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DIRTY NEWS

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Is Fukushima's Doomsday Machine About to Blow?

By Mike Whitney

Source: http://www.opednews.com/articles/Is-Fukushima-s-Doomsday-Ma-by-Mike-Whitney-120420-44.html

Mounting troubles at Japan's hobbled Fukushima Dai-Ichi nuclear power plant now pose a real threat to human survival. If the area in which Unit 4 is struck by another 7.0 magnitude earthquake, there's a 70 percent chance that "the entire fuel pool structure will collapse" and massive doses of lethal nuclear radiation will be released into the atmosphere. The disaster would release approximately "134 million curies is Cesium-137 -- roughly 85 times the amount of Cs-137 released at Chernobyl as estimated by the U.S. National Council on Radiation Protection (NCRP)." Experts believe that the amounts are sufficient to "destroy the world environment and our civilization," which makes containment "an issue of human survival." ("The Greatest Single Threat to Humanity: Fuel Pool Number 4," Washington's blog)

The structural integrity of Unit 4's cooling pool was greatly compromised by the earthquake and following tsunami which struck the facility over a year ago. At present, the pools are not adequately protected or reinforced, which means that a sizable tremor could "cause a disaster worse than the three reactor meltdowns." If such a disaster were to occur, "people should get out of Japan, and residents of the West Coast of America and Canada should shut all of their windows and stay inside," says nuclear expert Arnie Gundersen.

While the danger to life and the environment pose the greatest single national security threat the United States has faced since WW2, the Obama administration has provided little aid to the emergency effort. Japan is largely "going it alone" trying to cobble together a plan to safely store the spent fuel and minimize the risks to public safety.

On March 8, 2012, Dr. Hiroaki Koide, Research Associate at the Research Reactor Institute of Kyoto University, gave his bleak assessment of the situation on the Japanese a news program called, "Morning Bird." Koide explained how 1,500 rods are presently located in a "fuel pool" that has been severely damaged. The rods have to be cooled constantly or a "huge amount of radiation contained in the spent fuel will be released outside." If an earthquake hits and undermines the pool, the coolant will exit the pool, the rods will melt and radioactive plumes will rise into the atmosphere. Koide explained that the rods could not be safely removed from the existing pool because "if you hoist them up in the air, huge amounts of radiation will come out from the spent fuel and people nearby will die."

One of the journalists on "Morning Bird" asked Koide what would happen if the Unit was struck by another earthquake? Koide answered, "That will be the end." "The end?" the journalist asked, visibly shaken. "The end," Koide repeated emphatically. ("Fukushima Dai-Ichi No. 4: An earthquake before spent fuel rods are moved to safe storage would be "the end," Lambert Strether, Naked Capitalism). Now, check this out:

"Japan's former Ambassador to Switzerland, Mr. Mitsuhei Murata... strongly stated that if the crippled building of reactor unit 4 -- with 1,535 fuel rods in the spent fuel pool 100 feet (30 meters) above the ground -- collapses, not only will it cause a shutdown of all six reactors but it will also affect the common spent fuel pool containing 6,375 fuel rods, located some 50 meters from reactor 4. In both cases the radioactive rods are not protected by a containment vessel; dangerously, they are open to the air. This would certainly cause a global catastrophe like we have never before experienced. ... Such a catastrophe would affect us all for centuries." ("Fukushima Daiichi

Site: Cesium-137 is 85 times greater than at Chernobyl Accident," akiomatsumura.com)

Murata's concerns have been brought to the attention of the UN Secretary General Ban Ki-moon, to high-ranking officials in the Obama administration and EU, and to leaders around the world. The reaction has basically been the same everywhere, which is, "It's Japan's problem. Let them deal with it."

There is no way to overstate the media's complicity in concealing critical information about the tragedy that is presently unfolding at Fukushima. If there is another earthquake, the media will certainly be every bit as responsible as the government officials who saw the danger, but chose to do nothing.

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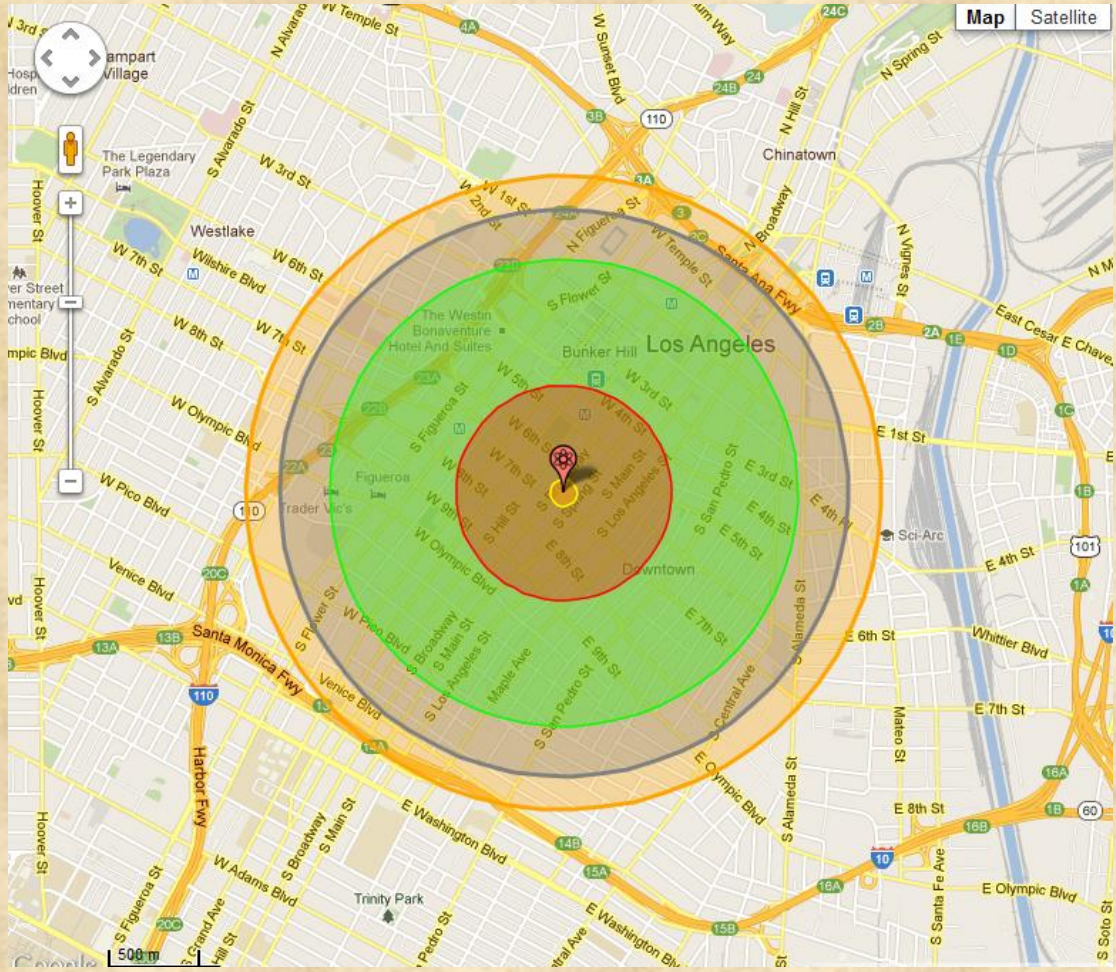
Researchers Study Costs of Dirty Bomb Attack in L.A.

Source: http://news.usc.edu/#!/article/33719/researchers-study-costs-of-dirty-bomb-attack-in-l-a/

A dirty bomb attack on downtown Los Angeles' financial district severely could impact the region's economy to the tune of nearly $16 billion, fueled primarily by psychological effects that could persist for a decade, according to a study by USC researchers and others.



Published by a team of internationally recognized economists and decision scientists in *Risk Analysis*, the study monetized the effects of fear and risk perception, incorporating them into a state-of-the-art macroeconomic model.

"Terrorism can have a much larger impact than first believed," said study co-author Adam Rose, research professor at the USC Sol Price School of Public Policy and coordinator for economics at USC's National Center for Risk and

Economic Analysis of Terrorism Events (CREATE). "The economic effects of the public's change in behavior are 15 times more costly than the immediate damage in the wake of a disaster.

"These findings illustrate that because the costs of modern disasters are so large, even small changes in public perception and behaviors may significantly affect the economic impact," said Rose, who has published economic estimates of the 9/11 attacks, the Northridge earthquake and other major disasters.

Study co-author William Burns, a research scientist at Decision Research in Eugene, Ore., added: "We decided to study a terrorist attack on Los Angeles not to scare people, but to alert policymakers just how large the impact of the public's reaction might be. This underscores the importance of risk communication before and after a major disaster to reduce economic losses."

Economists most often focus on the immediate economic costs of a terrorist event, such as injuries, cleanup and business closures. In this scenario, those initial costs would total just over $1 billion.

To estimate how fear and risk perception ripple through the economy after a major terrorist event, the researchers surveyed 625 people nationwide after showing them a mock newspaper article and newscasts about the hypothetical dirty bomb attack to gauge the public's reticence to return to normal life in the financial district.

The study translated these survey results into estimates of what economic premiums would be put on wages and what discounts shoppers likely would require in the aftermath of a terrorist attack.

After six months, 41 percent of those surveyed said they still would not consider shopping or dining in the financial district. And, on average, employees would demand a 25 percent increase in wages to return to their jobs.

"The stigma generated by dirty bomb radiation could generate large changes in the perceived risk of doing business in the region," said co-author James Giesecke of the Centre of Policy Studies at Monash University. "However, with regional economies in competition with one another for customers, businesses and employees, it takes only small changes in perceived risk to generate big losses in economic activity."

The paper relied on one of 15 planning scenarios – the detonation of a dirty bomb in a city center – identified by the Department of Homeland Security in an effort to focus anti-terrorism spending nationwide.

Other authors of the study were Ergin Bayrak of the USC Annenberg School for Communication and Journalism; Paul Slovic with Decision Research and the University of Oregon; Anthony Barrett of ABS Consulting in Arlington, Va.; and Michael Suher of Brown University.

The study was part of a larger special issue of *Risk Analysis* that showcased CREATE's risk-assessment research of terrorism events, natural disasters and their economic impacts. The special series, titled "Risk Perception Behavior: Anticipating and Responding to Crisis," was the result of a CREATE workshop that explored possible avenues of research leading to insights in risk analysis.

The U.S. Department of Homeland Security funded the research through CREATE and the National Science Foundation.

Novel radiation detection technology to thwart nuclear terrorism

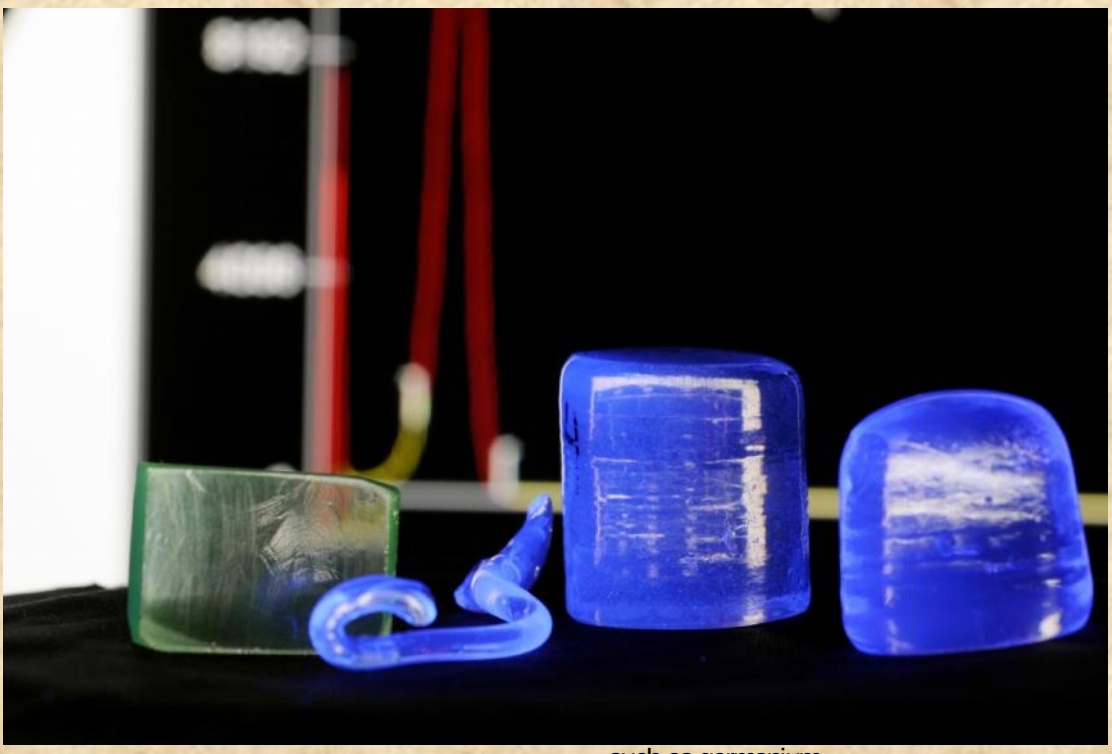
Source: http://www.homelandsecuritynewswire.com/dr20120503-novel-radiation-detection-technology-to-thwart-nuclear-terrorism

Researchers at the Georgia Tech Research Institute (GTRI) are developing ways to enhance the radiation-detection devices used at ports, border crossings, airports, and elsewhere; the aim is to create technologies that will increase the effectiveness and reliability of detectors in the field, while also reducing cost

Among terrorism scenarios that raise the most concern are attacks involving nuclear devices or materials. For this reason, technology that can effectively detect smuggled radioactive materials is considered vital to U.S. security.

Researchers at the Georgia Tech Research Institute (GTRI) are

developing ways to enhance the radiation-detection devices used at ports, border crossings, airports, and elsewhere. The aim is to create technologies that will increase the effectiveness and reliability of detectors in the field, while also reducing cost. The work is co-sponsored by the Domestic Nuclear Defense Office (DNDO) of the Department of Homeland Security and by the National Science Foundation.



Examples of scintillators that were produced from molten glass by the GTRI researchers. The wormlike blue structure is an artifact from the glass-molding process.

"U.S. security personnel have to be on guard against two types of nuclear attack — true nuclear bombs, and devices that seek to harm people by dispersing radioactive material," said Bernd Kahn, a researcher who is principal investigator on the project. "Both of these threats can be successfully detected by the right technology."

A Georgia Tech release reports that the GTRI team, led by co-principal investigator Brent Wagner, is utilizing novel materials and nanotechnology techniques to produce improved radiation detection. The researchers have developed the Nano-photonic Composite Scintillation Detector, a prototype that combines rare-earth elements and other materials at the nanoscale for improved sensitivity, accuracy and robustness.

Details of the research were presented 23 April 2012 at the SPIE Defense, Security, and Sensing Conference held in Baltimore, Maryland.

Scintillation detectors and solid-state detectors are two common types of radiation detectors, Wagner explained. A scintillation detector commonly employs a single crystal of sodium iodide or a similar material, while a solid-state detector is based on semiconducting materials such as germanium.

Both technologies are able to detect gamma rays and subatomic particles emitted by nuclear material. When gamma rays or particles strike a scintillation detector, they create light flashes that are converted to electrical pulses to help identify the radiation at hand. In a solid-state detector, incoming gamma rays or particles register directly as electrical pulses.

"Each reaction to a gamma ray takes a very short time — a fraction of a microsecond," Wagner said.

"By looking at the number and the intensity of the pulses, along with other factors, we can make informed judgments about the type of radioactive material we're dealing with."

The release notes, however, that both approaches have drawbacks. A scintillation detector requires a large crystal grown from sodium iodide or other materials. Such crystals are typically fragile, cumbersome, difficult

to produce and extremely vulnerable to humidity.

A germanium-based solid-state detector offers better identification of different kinds of nuclear materials. High-purity single-crystal germanium, however, is difficult to make in a large volume; the result is less-sensitive devices with reduced ability to detect radiation at a distance. Moreover, germanium must be kept extremely cold — 200 degrees below zero Celsius — to function properly, which poses problems for use in the field.

To address these problems, the GTRI team has been investigating a wide variety of alternative materials and methodologies. After selecting the scintillation approach over solid-state, the researchers developed a composite material — composed of nanoparticles of rare-earth elements, halides and oxides — capable of creating light.

"A nanopowder can be much easier to make, because you don't have to worry about producing a single large crystal that has zero imperfections," Wagner said.

A scintillator crystal must be transparent to light, he explained, a quality that's key to its ability to detect radiation. A perfect crystal uniformly converts incoming energy from gamma rays to flashes of light. A photo-multiplier then amplifies these flashes of light so they can be accurately measured to provide information about radioactivity.

When a transparent material — such as crystal or glass — is ground into smaller pieces, its transparency disappears. As a result, a mixture of particles in a transparent glass would scatter the luminescence created by incoming gamma rays. That scattered light can't reach the photo-multiplier in a uniform manner, and the resulting readings are badly skewed.

To overcome this issue, the GTRI team reduced the particles to the nanoscale. When a nanopowder reaches particle sizes of 20 nanometers or less, scattering effects fade because the particles are now significantly smaller than the wavelength of incoming gamma rays.

"Think of it as a big ocean wave coming in," Wagner said. "That wave would definitely interact with a large boat, but something the size of a beach ball doesn't affect it."

At first the team worked on dispersing radiation-sensitive crystalline nanoparticles in a plastic matrix. They encountered problems with distributing the nanopowder uniformly enough in the matrix to achieve sufficiently accurate radiation readings.

More recently, the researchers have investigated a parallel path using glass rather than plastic as a matrix material, combining gadolinium and cerium bromide with silica and alumina.

Kahn explained that gadolinium or a similar material is essential to scintillation-type particle detection because of its role as an absorber. In this case, however, when an incoming gamma ray is absorbed in gadolinium, the energy is not efficiently emitted in the form of luminescence.

Instead, the light emission role here falls to a second component — cerium. The gadolinium absorbs energy from an incoming gamma ray and transfers that energy to the cerium atom, which then acts as an efficient light emitter.

The researchers found that by heating gadolinium, cerium, silica and alumina and then cooling them from a molten mix to a solid monolith, they could successfully distribute the gadolinium and cerium in silica-based glasses.

As the material cools, gadolinium and cerium precipitate out of the aluminosilicate solution and are distributed throughout the glass in a uniform manner. The resulting composite gives dependable readings when exposed to incoming gamma rays.

"We're optimistic that we've identified a productive methodology for creating a material that could be effective in the field," Wagner said. "We're continuing to work on issues involving purity, uniformity and scaling, with the aim of producing a material that can be successfully tested and deployed."

This material is based upon work supported by the DHS under Grant Award (the researchers note that the views and conclusions contained in their paper are their own and not those of DHS).

Atomic warfare in ancient India

Source:http://www.indiadivine.org/audarya/spiritual-discussions/31909-atomic-warfare-ancient-india.html

A heavy layer of radioactive ash in Rajasthan, India, covers a three-square mile area, ten miles west of Jodhpur. Scientists are investigating the site, where a housing development was being built.

For some time it has been established that there is a very high rate of birth defects and cancer in the area under construction. The

levels of radiation there have registered so high on investigators' gauges that the Indian government has now cordoned off the region.

Scientists have unearthed an ancient city where evidence shows an atomic blast dating back thousands of years, from 8,000 to 12,000 years, destroyed most of the buildings and probably a half-million people. One researcher estimates that the nuclear bomb used was about the size of the ones dropped on Japan in 1945.

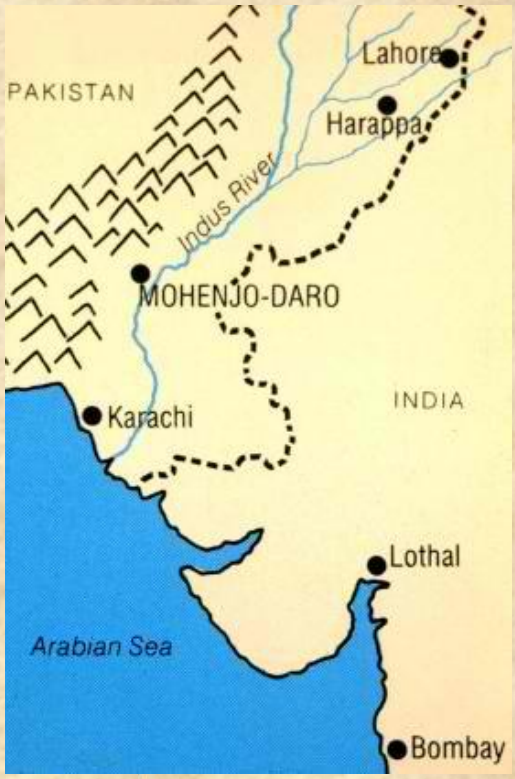
The Mahabharata clearly describes a catastrophic blast that rocked the continent. "A single projectile charged with all the power in the Universe...An incandescent column of smoke and flame as bright as 10,000 suns, rose in all its splendor...it was an unknown weapon, an iron thunderbolt, a gigantic messenger of death which reduced to ashes an entire race.

"The corpses were so burned as to be unrecognizable. Their hair and nails fell out, pottery broke without any apparent cause, and the birds turned white.

"After a few hours, all foodstuffs were infected. To escape from this fire, the soldiers threw themselves into the river."

A historian comments

Historian Kisari Mohan Ganguli says that Indian sacred writings are full of such descriptions, which sound like an atomic blast as experienced in Hiroshima and Nagasaki. He says references mention fighting sky chariots and final weapons. An ancient battle is described in the Drona Parva, a section of the Mahabharata. "The passage tells of combat where explosions of final weapons decimate entire armies, causing crowds of warriors with steeds and elephants and weapons to be carried away as if they were dry leaves of trees," says Ganguli.



"Instead of mushroom clouds, the writer describes a perpendicular explosion with its billowing smoke clouds as consecutive openings of giant parasols. There are comments about the contamination of food and people's hair falling out."

Archeological investigation provides information

Archeologist Francis Taylor says that etchings in some nearby temples he has managed to translate suggest that they prayed to be spared from the great light that was coming to lay ruin to the city. "It's so mid-boggling to imagine that some civilization had nuclear technology before

we did. The radioactive ash adds credibility to the ancient Indian records that describe atomic warfare."

Construction has halted while the five member team conducts the investigation. The foreman of the project is Lee Hundley, who pioneered the investigation after the high level of radiation was discovered.

There is evidence that the Rama empire (now India) was devastated by nuclear war. The Indus valley is now the Thar desert, and the site of the radioactive ash found west of Jodhpur is around there.

Consider these verses from the ancient (6500 BC at the latest) Mahabharata:

...a single projectile Charged with all the power of the Universe. An incandescent column of smoke and flame As bright as the thousand suns Rose in all its splendour... a perpendicular explosion with its billowing smoke clouds... ...the cloud of smoke rising after its first explosion formed into expanding round circles like the opening of giant parasols...

..it was an unknown weapon, An iron thunderbolt, A gigantic messenger of death,

Which reduced to ashes The entire race of the Vrishnis and the Andhakas. ...The corpses were so burned

As to be unrecognisable. The hair and nails fell out; Pottery broke without apparent cause, And the birds turned white. After a few hours All foodstuffs were infected... ...to escape from this fire The soldiers threw themselves in streams To wash themselves and their equipment.

Until the bombing of Hiroshima and Nagasaki, modern mankind could not imagine any weapon as horrible and devastating as those described in the ancient Indian texts. Yet they very accurately described the effects of an atomic explosion. Radioactive poisoning will make hair and nails fall out. Immersing oneself in water gives some respite, though it is not a cure.

