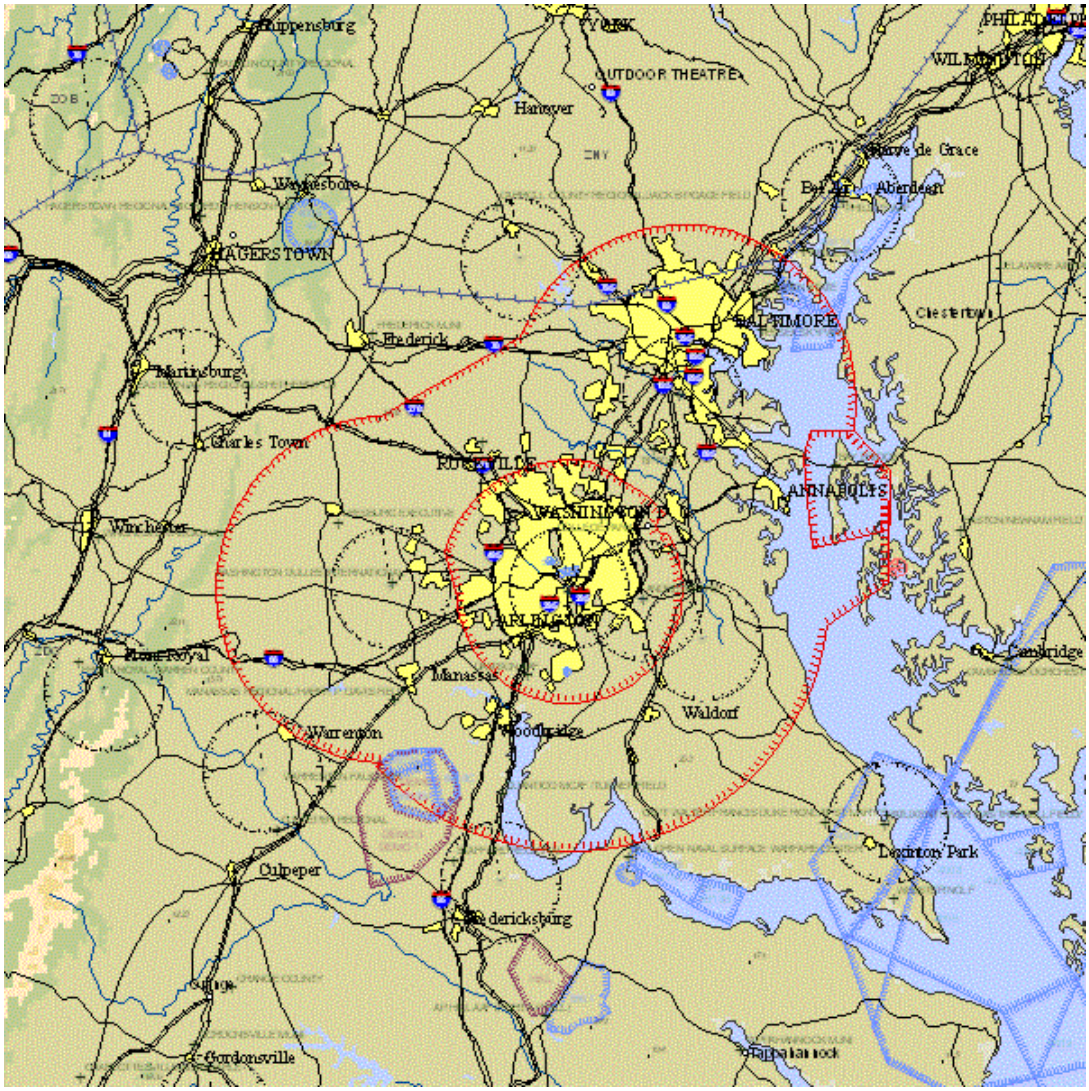


**Figure 1 Washington DC Air Defense Identification Zone (DC ADIZ)**

## *Policy Recommendations*

NDZs need to become a standard approach accessible to all nations in order to enhance security from loose HEU in major cities and even around storage sites containing HEU stockpiles. Going beyond their historical focus on regional threats and security, all military service branches should conduct a review of their collective capability to deal with the global threat of nuclear terrorism or clandestine attack from hostile nation-states. This includes the creation of multiple concentric Nuclear Defense Zones around major US cities.

In 2005, the Secretary of Defense designated US Strategic Command as the focal point for integrating and synchronizing efforts to combat WMD, with Defense Threat Reduction Agency (DTRA) as primary support and the Army's Chem-Bio-Radiological-Nuclear division (CBRNE) to "respond-to" and "render-safe" any WMD threat. To achieve these goals, the DTRA will need to operate a reliable national detection system to detect HEU across all transportation pathways (vehicles) accessible to terrorists within

Nuclear Defense Zones (NDZs) surrounding each metropolitan area. Actionable information on HEU content and integrity of the NDZ operations in each city, with near-zero false-negatives or false-positives, needs to be generated by DTRA and made accessible to the Army, Navy, and Air Force by securely reading out and processing detector readings for each vehicle.

Defense Research & Engineering (DR&E) should be charged with the responsibility of engineering a national nuclear detection architecture capable of detecting HEU in every vehicle. Congress should require that DR&E invest in nuclear detection systems at least at a level comparable to missile defense spending which is currently $10 billion annually (out of a total annual DR&E budget exceeding $70 billion) and projected to remain around that level for over a decade.

Current efforts are narrowly fragmented into three independent government initiatives, DoD (DTRA), DHS (DNDO), DoE (NNSA) -- none which has the vision of creating a reliable metropolitan Nuclear Defense Zone. The “Global Nuclear Detection Architecture” proposed in the DNDO charter is a mirage. Reliable detection on a global scale is not achievable in the near term—a domestic, metropolitan nuclear detection architecture is a more solvable problem that can result in a reliable nuclear detection system around primary targets.