When excavations of Harappa and Mohenjo-Daro reached the street level, they discovered skeletons scattered about the cities, many holding hands and sprawling in the streets as if some instant, horrible doom had taken place. People were just lying, unburied, in the streets of the city. And these skeletons are thousands of years old, even by traditional archaeological standards. What could cause such a thing? Why did the bodies not decay or get eaten

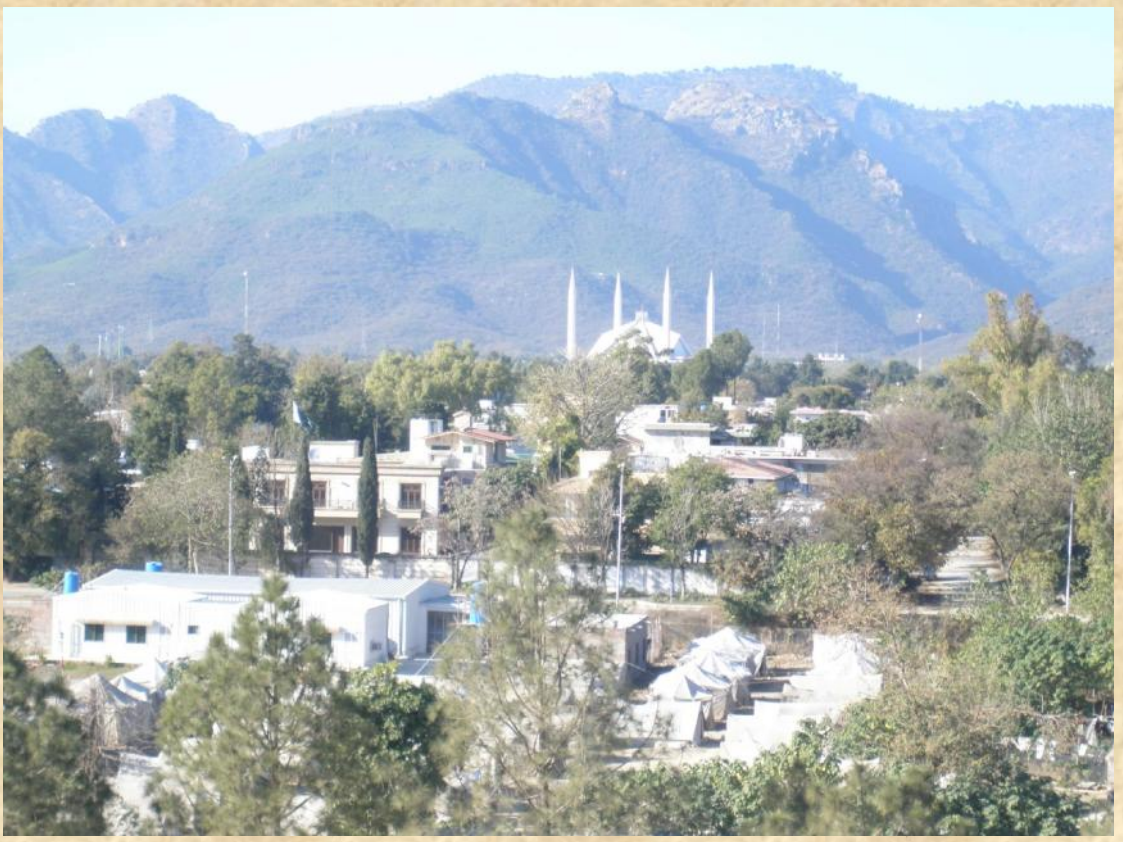
by wild animals? Furthermore, there is no apparent cause of a physically violent death.
These skeletons are among the most radioactive ever found, on par with those at Hiroshima and Nagasaki. At one site, Soviet scholars found a skeleton which had a radioactive level 50 times greater than normal.
Other cities have been found in northern India that show indications of explosions of great magnitude. One such city, found between the Ganges and the mountains of Rajmahal, seems to have been subjected to intense heat. Huge masses of walls and foundations of the ancient city are fused together, literally vitrified! And since there is no indication of a volcanic eruption at Mohenjo-Daro or at the other cities, the intense heat to melt clay vessels can only be explained by an atomic blast or some other unknown weapon. The cities were wiped out entirely.
While the skeletons have been carbon-dated to 2500 BC, we must keep in mind that carbon-dating involves measuring the amount of radiation left. When atomic explosions are involved, that makes then seem much younger.
Interestingly, Manhattan Project chief scientist Dr J. Robert Oppenheimer was known to be familiar with ancient Sanskrit literature. In an interview conducted after he watched the first atomic test, he quoted from the Bhagavad Gita: '"Now I am become Death, the Destroyer of Worlds.' I suppose we all felt that way." When asked in an interview at Rochester University seven years after the Alamogordo nuclear test whether that was the first atomic bomb ever to be detonated, his reply was, "Well, yes, in modern history."
Ancient cities whose brick and stone walls have literally been vitrified, that is, fused together, can be found in India, Ireland, Scotland, France, Turkey and other places. There is no logical explanation for the vitrification of stone forts and cities, except from an atomic blast.
Another curious sign of an ancient nuclear war in India is a giant crater near Bombay. The nearly circular 2,154-metre-diameter Lonar crater, located 400 kilometres northeast of Bombay and aged at less than 50,000 years old, could be related to nuclear warfare of antiquity. No trace of any meteoric material, etc., has been found at the site or in the vicinity, and this is the world's only known "impact" crater in basalt. Indications of great shock (from a pressure exceeding 600,000 atmospheres) and intense, abrupt heat (indicated by basalt glass spherules) can be ascertained from the site.

►**Read also:** http://twitscope.wordpress.com/2008/07/12/evidence-of-nuclear-explosion-in-ancient-india/

Uncovering a Nuclear Smuggling Operation in Pakistan

By Larry Werline

Source:http://blackwaterusa.com/2012/05/1063/?utm_source=May+12+BTW&utm_campaign=BTW+MAY+12&utm_medium=email



I was sitting on a plane headed for Pakistan on an assignment as an Aviation Consultant from my new company. Having left Blackwater three years ago, the thoughts of my friends and colleagues I had left ran through my head. I remembered all the good times, but most importantly to never forget the brothers we all loved that have died in service to Blackwater and the Department of State. This is a true story, and it is dedicated to all those fallen who paid the ultimate price.

Stay on your toes, keep sharp, walk quietly, stay calm and professional and don't worry about your six! I got you covered bro! That's what Joshua "Pedro" Hernandez would always tell me when the chips were down. Unfortunately, I had no one to watch my six on this assignment; I was completely alone on this trip and was wondering if my contact in Islamabad, Pakistan, would even show at the airport. This was a solo job.

Before my departure, my new company had brought me up to date on their government contract and that a Pakistani Local National was the "In-Country Manager." I knew it was unusual to have a local national working on this particular contract and questioned the Executive Management of the issues I was going to have—namely, Proprietary and Contract Disclosures to include Export Compliance Control regarding disclosures to foreign nationals, business sales and service to include training and much more. Needless to say, I was instructed to give this person full and complete cooperation from the Vice President himself, as the company was determined to win additional government contracts. I wanted to touch base with a company export control compliance representative. I had more questions I wanted answered and clarity from a legal perspective, but was advised by my program manager who had been with the company for several years and was relatively a decent guy: "Don't rock the boat! Besides, our contact in Islamabad was hired by our people in

marketing and he's been checked out." That's when the red flag appeared in my mind. I was feeling uncomfortable about the local national in a key position, but the program manager assured me all would be fine.

When I arrived at the airport, authorities escorted me from the Immigration control desk to the main office of the airport where the in-country manager, Dr. Mohammed, was waiting for my arrival. He spoke excellent English, was in western dress, and was short and of poor physical condition. My initial impression of this person was fair, but not what I expected. He arrogantly boasted himself as a doctor. I collected my baggage, and we proceeded to an outside parking lot. I noticed we were being shadowed by two men dressed in traditional Pakistani Shalwar Kameez "Man Dresses" with black vests. I scanned for threats, but kept my cool. Dr. Mohammad drove me to the hotel, and the two men from the airport were pulling into the hotel parking lot at the same time. They parked their car and watched as I went into the hotel. Dr. Mohammad informed me that he would check back in a few days when we could start with searching for a safe house to lease.

For the next day, I tried to catch up on my sleep as much as I could, made the usual calls to family and company, bringing everyone up to date. Dr. Mohammad called and we met for lunch to go over the company plans for a safe house and all other requirements for the contract. At this point, I was feeling very uncomfortable with this person and my gut instinct kicked in telling me something was amiss for a medical doctor to be working with me on a US government contract. I spent the rest of the day driving around with Dr. Mohammed, and the safe houses we looked at did not meet the billing for the basic security requirements I was looking for. So we ended that day without any results and this person informed me that he would schedule more homes for viewing for the remainder of the week.

Bored, I decided to look for myself online for homes in Islamabad that were for lease and do my own due diligence. I also wanted to know if this "Doctor" was ever in practice and did an online search to learn more about him.

Doctor Mohammad was recently arrested in Europe on charges of illegally shipping nuclear materials to Pakistan for the illicit end use and development of a nuclear bomb. He was working in secret and intentionally disguising the shipments as medical research materials to fabricated, bogus addresses. US intelligence had no warnings or credible information as to what, where, when or who this person was or what he was doing. According to legal briefs from the court that tried him in Europe, Dr. Mohammad was released on a technicality that left the European legal system reeling, and he returned to Pakistan. No one had any idea who Dr. Mohammad was really working for, where he managed to get the funds for these illegal transactions, how the shipments even managed to leave the EU without any red flags, or if Dr. Mohammad was really who he said he was. There were a lot of unknowns. The Pakistan Government made no effort to intervene or acknowledge his business ties with the PAEC (Pakistan Atomic Energy Commission), much less provide him with any legal representation. All this occurred in 2007/2008, after 9/11.

As the Red Flags continued to go up, my blood was pumping, my hands swelled and I wanted his head mounted above my fireplace. I knew my company's business dealings in Pakistan were now in the hands of a very dangerous person. I considered him a terrorist. All my training at Blackwater, in US Army and at a three digit agency I worked for trained me in only one way to deal with terrorist threats. I had to maintain my composure while I had all this checked out and clarified. Question was, who could I trust with my life? Trust no one. When the timing was right I would reach out for assistance. But for now, I had to be cool and bring to bare all the clandestine dark arts I had been taught from scratch over the years.

I had an alarm clock with a movement sensor and camera built in that would record video and sound when I was out of my room that came in useful. I downloaded a video of a person placing a listening device under the nightstand next to my bed. I recovered the planted device and placed it next to my computer and opened a 30 minute porn video with speakers on high.

I went into the hallway, got on my cell and made reservations for another hotel. I went back into my room and packed. I took a bag of chips out of the concession mini bar and placed the listening device in the bag, rolled and tied the bag with a rubber band and checked out. On my way to the Serena Hotel, I was followed from my old hotel right up to the reception

desk of the new hotel. I played everything off and never made eye contact with the men following me. I called Dr. Mohammad and notified him of the hotel change. He was surprised and asked why I moved. I informed him that I learned the Serena Hotel had booze and better women! He laughed it off and told me to have a good time.

The Guard House. Taliban leader squatting at left.

That next day, we drove around looking at more safe houses, appliances, furniture, etc. I couldn't help but notice that Dr. Mohammad seemed nervous, on edge, had a white knuckled grip on the steering wheel and was looking into his rearview mirror often. The Doctor then started to ask me about my background in IT, electrical, avionics and if I had any explosives experience. I mentioned my extensive background in electrical sciences and was trained in demolitions, particularly detonator technology. That got the doctor to take notice and he wanted to know more. I told him that I felt more comfortable having some drinks and talking in a better setting then in the vehicle. He agreed, dropped me off at my hotel and stated that he would come back tomorrow with spirits and if I had any special brand I preferred. I told him "Old Number 7". Looking confused, he asked what brand that was. I told him Jack Daniels, and he smiled and drove off. I sent a text message to my program manager in sections of a sentence that he understood and an email to complete the sentence. I was fortunate that he was able to understand the message.

In the morning Dr. Mohammad called and said he was down in the parking lot waiting for me. He had a list of addresses we were to go look at and so we went off for the rest of the day looking at some safe houses that were getting closer to what I was looking for, but still nothing solid. Later that night the call came that I was waiting for. It was a high-level contact in Washington, D.C. who instructed me to do nothing to upset Dr. Mohammad or give any indications of my discovery, a member of his office would be contacting me ASAP. That was all.

Dr. Mohammad was seemingly in a good mood and took me to one of his favorite restaurants where he wanted to speak with me about my skill sets regarding barometric detonators, time delays, mercury switches and charged vacuum tubes. Our discussion regarding compositions, shielding, shapes, compounds, power sources, composites and use of magnets went on for some time, and Dr. Mohammad was convinced that I had a keen knowledge of the work he was talking about and actively aware of technical subjects. It was then that I knew that

I was not dealing with any medical doctor, but a highly educated, technically knowledgeable terrorist who was very interested in construction of a sophisticated detonator. The more I was around him, the more I wanted to kill him. We left the restaurant and went back to the Serena Hotel, had some drinks. Dr. Mohammad asked more about my family, friends and previous work experience. He made mention to the fact that he knew I had worked for Blackwater USA and wanted to know what it took to be selected. Needless to say, I gave him a dead end trail of bullshit and confusion. He agreed to not ask me about my past, and I wouldn't ask him about his. Little did he know that I knew a great deal more about him then he could imagine.

A few days later, I had an envelope under my door and it was from my Washington, D.C. contact. It was short code, and I understood it as instructions to meet the contact in the hotel restaurant at 9:00am sharp. It also described what he was wearing and where he would be sitting. I met the contact and verified his identity. He was instructed to inform me to initiate Executive Protocol within the next 7 days, neutralize and eliminate the threat with minimal exposure. I was solo and this meeting never took place. He walked away and left me there reading the paper.

At this point, I was pretending to read the paper and my thoughts were deeply off into my situation, how I even got to this point and most importantly how I was going to initiate the order with virtually no support, cover or means of egress. I knew I was being sacrificed to carry out a mission no one would ever know about. I went back to my room, laid down and my thoughts went off to the days when I was trained to carry out missions like this in a group. However, if this was to be solo it would occur immediately and with extreme prejudice.

After some deep thought, I made a trip to the local bazaar and acquired all the materials I needed and made a 13 in. wrist spike out of a toilet plunger dowel stick with the release tied to my finger. With a long-sleeve shirt and black gloves, it was well concealed. I bought two new Shalwar Kameez and had them boxed with new sandals. The weapon worked really well, and there was no problem with metal detectors or pat downs at the high security points. The pat downs never went as far as my wrist.

My planning went into effect and within two days, and I was prepared to execute Executive Protocol with a 50/50 possibility I would survive and a 20/80 probability that I would be arrested and jailed for life. With that being said, I opted to the 100% probability I would terminate my life if or when captured.

I made a decision on a safe house, signed the lease and informed the company of all issues pertaining to the contract. Dr. Mohammad was very pleased about this and wanted to celebrate and talk to me about a separate business venture he wanted to propose. On that day, Dr. Mohammad took me on a tour of his office and warehouse in the business district of Islamabad. When we arrived, he began the tour of showing me his business inventory. I noticed several metal boxes and crates that had European shipping labels and some opened crates that were from Iran. I memorized the wording and symbols as diligently as I could and the tour went on, after which Dr. Mohammad got down to business.

He wanted to utilize my company's shipping carrier for imports through Europe and other locations within the Emirates. He explained that it would cut down on import / export civilian shipping regulations. He would arrange for my company's business in Pakistan to be that of a US government contract obligation and all of the company shipments would be excluded from inspections that. I explained that I would have to think this over and let him know at a later date. Dr. Mohammad explained that he needed my assurances now, that I would be compensated, and that I was the only one who should make this decision. I explained again that I would consider this and keep everything to myself. I also reassured him that his secrets were my secrets, and I that I needed a financial boost to seal the deal. Dr. Mohammad reassured me that I would be paid six figures for my full cooperation. I told him we had a deal and as I shook his hand. I wanted to break every bone in it.

I down loaded the Dari alphabet and ran the symbols from the doctor's warehouse. It was nuclear shipping verbiage that was the wording for radioactive components. This was all very big and needed to be relayed to my counterpart. For the next four days it was raining very heavily and the rains never let up for a minute. Dr. Mohammad called me from the hotel parking lot and wanted me downstairs

and to meet with him. When I got into the vehicle, Dr. Mohammad went over a highly sensitive security contract proposal he had and wanted my opinion on. He also had American top secret documents about a highly sensitive

site in Pakistan that someone from my company had emailed him regarding a visit within a few days that the company wanted him to go over. They wanted Dr. Mohammad's opinion about local security staffing man power, training, blueprint overlays of the site, weapons to be utilized by the security staff on the contract if awarded, and the list goes on. Dr. Mohammad was wanting to create his own security company, subcontract all the work out and pocket the profits. I was wearing my poker face that moment and wanted to clean this guy's ears with an ice pick. But it was now that I realized that matters were out of control and my counterpart needed to be advised. I left Dr. Mohammad and advised him that I needed more time to go over the proposal and lend my expertise to him for a response. He reminded me about the secrecy and that I would have $50,000 coming to me when I wrote a solid proposal on this contract for him to present to my own company. He was adamant about our agreement to maintain secrecy and needed the proposal within 48 hours.

The clock was ticking; I had no direct way of contacting my counterpart in Islamabad and would not risk any emails or calls to Washington, D.C. I wrote all this down in the notes feature of my cell phone and removed the SIM Card. Utilizing two other encrypted SIM cards for cell phones that I was to give to members of my team coming from the States, I sent two separate text messages, one each, with one word to my Program Manager in the USA: "noteworthy" "comment". I knew my program manager would pass this to my contact in Washington, D.C. I went off to sleep and never received any replies. The next morning while having breakfast downstairs at the hotel, my counterpart was there at the buffet table.

Dr. Mohammed, the Nuclear Smuggler

I had the SIM Card in my hand with all the notes, between my fingers and went to serve myself a plate. While doing so, I walked up to the desert table next to him, suggested the cake, and he saw me drop the SIM Card onto the desert plate, place a piece of cake on top, and hand it to him. I went back to eat, finished and left for my room without saying a word. That day, Dr. Mohammad called and stated that the safe house was ready for me to move into and that he would come by for lunch so that he could help me check out. He also wanted to examine the draft proposal.

I checked out of the hotel and was in the lobby waiting when Dr. Mohammad came. We had lunch, I gave him my draft of the proposal, and we left for the safe house. The security guards were in place, with all the other house and grounds personnel that all were local nationals. We toured the safe house and Dr. Mohammad stated that he would come by later that night to pick me up to go to Margala Hills on the outskirts of Islamabad to drink and celebrate. I told him that this was fine and that I would be ready when he called. He left and I made sure the room I was staying in was not bugged with the help of a small 9V transistor radio that I played and walked through every inch of the room *(I was listening for any RF Interference that a listening device would emit, there was none).* I tested the wrist spike and all was in working order. I grabbed my backpack and placed the clothes (Shalwar Kameez) inside with a few bottles of water, passport & loads of cash. Dr. Mohammad called, came by to pick me up, and had my Old number 7 with him. On our way to the hills, he

detoured and picked up a woman that was waiting at a linen's store in a local market. The woman got into the vehicle and now I was wondering, "What the Hell?" Dr. Mohammad introduced her as his mistress. She got in the back seat and took off her head dress, She was about 5'1", 105 lbs, black curly hair, steel green eyes and 17 years old. I looked over at Dr. Mohammad (who was now all smiles and laughs) and said to him, "What the Fuck? She's old enough to be your daughter!" They both just laughed, and she later was quiet. Dr. Mohammad explained that she was going with us to celebrate. I stated to him that I was not notified about this in advance and if I knew she was coming along I would have brought her a gift. *(At this time I was pissed and knowing I would not be able to carry out the order with her along)*

We were up in Margala Hills for about two hours drinking off the side of a remote road and this girl was lip locked on Old Number 7 like a baby drinking milk from a bottle. I told Dr. Mohammad that I was feeling sick and wanted to go back to the safe house *(Dr. Mohammad and his mistress were doing the nasty and she was on her cell phone to her girl friend to come join us for drinks. I was going to have no part in the mess and reiterated that I was really not feeling well and that the alcohol was making me experience vertigo).* Little did anyone know I was about to run a sharpened wooden spike through Dr. Mohammad's head like a voodoo doll. But the timing was off and I didn't want to take a young innocent life from the girl as well.

Dr. Mohammad and his mistress drove me back to the safe house and when I got there I was fuming in disgust that I missed the opportunity to carry out the order. I needed minimum exposure, and she had seen my face.

Upon arriving at the safe house, the servant came upstairs, knocked on my door and gave me a cell phone in a new box that had arrived for me through a local courier. It was a piece of crap Nokia that you can find at all the cell shops in the country. I opened the box and found the phone fully operational with SIM card installed. I placed the phone down, took a shower and came back. I could only conclude that it came from my counterpart. I went to the notes feature of the cell and there was scrambled numbers that I interpreted: "ABORT". I pulled the SIM Card, burned and flushed it. By this time I had had enough and was ready to resign. I had done my part in setting up the safe house and made good on a solid attempt at neutralizing and eliminating the threat. I figured it might only be a matter of time before I was discovered and I started to reason with myself. I thought about this for a few days and made up my mind to resign. I looked at the clock and it was about 6 PM in the USA. Time for me to call the Program Manager and break the bad news. I went to the roof with a beautiful view of Islamabad, and while talking on the cell, pacing, I heard an unmistakable sound I hadn't heard since I was in Baghdad: the sound of a high velocity bullet, then another and then a ricochet. I got down, crawled to the door, one of the bullets passed right through the collar of my leather jacket, missing me by a quarter of an inch. There was no sound or clap of the round being discharged, to my surprise, and so this was a professional who was a poor shot. I left Islamabad after a few weeks, was debriefed by a three-digit agency and was requested to return to Islamabad a year later. But that's another story.

Photos courtesy of Larry Werline.

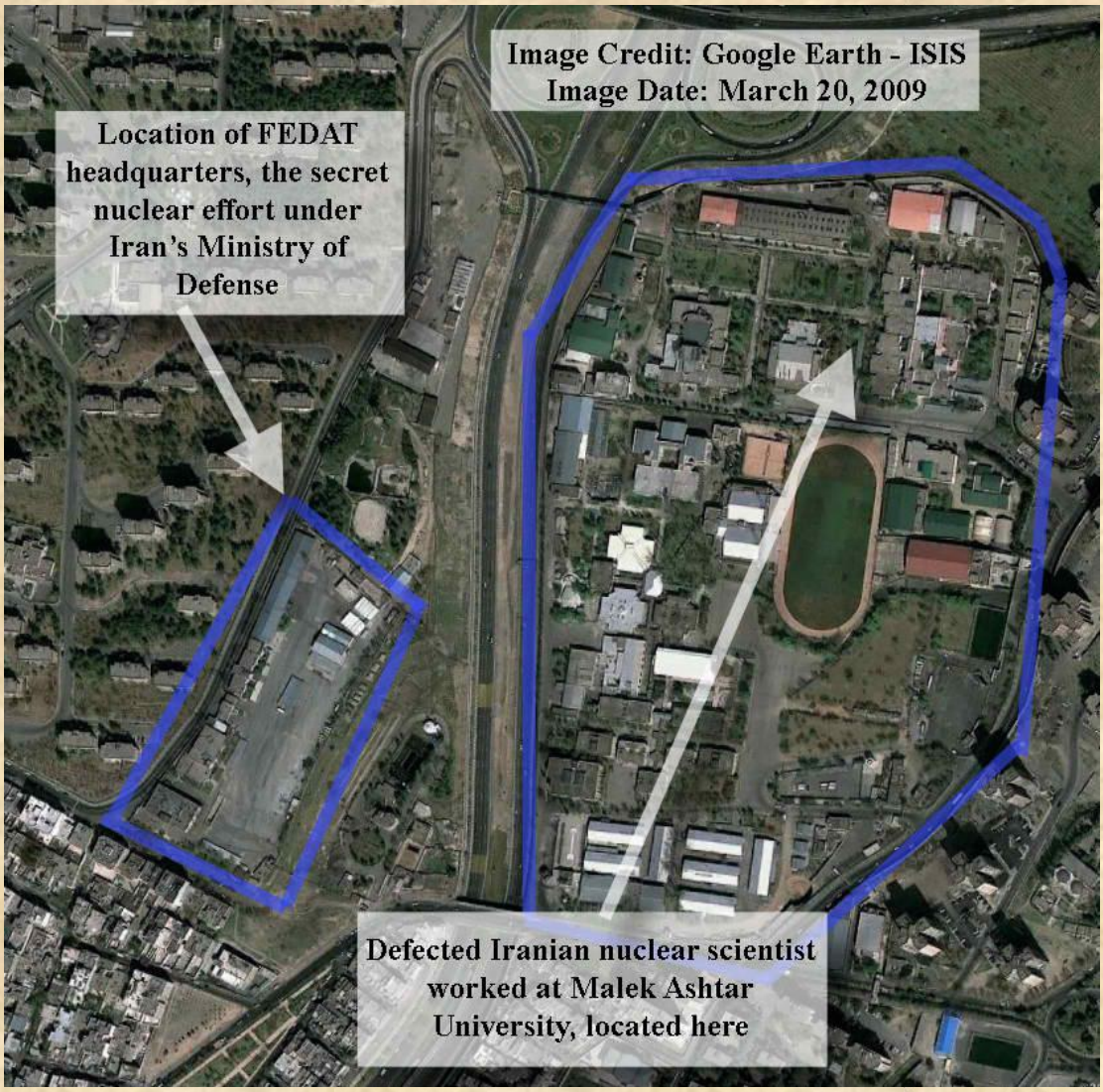
More than 60 nuclear experts at work building Iranian nuclear bomb

Source: http://www.debka.com/article/21999/

The names and addresses of 60 Iranian experts employed by 11 different Iranian agencies under the control of the Iranian Defense Ministry were revealed Saturday, May 12, by the main Iranian opposition Mujahedin-e Khalq (MEK/PMOI). This is the first time an extensive, highly secret, central organizational structure dedicated to building a nuclear weapon has been revealed in detail – specifically the Ministry of Defense under the command of the Revolutionary Guard Corps, which also runs the Fordow Fuel Enrichment Plant.

The information updated to April 2012 was provided by "sources within the Iranian regime's agencies, including military institutions."

before the Six Powers were due to hold a second round of nuclear talks with Iran in Baghdad on May 23, debkafile's intelligence and Iranian sources report.



Malek Ashtar University: Nuclear bomb project HQ

It contradicts the fundamental conclusion reached by the US and five world powers and International Atomic Energy Agency (IAEA) - that Iran's nuclear program is not run by a single organization - on the basis of which they entered into negotiation with Tehran. Most of all, it refutes another key argument heard in the West that Iran has not yet decided to actually build a weapon because Iran's supreme leader Ali Khamenei's said it would be a "sin."

The Mujahedin-e Khalq, which Tehran accuses of collaborating with US and Israeli intelligence to assassinate its nuclear scientists, clearly timed the publication of its findings for 11 days

Ahead of the meeting, US administration sources put about word that a compromise deal developed in the direct backdoor channel between Washington and Tehran had a good chance of coming before the meeting. It was said to consist of three points of accord: Allowing uranium enrichment up to 5 percent purity to continue; barring enrichment up to 20 percent (effectively discontinuing work at Fordow); and exporting Iran's entire 20 percent in stock to prevent its use for bomb production.

According to debkafile's Iranian intelligence sources, there is no such deal: Tehran is not willing either to stop 20 percent uranium enrichment or shut down the Fordow plant. Just the opposite: **DEBKA-Net-Weekly,** the only Western publication following the secret US-Iranian

negotiations, last week quoted a message from Khamenei to President Barack Obama flatly refusing to close Fordow, whose sole purpose is the production of 20 percent grade uranium which brings the fuel a short step before weapons grade.

After procuring Washington's consent to 5 percent enrichment – over strong Israeli protests – Tehran has been encouraged to fight for 20 percent as well. The probable point of accord would be a ceiling on quantity.

Other American sources most recently explained their optimism about a successful culmination of the secret talks by Tehran's admission for the first time that it was engaged in developing a nuclear weapon, which it hitherto denied. This laid the issue open to negotiation.

All in all, Jerusalem takes issue with US acceptance of the above deal as "bad for Israel." It refuses to accept anything less than a complete halt of all uranium enrichment forthwith, the shutdown of Fordow (photo above) and the removal of every scrap of enriched uranium from Iran.

This position was put firmly before the European Union Foreign Executive Catherine Ashton by Prime Minister Binyamin Netanyahu and the heads of his unity government, Defense Minister Ehud Barak, Foreign Minister Avigdor Lieberman and designated Deputy Prime Minister Shaul Mofaz, last Wednesday, May 9.

She arrived in Jerusalem the day after the expanded Netanyahu government was formed to find out where it stood on the Iranian question.

The exhaustively detailed Mujahedin-e Khalq document presents a completely new picture of a well-advanced and centralized nuclear weapons program, quite different from the one broadcast by the US and its fellow nuclear negotiators - and even by some Israeli circles.

Refuting the belief Iran has not actually started building a nuclear warhead or bomb, the Iranian opposition group provides chapter and verse to demonstrate that Iran is way past the decision and flying ahead at top speed on its manufacture.

The project is revealed to be working out of the "headquarters of the Iranian Defense Ministry's SPND (New Defense Research Organization) at the Mojdeh site in the western part of Malek Ashtar University in the Lavizan region."

(This university was first exposed in 2009 along with its three campuses in Tehran, Isfahan and Urma.)

Where the document breaks startling new ground is in detailing the SPND's 7 sub-sections, "each of which conducts research and tests in a specific field:"

1. Working on the main element for the bomb, i.e. enriched uranium and fissile material.

2. Shaping and molding the required material, including metal elements, to build a warhead.
3. Producing metals required for building a nuclear warhead.
4. Producing high-explosive material used to detonate a nuclear bomb.
5. Conducting research on advanced chemical material.
6. Blue prints and carrying out electronic calculations required for building a nuclear warhead.
7. Laser activities applicable in the nuclear field.

To each sub-division, the Mujahedin-e Khalq document has attached diagrams of its internal structure plus the full names and addresses of its heads, officers, researchers and the liaison offices among the departments. Some are provided with their landline and cell phone numbers. The information is said be updated to April 2012.

In response to these revelations, some official American sources commented that they could not be confirmed and were skeptical about the document's credibility. Our intelligence sources note that all of this Iranian group's previous disclosures in the past nine years have proved accurate.

On protecting the inexperienced reader from Chernobyl myths

By M I Balonov
Institute of Radiation Hygiene, St Petersburg, Russia
M I Balonov 2012 *J. Radiol. Prot.* 32 181
Source: http://iopscience.iop.org/0952-4746/32/2/181/

The health and environmental consequences of the Chernobyl accident continue to attract the attention of experts, decision-makers and the general public, and now these consequences have been given added relevance by the similar accident in 2011 at the Fukushima-1 nuclear power plant (NPP) in Japan. Expert analysis of radiation levels and effects has been conducted by international bodies—UNSCEAR in 2008 and the Chernobyl Forum during 2003–5. At the same time, three Russian and Belarusian scientists, Yablokov, Nesterenko and Nesterenko (2009 *Chernobyl. Consequences of the Catastrophe for People and the Environment* (New York: Annals of the New York Academy of Sciences)) published both in Russian and English a substantial review of the consequences of Chernobyl based mostly on Russian-language papers. In this book, they suggested a departure from analytical epidemiological studies in favour of ecological ones. This erroneous approach resulted in the overestimation of the number of accident victims by more than 800 000 deaths during 1987–2004. This paper investigates the mistakes in methodology made by Yablokov *et al* and concludes that these errors led to a clear exaggeration of radiation-induced health effects. Should similar mistakes be made following the 2011 accident at Fukushima-1 NPP this could lead quite unnecessarily to a panic reaction by the public about possible health effects and to erroneous decisions by the authorities in Japan.

NOTE: You can read the full paper at Newsletter's website – "CBRN-CT Papers" section.

Kodak's Rochester Unit Sheltered A Nuclear Reactor For More Than 30 Years

Source:http://www.crazyengineers.com/kodaks-rochester-unit-sheltered-a-nuclear-reactor-for-more-than-30-years-2200/

A shocking report by the Democrat and Chronicle revealed imaging giant Kodak to have sheltered a californium neutron flux multiplier (CFX) for more than 30 years, till the federal agencies finally took over the highly enriched weapon grade uranium (around 1.36 kg) to its South Carolina facility in 2007. The research reactor was placed inside a 2 feet concrete protected chamber under Building 82 at the Eastman Kodak's Rochester, NY industrial unit.

Since acquiring the CFX in 1974, Kodak was using it to exercise purity check on various chemicals and materials, along with highly supervised use in neutron radiography. It primarily multiplies the flow of neutrons from the core of the reactor, helping researchers create an image of a material without damaging it.

Information regarding Kodak's possession of the research reactor and the said quantity of uranium was highly protected under federal lines, with even several city officials unaware of its operations. The company assures of having employed high security measures to keep the facility and city radiation free.

➲ **NOTE:** The uranium was removed in 2007 and taken to a government facility in South Carolina.

U.S. Remains Vulnerable to an EMP

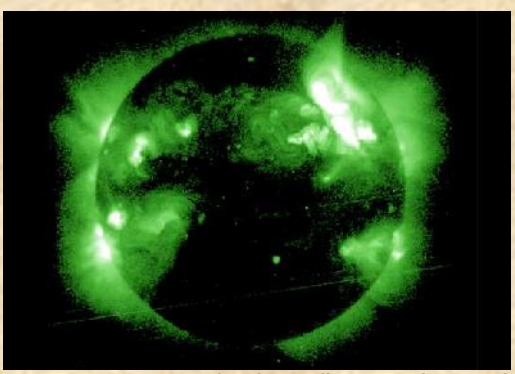
By Bryan Kimbell

Source: http://blog.heritage.org/2012/05/12/u-s-remains-vulnerable-to-an-emp/

An article recently published by the *Los Angeles Times* discusses how solar storms pose a grave threat to Earth. Mike Hapgood, a space weather scientist in England, says that the world is unprepared for such a storm, and one is likely to occur soon.

The Heritage Foundation has led a vital campaign aimed at informing the American public about the seriousness of electromagnetic pulse (EMP) attacks. An EMP is typically described as occurring when a nuclear weapon is detonated at a high altitude, resulting in a high-intensity burst of electromagnetic energy caused by the rapid acceleration of charged particles. The second scenario involves massive explosions on the sun's surface ("space weather").

Society is becoming increasingly more dependent on electrical devices, and this leads to greater vulnerability to space weather and EMP attacks. These charged particles, if strong enough, cause the destruction of electrical circuits. This would affect cell phones, computers, vehicles, airplanes, and even the power grid. In the case of an EMP, from "space weather" or a high-altitude nuclear detonation, transportation systems would be halted, communications would be rendered useless, and grocery stores would be unable to



preserve or restore food supplies. As observed in *33 Minutes*, a successful EMP would send the United States spiraling back to the 18th century.

Despite the severe ramifications of such events, the U.S. is unprepared to deal with either. Fortunately, the United States can still make the necessary preparations to protect its vital infrastructure. Hardening provides resiliency and resistance to vital infrastructure against extreme space weather or EMP effects. Developing a national plan to respond effectively to EMP emergencies is a necessity. This would involve educating federal, state, and local officials along with the public about the risks and response options. Finally, the U.S. should continue to invest in missile defenses to protect against ballistic attacks aimed at achieving high-altitude nuclear detonation or EMP attack, especially against ship-launched missiles off the U.S. coast. The threat of space weather and EMP attack deserves proper planning and robust defenses.

Bryan Kimbell *is currently a member of the Young Leaders Program at The Heritage Foundation.*

Illicit Radiological and Nuclear Trafficking, Smuggling and Security Incidents in the Black Sea Region since the Fall of the Iron Curtain – an Open Source Inventory

By Alex P. Schmid & Charlotte Spencer-Smith[1]

Source: http://www.terrorismanalysts.com/pt/index.php/pot/article/view/schmid-illicit-radiological/html

PERSPECTIVES ON TERRORISM

a journal of the Terrorism Research Initiative

Introduction

On March 26-27, 2012, leaders of 53 countries met for a summit in Seoul, Korea, in the framework of the American initiative to reduce and secure scattered nuclear materials which could offer terrorists an opportunity to acquire uranium or plutonium for exploding a nuclear weapon. It takes less than 25 kilograms of highly enriched uranium (HEU) and less than eight kilograms of plutonium (Pu) for constructing a viable atomic bomb. There are still between 1.300 and nearly 1.600 tons of highly enriched uranium and nearly 500 tons of plutonium stored in Russia and the United States and, to a lesser extent, in some 30 more countries. While the more than 100 military storage sites which contain some 19,000 assembled nuclear weapons (all but about 1.000 in the USA and Russia) are generally well-protected, some of the ca. 500 civilian nuclear power stations and some of the ca. 120 academic HEU-powered research reactors are in a number of cases much less well protected. Some of the latter are badly in need of better security than a chain-lock at the gates and a single night watchman on duty. There have been some twenty known cases of theft of plutonium and highly enriched uranium since 1990 and many more of other radioactive materials.

Documented illegal nuclear material seizures were especially frequent between 1992-1995 when more than 15 kg were intercepted. Yet seizures of significant smaller quantities of HEU and Pu were also made in the years 2000, 2003 and 2005. [2]As recent seizures of highly enriched uranium in Georgia (2010) and Moldova (2011) illustrate, the problem continues to be most acute in the regions of the former Soviet Union and, in particular, in the greater Black Sea region.

Based solely on open sources, the authors of this inventory have made an attempt to document the extent of leakage of nuclear (Uranium, Plutonium) but also of other radioactive materials (isotopes like C0-60, Am-241,Cs-137,Ir-192,Sr-90,Cf-252,Ra-226) which could be used for the construction of an atomic fission bomb or, in the case of the latter, a radioactive dispersal device (RDD) or so-called 'dirty' bomb. No attempt is made here to look at the intentions and capabilities of possible terrorist end users.[3] Instead, we would like to discuss here briefly some issues of selection bias in radiological and nuclear smuggling and trafficking data.

Data Problems

The principal problem with open source data on radiological and nuclear smuggling and trafficking incidents are inherent selection biases. Such data therefore should not be used for inferential statistics on *all* incidents of a radiological and nuclear nature. Open source data draw from a pool of incidents that have been intercepted by the authorities. Therefore, incidents of smuggling and trafficking that have not been intercepted will not appear in our data. There is another limitation to open source data: not only have there to be intercepts of one sort or another, the incidents also have to have been reported in the media. A government may choose not to make an incident public for security or political reasons. More rarely, an incident may not receive sufficient interest from the media because the context of discovery is unspectacular, e.g. when uranium is found on a metal scrap yard by accident. Both the number of non-intercepted incidents and the number of unreported incidents is unknown to the open source researcher. It is therefore not possible to calculate statistical standard deviation. This makes open source data on radiological and nuclear trafficking incidents a poor source for inferential statistics on incidents that have not been intercepted.

It is also unknown how different intercepted incidents are from non-intercepted incidents. It is plausible that successful trafficking of materials is inherently different from unsuccessful, intercepted trafficking: some traffickers may be familiar with routes and methods of trafficking that authorities are not aware of. They may be using weaknesses in nuclear security and customs control that have remained undetected. For these reasons, open source data of this nature should only be used for descriptive and not for inferential statistics. This is unfortunate as it is the successful cases of trafficking that are the most worrying from the perspective of terrorism prevention.

Open Source Data as a Descriptive Snapshot

Given these limitations, open source data can best be considered as snapshots on how nuclear and radiological materials can escape regulatory control regimes that protect them from malicious intent or pure negligence. Our data provide some insights how people attempt to smuggle and traffic nuclear and other radioactive materials and how they fail. The story that our data are not able to tell is the story of how materials are successfully trafficked and how they arrive in the hands of end users. Our data should be seen as illustrative examples of what might be considered 'archetypes' of nuclear and radiological smuggling and trafficking in the wider Black Sea region. Archetypes, or the multiple recurrence of similar incidents, are also closely connected with the political and economic history and present security situation of the region as described in the article co-authored by one of the present compilers and mentioned in not 1.

The amount of nuclear and radiological material that fell out of regulatory control after the end of former Soviet Union and remains so is unspecified but is believed to be significant. We must assume that in a number of cases, perhaps even in many cases, the intercepted quantities of materials were mere demonstration samples to convince potential buyers that the seller or his middleman had genuine access to nuclear and radioactive materials.

Other Limitations of Our Data

A further, practical consideration is that the data is not uniform. Details about the incidents have been gathered from newspaper and online articles about incidents. News reports vary in the depth of information they give, and often, multiple news reports on one incident will contain almost identical information because different media outlets have acquired the story from the same news agency. This also means that the place of seizure of the material, the nature and amount of material, the method of interception and details about the trafficker, as well as the source of the material and its intended destination and use may or may not be known. The quality of

information provided across different incidents is not uniform across the data.
A minor but noteworthy consideration is that some materials that are intercepted at customs checkpoints are not the subject of criminal trafficking at all, but have fallen victim to the failure of exporters and importers to acquire the correct transport permits. In the context of terrorism research, it might be better to disaggregate these incidents from the rest of the data: failure to acquire the appropriate permit does not indicate intent to traffic and to sell; the material may have been destined for a legitimate buyer. Which data to retain and which data to discard in an inventory like ours may often be a question of subjective judgment, because the information given about incidents only occasionally states whether or not there was malicious intent behind it.
The ghost of the 1986 Chernobyl nuclear accident still haunts Eastern Europe. This history is reflected in the reports of discoveries of radioactive scrap metal and orphan source Caesium-137 and trafficking of radioactive materials from within the Chernobyl exclusion zone. Economic difficulties and the presence of organized crime are also part of the subtext of the data. These are illustrated in reports of thefts of ice detectors and quantities of nuclear material from commercial facilities, power plants and even submarines.
With these caveats, we release part of the fruit of our efforts to gather open source data to fellow researchers for their cautious consideration and their feedback in the form of corrections, qualifications and additions.

Nuclear and radiological smuggling and trafficking incidents, events, and threats from the wider Black Sea area, 1990 – 2011

An Open Source Compilation prepared by Alex P. Schmid & Charlotte Spencer-Smith

1990, February / Azerbaijan / N: Azerbaijani rebels unsuccessfully attacked a Soviet military depot dear Baku where nuclear weapons are stored; Soviet troops were sent to secure the base (http://www.johnstonarchive.net/nuclear/wrjp1855.html).
1991 / Kazakhstan / Iran / N: According to unconfirmed reports, Kazakhstan sold Iran three tactical nuclear warheads for between $130 million and $150million (Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 124).
1991 / Russian Federation / N: Islamic Jihad purportedly approached one of Russian Federation's closed cities, Arzamas-16, offering to buy a nuclear weapon.
1992 / USA / N: Last US explosive test. Former Russian test site Semipalatinsk is closed by newly independent Kazakhstan.
1992, January / Iran / N: An Egyptian newspaper claimed Iran had bought three Soviet nuclear warheads from Kazakhstan for $150 million; Kazakhstan denied the report. In April, Russian intelligence reported Iran had obtained at least two warheads from Kazakhstan; in July a Kazakh official said the 3 reportedly missing warheads were in test shafts a the Kazakh test site; in September a U.S. congressional task force alleged Iran had obtained 4 Soviet warheads (including two operational): two 40 kt SRBM warheads, one 50 kt NGB, and one 0.1 kt AFAP. By 1994, Russia said the warheads were accounted for; Israeli officials suggest the warheads were borrowed for disassembly and reverse engineering (http://www.johnstonsarchive.net/nuclear/wrjp1855.html).
1992, March / Commonwealth of Independent States / R: Reportedly, a box of radioactive material stolen from Pridniestroviye, Transdnestr; thieves threatened to blow up the material if fighting in Moldova was not stopped (http://www.johnstonsarchive.net/nuclear/wrjp1855.html).
1992, May–October / Russian Federation, Luch Scientific Production Association / N: This incident involved a chemical engineer, Yuri Smirnov and long-time employee of the State Research Institute, Scientific Production Association (also known as Luch) which is located 22 miles from Moscow. Beginning in May 1992, over a 5-month period, the individual smuggled out of the institute small quantities of 90% HEU, totalling 1.5 kg. In October 1992, the engineer was arrested because police suspected him of stealing equipment from the Luch faculty. Once in custody, the police discovered the nuclear material that he had stolen. The individual did not have a specific buyer in mind, but was trying to determinate whether there was a market for the stolen nuclear material. He was tried before a Russian court and received 3 years' probation. The material

had been seized in October, 1994, in Podolsk, Russian Federation (Frank Barnaby: 'Instruments of Terror', 1996, p.154; and Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 110).

1992 / Kazakhstan/Iran / R/N: Iranian agents allegedly contacted officials at nuclear facilities in Kazakhstan on several occasions, attempting to acquire nuclear-related materials. In the same year, Iran had allegedly unsuccessfully approached the Ulba Metallurgical Plant to obtain enriched Uranium.

1992, May–October / Ukraine / R/N: Apparently 100 kg of Uranium was stolen from the Chepetsk Mechanical Factory (Ukraine?); 80 kg could be recovered later. The material was apparently destined for the Middle East.

1992, 30 March–6 April / Russian Federation/North Korea / N: 56 kg of Plutonium was said to have been smuggled by train, hidden among scrap metals, to North Korea from Russian Federation in early 1992, according to *Kommsersant*.

1992, October / Russian Federation: Yuri Smirnov, an engineer at the Lunch Scientific Production Association in Podolsk, Russian Federation was accused of stealing 3.7 pounds of HEU (90% enriched U-235). He was caught when leaving for Moscow to find a buyer

1992, October 28 / Bulgaria/Iraq / N: A consignment of 44 kg of Pu-239, possibly destined for Iraq, was found in the Sheraton hotel in Sofia, according to a report of *Komosomolskaya Pravda (11.11.1992).* However, Bulgarian officials ultimately identified the perpetrator as a British journalist claiming to research the activities of a gang who had offered to deliver 80 kg of Pu to Iraq. The journalist had managed to insinuate himself as intermediaries in the transaction and passed the first box of Pu (worth $378,000) to the Bulgarian authorities. The 'Plutonium' turned out to be a box of metal screws with a total content of 200 millig of Pu. (Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 75, 87).

1992, December / Kazakhstan/Iran / N: a phone conversation between two Iranian officials, intercepted by a European security service, allegedly recorded a discussion on the purchase of four nuclear warheads from Kazakhstan. Apparently the warheads had already been paid for but there was a 'transportation problem'.

1993 / Russian Federation / R/N: 165 kg of Uranium were reportedly confiscated in Izjezk, 900 km from Moscow.

1993 / Turkey/Iran / R/N: Three Iranians believed to have had connections to Iran's intelligence service, were arrested in Turkey while seeking to acquire nuclear material from smugglers from the former Soviet Union.

1993 / Ukraine / Palestine / N: According to unconfirmed reports, Ukrainians sold the Palestine Liberation Organisation two nuclear warheads for $10 million (Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 125).

1993 / Russian Federation / N: The director of the nuclear research centre in Arzamas-16 was, according to his own testimony, offered $ 2 billion for a warhead by Iraqi representatives (Rensselaer Lee, as quoted in CSIS, The Nuclear Black Market, op. Cit., p. 15).

1993 / Russian Federation / R/N: A Volgograd businessman offered 2.5 kg of HEU to a criminal gang based in the Central Volge region to pay off a debt he owed to them. The gang refused the material as payment for the debt because it could not find any buyers (Gavin Cameron: 'Nuclear Terrorism', 1998, p. 9).

1993, January / Russian Federation / R/N: Several persons where arrested in the 'closed' city of Arzamas-16 in the Russian Federation after 10 kg of Uranium were found in their possession.

1993, March / Chechnya / R/N: Chechens were reported to have obtained enriched Uranium from Kazakhstan and from Russian Army deports.

1993, March / Turkey / R/N: Turkish intelligence sources reported that six kg of enriched Uranium was smuggled into Turkey through the Aralik border gate in Kars province in eastern Turkey. The material was reportedly brought in from Tashkent, Uzbekistan, to Grozny, Chechnya, and via Georgia to Nachichevan, before it was intercepted in Istanbul.

1993, April / Ukraine / R: 80 tons of nuclear fuel were discovered by the Ukrainian customs service on its way from Russian Federation to Varna, Bulgaria, where is was thought to be shipped to Libya.

1993, April / Lithuania / R/N: Uranium and Strontium were reported to have disappeared from a nuclear power plant in north-east Lithuania.

1993, April / Russian Federation / R/N: 75 g of Plutonium were seized in Orel, Russian Federation, in April, 1993. The material was reportedly stolen from the Orel Branch of the

Moscow Instrumentation Research and Development Institute (Rensselaer W. Lee**:** 'Smuggling Armageddon', New York, 1998, p. 107).**1993, May / Glazov, Russian Federation / N:** Reported trafficking of 11 kg Natural Uranium (*Comprehensive List*).

1993, May 24 / Vilnius, Lithuania / R/N: In May 1993, Lithuanian authorities recovered 4.4 tons of Beryllium in a smuggling investigation. Beryllium is a metal that is used in the production of, among others things, x-ray tubes, lasers, computers, aircraft parts, nuclear reactors, and nuclear weapons. When Lithuanian authorities seized the material, they discovered that some of the Beryllium (141 kg) was contaminated with approximately 0.1 kg of HEU (50% enriched U-235) . There was no evidence that the individuals involved were aware that the Beryllium contained the enriched Uranium. Some reports indicated that the Beryllium originated in the Institute of Physics and Power Engineering in the Russian Federation. This institute was involved in the research and development of nuclear power reactors and employed about 5,000 people. It was said to possesses several tons of weapons-usable materials.

1993, June / Orenburg region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1993, June / Electrostal company, Russian Federation / N: Reported trafficking of 2.5 kg natural Uranium (*Comprehensive List*).

1993, July / Andreeva Guba, Murmansk, Russian Federation / R/N: In July 1993, two Russian naval enlisted personnel stole two fresh fuel rods from a storage facility in Murmansk, Russian Federation. These rods were for Russian naval propulsion reactors that power submarines and contained 36% enriched Uranium. The amount of materials totalled about 1.8 kg of HEU. Russian security officers discovered the missing materials and apprehended the individuals before the material left the Murmank area. One of the individuals arrested was a guard at the facility and was suspected by authorities after the material was missing. The two enlisted personnel who were caught implicated two Russian naval officers in the plant. However, at the ensuing trial only the two enlisted personnel were convicted and sentenced to prison terms of four and five years. (F Steinhaeussler and L Zaitseva. Illicit Trafficking in Nuclear and other Radioactive Materials, with a focus on nuclear and radiological terrorism. Paper prepared for Courmayeur, ISPAC Conference, 6-8 December 2002, p. 5).

1993, August / Murmansk region, Russian Federation / R: reported trafficking of Cs-137 (*Comprehensive List*).

1993, September / Novgorod region, Russian Federation / R: reported trafficking of Cs-137 (*Comprehensive List*).

1993, September / Sarov, Russian Federation / N: Reported trafficking of 9.1 kg Natural Uranium (*Comprehensive List*).

1993, September / Grodno, Belarus / N: Reported trafficking of depleted U-238 (*Comprehensive List*).

1993, October / Primorsk region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1993, October 5 / Turkey / R/N: Istanbul police seized 2.49 kg of natural Uranium and arrested four Turkish businessmen and four suspected agents of Iran's secret service. The material was of Russian origin and allegedly transported to Istanbul from the Hartenholm airfield (allegedly a privately owned airfield used by Iranian arms dealers) near Hamburg by a private Cessna aircraft. The purchasing price was said to be $ 825 million.

1993, November / Moscow, Russian Federation / N: Reported trafficking of 3.5 kg Depleted Uranium (*Comprehensive List*).

1993, November / Russian Federation / N: Workers allegedly removed two nuclear warheads from the Zlatoust-36 Instrument-Building Plant facility near Chelyabinsk, Russian Federation. The warheads were recovered from a garage in a nearby residential site (Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 124).

1993, November / Russian Federation / N/R: In November 1993, approximately 4.5 kg of 20% enriched Uranium, intended for use in submarine propulsion reactor, was stolen from a fuel storage facility in the Sevmorput shipyard near Murmansk, Russian Federation. Three individuals were arrested in connection with the theft, including two naval officers. The group stored the fuel rods in a garage for several months while they were looking for a prospective buyer. The three individuals were arrested and two of the men received 3-1/2-year sentences; the third person was acquitted. (F Steinhaeusler and L Zaitseva. Illicit Trafficking in Nuclear and other

Radioactive Materials, with a focus on nuclear and radiological terrorism. Paper prepared for Courmayeur, ISPAC Conference, 6-8 December 2002).

1993, November / Russian Federation / R : In a case stemming from an incident in November 1993 in which a Russian naval officer stole 4 kg of 20 percent enriched U-235 nuclear fuel rods from a poorly guarded area at Severomorsk, a Russian court found the officer guilty but gave him a suspended sentence because he admitted the act. Two accomplices were sentenced to three years at a labor camp (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1993, November / Italy / Russian Federation / R/N: It was reported that in the previous two years 234.42 kg of Uranium-235 'pills' had been stolen by Moldovans, Romanians, Hungarians and a Syrian from the Nuclear Reactors Institute in Pitesti. Another 208 kg, stolen from a plant in Braslov, could be recovered.

1993, Border Poland-Ukraine, Poland / R: Reported trafficking of Strontium-90 (7 mCi) (*Comprehensive List*).

1993, November 27 / Turkey / N/R: Three Georgian nationals arrested at Bursa, Turkey, were found in possession of 4.5 kg of Uranium.

1993, November 29 / Russian Federation / N/R: Lt-Col. Tikhomirov of the Russian Navy, and Alyak Beranov, deputy administrator of the Polyarnyy submarine base, entered a naval fuel store at the Sevmorput shipyard near Murmansk, Russian Federation, through a hole in the perimeter fence and stole three fuel rods of Uranium, containing 4.34 kg of HEU (20% enriched U-235). They intended to sell the Uranium for $ 50,000. The fuel was kept in Beranov's garage for seven months, until Tikhomirov got drunk and boasted of the theft to fellow officers. Both were arrested (Rensselaer W. Lee: 'Smuggling Armageddon', New York, 1998, p. 117).

1993, December / Kazan, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1994 / Russian Federation / Chechnya / N: Chechen leader Dzhokhar Dudayev reportedly warned the US government in the summer of 1994 that it had two tactical nuclear weapons and that he would transfer them to Libya if the United States did not recognise Chechnya's independence. The USA allegedly sent, with Russian Federation acquiescence, a team to inspect the weapons, which, however, did not exist (Andrew Cockburn and Leslie Cockburn. One Point Safe. Washington, D.C. Doubleday, 1997, pp. 101-103; cit. Scott Parrish, op. cit, p.10).

1994 / Russian Federation / R/N: The Russian Federation Newspaper *Moskovskiy Komsomolets* reported in mid-1994, that the Russian Federation Federal Counterintelligence Service (FSK) allegedly arrested one of its own captains and a former FSK warrant officer for possession of about 2 kg of Uranium. The FSK denied the incident (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998).

1994, January / Electrostal company, Russian Federation / N: Reported trafficking of 3 kg LEU (3.6% enriched) fuel pellets (*Comprehensive List*).

1994, February / Ekatarinburg, Russian Federation / N: Reported trafficking of 30 kg depleted Uranium in a protective container (*Comprehensive List*).

1994, March / Russian Federation / N: 11 out of 60 nuclear warheads and their missiles, en route from the Ukraine to the Russian Federation to be scrapped, reportedly disappeared, according to the German BND (This was not confirmed by the CIA. John M. Deutch, in testimony of 20 March 1996**:**"We have received well over a hundred reports alleging the division of nuclear warhead or component during the last few years. The Intelligence Community checks out all reporting of warhead theft and will continue to do so. But to date much of the reporting has been sporadic, unsubstantiated, and unreliable"). It was suspected that Iran was an interested potential buyer.

1994, March / Krasnoyarsk region, Russian Federation / R: reported trafficking of Cs-137 (*Comprehensive List*)

1994, March / Sarov, Russian Federation / N: Reported trafficking of 3.71 kg Natural Uranium (*Comprehensive List*).

1994, March / Sneginsk, Russian Federation / N: Reported trafficking of 5.5 kg Natural Uranium (*Comprehensive List*).

1994, March-April / Russian Federation / R/N: A worker at 'Elektrostal' and his cousin stole 1.76 kg of Uranium from the plant. They were arrested, together with two other persons, when

they tried to sell the material to an agent of the Russian Federal Security Service (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998).

1994, March 4 / St. Petersburg, Russian Federation / N: Trafficking of 2.972 kg HEU Dioxide (90% enriched) that was likely to be from the Elektrostal company. Three people attempting to sell the HEU were arrested by Russian agents in St. Petersburg (*Comprehensive List* and the *Christian Science Monitor*).

1994, April / Sochi, Russian Federation / N: Reported trafficking of 3 kg Natural Uranium (*Comprehensive List*).

1994, April / Yackutiya region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1994, April / Lenengrad region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1994, May / Leningrad region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1994, May 10 / Tengen-Wiechs (Baden-Wuerttemberg) Germany / R/N: In the small town of Tengen-Wiechs, Germany, a 5.6 g of very pure (99.75% enriched) Plutonium-239 was found in the garage of businessman Adolf Jaekle, mixed with Red Mercury. The most likely origin of the material was a Russian weapons laboratory, possibly the Arzamas-16 laboratory near Moscow (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 93).

1994, June / Nignegorod region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1994, June / Sevmorput shipyard, Russia / N: A naval office at the Sevmorput Shipyard notified authorities after a fellow officer asked about potential customers for nuclear material. The tip leads to the piecing together of a case involving two other officers and 4.5 kg HEU that had been stolen from the shipyard in 1993 (Compilation by *The Christian Science Monitor*, 2001).

1994, June / Russian Federation / R/N: 3.05 kg of HEU (50-90% enriched U-235) were seized in St. Petersburg in June, 1994. The material was reportedly stolen from the 'Elektrostal' Machine Building plant in February, 1994 (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 107).

1994, June 13 / Landshut (Bavaria), Germany / R/N: Gustav Illich, a Slovak national, was arrested by German police in Landshut after he had offered HEU to an undercover agent and after he had delivered an Uranium sample containing 800 millig of HEU. Illich had reportedly obtained the material from Jaroslav Vagner, a Czech national, and had told the police agent that several kg of HEU were secretly stored in Prague. The Uranium shipment reportedly consisted of about 3-6 kg and was smuggled from the Russian Federation to Prague in May or June 1994. The origin of the HEU sample was the Institute of Physics and Power Engineering in Obninsk, Russian Federation. Chemical identical HEU was found in Prague on December 14, 1994, and in June, 1995 (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 79, 98-101).

1994, July / Turkey / R/N: Turkish police confiscated 12 kg of possible weapons-grade Uranium coming from Azerbaijan to Istanbul; they arrested seven Turks.

1994, July / Romania / R: According to a 2 November press report, police in Timisoara, Romania, had arrested five Romanians trying to sell 2.6 kg of Russian Uranium (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1994, July / Russian Federation / R/N: Four businessmen from Severodvinsk, Russian Federation, were reportedly arrested in July, 1994, for stealing 3.5 kg of Uranium dioxide (20-40% enriched U-235) from the Severodvinsk Sevmash nuclear submarine construction plant. They allegedly had links to Sevmash plant workers (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 119).

1994, July / Russian Federation / R: According to 6 July press reporting, Russian authorities in Shezninks discovered 5.5 kg of U-238 previously stolen from the Chelyabinsk-65 nuclear facility (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1994, July 19 / Istanbul, Turkey / N: Reported trafficking of 12.38 kg Depleted Uranium (*Comprehensive List*).

1994, August / Kaliningrad, Russian Federation / N: Reported trafficking of 30 kg natural Uranium in a protective container (*Comprehensive List*).

1994, August / Sarov, Russian Federation / N: Reported trafficking of 8.94 kg Natural Uranium (*Comprehensive List*).

1994, August / Vladimir region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).
1994, August 3 / Brest, Belarus / R: Reported trafficking of Cs-137 (2Ci) (*Comprehensive List*).
1994, August 4 / Timis, Romania / N: Reported trafficking of 2.6 kg LEU (*Comprehensive List*).
1994, August 10 / Munich, Germany / R/N: One Colombian and two Spaniards were arrested at Munich airport, arriving by Lufthansa from Moscow. In their possession were 560 g LEU and 363.4 g of Pu-239 (pu-240 10.78% enriched). German BND agents offering them $ 276 million to procure 4 kg of Russian plutonium and convey it to Munich had lured them into this sting operation (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 93). The smugglers displayed all characteristics of amateurs. However, the German magazine *Focus* reported that the planned sale was a private deal by high-ranking officers of the Illegals Directorate of the Russian Foreign Intelligence Agency (*Focus report* Feb. 1997, quoted in**:** Rensselaer W. Lee, p. 75).
1994, August 12 / Russian Federation / N: Press reports indicated that St. Petersburg police arrested three men trying to sell 60 kg of unidentified nuclear material (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, August 20 or 24 / Russian Federation / R/N: Three unemployed youth entered through a hole in the fence the All-Russia Research Institute in the 'closed' city of Arzamas-16 and walked away with 9.5 kg of Uranium-238. (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, August 30 / Hungary / R: Hungarian police seized two kg (4.4 pounds) of what they believed were Uranium rods coming from Russian Federation. (http://www.infomanage.com/nonproliferation/smuggling/timeline.html).
1994, August 31 / Russian Federation / R: "Unidentified thieves stole radioactive Caesium from a chemical plant in southern Russian Federation. They stole the capsule containing the metal by breaking through a wall of the plant's storehouse, said Karl Smolikov, a spokesman for the Russian Ministry for Emergency Situation. The theft occurred at the Ivarov chemical plant in the city of Tambov, about 250 miles south of Moscow. The Caesium capsule apparently was part of some industrial equipment, Smolikov said. According to the police, the device could emit lethal radiation if handled improperly, the ITAR-Tass news agency reported. The agency also quoted nuclear experts as saying the Caesium-137 was widely used in measuring devices applied in many fields of industry and medicine (www.infomanage.com/nonproliferation/smuggling/timeline.html).
1994, September / Sofia, Bulgaria / R: Trafficking of a Pu-239 source, one Natural Uranium source, Cs-137, Sr-90, Tl-204, one Neutron source Pu/Be (low activity calibration sources) (*Comprehensive List*).
1994, September / Nignegorod, Russian Federation / R: Trafficking of Cs-137 (*Comprehensive List*).
1994, September / Italy / R/N: A sample of Plutonium-239 (1 g) was found in the Turin home of former Bulgarian fencing champion Assen Djakovski. An Italian prosecutor indicted him and four others for trying to import 62 kg of Plutonium-239 and resell it to the Middle East.
1994, September 5 / Bulgaria / R: Press reports indicated Bulgarian authorities arrested six Bulgarians in connection and seized 19 containers of radioactive material (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, September 7 / Russian Federation / R: Press reports indicated Russian police arrested three people in Glazov trying to sell 100 kg of U-238 (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, September 28 / Snagov, Romania / N: Reported trafficking of 4.6 kg Natural Uranium (*Comprehensive List*).
1994, September 28 / Tallinn, Estonia / R: Trafficking of Cs-137 (66 GBq) (*Comprehensive List*). Press reporting indicates that a container with radioactive substances was found on a street in Tallinn (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, October / Russian Federation / R/N: Fuel rods for nuclear submarines were allegedly stolen from the Sevmash nuclear submarine construction plant in Severodvinsk, Russian Federation, in October, 1994 (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 119).
1994, October / Russian Federation/ R: Press reporting dated 26 October indicates Russian authorities arrested three men trying to pass 67 kg of U-238 to unidentified individuals in the city of Pskov (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1994, October / Mordoviya region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).
1994, October / Bulgaria / R: Bulgarian authorities seized four lead capsules suspected of containing radioactive material on a bus en route to Turkey.
1994, October 1 /Romania/N: Press reporting indicates Romanian police arrested four people trying to sell over 4 kg of U-235 and U-238 (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1994, October 10 / Moldova, Romania / R: Reported trafficking of Sr-90 (1 mCi) (*Comprehensive List*).
1994, October 10 / Romania / N: Press reporting indicates Romanian authorities arrested seven people and seized 7 kg of Uranium and an unidentified quantity of Sr or Cs (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).[4]
1994, October 19 / Istanbul, Turkey / R/N: 650 g LEU (U-238) were seized in Istanbul. The origin of the material, which was found in the possession of an Azerbaijani national, was Baku/Azerbaijan.
1994, November / Nignegorod, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).
1994, December / Orenburg region, Russian Federation / R: Reported trafficking of Ir-192 (*Comprehensive List*).
1994, December 14 / Prague, Czech Republic / R/N: 2.7 kg of 87.7 percent HEU (U-235 87.7% enriched) were seized in Prague by the Czech Security and Intelligence Service, and one Czech nuclear scientist, Jaroslav Vagner, and two former Soviet citizens were arrested. The market value of the radioactive material, which was professionally stored in two metal cylinders, complete with a Russian factory certificate, was many tens of millions of dollars. The seized Uranium was chemically identical to the HEU seized in Landshut, Germany, on June 13, 1994, and was apparently extracted from the same cache. The source of the material was the Institute of Physics and Power Engineering in Obninsk, Russian Federation. Vagner had already been involved in the Landshut incident (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 98-101).
1994, December 15 / Kaunas, Lithuania / N: Reported trafficking of 8 kg LEU fuel pellets (2% enriched U-235) (*Comprehensive List*).
1995 / USA / Ukraine / R/N: Federal authorities arrested three employees of the New York company 'Interglobal Manufacturing Enterprise' for trying to sell some tons of Zirconium to undercover custom agents posing as arms buyers from Iran. The Zirconium was smuggled to the U.S. from the Ukraine (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 120).
1995, January / St. Petersburg, Russian Federation / N: Reported trafficking of 1.5 kg LEU (3.6% enriched) fuel pellets (*Comprehensive List*).
1995, February / Kaliningrad region, Russian Federation / R: Reported trafficking of Sr-90 and Y-90 (*Comprehensive List*).
1995, March 8 / Italy / N: Italian police arrested one Nicola Todesco for murder in a Plutonium smuggling case gone awry when the murder victim did not have the money to pay for a quantity of Plutonium smuggled out of Bulgaria. Todesco claimed he threw 5g of plutonium into the Adige river, but no trace of it was found after an extensive search. (Comment: Although an official Italian spokesman believed the Plutonium was "enriched for military use," it had not been analyzed. This may have been another scam involving 'plutonium screws' from smoke detectors (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1995, April / Czech Republic / R/N: Czech authorities arrested nine people and confiscated more than 50 kg of Uranium which was found in a car travelling from the Ukraine to Slovakia (Frank Barnaby, "Instruments of Terror", 1996, p.157).
1995, April 4 / Ukraine / N/R: Press reports that 6 kg of U-235, U-238, Radium, and Palladium were found in a Kiev apartment. Occupants were ex-army, a lieutenant colonel and a warrant officer, and material reportedly came from Russia (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).
1995, April 13/Slovakia/N: Slovak police culminated a long investigation with the discovery of 18.39 kg of nuclear materials, 17.5 kg of which apparently was U-238, in a car stopped near Poprad in eastern Slovakia. Altogether, three Hungarians, four Slovaks, and two Ukrainians were arrested. This gang was said to be connected to three other nuclear material smuggling incidents (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1995, April 29 / R: A container with 763 kg of Cs-137, Am-241 and Be, shipped in December 1993 from Amsterdam by a French company, was discovered at Baku airport.

1995, May / Electrostal company, Russian Federation / N: Reported trafficking of 11 kg LEU (3.6% enriched) fuel pellets (*Comprehensive List*).

1995, May-September / Russian Federation / N/R: An engineer removed 1.5 kg of weapons-grade Uranium from the Luch' Scientific-Production Association in Podolsk in several separate diversions between May and September 1995. The man was later arrested in Moscow carrying the Uranium in search for a buyer (Rensselaer W. Lee**:** 'Smuggling Armageddon', New York, 1998).

1995, June / Electrostal company, Russian Federation: 1.7 kg of 21% enriched HEU U3O8 (F Steinhaeusler and L Zaitseva. Illicit Trafficking in Nuclear and other Radioactive Materials, with a focus on nuclear and radiological terrorism. Paper prepared for Courmayeur, ISPAC Conference, 6-8 December 2002).

1995, June 15 / Romania / N: Press reports indicated that so far in 1995 Romanian authorities had seized 24 kg of Uranium powder and tablets. In 1994 they had arrested 24 people for involvement in nuclear smuggling and seized 10.35 kg of Uranium powder and tablets. From 1989 to 1993, the Romanians reportedly broke up five gangs, arrested 50 people, and seized 230 kg of nuclear materials (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1995, July / St. Petersburg, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1995, July / Irkutsk region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1995, September / Nignegorod region, Russian Federation / N: Reported trafficking of 2 kg Natural Uranium (*Comprehensive List*).

1995, September/Bulgaria/R/N: According to press reports, Bulgarian police had broken an international nuclear smuggling ring composed of Russians and Ukrainians. A police spokesmen declining to disclose details, saying only that the materials seized were of strategic value and included rare metals. The arrests were the culmination of a year-long undercover operation. Senior police officials commented that they were still investigating the final destination of the materials, some of which were radioactive (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1995, October 25/Russian Federation/R: The cleaning staff at Moscow's Sheremetyevo 2 airport found a small lead container packed with radioactive substances in the men's restrooms, according to press reports. Experts reportedly were attempting to determine the exact composition of the three sources of ionizing radiation found in the container. The speculation in the Russian press was that a nuclear smuggler lost his nerve and abandoned the material during an aborted smuggling attempt (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1995, November / Tchelyabinsk region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1995, November 8 / Prudnik, Poland / R: Reported trafficking of Sr-90 of "very low activity" (*Comprehensive List*)

1995, November 23 / Russian Federation / Chechnya / R: Chechen separatists were reported to have placed a 30-pound container of radioactive Cs-137 near the entrance of Moscow's Izmailov Park as a demonstration of their capabilities. Shamil Basayev tipped off NTV television reporters as to where to find the radioactive package under the snow. It allegedly emitted 300 times the normal background radiation. The idea behind this incident was apparently to show the Chechen's ability to strike at the heart of Russian Federation. The material has possibly been stolen from the Budyonnovsk hospital, which Chechens had temporarily occupied in the spring of 1995. Shamil Basayev and other Chechen commanders also threatened to attack Russian nuclear power plants. Earlier S. Basayev had explicitly denied having nuclear weapons in a July 1995 interview with the Moscow daily *Segodnya*. The Izmailov incident remains contested (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 135/136).

1995, November 29/ Russian Federation/R: Russian security officials recovered four containers with radioactive Caesium, stolen from an industrial plant in the Urals and arrested the thieves, according to press reports. Federal Security Service (FSB) officers found the 90 Kg containers in a shaft of an old mine, ITAR-Tass news agency reported. One of the alleged thieves, a Bakal mining plant's electrical engineer, had initially kept them at his vegetable

garden but moved them to a safer place after the theft had been discovered, according to claims by security officials. Two officials of a local penitentiary were said to be his accomplices. Each container held a capsule with Caesium-137, a radioactive isotope used in geological research, as well as in medicine. The containers were similar to the one allegedly planted by Chechen rebels in a Moscow park (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1995, December / St. Petersburg region, Russian Federation / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1995, December / Kazakhstan / R/N: Police found 4.5 kg of Uranium in the back of a car they had stopped (Frank Barnaby, "Instruments of Terror", 1996, p.157).

1995, December 7 / Ust-Kamenogorsk, Kazakhstan / N: Reported trafficking of 149.8 kg LEU (2.4% enriched) (*Comprehensive List*).

1995, December 28/ Novosibirsk, Russian Federation / N: Reported trafficking of 10 kg LEU (2.4% enriched) fuel pellets – According to press reports, the Russian Federal Security Service (FSB) arrested 9 members of a criminal organization in Novosibirsk and seized a quantity of radioactive material. The material was identified in press reports as "enriched" Uranium-235. The material had been transported to Novosibirsk by middlemen, possibly from Kazakhstan. The ultimate destination may have been South Korea, according to press reports. (http://www.fas.org/irp/cia/product/go_appendixa_032796.html and *Comprehensive List*).

1995-1996 / Chechnya: Chechens had reportedly developed a detailed plan to hijack a Russian nuclear submarine from the Navy's Pacific Fleet with the help of a former commander on Russian submarines (M. Bunn, Anthony Wier, John P. Holdren, op. cit., pp 219-219).

1996, January / Russian Federation / R/N: Three workers reportedly stole fuel rods containing at least 7 kg of HEU, reportedly from a Pacific Fleet base at Sovietskaya Gavan. Some of the material (2.5 kg) was later found at a facility of a metal trading firm in the Baltic city of Kaliningrad and 5 kg were seized at the Sovietskaya Gavan facility (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 119).

1996, 17 January/ Dubai, UAE: A Palestinian in Dubai, UAE offered to sell 3 kg of reportedly Russian-origin red mercury to a Lebanese-American businessman, according to US diplomatic reporting (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1996, January 26 / Yalova, Turkey / n: Reported trafficking of 1121.2 g LEU (*Comprehensive List*).

1996, February / Switzerland / R/N: A Turkish citizen with dual Swiss citizenship was arrested in Switzerland for attempting to sell a sample of HEU. The suspect claimed that the sample belonged to a larger cache in Turkey. Turkish police, using information from their Swiss counterparts, subsequently arrested eight people and seized 1.128 kg of similar material, which is usually used in nuclear power plant fuel rods. Its origin was unclear. (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1996, February 23/Belarus/R: According to press reports, the Belarus Committee for State Security (KGB) seized five kg of Caesium-133. The radioactive metal was reportedly sealed in glass containers. Belarus authorities were investigating the incident, according to press reports. (http://www.fas.org/irp/cia/product/go_appendixa_032796.html).

1996, March / Turkey / N/R: 20kg Uranium in the possession of five Turkish nationals were seized in Antalya, Turkey.

1996, March / Ukraine / R/N: 6 kg of Uranium (about 20% enriched U-235) were seized in Kiev, Ukraine, in March, 1996. The material was probably stolen from a Russian naval fuel storage facility (Rensselaer W. Lee, 'Smuggling Armageddon', New York, 1998, p. 107).

1996, March 6 / Timis, Romania / N: Reported trafficking of 82 kg natural Uranium (*Comprehensive List*).

1996, May 21 / Kocaeli, Turkey / N: Reported trafficking of 15 g LEU (*Comprehensive List*).

1996, June / Tatarstan region, Russian Federation / N: Reported trafficking of 50 g Natural Uranium (*Comprehensive List*).

1996, September 12 / Kocaeli, Turkey / N: Reported trafficking of 15.4 g LEU (*Comprehensive List*).

1996, December 14 / Bucuresti, Romania / N: Reported trafficking of 50 g Natural Uranium (*Comprehensive List*).

1997, February 14 / Edirne, Turkey / N: Reported trafficking of 15.4 g LEU (*Comprehensive List*).

1997, February 28 / Edirne, Turkey / N: Reported trafficking of 508.3 g LEU (*Comprehensive List*).
1997, March / Sofia, Bulgaria / R/N: Reported trafficking of Pu, Be, 23 mg (*Comprehensive List*).
1997, March / Turkey / R: Turkish police arrested three Turkish nationals, who offered them 2.5 g of Osmium, valued at US $ 3 million, for $ 500,000 (Osmium is extremely rigid and heat-resistant and is used with plutonium as coating for nuclear missile warheads).
1997, May 26 / Bursa, Turkey / N: Reported trafficking of 841 g LEU (*Comprehensive List*).
1997, June 17 / Brest, Belarus / N: Reported trafficking of 1.7 kg depleted Uranium in three cylindrical shaped pieces (*Comprehensive List*).
1997, September 11 / Sofia, Injproekt, Bulgaria / R: Reported trafficking of Am-241 (50 mCi activity) and Cs-137 (10 mCi activity) (*Comprehensive List*).
1997, September 13 / Kirovograd, Ukraine / R: Reported trafficking of Co-60 in four pieces of medical applications (*Comprehensive List*).
1997, October 31 / Russian Federation / N: Aleksey Yablokov, former advisor to President Jeltsin, threatened to release the technical details of the nuclear suitcase bombs if President Jeltsin does not reply to a letter Yablokov sent him on October 27. According to Yablokov, the letter warns that the Russian Federation had a whole class of nuclear weapons, which are not immediately controlled by the president (*Interfax*, 31 Oct. 1991. In: FBIS-TAC-97-304; cit. Scott Parrish, op. cit.12).
1997, November / Russian Federation / N: General Lebed claimed in an interview that of 132 Russian nuclear "suitcase bombs" (RA-115, 2 kilotons) only 48 had been accounted for (Jessica Stern: "The Ultimate Terrorists", 1999, p. 90).[This claim was distrusted by insiders].
1997, November 16 / Bucharest, Romania / N: Reported trafficking of Sr-90, Y-90 (*Comprehensive List*).
1997, November 20 / Bucharest, Romania / N: Reported trafficking of 13.3 ounces of Uranium (*Comprehensive List*).
1997, November 24 / Hunedoara, Romania / N: Reported trafficking of 17,35 g Natural Uranium fuel pellet scrap (*Comprehensive List*).
1997, November 24 / Bucharest, Romania / N: Reported trafficking of 16,83 g Natural Uranium fuel pellet scrap (*Comprehensive List*).
1997, December 16 / Istanbul-Esenler / R: Reported trafficking of mixed alpha sources (*Comprehensive List*).
1998 / Chechnya : A radioactive container attached to an explosive device was discovered near a rail line in Chechnya – apparently a foiled act of sabotage by Chechen militants. (ITAR-TASS, 29 Dec. 1998. (Cit. F Steinhaeussler and L Zaitseva. Illicit Trafficking in Nuclear and other Radioactive Materials, with a focus on nuclear and radiological terrorism. Paper prepared for Courmayeur, ISPAC Conference, 6-8 December 2002, p.8).
1998, March 18 / Dnipropetrovsk, Ukraine / R: Reported trafficking of Cs-137 (*Comprehensive List*).
1998, March 31 / Smila, Cherkasy region, Ukraine / R: Reported trafficking of Cs-137 (*Comprehensive List*).
1998, April 22 / Georgia / R/N: A plan to airlift enriched Uranium from a mothballed experimental nuclear reactor near Tbilisi, Georgia, to the British nuclear complex at Dounreay became public. It was part of a deal between President Bill Clinton and Prime Minister Tony Blair to take the fuel to the UK after France, Russian Federation and the US had declined to accept it.
1998, May 7 / Volgograd, Russian Federation / R: Reported trafficking of Cs-137 (200 R/h) (*Comprehensive List*).
1998, May 12 / Republic of Tuva, Russian Federation / R: Reported trafficking of Cs-137 (70 mR/h) (*Comprehensive List*).
1998, June / Turkey / R: Three Turkish nationals were arrested and unspecified amounts of Antinomy, Bismuth and Scandium obtained from Azerbaijan were seized in Bursa, near Istanbul.
1998, June / Bulgaria / N/R: Bulgarian custom officials seized equipment of the kind commonly used in nuclear reactors in a Bulgarian truck at a border post on the Turco-Bulgarian frontier. The truck had reportedly picked up its consignment in France and was destined for Armenia. However, its log indicated that it was loaded in Austria and its destination was Iran.
1998, July 1 / Turkey / N/R: Turkish police arrested six suspects, one of them an Iranian national, the rest Turks, in Van, eastern Turkey, for smuggling 13 glass tubes suspected of containing nuclear material from Iran into Turkey (Caelsium, Tanium, Copper, Zinc, Lead, Iron

Rubidium, Zirconium, Manganese and Sr (stable) isotopes). They had 13 cylinders, all marked UPAT UKA3 M8 and carrying stamps with three stars, containing an unidentified substance. The suspects claimed the cylinders contained only snake venom, but police suspected it might be nuclear material. The suspects confessed that they were going to deliver the tubes to Istanbul for a fee of $1,000 per tube.

1998, 3 September / Turkey / N/R: Acting on information from the Turkish National Intelligence Organisation (MIT), more than 4.5 kg of unprocessed Uranium and six gramms of Plutonium were seized in Istanbul. Nine suspects were arrested from possession of this material coming out of Russian Federation. The suspects had earlier asked an undercover officer for US $ 1 million for the contraband material, which was reportedly worth more than $ 3 million. The suspects were charged with felony smuggling, punishable by ten years in prison.

1998, October 16 / Kiev airport, Ukraine / R: Reported trafficking of Cs-137, Am-241, Eu-155, Cs-134, Sb-125 (with a total activity of 4.3 plus/minus 0.3 kBq) (*Comprehensive List*).

1998, December 4 / Moldova / N/R: Customs officials and border guards detained two individuals attempting to smuggle a lead container with nuclear fuel materials into Moldova.

1998, December 17 / Chelyabinsk Oblast region, Russia / N: A Russian agency reports that it thwarted an attempt by workers at a nuclear facility to steal 18.5 kg of Uranium (Compilation by *The Christian Science Monitor*, 2001).

1998, December 19 / Russian Federation / N/R: The Russian Federal Security Service reports the termination of an attempt to embezzle 18.5 kg of radioactive materials, that 'might have been used for production of components for nuclear weapons' (*PPNN Newsbrief*, fourth quarter, 1998), from an enterprise in the Chelyabinsk department (Russian Story, *Defence & Security*, Jan 15, 1998, original source: *Chelyabinsk Rabochy*, Dec. 19, 1998).

1998, December 29 / Chechnya / N/R: A container emitting strong radioactivity was found near the Chechen town of Argun, east of Grozny. It was reportedly rigged with landmines (*Le Temps*, Dec. 30, 1998).

1999, January 7 / Edirne, Turkey / N: Reported trafficking of 0.1 g Natural Uranium (*Comprehensive List*).

1999, February 2 / Turkey / N/R: Turkish police seized 5 g of Uranium and arrested four people in the province of Istanbul. The Uranium was brought to Turkey from Azerbaijan (BBC, Feb. 3, 1999)

1999, February 5 / Turkey / R: A heavy block of lead and steel containing Cobalt-60 disappeared from a company in Ikitelli and was thought to be stolen. On January 13, 1999, 16 people in Ikitelli were injured when two scrap-iron dealers had found a similar block. The condition of the two men was critical (*IAEA Daily Press Review*, Feb. 5 1999, *Turkish Daily News*, Jan. 13/16, 1999).

1999, March 1 / Georgia / R: In Tiblisi, Georgian security officials arrested five persons for stealing from the premises of a firm which works closely with the Georgian Defence Ministry two containers with radioactive Caesium capsules valued at between $ 80,000 and $ 120,000. (BBC, March 2, 1999)

1999, March 25 / Liepaja port, Latvia / R: Reported trafficking of Cs-137 (*Comprehensive List*).

1999, May 3 / Victoria (Brasov), Romania / N: Reported trafficking of 14.7 kg Depleted Uranium and Ir-192 (2.5 microCi) (*Comprehensive List*).

1999, May 14 / Kyrgyzstan / N/R: An Uzbek national was arrested at Bishkek airport in Kyrgyzstan while trying to smuggle Plutonium on a flight to the United Arab Emirates. The surface of the rubber container he was carrying showed a deadly level of radiation. The arrested man said he had received the Plutonium at the airport from a person he did not know, and that he was to take it to the United Arab Emirates for a fee of $16,000 (IAEA Daily Press Review, May 17, 1999, ITAR-TASS May 15, 1999).

1999, May 22 / Ukraine / N/R: Two Armenians trying to sell 20 kg enriched LEU U-235 ore and a buyer were arrested by Ukrainian law enforcement officials in the town of Berehovo. The two Armenians demanded $35,000 per kg for the Uranium. They received heavy radiation doses because they had handled the material with their bare hands and carried it in rubber bags. (BBC Monitoring, source: '*Fakty i Kommentarii*', Kiev, May 22, 1999, *IAEA Daily Press Review,* May 25, 1999) According to one source, the material was enriched Uranium in white powder form stolen from a radioactive-materials recycling facility in Krasnoyarsk. Other sources said it was LEU metal suitable for making fuel for RBMK reactors (IAEA Daily Press Review, May 28, 1999).

1999, May 28 / Bulgaria / N/R: Bulgarian custom officers arrested a Turkish citizen smuggling a container with 10 g of Uranium-235 across Bulgaria's checkpoint at Rousse (*IAEA Daily*

Press Review, May 30, 1999). Bulgarian scientists concluded that the material was HEU. Although the source of the material is not certain, it is likely that it came from the Mayak Production Association in the Russian Federation.

1999, May 29 / Dunav Most, Bulgaria / N: Bulgarian customs officers discover 10 g of HEU hidden in a car crossing into Turkey. The driver said he obtained the material in Moldova although authorities have not determined the source (Compilation by *The Christian Science Monitor*, 2001).

1999, June 28 / Chechnya / N/R: A British journalist reported that a Chechen mafia salesman offered him Plutonium (*The Express*, London, June 28, 1999, *IAEA Daily Press Review,* June 29, 1999).

1999, July 1 / St. Petersburg (Murmansk), Russian Federation / R: Reported trafficking of Cf-252 (*Comprehensive List*).

1999, July 8 / Cherikov (Mogilev), Belarus / R: Reported trafficking of Ir-192 (1.85 x E 10 Bq) (*Comprehensive List*).

1999, July 22 / Kazakhstan / N/R: Kazakh custom officers detained a Russian officer trying to smuggle 'radioactive substances' into Uzbekistan (ITAR TASS, July 22, 1999; IAEA Daily Press Review, July 23, 1999).

1999, July 30 / Plant 'Granit', Mikashevichi (Brest), Belarus / R: Reported trafficking of Cs-137 (2.8 x 10 E Bq or 0.0765 Ci) (*Comprehensive List*).

1999, August 5 / Istanbul, Turkey / R: Reported trafficking of Cs-137 (1739 MBq) and Cs-137 (44 MBq) (*Comprehensive List*).

1999, August 6 / Almaty, Kazakhstan / R: 5 KG of LEU (3.5-4%) was intercepted through an intelligence operation. The material possibly originated from Ulba, Kazakhstan (*The Nonproliferation Review*, Monterey, CA.; Fall-Winter 2002).

1999, August 17 / Turkey / R: Turkish police arrested five people, among them foreign citizens, trying to sell 49 g of Caesium-137 in Istanbul after having smuggled it into Turkey from abroad (*BBC Monitoring Service*, Aug. 17, 1999, *IAEA Daily Press Review*, Aug. 18, 1999).

1999, August 25 / Hamburg, seaport, Germany / R: Reported trafficking of Ra-226 (approximately 36 MBq) (*Comprehensive List*).

1999, August 30 / Romania / R: Shim'on, Ion Menciu, and Ivan Busuioc were arrested as middlemen in an illegal operation to smuggle arms, explosive, and nuclear components through Romania to export-embargoed nations and possibly terrorist organizations. (CNS Monterey Institute)

1999, September / Georgia: 1 kg of reportedly U-235 was seized in Georgia (http://www.defenselink.mil).

1999, September 20 / Batumi (Khelvachauri, Adzharia), Georgia / N: Reported trafficking of 998.87 g LEU (UO_2, 3-3.3% enriched) (*Comprehensive List*).

1999, September 20 / Ukraine / R: During the week of 20 September, officials in Uzhgorod, Ukraine, confiscated two lead cylinders containing radioactive Strontium (according to early report) or Strontium-90 (according to later report) from a group of Russian and Ukrainian citizens during a routine passport check (CNS Monterey Institute).

1999, September 23 / Uzhhorod and Kiev, Ukraine / R: Reported trafficking of Sr-90 (*Comprehensive List*).

1999, September 23 / Mramor (Sofia region), Bulgaria / R: Reported trafficking of Cs-137 (740 GBq) and Co-60 (74 MBq) (*Comprehensive List*).

1999, October / Kyrgyztan / N: In October 1999, two persons were arrested in the act of selling a small metallic disk containing 0.0015 kg of Plutonium. The item was analyzed by the Institute of Nuclear Physics in Kazakhstan and the two individuals arrested were convicted and sentenced to prison.

1999, October 2 / Kara-Balta, Kyrgyzstan / N: Reported trafficking of 1,49 g Pu (*Comprehensive List*).

1999, October 13 / Russian Federation / N: Russian officials warned that Chechen terrorists were planning to attack Russian nuclear facilities. (*CNN*, Oct. 13, 1999) Chechen rebel leader Basayev told Agence France Press on Oct. 12, 1999, that he was prepared to launch a terrorist campaign inside Russian Federation (*Süddeutsche Zeitung,* Oct. 12, 1999).

1999, December / I.N. Vekua Physics and Technology Institute, Sukhumi, Georgia / N: A Russian inspection team visits the institute in Georgia which had been closed as a result of the Abkhazia-Georgia conflict. About 2 kg of HEU that have been registered in a 1992 inventory turned out to be missing. The material has not been recovered (Compilation by *The Christian Science Monitor*, 2001).

1999, December 2 / Russian Federation (Chechnya) / C/R: Environmental organizations in Georgia and Chechnya warned that indiscriminate Russian bombing and shelling of chemical plants, oil refineries and of a huge disposal site for radioactive waste in the Karakh mountains near Grozny could lead to an imminent environmental catastrophe. The disposal site, which was built for the Radon organization, had been in operation since 1965. It contains almost 1000 cubic meters of material, including Co-60, Pu, Be, Ra-226, Cs-137, Thulium-170, Ir-192, Am-241 and I-131. Environmental groups warned that powerful surface bombs could damage the burial shafts thus causing radioactive contamination of the environment. Scientists in Georgia, Chechnya and other regions in the Caucasus claimed that damage to the Radon site would have severe consequences for the whole region. Moreover various factories and enterprises in the Grozny region which were known to be storing many different forms of radiation were facing daily bombing. (*UNIS Press Review*, 12/2/99)

1999, December 3 / Semipalatinsk, Kazakhstan / R: 1 kg of LEU was intercepted through an intelligence operation. The material originated from Ulba, Kazakhstan (*The Nonproliferation Review*, Monterey, CA.; Fall-Winter 2002)

1999, December 12 / Otopeni airport customs, Romania / R: Reported trafficking of Ir-192 (8.19 GBq) (*Comprehensive List*).

1999, December 24 / Mehedinti county, Romanai / N: Reported trafficking of 3 kg Natural Uranium (0.71% enriched U-235) (*Comprehensive List*).

2000 / Electrostal company, Russian Federation: Trafficking of 3.7 kg of 21% HEU (F. Steinhauser and L. Zaitseva. Illicit Trafficking in Nuclear and Other Radioactive Materials. Conference Paper, Courmayeur, ISPAC conference, 6-8 Dec. 2002).

2000, January 10 / Almaty, Kazakhstan / N: Reported trafficking of 530 g LEU (*Comprehensive List*).

2000, January 14 / Bucharest, Romania / N: Reported trafficking of 1000 g Depleted Uranium (*Comprehensive List*).

2000, January 20 / Dupnitsa, highway, Bulgaria / N: Reported trafficking of 15 kg Depleted Uranium (*Comprehensive List*).

2000, February 5 / Romania / R: four persons were arrested by the police for stealing radioactive substances. Two of them, Liubovi Dasan (45) and her boyfriend, Anatolie Cojocaru (43), were said to be Moldovan nationals. The other two arrested, Ionel Bobeica (36)and Toader Ciuhan (45) were Romanians. They were arrested while found testing radioactive material in an underground laboratory in Bucharest, which they had apparently smuggled from a Russian military base in Tiraspol, Romania. They intended to sell the material, 1 kg of Uranium, for US$ 150,000. (WIJN News 2/8/00)

2000, February 23 / Ukraine / R: 28 containers with ampoules of Sr-90 and Y-90 were confiscated. According to preliminary estimates, the material taken off the five illegal traders in radioactive material would cost some 1.5 Million US$ on the black market. The material appeared to have been stolen from a military unit in the Donetsk region and was kept in a flat. In the 1990s, 81 radioactive objects had been stolen from enterprises in Donetsk, according to the Regional sanitary and epidemic station, of which only 56 had been found by early 2000 (Ukrainian Television Third Program cited by BBC, 25/2/2000).

2000, March 30 / Kazakhstan / Uzbekistan / N/R: Uzbek border controls stopped a truck, allegedly holding only scrap metal, at the border to Turkmenistan. The 10 lead boxes contained nearly a ton of highly radioactive material. The trucks journey started in Kazakhstan and headed for Pakistan via Iran. The material emitted about 1,200 milliroentgen per hour, enough to cause radiation sickness after 50 days of exposure (AP, Apr. 6, 2000). Former head of the Defence Technology Security Administration, Stephen Bryen, claimed that the material may have the markings of a "radiation bomb", which could be used by Asian terrorists, and not a nuclear weapon. There have been signals that terrorists supported by Iran and Afghanistan, for which the weapon could be created in Pakistan, might threaten Uzbekistan. He stated that these nuclear smuggling operations are run by "well-disciplined intelligence services of Iran and Afghanistan and, "quite possibly", Pakistan" (*The Hindu*, Apr. 12, 2000). However, Kazakhstan's ambassador denied the allegations of a radioactive substance, but claimed that part of the scrap material had been contaminated by radioactivity (RFE/RL).

2000, April / Georgia / R: Georgian police arrested four persons in Batumi, Georgia, for unauthorized possession of 0.9 kg of HEU fuel pellets. According to one press report, the material may have been smuggled from Russian Federation. The pellets mass and shape, together with the reported enrichment level, suggest that the pellets were produced for use a commercial or experimental fast breeder reactor. Another report also stated that the smugglers

were detected when they crossed the Russian border into Georgia, possibility by radiation monitoring equipment and were then trailed to the city of Batumi, where they were apprehended. It is believed that the individuals were trying to smuggle the material into Turkey.

2000, June 29 / Almaty, Kazakhstan / R: 4 Kg of LEU pellets (3.6%) were intercepted through an intelligence operation. The material originated from Ulba, Kazakhstan (*The Nonproliferation Review*, Monterey, CA.; Fall-Winter 2002).

2000, September / Tbilisi, Georgia / R: Three persons were arrested at Tbilisi airport for attempting to sell a small quantity of mixed powder containing about 0.0004 kg of Pu and 0.00008 kg of LEU. According to press reports, an official in the Georgian Ministry of State Security said that two individuals arrested were Georgians citizens, and the third was from Armenia. The individuals said they had brought the Uranium and Pu from the Russian Federation and Ukraine to sell it.

2000, October 6 / Turkey / R: 150g of LEU was intercepted through an intelligence operation. The material was from an unknown origin (*The Nonproliferation Review*, Monterey, CA.; Fall-Winter 2002).

2001, January 29/Russian Federation/N: Police in St. Petersburg reported on 29 January that thieves made off with 270 kg of Pu worth almost $5 million from a research institute there, AP reported. (WJIN News, Radio Free Europe/Radio Liberty (http://www.wjin.net/html/news/7169.htm).

2001, February 16 / Russian Federation /N/R: Kamchatka Region detectives arrested a group, headed by an army officer, that allegedly stole radioactive devices from Mi-8 helicopters in a military unit deployed on Kamchatka. Authorities believe they intended to sell the equipment to China. An expert from the radiological control service determined that the radiation level reached 25 micro-roentgen per hour one metre away from the device. The suspects could face up to 10 years in prison. (*NTV*, Moscow (*BBC),* 16/02/01)

2001, July 20 / Batumi (Adzhariya), Georgia / R: 1.8 kg of LEU (3.6%) was intercepted via an informant's tip. The origin of the material was unknown (*The Nonproliferation Review,* Monterey, CA.; Fall-Winter 2002).

2001, October 15 / Tbilisi, Georgia / R: 23 containers of Pu were confiscated through an intelligence operation, its origin was unknown (*The Nonproliferation Review,* Monterey, CA.; Fall-Winter 2002).

2001, November 6 / Istanbul, Turkey / R: 1.15kg of LEU were intercepted in an intelligence operation, the material probably originated in the Russian Federation **(***The Nonproliferation Review,* Monterey, CA.; Fall-Winter 2002).

2001, December 19 / Samtskhe-Javakheti region, Georgia / R: 300 g of LEU were intercepted in an intelligence operation, the origin of the material was most likely Armenia (*The Nonproliferation Review*, Monterey, CA.; Fall-Winter 2002).

2002, January / Belarus: In January 2002, in Minsk, Belarus, the Belarus State Committee arrested six international gang members for allegedly trying to sell Uranium metal rods ("Belarus police halt attempt to sell weapons-grade Uranium" DPA, 18 January 2002; and "Belarus security services arrest 6, seize Uranium," AFP, 17 January 2002)

2002, January 15 / Liya area, Georgia / R: Three woodcutters were hospitalized with radiation sickness after discovering two Sr-90 sources 27 km outside the village of Liya in Tsalenjikha District, Georgia in early December 2001, according to NTV. The radiation was emitted by two cylinders, six inches long and four inches in diameter, that contained Strontium-90 . They had been used in radiothermal generators installed in the area during the Soviet era and then abandoned. According to NTV and Interfax, the three men had broken through the lead, tungsten, concrete, and ferrous layers that shielded the Sr-90, while the *New York Times* reported that the men found the cylinders laying in the snow. According to the *Los Angeles Times*, the men took the cylinders to their campsite to use as heat sources and became sick within hours from the radiation exposure. (http://www.nti.org/analysis/articles/radiothermal-generators-containing-strontium-90-discovered-liya-georgia/)

2002, January 17 / Belarus / R: Agents of the Belarusian State Security Committee (KGB) arrested several members of an "international criminal group trying to arrange the illegal sale in Belarus of radioactive materials, *Interfax* reported on 17 January 2002. The report said that six suspects had been arrested in connection with the case, but did not provide any names or details about their citizenship, nor did it specify the date of the arrests. The KGB made the arrests as the result of a "sting" operation. The agency had been informed that some "enterprising citizens"

were trying to sell Uranium. (http://www.nti.org/analysis/articles/belarusian-police-arrest-uranium/).

2002, January 27 / Avcilar, Turkey / R: Three grams of "Red Mercury" were seized from a house in Avcilar, Turkey, the Istanbul newspaper *Aksam* reported on 27 January 2002. Two suspects, Makhi Yeddinho and Irina Grische, both from Russia, were arrested by Turkish police. According to *Aksam*, the Russian mafia stole the substance from a nuclear plant in Russia. *Aksam* claimed that Red Mercury was "used in the construction of nuclear weapons," was a strategic metal, that trade "requires a special permit throughout the world," and that the three grams seized in Avcilar have a market value of $300,000 (http://www.aksam.com.tr last visited 22/05/2003).

2002, February 14 / Verkhnedneprovsk (Smolensk Oblast), Russian Federation / R: Two radiation sources containing Krypton-85 gas were stolen from the Polimerplenka enterprise in Verkhnedneprovsk village, Smolensk Oblast, a spokesman for the Russian Ministry of Emergency Situations reported on 14 February 2002. Each ampoule emits 230mCi, "which is enough for a person to get a lethal dose quickly," according to the spokesman. The Smolensk Oblast prosecutor's office, assisted by specialists from the Ministry of Emergency Situations, has initiated a criminal investigation of the theft (http://www.nti.org/analysis/articles/two-krypton-85-sources-stolen-smolensk-oblast/).

2002, March 6 / Belarus / R: The Belarusian Prosecutor's Office arrested members of a gang based in the town of Kalinkavichy, Gomel Oblast. They had planned to plant radioactive materials in Internal Affairs Ministry offices in Kalinkavichy and Mazyr, Gomel Oblast, Belapan reported on 6 March 2002. Belarusian police seized four containers with radioactive material from gang members, as well as firearms, a grenade, and explosives. The report does not identify the radioactive material involved in the case. Investigation by the Prosecutor's Office has identified 20 gang members, and 17 have been arrested and charged. (http://www.nti.org/analysis/articles/belarusian-police-seize-weapons-radioactive-materials-crime-ring/

2002, March 26 / Chkalovsk, Tajikistan / N: Authorities in Tajikistan arrested four men in the city of Chkalovsk and confiscated 2kg of stolen "non-concentrated uranium" [probably natural uranium], the Tajikistani newswire *AP-Blitz* reported on 27 March 2002. Laboratory tests determined that the Uranium was taken from the Vostochnyy Rare Metal Industrial Association (Vostokredmet) in the nearby town of Taboshar. [Vostokredmet is a Uranium processing plant.] AP-Blitz reports that the suspects, Tolib Qurbonov, Rustam Ahmadshoyev, Yusuf Nurmatov, and Musulmon Azizov, were reported to be members of an organized crime ring and were accused to have stolen radioactive materials from Vostokredmet since 1998. Law authorities have opened criminal proceedings against the suspects (BBC, http://news.bbc.co.uk last visited 22/05/2003).

2002, May 16 / Bulgaria / R: On 16 May 2002 the Bulgarian newspaper *24 Chasa* reported that a stolen radioactive instrument and 100 "plutonium sensors" were seized by police during the arrest of two suspects headed for Veliko Turnovo, Bulgaria in a taxi. The two suspects, 42-year-old Emil Spirov and Daniela Tsaneva, were arrested for possessing an American-made instrument containing Beryllium that is used to measure soil radioactivity. The instrument had been stolen from an unspecified nuclear power plant during its construction. The National Service for Combating Organized Crime (NSCOC), which conducted the operation to arrest Spirov and Tsaneva, had been looking for the stolen instrument for two years and had been monitoring the two suspects for "a long time." (http://www.nti.org/analysis/articles/plutonium-sensors-are-caught-near-turnovo-cesium-found-kurilo/).

2002, May 22 / Moscow, Russian Federation / N: On 22 May 2002 *Izvestiya* reported that Moscow police had arrested a homeless Belarusian named Nikolai Shitik who was in possession of 500 grams of what it describes as "weapons-grade uranium." An unspecified Moscow FSB official said Shitik most likely came to Moscow intending to sell the Uranium. According to *Izvestiya*, Interfax reported that the seized material was Uranium-238 (http://www.nti.org/analysis/articles/native-belorussia-tried-sell-half-kilo-uranium/).

2002, June 18 / Izhevsk, Russian Federation: Russian police and the Federal Security Service seized 2 kg of Uranium Izhevsk, Russian Federation from a car belonging to a private firm. ("Special services seize two kg of Uranium from a private firm car," TASS 18 June 2002; and "Two kg of Uranium discovered in a car in central Russian Federation," AFP 18 June 2002).

2002, July 19 / Rostov Oblast, Russian Federation / R: A 19 July 2002 article in *The Guardian*, citing an anonymous US official, reported that Chechen rebels stole radioactive and nuclear materials from the Volgodonsk Nuclear Power Plant (NPP) in Rostov Oblast, Russia. The official claimed that the theft occurred within the last 12 months and the list of stolen

materials allegedly included Caesium, Strontium, low-enriched Uranium, and possibly Plutonium. The same US official said that the theft was reported by Russian officials to the International Atomic Energy Agency (IAEA), which in turn informed the US Department of Energy about the incident. IAEA, Russian Ministry of Atomic Energy, and Volgodonsk NPP officials denied the theft (*The Guardian*, http://web.lexis-nexis.com/universe).

2002, September 22 / Pavlograd, Ukraine / R: On 20 September 2002 ITAR-TASS reported that Ukrainian police had arrested a 26-year-old Russian man in Pavlograd who was attempting to sell a container of the radioactive isotope Sr-90. The man had brought the Strontium from Zlatoust, in Russia's Chelyabinsk Oblast and was arrested while trying to sell it to two local residents. The material was seized and an investigation to establish the identity of the buyers was opened (http://www.nti.org/analysis/articles/russian-arrested-ukraine-attempt-sell/).

2002, October 10/ Belarus / N: Sovietskaya Belorussia reported that five men were on trial for attempting to sell 1.5 kg of 2% enriched Uranium-235 to undercover officers in a sting operation. This material was in the form of Uranium dioxide fuel pellets and was alleged to have come from Chernobyl. However, there are some doubts about the veracity of the story published by the state newspaper. http://bellona.org/english_import_area/international/russia/nuke-weapons/nonproliferation/26272

2002, October 15 / Dagestani-Azeri border, Russian Federation / R: Russian customs officers detained a resident of Chechnya who tried to transport a radiation source across the Russian-Azerbaijani border, Interfax reported on 15 October 2002. The suspect, Ilyas Dovletmurzayev, was detained at the Yarag-Kazmalyar border crossing between the Russian republic of Dagestan and Azerbaijan. An investigation into the incident, charging the suspect with violating Article 188 (contraband) of the Russian Criminal Code, wassubsequently opened (http://www.nti.org/analysis/articles/chechnya-resident-tries-take-radiation-source-out-russia/).

2002, December 6 / Bulgaria: Bulgarian media reported during the first week of December 2002 on the theft of two radioactive sources from the Kremikovtsi Metallurgical Works. The sources contain Cs-137 and were reportedly mounted on level gauges, which are used to control the level of filling zapulvane. The thieves stole the devices, which emit 3 curies, without their protective covers. Khristo Botev Radio reported on 6 December 2002 that a measuring device containing Cs-137 and Am-241 had been stolen from Bobov Dol Thermoelectric Power Plant. Each of the sources was mounted in its own container and weighed 45 kilograms (http://www.nti.org/analysis/articles/uranium-traders-punished-probation/).

2003, February 14 / Belarus / R: "Authorities have detained an unknown number of people in Belarus who attempted to sell two containers of Caesium-137 to an undercover agent, officials said yesterday." (http://www.nti.org/analysis/articles/cesium-peddlers-arrested-belarus/)

2003, February 28 / Russian Federation / R: Russian authorities announced today that they had prevented the sale of a quantity of radioactive Osmium-137 to organized crime elements. Russian Federal Security Service officials in the city of Omsk, located in the Siberian region, have detained one person with a quantity of Osmium-137 and another with 158,000 counterfeit Iraqi Dinars, said security service spokeswoman Natalya Grutsina. The two people had attempted to sell the Osmium-137, contained in a vial disguised as a pen, for $30,000 to organized crime members from Moscow, according to ITAR-Tass (http://www.nti.org/analysis/articles/osmium-187-seized-omsk-russia/)

2003, April 4 / Akhtubinsk (Astrakhan Oblast), Russian Federation / R: Two small cylindrical containers bearing radioactive warning labels and the inscription "harmful to life" were found in a shed in Akhtubinsk, Astrakhan Oblast, in southern Russia, *Regions.ru* reported on 4 April 2003. It is thought that there has been an underground market for radioactive materials at the military base in Akhtubinsk since Soviet times. According to *Regions.ru*, a container similar to those found last week was found in another district of the city last year. A criminal case has been opened in connection with the incident (http://www.nti.org/analysis/articles/cesium-137-seized-akhtubinsk-russia/).

2003, July / Kazakhstan/ N: Three men – two residents of Pavlodar and a Russian citizen – tried to sell Plutonium in the Pavlodar rail station. (http://www.nti.org/analysis/articles/kazakhstani-police-seize-plutonium-239-source/)

2003, August 28 / Russia / N: The deputy director of Atomflot, a company that performs repair work on nuclear icebreakers and submarines, was arrested in a sting when he tried to sell Uranium-235 to FSB agents posing as potential buyers. The material was found in his suitcase. Uranium-238 was found during a search of his garage. There are varying reports

about how much material was found. http://saint-petersburg.ru/m/57854, http://bellona.org/english_import_area/international/russia/icebreakers/31049, http://www.lenta.ru/articles/2003/10/02/uran/, http://articles.sfgate.com/2003-11-23/news/17519696_1_research-reactors-radioactive-material-nuclear-facilities

2003, October / Russian Federation / R: two men were convicted for attempting to sell what they claimed was weapons-grade Plutonium stolen from a closed Russian nuclear site - a secure facility in the closed city of Sarov. Although no Plutonium had actually been stolen on this occasion, the two men posed as military officials tried to convince a third man that they had the material in their possession. The would-be client apparently planned to sell the Plutonium to a third party. (Gnosis, 13.10.2004)

2003, December 7 / Moldova / R: 38 Alazan (a small, thin, radioactive rocket) warheads were reported as having disappeared from a repository in Tiraspol, Moldova. (*The Washington Post*, http://www.washingtonpost.com/wp-dyn/articles/A41921-2003Dec6.html).

2004, February 12/ Armenia, Iran/ R: It was reported, that on December 29, 2003, at the Megri border checkpoint on the Armenian-Iranian border, Armenian customs officials discovered a radiation source in a scrap metal shipment bound for Iran. Neither Iran nor the Armenian NPP were connected to the radioactive object, which was an empty casing from a radioactive sources, which previously contained Strontium-90, the implication being that the radiation source itself had been moved to an unknown location. (http://www.nti.org/analysis/articles/armenian-customs-stops-radiation-source-bound-iran/)

2004, March / Kazakhstan / N: Three men were convicted in Kazakhstan after attempting to sell Plutonium at Pavlodar railway station the previous July. (*Gnosis*, 13.10.2004)

2004, March 13/ Georgian Republic/ R: Armenian citizen with radioactive material – the report did not identify the radioactive material - was detained at the Sadakhlo border post on the Georgian-Armenian border. (http://www.nti.org/analysis/articles/radioactive-material-seized-georgian-armenian-border/)

2004, March 13/ Tajikistan/ N: Tajikistani Drug Control Agency authorities arrested an Uzbekistani citizen in Dushanbe, Tajikistan and seized a capsule containing 3g of Plutonium on 13 March 2004. 'According to Tajik Television First Channel, the Plutonium capsule was of Russian origin, and was intact and did not pose a health risk. According to Drug Control Agency spokesman Avaz Yuldoshev, the suspect intended to sell the plutonium to individuals in Afghanistan or Pakistan for $21,000. The Associated Press reported that the suspect was looking for Pakistani or Indian buyers.' (http://www.nti.org/analysis/articles/radiation-source-containing-plutonium-seized-dushanbe-tajikistan/)

2004, early April/ Ukraine/ R+N: The Ukrainian Security Service seized two containers filled with Caesium-137 in Crime, and arrested members of an organized crime group involved in the trafficking of radioactive and rare-earth metals. (http://nti.org/analysis/articles/cesium-peddlers-arrested-crimea-ukraine)

2004, May 18 / Ukraine / R: "The Ukrainian secret service said Monday that it had arrested several members of a criminal gang that was trying too sell radioactive material in the Middle East. Secret service officials said in a statement that several Ukrainians and citizens of Middle Eastern countries had been detained for trying to trade in red Mercury which is allegedly used in nuclear weapons. The suspects had obtained the Mercury in Ukraine and had tried to take it out of the country in special containers, officials said." (*International Herald Tribune* http://iht.com/articles/520286.html).

2004, July 23/ Russia/ R: *Regions.Ru* reported on 23 July 2004 that the Belgorod customs post has conducted customs radiation control on nearly 5 million cargoes and transport vehicles since January 2004. During that same period, there were 145 incidents involving cargoes with elevated radiation levels. An investigation has been opened with reference to a radioactive item not declared by an individual who was crossing the border. In two cases radioactive cargoes entering Russia from Ukraine were detained and then sent back. The article did not specify how many of the 145 incidents involved attempted imports and how many involved exports.' (http://nti.org/analysis/articles/belgorod-russia-customs-post-detects-145-radioactive-cargoes-during-2004)

2004, August 10 / Russia / R: A train car transporting scrap material for processing to the Krasnyo Oktyabr plant in Volgograd, Russia, was stopped since it was identified as emitting radiation ten times higher than normal background levels. (http://www.nti.org/db/nistraff/2004/20040400.htm, 13.04.2005)

2004 / August 16 / Ukraine / R: Ukrainian police uncovered three containers with radioactive material (Strontium and Plutonium, emitted levels of radiation hundreds of times higher than

normal background levels) an a cache of small arms in Kodyma, Odessa Oblast, Ukraine. One of the suspects claimed that he had bought the radioactive materials from an unknown person, in order to resell them with profit. (http://www.nti.org/analysis/articles/radioactive-material-reportedly-seized-near-odessa-ukraine/)

2004, September 2/ Ukraine/ N: Two men were arrested by Ukrainian police for the attempt to bring a container of Americium-241 into Kyiv. (http://nti.org/analysis/articles/americium-241-seized-kyiv-ukraine)

2004, September 3 - 24 / Russia / R: Roman Tsepov, the general-director of Russian private security company, Baltik-Escort, died on 24 September, having fallen ill after a business trip to Moscow 3 weeks earlier. He showed symptoms of severe radiation poisoning and tests found that he was contaminated with an unknown radioactive material with radioactivity one million times over background levels of radiation. (http://www.johnstonsarchive.net/nuclear/radevents/2004RUS1.html)

2004, September/ Kyrgyzstan / N: Two men were arrested near Bishkek while trying to sell 60 smoke detectors containing Plutonium-239. A spokesperson of the IAEA added that these smoke detectors have been produced 2 or 3 decades ago in the Soviet Union and these detectors themselves did not pose a nuclear proliferation threat, since such smoke detectors contain only a few micrograms of plutonium as an ionisation source. (http://nti.org/analysis/articles/smoke-detectors-plutonium-seized-near-bishkek-kyrgyzstan)

2004, October / Russia / R: Russian customs officers prevented an unspecified radioactive material from being brought into Russia at Sochi. The incident appeared in the press in January 2005. (http://www.nti.org/analysis/articles/radioactive-material-denied-entry-russia-customs-post-sochi/)

2004, October 19/ Russia/ R: A truck carrying radioactive materials – scrap metal removed from a military unit located in the closed city of Vilyuchinsk – was seized at the port of Petropavlovsk-Kamchatskiy. (http://nti.org/analysis/articles/radioactive-cargo-seized-petropavlovsk-kamchatskiy-russia)

2004, October 28 / Russia / R: Radioactive scrap metal was discovered in a train car near Chelyabinsk, Russia. (http://www.nti.org/analysis/articles/radioactive-scrap-found-chelyabinsk-oblast-russia/

2004, November 8 / Georgian Republic / R: Two containers emitting radiation were uncovered by Georgian security agents in Tbilisi suburb, Georgia. The recovered containers are gamma-ray flaw detectors containing Cobalt-60. Ministry experts stressed that these containers were 'hermitically packed and in this condition they could not pose a threat to public health'. (http://www.nti.org/analysis/articles/radioactive-material-discovered-near-tbilisi-georgia/)

2004, November 09 / Russia / R: A former nuclear physicist voluntarily surrendered several containers containing Plutonium-238 and Cadmium to the police in the eastern Siberian town of Zmeinogorsk." (*The St. Petersburg Times*, Issue 1019, 09.11.2004)

2004, December 29 / Russia, Kazakhstan / N/R: Russian customs officers detained a vehicle - bringing a group of workers to Kazakhstan – containing a container with 37kg of uranium –23, 12 kg of tungsten, and 200g of rare metals. The uranium was apparently depleted uranium used as shielding. (NTI NISTRAFF, 13.04.2005)

2005, January 18 / Russia, Georgian Republic / R: Russian border guards seized a minibus with radioactive cargo at the Nizhniy Zaramag border crossing on the Russian-Georgian border. The radiation level of the cargo was five times higher than the normal radiation background level. 42 sacks of Potassium Hydroxide in powder form, 35 kg each (1470 kg in total); and 11 barrels of aluminum powder, 50 kg each (550 kg in total) were found. The article did not cite the exact source of the radioactivity in the cargo. (http://nti.org/analysis/articles/radioactive-material-seized-russian-georgian-border)

2005, January 22 / Ukraine / R: 'Ukrainian police seized six metal containers filled with Cesium-137 in the village of Ishun, Krasnoperekopskyi district, Crimea, Ukraine, the Podrobnosti (Ukraine) news agency reported on 24 January 2005, citing UNIAN. According to *Krymskaya pravda* (Simferopol), each container could hold up to 30g of Caesium-137. The radiation level of the containers exceeded the normal background by 380 times; this prompted authorities to evacuate the residents of the house and their neighbors.' (http://nti.org/analysis/articles/cesium-137-seized-crimea-ukraine)

2005, February / Kyrgyzstan / R: Three residents of Tokmok were arrested for trying to sell 4kg of radioactive Mercury for over 1 million soms, as part of a sting operation by the National

Security Service. (http://nti.org/analysis/articles/radioactive-mercury-reported-seized-kyrgyzstan)
2005, February 8 / Kazakhstan / R: Two persons tried to steal approximately 4 tons of radioactive scrap metal at the Aktau Chemical and Hydrometallurgical Combine, Kazakhstan. (http://nti.org/analysis/articles/attempted-theft-radioactive-scrap-thwarted-aktau-kazakhstan)
2005, March 1 / Ukraine / N: The Security Service reportedly seized 582 g of Uranium-238 at Boryspil International Airport near Kiev from the boot of a car and arrested the owner of the car. (http://nti.org/analysis/articles/uranium-seized-kyiv-airport)
2005, April 20 / Kazakhstan/Russia / R: A truck from Kazakhstan containing over 3 metric tons of radioactive metal was detained at the Karasook customs checkpoint at Novosibirsk Oblast, Russia, and returned to Kazakhstan. (http://nti.org/analysis/articles/radioactive-scrap-metal-seized-novosibirsk-oblast-russia)
2005, May 5 / Moldova / R: The Times (UK) reported that an arms dealer in Bender, Transnistria, offered to sell three Alazan rockets equipped with radioactive warheads. The existence of these rockets has not been confirmed. (http://nti.org/analysis/articles/dirty-bomb-rocket-again-reported-sale-transnistria)
2005, June 23 / Ukraine / R: A container containing Yttrium and Strontium-90 was discovered in a warehouse in Khershon, Oblast. "The district Sanitary and Epidemiological Station (SES) examined the warehouse and reported that background radiation near the device (0.1 to 0.5 meters) ranged from 313 to 50 microroentgens per hour." (http://www.nti.org/analysis/articles/strontium-90-seized-kherson-oblast-ukraine/)
2005, June 23 / Russia / R: Strontium emitting 300 microroentgen per hour was detected in scrap metal rods at the port in Vladivostok. http://www.utro.ru/news/2005/06/23/451518.shtml
2005, August 11 / Russia / R: A radioactive dosimeter containing a source of Strontium was discovered outside the Rezets factory in Tri Ruchya in Murmansk.
2005, August 16 / Turkey / N: Turkish police arrested two men in Istanbul trying to sell 173g of 17% Uranium 235 for $7m, although the market value was $1,500. This was part of a sting operation between the police and the secret service. (http://www.nti.org/analysis/articles/turkey-seizes-leu/)
2005, August 18 / Turkey / N: Two men of undisclosed nationalities were arrested in a sting operation organised by the Turkish police while attempting to sell 173g of a mixture that was 17% U-235 and 83% U-238 for USD 7 million. An undisclosed source at Rosatom confirmed that the material was likely to have come from Russia. http://bellona.org/english_import_area/international/russia/nuke-weapons/nonproliferation/39468
2005, September 19 / Bulgaria / R: The BBC reported that a man was arrested for attempting to carry 3.4 kg of Hafnium across the Bulgarian border into Romania. It was transported as a metal and was therefore not radioactive. http://news.bbc.co.uk/1/hi/world/europe/4260996.stm

2005, September 28 / Ukraine / R: Ukrainian police recovered radioactive material missing since 1995. A plastic bag with 13 pipes and a 10-centimeter bar resembling fragments of nuclear fuel rods was discovered in the compound of the closed Chernobyl nuclear power plant (NPP). [2] The UNIAN news agency reported that the bag, emitting background radiation of 50 microroentgen per hour, was found during a routine radiation check in the territory surrounding the sarcophagus which encases unit four of the plant. The bag was hidden under a railroad car parked near the sarcophagus. (http://www.nti.org/analysis/articles/radioactive-material-found-chornobyl-npp-ukraine/; http://english.pravda.ru/news/world/28-09-2005/66940-0/)
2005, October 14 / Ukraine / R: An employee of the Crimean Heating and Wiring Enterprise found 31 containers marked radiation hazard, emitting 2000 micro roentgen per hour at the unfinished Crimean Nuclear Power Plant. (NTI NISTRAFF 13.04.2005)
2005, October 18 / Ukraine / R: A vial of Caesium-137 was found in a garage in Borisov. It emitted 2.5 - 3 times the level of background radiation, around 20 micro-roentgen per hour. (http://kp.by/daily/23597/140011/)
2005, November 8 / Russia / R: 113 capsules containing Plutonium-239 and Caesium-137 were discovered in the former biochemical plant in Blagoveshchensk in a building repair and machine shop. Radiation was at 1000 micro-roentgen per hour inside the building, and 600 outside. To receive an annual dose of radiation, it would have been enough to stand next to the dangerous sources for 5-7 minutes. The prosecutors did not rule out the possibility that

people may have been exposed. (http://www.mkset.ru/news/chronograph/2130/)

2005, November 10 / Russia / R: A source of radiation was discovered at Magadan port. The material was a non-ferrous metal from the village of Berry Magadan that had been brought into Magadan city for delivery to a scrap metal collection point. It was detected by a Yantar radiation detection system. A grey cylinder with a radiation symbol was found in the scrap. It emitted ten thousand times background radiation.
(http://www.korabel.ru/news/comments/v_morskom_torgovom_portu_magadana_obnaruzhili_istochnik_radiatsii.html)

2005, November 25 / Russia / R: Caesium-137 was found in the former warehouse of the enterprise "Hlebprodservis". The source was a RMGZ-01 from 1976. It emitted milliroentgen 6 per hour. "The device was used to test for radioactivity of food products. After closing the warehouse, Hlebprodservisa's management was supposed to arrange its transfer to the appropriate authorities. The fact that Caesium-137 was abandoned in a warehouse constitutes "inexcusable negligence", commented the MOE laboratory. (http://stolica.onego.ru/news/42064.html)

2005, December 23 / Russia / N/R: The Russian Federal Security Service (FSB) detained three suspects and seized 12 kg of radioactive materials in Yaroslavl as part of an undercover sting operation. The suspects claimed the materials were "real uranium" but tests revealed the material was unnamed radioactive material (possibly Caesium). (http://www.fsb.ru/fsb/comment/ufsb/single.htm%21id%3D10316366%40fsbComment.html)

2006, January 31 / Russia / R: A 1967 nautical sextant containing Radium-226, in a car, set off a Yantar radiation detection system ITAR-TASS in Vladivostok, emitting radiation over 30 times background radiation level, and was subsequently removed for disposal. (http://www.regnum.ru/news/581711.html)

2006, February 1 / Russia/Ukraine / R: A Ukrainian citizen was detained attempting to smuggle two RIO-3 radioisotope icing sensors for use in aviation without a license across the Russian-Ukrainian border at Belgorod. (http://www.nti.org/analysis/articles/radioactive-cargo-stopped-border/)

2006, February 3 / Russia / R: RIA Novosti-Yug reported that according to Usam Bakayev, chief epidemiologist at the Chechen Ministry of Health, 12 radioactive sources have been reported missing since 1995, while there were 29 sources between 2001 and 2005. There are no records of radioactive sources before 1995 because they have been destroyed. The Groznyy Chemical Combine, where a radioactive accident occurred in 1999 at the 212 Unit, still poses a threat to health and safety, as on the territory on the unit, radiation levels at 90,000 times that of background levels. (http://www.nti.org/analysis/articles/unidentified-number-radioactive-sources-still-missing-chechnya/)

2006, February 5 / Georgia / N: Georgian media reported the alleged seizure of 80g of enriched Uranium by Georgian security agents on the South Ossetian border. This was disputed by the Russian Deputy Prime Minister and Defence Minister, Sergei Ivanov. (NTI NISTRAFF 29.04.2010)

2006, February 10 / Belarus / R: A cargo containing 3 tons of Charoit, a slightly radioactive semi-precious stone from Sakha Republic in Russia, was detained at customs at Brest. Background radiation near some of the stones was nearly 4 times higher than normal, but dropped to a normal level three to five metres away from the cargo. (http://www.nti.org/analysis/articles/radioactive-cargo-semi-precious-stone-charoit-seized-belarus/)

2006, February 20 / Russia / R: A truck carrying the debris of a minivan emitting 50 times the level of background radiation was detected by a Yantar radiation detection system and detained at the port of Vladivostok. The owner refused to cooperate and Primtekhnopolis, the company responsible for the removal of radioactive materials, was unable to extract the debris from the van. (http://nti.org/analysis/articles/radioactive-truck-detained-entry-port-vladivostok)

2006, March 25 / Russia / R: A fast neutron source, 2x3cm in size, and emitting 1500 neutrons per second and 14000 microroentgen per second, was discovered in scrap metal at the port of Vladivostok. (http://nti.org/analysis/articles/neutron-radiation-source-detected-port-vladivostok)

2006, March / Russia / R: Four dismantled Radioisotope Thermoelectric Generators were discovered in Norilsk, Krasnoyarsk with the Strontium-90 sources left intact. (NTI NISTRAFF 29.04.2011)

2006, April 13 / Russia / R: Russian police detained two men who tried to sell 5kg of 4% LEU pellets stolen from the Machine Building Plant in Elektrostaal in a sting. One of the men led them to a further 17kg LEU he was storing in his garage. (http://nti.org/analysis/articles/ukrainians-tried-smuggle-military-equipment-poland)

2006, April 20 / Ukraine / R: A man was detained at Smilnyytsa on the Polish-Ukrainian border by Ukrainian police after his minivan containing 11 TZK-11 zenith tubes, 700 artillery compasses, 51 periscopes, 43 azimuth compasses, and 14 binocular telescopes set off radiation detection alarms without the required cross-border transport permit. (http://nti.org/analysis/articles/ukrainians-tried-smuggle-military-equipment-poland)

2006, May 11 / Uzbekistan / R: Two incidents were reported by the Uzbek authorities. A cargo of 15.386 kg of zinc powder destined for Iran set off radiation alarms at the Bukhara Oblast checkpoint because it contained traces of Caesium 127 emitting 240-300 microroentgen per hour at a distance of 1.5m. It was detained because the transporters did not have the appropriate permit and were using falsified documentation. In the other incident, a train cargo of Molybdenum was seized en route to Tajikistan because it contained Radium-226, Uranium-234, Uranium-238 and Thorium-234. (http://www.nti.org/analysis/articles/uzbek-customs-uncovers-contraband/)

2006, July 27 / Georgia / R: Two orphaned Caesium-127 sources were found by a joint Georgian Ministry of Environment and IAEA team in the first three days of a joint initiative to locate orphan sources. One was found in an abandoned arsenic processing plant in Iri and another was found in a house in Likhaura. (http://www.nti.org/analysis/articles/radioactive-recovered-georgia/)

2006, October 23 / Russia / R: Vremya Novostey reported that a car loaded with metal pipes contaminated with radiation was discovered in Rostov-on-Don. The radiation was seven times the background level and it is suspected that, as the cargo was of Ukrainian origin, the pipes came from the Chernobyl quarantine zone. (http://www.nti.org/analysis/articles/metal-contaminated-radiation-again/)

2006, November 1 - 23 / UK / R: Former KGB agent, Alexander Litvinenko fell ill on 1 November and died on 23 November in London from poisoning by an estimated 5 microcuries of Polonium-210. Two of his associates, Andrei Lugovoi and Dmitry Kovtun were also taken ill, 120 individuals showed probable contamination, 17 showed contamination not significant enough to cause a risk to health, and 12 locations in London tested positive for trace levels of Polonium-210. On 28 May 2007, the UK authorities formally requested that Russia extradite Lugovoi under charges for Litvinenko's murder. This was refused, sparking a period of diplomatic tension between the UK and Russia.

2006, November 13 / Kazakhstan / R: Kazakh customers inspectors seized 500g Caesium-137 from a Chinese citizen at Maykapchagay. The material emitted 22.67 microsieverts per hour. (NISTRAFF 05.05.2011; http://www.yorkintel.com/NFCInitiate_Trafficking_News.aspx)

2007, January 15 / Georgia / N: Media reports appear alleging that Russian national Oleg Khintsagov was arrested in February 2006, alongside three Georgian citizens, for trying to sell 100g of almost 90% enriched HEU, in a sting operation by the Georgian Secret Service in Tiblisi. Reportedly, he was secretly tried and jailed for eight years. (http://nti.org/analysis/articles/heu-seized-georgia)

2007, February 27 / Russia / R: A radioactive isotope icing sensor used in aviation was discovered by a railroad worker 50 meters away from the Krasnodar-Yeysk highway. It was covered in oiled paper and measured 30cm by 30cm. (http://www.nti.org/analysis/articles/radioactive-object-krasnodar-territory/)

2007, April 13 / Russia / R: It was reported that a resident of Taganrog was arrested in Podolsk in Moscow for attempting to sell 6.5g of Osmium Tetraoxide for $52,000. (http://www.yorkintel.com/NFCInitiate_Trafficking_News.aspx)

2007, April 22 / Belarus/Lithuania / N: Two Belarusian nationals were detained at the border between Belarus and Lithuania as part of a joint operation between the Belarus Main Directorate for the Fight Against Organised Crime and Corruption under the Ministry of Internal Affairs and the Lithuanian Bureau of Criminal Police. An empty container labelled Russian Uranium-238 1991 was recovered from their car. (http://nti.org/analysis/articles/two-belarus-residents-detained-lithuania-suspicion-smuggling-radioactive-cargo, http://afn.by/news/i/85625, http://afn.by/news/i/92844)

2007, May 7 / Russia / R: A radioactive item in a sealed pipe and a radioactive item in a metal container were discovered at the site of the Stroyindustriya joint stock company in Togliatti, Samara Oblast, by officials from the local Center for Hygiene and Epidemiology. The radioactive item in the pipe was 1.5 cm in diameter and 15 cm in length and emitted 9 – 10 microsieverts per hour, while the other item emitted 1.55 microsievert per hour. (http://nti.org/analysis/articles/highly-radioactive-discovered-togliatti)

2007, May 8 / Tajikistan / R: Eight men face prosecution for attempting to sell two containers of Plutonium-Beryllium and one container of Caesium-137 to two Kazakh buyers and one

buyer from an unidentified Arab country for USD 400,000. (http://nti.org/analysis/articles/criminal-prosecution-attempted-sale-plutonium)

2007, May 16 / Russia / R: A radioactive parcel was detected at Moscow's Sheremetyevo-I airport. It emitted 20 times background radiation levels and was detected by a Yantar radiation detection system in a mail screening operation. (http://nti.org/analysis/articles/radioactive-parcel-found-sheremetyevo)

2007, June 5 / Russia / R: A cylinder 4.5cm in diameter and 5cm in height marked with a radioactivity sign and a serial number was discovered in a forest in Stavropol Kray in southwestern Russia. It emitted 8.4 microsieverts per hour at the surface, although it emitted only background radiation from 1m away. (http://nti.org/analysis/articles/radioactive-container-stavropol-kray)

2007, June 5 / Kazakhstan / R: 10 glass ampoules marked Caesium-137 were discovered in an abandoned water well in a forest near Ivanovka, although they emitted background radiation normal for the region. (http://nti.org/analysis/articles/ampoules-labeled-cesium-133-uncovered-water-well-kazakhstan)

2007, June 15 / Georgia/Azerbaijan / R: A Plutonium-Beryllium source hidden inside a truck carrying stainless steel scrap metal set off a radiation alarm, entering Georgia from Azerbaijan at the Red Bridge port of entry. The truck was sent back, according to Georgia because it did not want to incur the cost of storage of a radioactive source, and according to Azerbaijan because there was no source and the truck was merely emitting higher than average levels of radiation. (http://nti.org/analysis/articles/georgian-authorities-thwart-attempt)

2007, June 18 / Kazakhstan / R: Kazakh media reports that two individuals were arrested for attempting to sell a container of Caesium by an operational investigation group from the Kazakh Interior Ministry. (http://nti.org/analysis/articles/radioactive-material-seized-kazakhstan)

2007, June 29 / Kazakhstan / R: In Petropavlosk, a radioactive source was found at the bottom of a metal pole 50cm in diameter, fixed into the ground 2m from a street. The source was 15cm in length and 10cm in diameter, was marked with a radioactivity symbol and emitted 25 times background radiation. (http://nti.org/analysis/articles/potentially-radioactive-orphan-sources-found-construction-site-arkhangelsk-russia)

2007, July 29 / Russia / R: A sealed container holding 2.1kg of Mercury was discovered by workers on a construction site in Arkhangelsk. A site inspection discovered a further eight instruments 10cm x 8cm that were labeled, "caution: radioactive". (http://www.arhpress.ru/arkhangelsk/2007/8/1/22.shtml, http://nti.org/analysis/articles/potentially-radioactive-orphan-sources-found-construction-site-arkhangelsk-russia)

2007, August 27 / Russia / R: Three men were arrested in Dimitrovgrad in possession of 300g of Americum-241, possibly stolen from the All-Russian Scientific Research Institute of Atomic Reactors, although this may have been part of a training exercise. (http://nti.org/analysis/articles/nuclear-attack)

2007, September / Russia / N: 30.7 kilograms of Uranium rods were stolen from an enterprise in Udmurtia. (http://www.nti.org/analysis/articles/trial-uranium-rod-thieves-begin-udmurtia/)

2007, September 7 / Belarus / R: Media reported that Belarussian customs officials detained a truck carrying of Aluminium concentrate that was radioactive on the Belarussian-Polish border en route to Russia. (http://nti.org/analysis/articles/belarusian-customs-seize-radioactive)

2007, September 24 / Ukraine / R: A 12 kg package emitting high levels of radiation was seized at Zhulyany airport. It was emitting radiation 100 times the normal level. (http://kartina-ua.info/index.phtml?art_id=180344&action=view&sel_date=2007-11-01)

2007, September 28 / Russia / R: A 15cm x 15cm metal cylinder emitting 3 milliroentgen of gamma radiation at close range was discovered by an employee at a scrap metal receiving station in Ufa. (http://www.yorkintel.com/NFCInitiate_Trafficking_News.aspx)

2007, October 3 / Russia / R: The Department of the Interior Directorate for Fighting Organised Crime arrested four Russian citizens for attempting to sell an ampoule of 10.5g of Osmium for $735,000 as part of a sting operation. Authorities also discovered an ampoule labelled "Osmium-187" which was filled with a Cobalt-Zinc mixture. (http://www.nti.org/analysis/articles/authorities-department-interior/)

2007, October 3 / Russia / R: A piece of scrap metal emitting 3 microroentgen per hour was brought to a scrap metal collection point in Ufa. (http://www.nti.org/analysis/articles/three-cases-radioactive-metal-scrap-are-uncovered-russia/)

2007, October 15 / Ukraine / R: A railroad car carrying 54 metric tons of Zirconic ore was detained by officials at the Chop checkpoint between Ukraine and Hungary and was sent back

to Italy because of a lack of relevant certificates. (http://nti.org/analysis/articles/railroad-car-radioactive)

2007, October 22 / Russia / R: A Russian customs official in Vladivostok discovered a parcel sent from Russia to the UK containing binoculars and a strand for the binoculars covered in Radium-266, emitting 400 times the legal limit of radiation. The parcel was disposed of by Primtekhnopolis. (http://nti.org/analysis/articles/parcel-object-radium-discovered)

2007, October 23 / Russia / R: Customs officials in Vladivostok discovered two shipping containers labelled "concentrated ore" that emitted 20 times background radiation levels. (http://nti.org/analysis/articles/parcel-object-radium-discovered)

2007, October 24 / Georgia / R: Georgian police officers and operatives from the Special Operations Center of the Main Directorate of the Ministry of Internal Affairs of Georgia for the Autonomous Republic of Adjara arrested an Armenian citizen for attempting to smuggle 2.04g of Lawrencium-103 to Turkey in a specifically designed gold container. (http://www.regnum.ru/news/905759.html, http://www.nti.org/analysis/articles/rare-transuranic-element-lawrencium-seized-georgian-turkish-border/)

2007, November 2 / Georgia / R: Police officers discovered an unspecified amount of Caesium-137 in a car and arrested its occupants after detaining the car after a traffic violation. They also discovered a device for opening the container of Caesium and detonators. (http://www.nti.org/analysis/articles/cesium-137-seized-zugdidi-western-georgia/, http://www.apsny.ge/news/1194031045.php, http://www.rian.ru/politics/20071102/86427236.html,http://www.rian.ru/politics/20071102/86452125.html, http://www.lenta.ru/news/2007/11/02/caesium/)

2007, November 8 / Russia / R: A railcar emitting over 20 microroentgen per hour was detained in Murmansk. The content of the cargo is unknown. It was on its way from Saratov to a military base in Kola Peninsula. (http://www.murman.ru/news/?d=09-11-2007, http://www.nti.org/analysis/articles/kola-peninsula-bound-railway-car-radioactive-shipment-detained-murmansk/)

2007, November 11 / Ukraine / R: A 32 kilogram container of Caesium-137 was seized from a suspect in Lugansk. 7 vials of what may have been Mercury were also seized. (http://www.nti.org/analysis/articles/ukrainian-police-seizes-mercury-and-cesium-137-individual/)

2007, November 27 / Russia / R: Ferrous metal scrap containing Barium and Thorium emitting ionising radiation twice background levels was discovered in a train car bound from Kazakhstan to Estonia at the Kartaly checkpoint. (http://www.nti.org/analysis/articles/three-cases-radioactive-metal-scrap-are-uncovered-russia/)

2007, December 21 / Russia: The Russian Federal Customs Service announced that technical radiation detection had helped intercept approximately 850 attempts at illicit trafficking of radioactive materials. (http://nti.org/analysis/articles/russias-federal-customs-service-releases-trafficking-statistics)

2007, December 31 / Uzbekistan / R: A "chunk of black metal" emitting 1000 milliroentgen per hour was discovered aboard a freight train travelling from Kyrgyzstan to Iran by Uzbek border officials. (http://www.yorkintel.com/NFCInitiate_Trafficking_News.aspx)

2008, January 10 / Kazakhstan / R: The Department of State Ecological Expertise of the Ministry of Ecology and the Environment of Kyrgyzstan Kubanychbek Noruzbaev announced that Uzbek customs guards detained a railcar from a Krygyz train passing through Kazakhstan on 31 December 2007. It was carrying Caesium-137 emitting more than 1000 milliroentgen per hour. http://news.mail.ru/incident/1553844/

2008, January 23 / Russia / R: The city court in Kurgan found four Russian citizens guilty of contraband and sentenced them to 7 – 10 years in prison for smuggling a container containing 9 radionuclides across the Russian-Kazakh border in 2006, including Iridium, Cobalt, Radium, Promethium and Europium, with intent to sell. (http://nti.org/analysis/articles/four-russians-sentenced-smuggling-radioactive-sources-across-russian-kazakh-border)

2008, February 28 / Kazakhstan / N: Integrum Techno reported that two individuals had been sentenced by a Kazakh court in Almaty for attempting to sell 2 kg of Uranium-235. (http://nti.org/analysis/articles/almaty-court-sentences-two-individuals-two-years-prison)

2008, March 11 / Kazakhstan / R: 65 barrels of Tantalum concentrate emitting radiation 4 times higher than normal was seized from an airplane that had arrived from Fujairah. It later emerged that there were no irregularities in the transport of this material and that its travel had been legitimate. (http://nti.org/analysis/articles/kazakh-customs-detain-consignment)

2008, April 5 / Russia / R: A radioactive container was found in cargo from Chita at Vladivostok port emitting 130 microroentgen per hour. The container was later destroyed. (http://nti.org/analysis/articles/kazakh-customs-detain-consignment)
2008, April 21 / Ukraine / R: Radiation detection equipment installed at a checkpoint detected 4,500 tons of used medical isotopes emitting 60 microroentgen per hour on a truck travelling from the Institute of Oncology in Chisinau, Moldova, to the Czech Republic through the Ukraine. The driver did not possess the required documentation and hazard signs were not displayed. (http://nti.org/analysis/articles/truck-radioactive-medical-isotopes-detained-ukraine-moldova-border)
2008, May 23 / Kazakhstan / R: Kazakh customs officials intercepted a truck travelling from Petropavlovks in Russia to Germany, which was emitting 116.22 microroentgen per hour. (http://www.nti.org/analysis/articles/kazakh-customs-detain-germany-bound-lorry-radioactive-material/)
2008, May 27 / Russia / R: Customs officials at the Kartaly checkpoint discovered a 60-ton consignment of scrap metal containing a source of Caesium-137 on its way to Latvia. It was sent back to Kazakhstan._(http://www.nti.org/analysis/articles/latvia-bound-train-radioactive-cargo-detained-russo-kazakh-border/)
2008, June 5 / Belarus / R: The Deputy Chairman of the Belarussian State Border Committee Vadzim Zaytsaw announced that in the past 6 months, Belarussian customs officials have halted more than 10 cargoes emitting more than the legal amount of radiation, all attempts to transport material from Western European countries to southern countries. (http://nti.org/analysis/articles/belarusian-customs-say-theyve-stopped-10-vehicles-radioactive-cargo)
2008, June 17 / Russia / R: A former pilot travelling to Kazakhstan installed an airplane turn indicator in an abandoned warehouse in Chelyabinsk airport in his car with scotch tape. He was detained by customs officials and it is believed that he was unaware that it emitted 6.17 microsieverts per hour. http://uralpress.ru/news/2008/06/17/magnitogorskie-tamozhenniki-sokhranili-zdorove-byvshemu-aviatoru
2008, June 19 / Russia / R: A lighting element containing Radium-226 emitting 47 500 microroentgen per hour was found in a lighting sign in cargo at Vladivostok port. (http://www.nti.org/analysis/articles/radiation-sources-discovered-vladivostok-port/)
2008, June 20 / Russia / R: A container containing Radium-226 emitting 475 microsieverts was detained at the port in Vladivostok. The material was removed by Primtekhnopolis. (http://primamedia.ru/news/Vladivostok/20.06.2008/73870/istochnik-radiatsii-obezvrezhen-v-portu-vladivostoka.html)
2008, July 1 / Kazakhstan / R: Three vehicles with radioactive cargo were detained at Zhanozol checkpoint, containing metal with excessive amounts of radiation. Kazakh customs detained a Volvo emitting 34.3 microsieverts per hour, an Iveco-model truck emitting 12.5 microsieverts per hour and another Iveco-model truck emitting 51.6 microsieverts per hour. The cargo was 60 tons of the insulating material vermikulit bound for the UK. (http://www.nti.org/analysis/articles/kazakh-customs-officials-detain-vehicles-radioactive-cargo/)
2008, July 7 / Ukraine / N: Two men were arrested at a location between Dnepropetovsk and Kiev Boryspil for trafficking enriched Uranium and Caesium as part of a sting operation conducted by the Interior Ministry General Directorate for Combating Organized Crime. They had planned to sell the material for USD5 million. (http://www.kommersant.ua/doc.html?docId=910052)
2008, July 8 / Kazakhstan / R: Kazakh customs officials sent two trucks carrying 39.2 tons of granite emitting over 18.5 times background level radiation back to China. (http://news.gazeta.kz/art.asp?aid=233823)
2008, July 8 / Ukraine / R: An individual was arrested in Dnepropetrovsk on suspicion of dealing in Uranium and Caesium as part of a sting operation. Two radioactive containers were also seized. (http://www.nti.org/analysis/articles/ukrainian-police-arrest-suspected-sellers-cesium-and-uranium/)
2008, July 8 / Ukraine / N: Deutsche Welle reported that a worker at the Ukrainian Embassy in Germany and the security manager of a bank in the Ukraine were arrested in Cherkassy with radioactive metals worth 3.1 million euros in their car, including Uranium and Caesium. The material was stolen from a holding facility in Kiev and intended to be sold to a criminal group. (http://www.dw-world.de/dw/article/0,,3467700,00.html, http://bellona.org/articles/articles_2008/ukraine_smuggling)

2008, September 11 / Russia / R: Zakon reported that a train destined for Moldova carrying a radioactive cargo was detained at the Kartaly checkpoint in Russia. The train had begun its journey in Ust-Kamenogorsk in Kazakhstan. From there, it had passed undetected through the Kazakh customs point at Uba and the Russian customs points at Tretyakov and Veseloyarsky. It continued its journey through Karaganda, Akmola and Kostanai and the customs point at Tobol, before it was discovered in Kartaly. The radioactive sources were found to be bismuth-207 and technetium-99 and emitted 4 microsieverts per hour. (http://www.zakon.kz/120490-po-territorii-kazakhstana.html)
2008, October 2 / Russia / R: A criminal case was opened by the police in Saratov into the theft of a RIO-3 ice detector. The ice detector was from a decommissioned YAK-40 airplane owned by Avia Alyans. (http://www.nti.org/analysis/articles/strontium-stolen-saratov/)
2008, October 13 / Ukraine / R: 20 tons of radioactive scrap metal emitting 1.4 times background radiation was discovered in a trailer attached to a Daimler Chrysler at the Zhanazhol checkpoint in the Mamlyutsky region. (http://www.emer.kz/conditions/archiv/detail.php?ID=3049)
2008, December 1 / Russia / R: Welding equipment emitting 190-340 microroentgen per hour was seized from the Dutch ship "Nedloyd Barentz" at Ilyichevsk. (http://www.nr2.ru/odessa/209277.html)
2008, December 22 / Russia / R: The Deita news agency reported that radioactive scrap metal was detected in cargo at Vladivostok. It emitted 21.05 microsieverts per hour and the source of the radiation was found to be a broken measuring device containing radium-226. (http://www.nti.org/analysis/articles/radioactive-cargo-detained-vladivostok/)
2009, March 12 / Ukraine / R: A Moldovan citizen was detained when a radioactive receiver was found in the back of his car as he crossed the checkpoint from the Ukraine to Moldova. He told police that he had purchased it from a man in Mikhaylovka-Rubensovka in the Sviatoshynsky Kiev region. (http://www.odvestnik.com.ua/issue/271/5887/)
2009, April, 9 / Russia / N: The FSB detained a man on the Chelyabinsk-Ufa highway after discovering an iron container containing suspected Uranium-235 and Uranium-238 particles in the back of a truck full of bricks. (http://vecherka.su/katalogizdaniy?id=24642, http://eanews.ru/news/33/item142306/)
2009, April 13 / Russia / R: Russian news outlet Sever Info reported that a German tourist was detained at Pulkovo airport when the Yantar-3 radiation detection system detected 138 grams of Radium-226 and Thorium-232 with him. He was en route from Prague to St Petersburg.The material emitted 2 400 microroentgen per hour. (http://www.old.severinfo.ru/news/26791)
2009, May 14 / Ukraine / R: Kompromat reported that a sheet of radioactive scrap metal emitting 30 times background radiation from Chernobyl was discovered buried 0.3m underground beneath a scrap metal collection point near a housing estate in Chernihiv. (http://compromat.ua/ru/16/25073/index.html)
2009, June 9 / Ukraine / N: Ukrainian regional news outlet Donbass reported that a railroad car in Donetsk carrying 60 tons of scrap metal and emitting 54-64 microroentgen per hour was stopped by a security company for the steel and metal works company Azovstal. (http://donbass.ua/news/region/2009/06/09/na-azovstali-obnaruzhili-radioaktivnyi-metall.html)
2009, June 9 / Georgia / R: Four sources of Caesium-137 and Strontium-90, emitting 3 millisieverts per hour were discovered at a scrap metal detection point in Tblisi. (http://newsgeorgia.ru/politics/20090709/151193925.html)
2009, July 20 / Russia / R: A cylinder containing Caesium-137 emitting over 100 times background radiation was found in a glove in a railcar on a train from Almaty to Moscow. The train was detained at the Ilesk-1 checkpoint. (http://www.nti.org/analysis/articles/railcar-emitting-radiation-detained-kazakh-russian-border/)
2009, August 16 / Russia / R: A man was detained on a train from Nikolaev to Moscow at the Dolbino checkpoint at Belgorod station and found in possession of 28 sets of radioactive night-vision devices for the Kalashnikov rifle. They emitted over 600 times the background level of radiation. The man claimed he had bought them in Dnepropetrovsk and was going to use them for hunting. (http://www.nti.org/analysis/articles/man-carrying-radioactive-night-vision-devices-detained-belgorod/)
2009, September 11 / Ukraine / R: A truck carrying 25 tons of radioactive scrap metal from Pripyat was detained at a checkpoint at the Chernobyl exclusion zone. It emitted over 13 times the background level of radiation. Six people were detained, including the truck driver and owner, a man who was accompanying the truck in another car, two police officers that were on duty at the time, and two police battalion commanders. The seizure was part of a sting in which a deputy chief of the Kiev SBU (Security Service) intended to test police and the Ministry of Interior Affairs

(MIA) official in charge of the exclusion zone by calling him to ask him to let the truck pass. The Deputy Chief and the four detained policemen were subsequently fired. No authorisation had been requested prior to the sting. (http://russia-ukraine-byelorussia.com/kak-sbu-mvd-na-pushku-brala/)

2009, October 21 / Russia / N: Lenta reported that a Chinese man was arrested at Irkutsk airport for attempting to transport six pieces of rock containing natural uranium from Russia. (http://www.lenta.ru/news/2009/10/21/chinese/)

2009, November 19 / Russia / R: A car containing sports equipment contaminated with Cobalt-60 was detained on the Russian border. The cargo emitted 4 microsieverts per hour. The car was sent back to Lithuania and the cargo was isolated and sent back to the owner in Germany. (http://ru.delfi.lt/news/crime/na-granice-zaderzhan-radioaktivnyj-gruz.d?id=19371033)

2010, March 14 / Ukraine / N: Six elderly friends came into possession of 2.5 kg of enriched uranium-235 in Slavayansk Donetsk. Two were arrested in a sting organised by Donetsk security officers, in which they attempted to sell the material initially for a deposit of $10 000. The other four were arrested at a nearby train station. The material emitted 250 microroentgen per hour. (http://old.inforotor.ru/visit/3902488?url=http://kp.ua/daily/140510/227265/)

2010, May 16 / Ukraine / N: The Ukrainian security service announced that it had seized 2.5 kg of depleted uranium and two products containing strontium-90, which exceed 300 times background radiation, as part of a special operation in Donetsk and Lugansk. (http://www.newsland.ru/news/detail/id/503406/cat/48/)

2010, August 24 / Moldova / N: Several individuals were arrested and 1.8 kg of uranium-238 was seized in Chisinau. They were attempting to sell the material for 9 million euros. Three of the individuals had previous convictions for illicit trafficking in Moldova, Romania and Russia. (http://www.bbc.co.uk/news/mobile/world-europe-11074645?SThisEM)

2010, November 30 / Pakistan / N: A Wikileaks cable dated May 27 2009 detailed that an unknown quantity of HEU from an old research reactor has been in Pakistan for the past three years awaiting removal and disposal by a US team because the Pakistani government is delaying concluding an agreement with the US on the matter. (http://www.nytimes.com/2010/12/01/world/asia/01wikileaks-pakistan.html?_r=1)

2010, December 14 / Kazakhstan / R: Ria Novosti reported that customs officials detained a Volvo with a semitrailer loaded with scrap metal at the Zhanazhol checkpoint in north Kazakhstan. The scrap metal exceeded the legal limit of 0.6-0.7 microroentgen per hour. The car was en route to Ankara, Turkey. (http://www.newskaz.ru/incidents/20101214/989606.html)

2011, 5 April / Georgia / R: The Nuclear and Radiation Security Service of Georgia announced that metal containing Caesium-137 had been located on board a cargo train at Batumi International Container Terminal. It is believed that the radioactive material may have become mixed up in radioactive scrap metal. (http://www.newsgeorgia.ru/incidents/20110405/213859214.html)

2011, 29 June / Moldova / N: Moldovan police arrested six people for attempting to sell more than 1kg of uranium-235 with a value of approximately 20m USD. It is reported that they were intending to sell the material to an individual from North Africa. (http://www.bbc.co.uk/news/world-europe-13968903)

Notes

[1] This inventory was originally meant to go as Appendix to an article by Vladimir Fenopetov, Bruce Lawlor, Tedo Japaridze, Yannis Tsantouli & Alex P. Schmid. New Security Threats – Old Security Architecture and Mind-Sets: Countering the Threat of Radiological and Nuclear Terrorism in the Black Sea Region. *American Foreign Policy Interests*, 33,197-208, 2011 and should best be read in conjunction with it (see: http://dx.doi.org/10.1080/10803920.620510). The views and opinions expressed in this introduction do not represent any official views or positions but are solely the responsibility of the authors. Errors in the inventory are possible as are omissions, due to the type of open sources utilized.

[2] Figures based on Matthew Bunn (Kennedy School of Government), as quoted in *The Economist*, Vol. 402, Number 8778, 31 March – 6 April 2012, pp. 61-62 and in M. Bunn's presentation 'The Threat of Nuclear Terrorism: What's New? What's True? Cambridge, Mass.: Belfer Center , Harvard Kennedy School, March 2012.

[3] For this aspect, see Alex P. Schmid & Robert Wesley. Possible Causes and Motives of Nuclear and Radiological Terrorism in the Light of Empirical Data on Smuggling Incidents of Nuclear Materials. In: Jeff Victoroff (Ed.). Tangled Roots: Social and Psychological Factors in the Genesis of Terrorism. Amsterdam: IOS

[4] Gnosis: Global Nuclear Open Source Information System; U.S. Nuclear Regulatory Commission, Office of International Programs

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Charlotte Spencer-Smith has contributed to The Atlantic Online and 'Obama and the Bomb: The Vision of a World Free of Nuclear Weapons' (Ed. Heinz Gaertner).

NBC's "Revolution" Shows Life after An Electromagnetic Pulse Attack

Source: http://blog.heritage.org/2012/05/17/nbcs-revolution-shows-life-after-an-electromagnetic-pulse-attack/

What would the life in the United States look like if the continent were hit by an electromagnetic pulse (EMP)? The new TV show *Revolution* from producer J.J. Abrams, launching on NBC in the fall, is seeking to answer the question.

The show portrays life in the United States 15 years after an EMP disables all electronics. Life as we know it changes forever; militias and warlords rule the society, which has to provide for itself without the help of all the electronic devices we know today. Such a scenario is not as unlikely as it might appear. The congressionally mandated EMP Commission Report stated that an EMP "has the capability to produce significant damage to critical infrastructures and thus to the very fabric of US society, as well as to the ability of the United States and Western nations to project influence and military power."

An EMP is a high-intensity burst of electromagnetic energy caused by the rapid acceleration of charged particles. It is created during solar storms or by nuclear and radio-frequency weapons detonations. A nuclear weapon detonated at a high altitude would send the United States back to the 18th century. An EMP's effects would include the destruction of electrical circuits, rendering cell phones, computers, vehicles, airplanes, power grids, and all other electrical equipment useless. In the case of an EMP—from "space weather" or a high-altitude nuclear detonation—transportation systems would be halted, communications would be rendered useless, and grocery stores would be unable to preserve or restore food supplies.

The United States must take steps to protect its infrastructure. The public and private sectors should harden vital infrastructure to make it more

resilient and resistant to solar storms or an EMP's effects. In addition to hardening its electrical grid, the U.S. should also develop a national plan to respond to EMP emergencies. This would involve educating federal, state, and local officials along with the public about the risks and response options.

Moreover, short-range and long-range ballistic missiles are the best means of delivery for a high-altitude nuclear weapon detonation. That is why the United States must continue to build up its missile defenses. The system would ideally be composed of Aegis ballistic missile capable ships; Aegis Ashore, the land-based ballistic missile component; and Unmanned Aerial Vehicle capabilities. These would offer a degree of protection against such an attack.

Sandia Labs technology used in Fukushima cleanup

Source: https://share.sandia.gov/news/resources/news_releases/fukushima_cleanup/

A Sandia National Laboratories technology has been used to remove radioactive material from more than 43 million gallons of contaminated wastewater at Japan's damaged Fukushima Daiichi nuclear power plant. Sandia researchers had worked around the clock following the March 2011 disaster to show the technology worked in seawater, which was pumped in to cool the plant's towers.

"It's the kind of thing that sends a chill," said Mark Rigali, manager of the geochemistry group at Sandia. "We've helped really make a difference in the world. These are the kinds of successes we want to see with all our intellectual property."

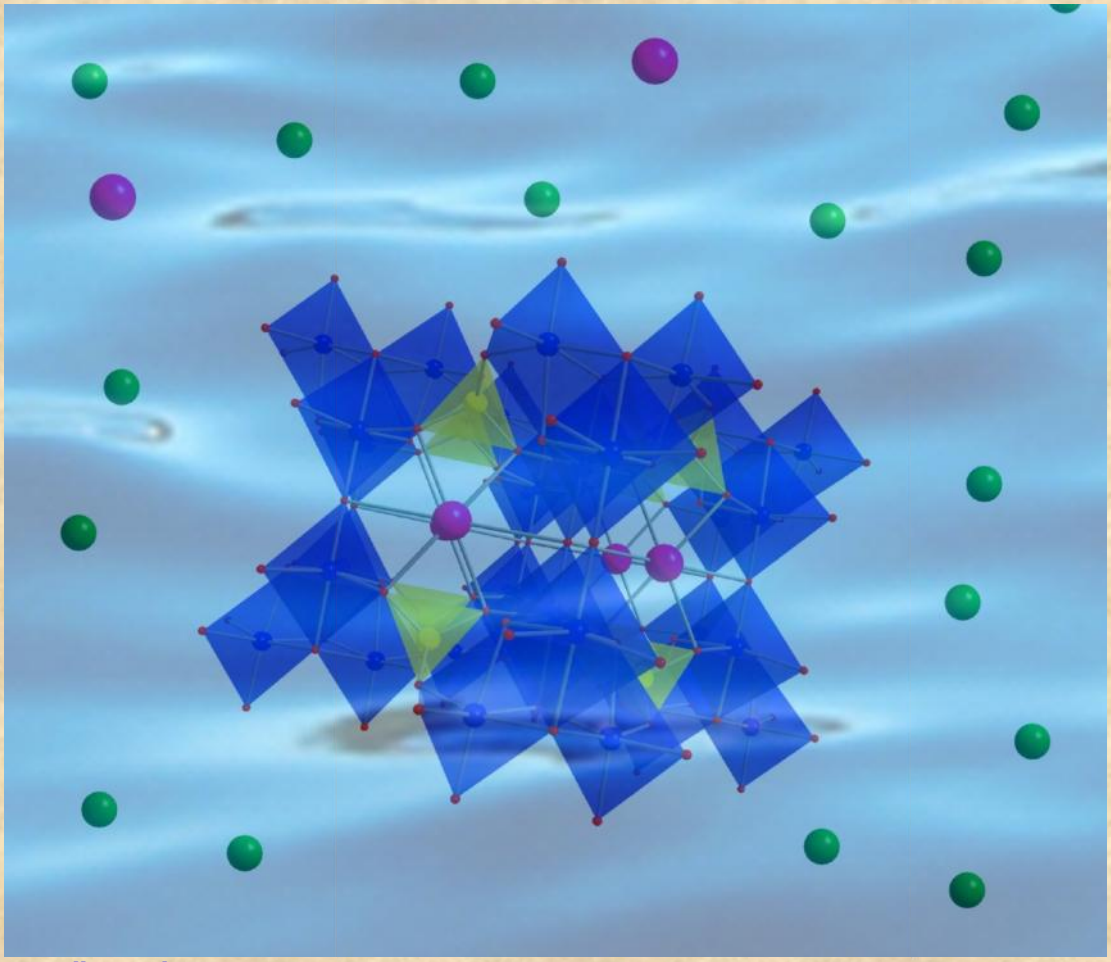
UOP LLC, a Honeywell company, late last year renegotiated its license of the Sandia technology being used at Fukushima. The revised license makes UOP the exclusive U.S. manufacturer of crystalline silico-titanate, or CST, a molecular sieve that can separate highly volatile elements from radioactive wastewater.

"Sandia has a very important and longstanding business relationship with UOP," said Bianca Thayer of Sandia's Intellectual Property Management, Alliances and Licensing Department. "This is an opportunity to grow our partnership with the company."

The late Sandia chemist Bob Dosch and Texas A&M chemical engineering professor Ray Anthony were leaders of the team that developed CSTs in the early 1990s response to a need for materials to remove radioactive contaminants from wastewater. They found that a certain class of synthetic zeolite is more effective in capturing some radioactive elements, like cesium, than other technologies.

They created CSTs: inorganic, molecularly engineered ion exchangers that can be sized specifically for cesium and other elements. When high-level radioactive elements are removed

from contaminated water with CSTs, the remaining lower-level radioactive waste can be treated in a more economical and less hazardous way.



Crystalline silico-titanate, or CST, is an inorganic molecular sieve that can capture and separate highly volatile elements from radioactive wastewater. (Illustration courtesy of Sandia National Laboratories)

UOP worked with Sandia through a Cooperative Research & Development Agreement (CRADA) to produce a commercial-scale manufacturing procedure for the CSTs. "We developed a technology to bind the material into a beaded form so it could be used in ion exchange columns," said Dennis Fennelly, UOP marketing manager.

The company licensed and began commercializing the technology in 1994. It was one of the first licenses issued by Sandia, which had begun its tech transfer program just a year earlier.

Rigali said CST technology was among the Labs' first Laboratory Directed Research and Development (LDRD) commercial product successes. "It was a very early CRADA success as well," he said. "There was program money on our side and there was interest on the commercial side, so the two groups got together and developed the CSTs as a commercial product."

In 1996, the CST work by Sandia, Texas A&M and UOP won an R&D 100 Award, often termed the Oscars of technological innovation.

UOP, based in Des Plaines, Ill., with locations around the world, is an international supplier and licensor of process technology, catalysts, adsorbents, process plants and consulting services to the petroleum refining, petrochemical and gas processing industries.

With the Sandia license in hand, UOP developed CST products to remove radioactive ions from liquids such as radioactive waste streams, alkaline tank waste and spent fuel storage pool water.

The products are part of the UOP IONSIV™ Selective Media line and were first aimed at government

facilities that produce nuclear weapons materials and at commercial nuclear power plants.

"We made some sales to the DOE (Department of Energy) complex," Fennelly said. "The largest scale was in the Melton Valley demonstration at Oak Ridge (National Laboratory)."

CSTs came to mind when the Fukushima Daiichi nuclear power plant outside Tokyo was damaged in an earthquake and tsunami on March 11, 2011.

Rigali said seawater was pumped in to cool the reactors. The water was contaminated with cesium, a common fission product in reactor fuel, and could not be released back into the ocean. "The Japanese were looking for a way to clean up the water," Rigali said. "That's where the CSTs came in."

But nobody knew whether the technology worked in seawater.

DOE called on Sandia chemist Tina Nenoff at the end of March 2011 to test CSTs for removal of cesium in concentrated seawater, due to her extensive experience in developing and working with CSTs in the 1990s. Tina and colleague Jim Krumhansl, now retired, worked around the clock for 10 days. "There was a sense of urgency," Nenoff said. "We compared CSTs against commercially available zeolites, mineral zeolites and some clays. We found that the CSTs outperformed the other materials for cesium removal from seawater under these conditions."

Rigali said other materials can capture cesium, "but there's nothing out there that works as well as a CST. It's tough to beat."

UOP, which was in contact with Sandia and doing its own tests, came to the same conclusion. The company asked to renegotiate its license with Sandia to become the exclusive manufacturer of CSTs. At the same time, UOP also began looking at expanding its water treatment product line to industrial and commercial applications.

"Basically, we're taking a renewed look at water treatment in general, especially in the areas of radionuclide removal and industrial treatment in support of our historical industrial base," Fennelly said. "We have materials that can be useful. We will market them more aggressively."

He said the marketplace is changing in the wake of the Fukushima disaster.

"There are a number of opportunities to apply the CSTs in gathering cesium. Everything is coming together," Rigali said. "CSTs are a material whose time has come."

UOP manufactures CSTs at its plant in Mobile, Ala. Toshiba Corp., Shaw Global Services LLC and AVANTech Inc. use CSTs in their Simplified Active Water Retrieve and Recovery System (SARRY). The SARRY system has been in operation at Fukushima since last fall and continues to successfully reduce radioactive cesium to nondetectable levels, UOP said.

Rigali and Fennelly said Sandia and UOP plan to continue their R&D work around other types of radioactive and industrial water treatment materials.

"We are exploring collaborative opportunities with specialty materials and technologies Sandia has developed in the 15 years since we initiated our collaboration with UOP in the mid-90s," Rigali said.

The two CST patents are held jointly by Sandia and Texas A&M, which share the licensing royalties, and run through 2013 and 2017. The UOP license will continue until 2017 when the last of the two patents expires, Thayer said.

She said the license with UOP is not just one of Sandia's earliest, but is among a handful from that period still in active use. "It's a long-term commercial relationship," she said.

Nenoff said the CST work had special meaning for her since she came to Sandia 18 years ago to work specifically on these materials. She helped in the development of the CSTs and other novel molecular sieves for defense legacy waste cleanup of tanks at the Hanford Site in Washington.

"It was the reason I came to Sandia," she said. "I'm glad to see 18 years later that the work is still having an impact. I had to pull out my old notebooks. This is a good lesson for students: Take good notes. You may need them years later."

Defence CBRN Centre
Winterbourne Gunner

CBRN Clinical Course

Course Outline. The course covers the main CBRN hazards, using the all-hazards approach, and looks at medical support from point of exposure through to definitive hospital care. On completion, candidates will be in date for CBRN Clinical for 5 years (some units may require more frequent training periods and continuation training will be provided during PDT). Course components:

- General considerations
- Chemical hazards
- Biological hazards
- Radiological / radiological hazards
- Advanced CBRN casualty management
- CBRN Incident management
- Pre-hospital module day

Teaching methods. Lectures, cases studies, casualty simulation, practical demonstrations and tabletop exercise.

Eligibility. This course is open to medical officers, nurses and senior medics of the Defence Medical Services, NATO and PfP. This course is recommended for Emergency Medicine, Pre-Hospital Care, Internal Medicine and Intensive Care SpRs and Consultants as well as specialty nursing staff as military competencies training. Intermediate / Advanced Life Support or BATLS is desirable although not essential.

Duration. 4.5 days **CPD Accreditation for 20 points** & NATO STANAG 2954 compliant

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Salisbury SP4 0ES
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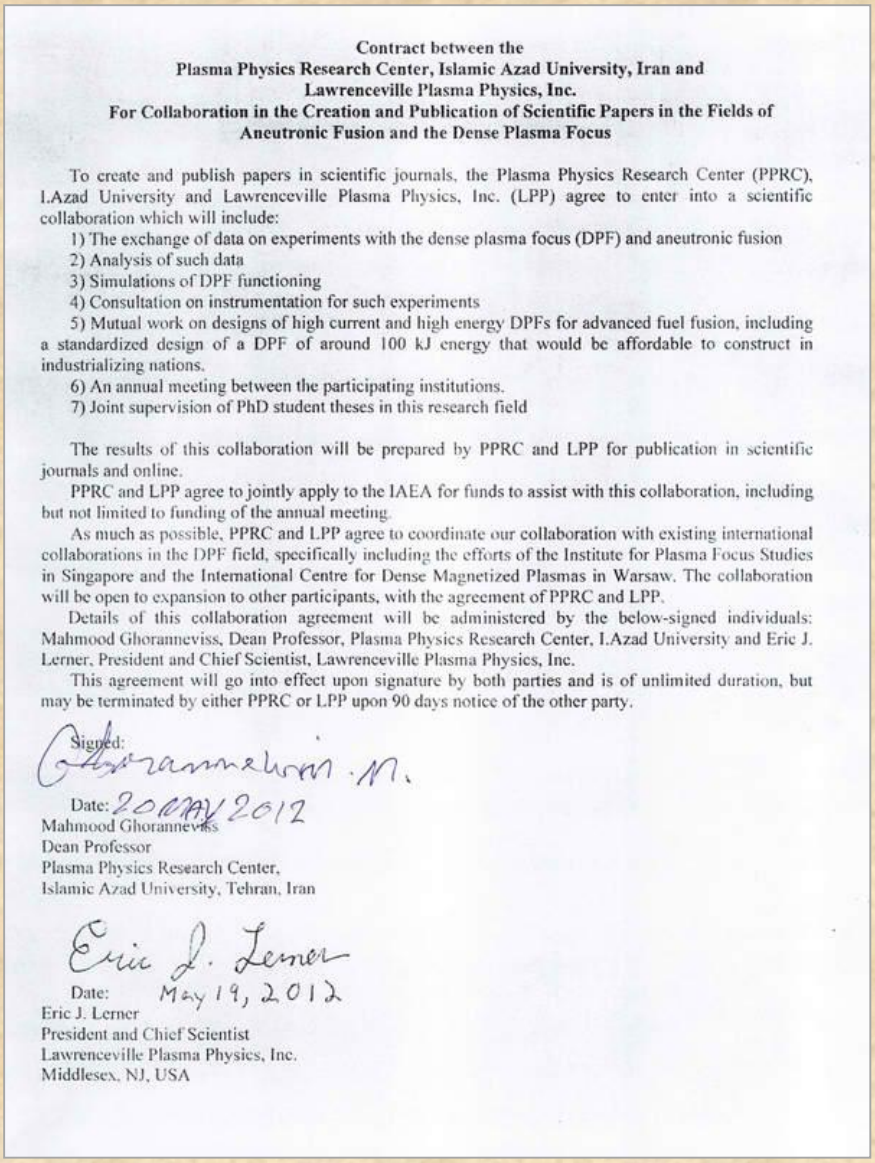
An American Company Is Helping Iran Achieve The Most Advanced Nuclear Power Imaginable

May 30, 2012

Source:http://www.businessinsider.com/irans-islamic-azad-university-is-working-with-new-jersey-company-plasma-physics-research-center-to-develop-a-whole-different-nuclear-program-2012-5

A group of leading American nuclear scientists in New Jersey are joining forces with an Iranian team.

The New Jersey-based research firm Lawrenceville Plasma Physics (LLP) have announced they've already "signed a contract on May 20 with the Plasma Physics Research Center (PPRC) of I. Azad University in Tehran, Iran."



Contract between the
Plasma Physics Research Center, Islamic Azad University, Iran and
Lawrenceville Plasma Physics, Inc.
For Collaboration in the Creation and Publication of Scientific Papers in the Fields of
Aneutronic Fusion and the Dense Plasma Focus

To create and publish papers in scientific journals, the Plasma Physics Research Center (PPRC), I.Azad University and Lawrenceville Plasma Physics, Inc. (LPP) agree to enter into a scientific collaboration which will include:

1) The exchange of data on experiments with the dense plasma focus (DPF) and aneutronic fusion
2) Analysis of such data
3) Simulations of DPF functioning
4) Consultation on instrumentation for such experiments
5) Mutual work on designs of high current and high energy DPFs for advanced fuel fusion, including a standardized design of a DPF of around 100 kJ energy that would be affordable to construct in industrializing nations.
6) An annual meeting between the participating institutions.
7) Joint supervision of PhD student theses in this research field

The results of this collaboration will be prepared by PPRC and LPP for publication in scientific journals and online.

PPRC and LPP agree to jointly apply to the IAEA for funds to assist with this collaboration, including but not limited to funding of the annual meeting.

As much as possible, PPRC and LPP agree to coordinate our collaboration with existing international collaborations in the DPF field, specifically including the efforts of the Institute for Plasma Focus Studies in Singapore and the International Centre for Dense Magnetized Plasmas in Warsaw. The collaboration will be open to expansion to other participants, with the agreement of PPRC and LPP.

Details of this collaboration agreement will be administered by the below-signed individuals: Mahmood Ghoranneviss, Dean Professor, Plasma Physics Research Center, I.Azad University and Eric J. Lerner, President and Chief Scientist, Lawrenceville Plasma Physics, Inc.

This agreement will go into effect upon signature by both parties and is of unlimited duration, but may be terminated by either PPRC or LPP upon 90 days notice of the other party.

Signed:

Date: 20 MAY 2012
Mahmood Ghoranneviss
Dean Professor
Plasma Physics Research Center,
Islamic Azad University, Tehran, Iran

Eric J. Lerner

Date: May 19, 2012
Eric J. Lerner
President and Chief Scientist
Lawrenceville Plasma Physics, Inc.
Middlesex, NJ, USA

A quick Internet search of this Iranian institution — consisting of a chain of colleges — shows that its full name is "Islamic Azad University." It's a small detail, but a little strange of the LLP official press release to diminish their new partner's name to a mere *I*. It just looked like someone wanted to dust that fact under the rug.

But how is this partnership even possible given U.S.-Iran relations? Well, there's a loop-hole:

The agreement falls within an exemption to the otherwise broad sanctions of the US against Iran. The US Department of Treasury's regulations include a general license which "authorizes collaborating with "**academics and research institutions**" of sanctioned countries on the…**creation and enhancement of written publications.**"

The two research teams will collaborate on writing scientific publications about their joint discoveries on aneutronic fusion. The LLP explains:

In the past three years, Iran has become a major player in the small but growing global effort to achieve aneutronic fusion power—controlled nuclear fusion using fuels that produce no neutrons. Controlled fusion harnesses the power that heats the sun–nuclear fusion--as a source of energy for peaceful purposes. Fuels that don't produce neutrons are important because neutrons can be extremely destructive, damaging the structure of a fusion generator and inducing radioactivity.

Focusing on the partnership, LLP President and Chief Scientist Eric J. Learner says:

"This agreement can greatly aid the development of aneutronic fusion, a potential source of cheap, safe, clean and unlimited energy," according to the release.

"While we all publish our results in scientific journals already, this new systematic collaboration in data exchange, analysis, and design of experiments will substantially accelerate the creation and publication of scientific results. The PPRC has large resources of highly trained personnel, and LPP can offer its many years of experience as a leading center in aneutronic fusion."

Fars News Agency reports that LLP's work could be a game-changer, if things go to plan: it's "one of several small companies that believe they can crack fusion far sooner than can ITER or the National Ignition Facility (NIF), another international behemoth, based in Livermore, California. "

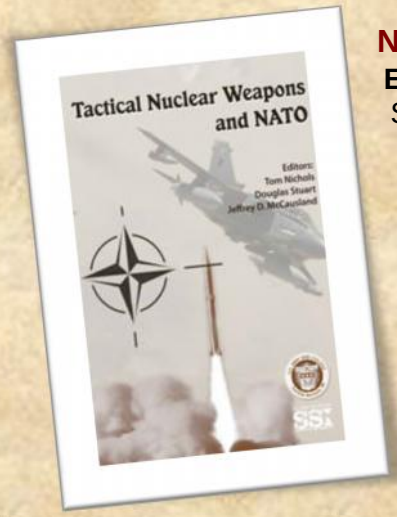
Checking out the LLP website this morning, Google informed us "This site may be compromised" — due to search engine's belief that the website may have been hacked — but we proceeded anyway and came across the contract in question, which you can see and evaluate for yourself:

LLP says that the whole idea to work with Iranian researchers originally came from Tehran:

The collaboration was first proposed to LPP on April 17 by Dr. Mahmood Ghoranneviss, Dean Professor of PPRC, and the chief organizer of Iran's fusion research effort. Dr. Ghoranneviss was responding to the April 10 broadcast of a report on the "Fusion for Peace" proposal by the Persian (Farsi) language TV channel of Voice of America (Persian News Network). On that broadcast, Lerner and Rezwan Razani, Executive Director of the Fusion Energy League and co-director of the Focus Fusion Society, described the initiative. Dr. Ghoranneviss was also informed of the proposal by Hamid Reza Youseffi, a professor at PPRC and one of the signers of the Fusion for Peace proposal. In just one month, LPP and PPRC were able to finalize the one-page agreement.

Fars News Agency also reports President Obama's council of advisors on sciences and technology will be formally notified of the partnership this Friday afternoon in Washington, DC.

But the notification will come way after the fact, as the contract was signed more than a week ago.



NEW BOOK – Tactical Nuclear Weapons and NATO

Edited by Dr. Tom Nichols, Dr. Douglas Stuart, Dr. Jeffrey D. McCausland

Source: http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubid=1103

NATO has been a "nuclear" alliance since its inception. Nuclear weapons have served the dual purpose of being part of NATO military planning as well as being central to the Alliance's deterrence strategy.

For over 4 decades, NATO allies sought to find conventional and nuclear forces, doctrines, and agreed strategies that linked the defense of Europe to that of the United States. Still, in light of the evolving security situation, the Alliance must now consider the role and future of tactical or non-strategic nuclear weapons (NSNWs). Two clear conclusions emerge from this analysis. First, in the more than 2

decades since the end of the Cold War, the problem itself—that is, the question of what to do with weapons designed in a previous century for the possibility of a World War III against a military alliance that no longer exists—is understudied, both inside and outside of government. Tactical weapons, although less awesome than their strategic siblings, carry significant security and political risks, and they have not received the attention that is commensurate to their importance. Second, it is clear that whatever the future of these arms, the status quo is unacceptable. It is past the time for NATO to make more resolute decisions, find a coherent strategy, and formulate more definite plans about its nuclear status. Consequently, decisions about the role of nuclear weapons within the Alliance and the associated supporting analysis are fundamental to the future identity of NATO. At the Lisbon Summit in Portugal in November 2010, the Alliance agreed to conduct the Deterrence and Defense Posture Review (DDPR). This effort is designed to answer these difficult questions prior to the upcoming NATO Summit in May 2012. The United States and its closest allies must define future threats and, in doing so, clarify NATO's identity, purpose, and corresponding force requirements. So far, NATO remains a "nuclear alliance," but it is increasingly hard to define what that means.

On the Cesium Road

By Toshio Nishi

Source: http://www.hoover.org/publications/hoover-digest/article/113111

For more than a year, I have been hoping that the Japanese government and the Tokyo Electric Power Company would find the courage to bear the unbearable and repair the breathtaking damage from last spring's earthquake and tsunami. But a better tomorrow is not in sight. A deathly silence still pervades the desolate landscape of Fukushima and the long coastal line of northern Japan—the cesium road.

The Japanese government grows more incompetent and dysfunctional, while Tokyo Electric has dug a deep foxhole of self-preservation and clings tightly to its monopoly. I am embarrassed as a Japanese citizen to list some of the most glaring shenanigans that the government and the power company have been acting out in public over the past year:

- Governmental study committees were supposed to investigate why Tokyo Electric failed to minimize the damage, but the "open" hearings were suddenly closed. The entrenched bureaucracy, as if fed by perpetual radioactivity, continues to grow while failing to disclose any new findings.
- Prime Minister Yoshihiko Noda, the sixth premier in the past five years, along with his cabinet and the largest opposition party, have agreed to raise the consumption tax from the current 5 percent to 10 percent. Apparently even that is not enough to cover the disaster damage. The government is talking about raising it to 17 percent within a year or so. When Japan achieved its famous "miracle," its great postwar economic renaissance, there was no consumption tax.
- Only five of Japan's fifty-four nuclear reactors are still operating. People were urged during last summer's extraordinary heat to use less electricity to prevent outages, having been convinced (falsely) that Japan had no excess power capacity. Patriotic citizens complied, enduring days and nights of acute discomfort. But because everyone used less electricity, Tokyo Electric and its subsidiaries made less money. The government, which favors Tokyo Electric, approved rate hikes of 15 percent for an ordinary household and 35 percent for large stores and industry.
- Few in the mass media, in Japan or abroad, talk about Japan's biggest nuclear secret: Monju. Named after a Buddhist saint of wisdom, Monju, Japan's first fast-breeder reactor squats right on a fault line. Its stated goal is to recycle the nation's fifteen thousand tons of spent fuel and supply endless energy. But despite swallowing $15 billion of our tax money for its construction, which began on January 5, 1983, Monju has never produced any usable energy, not even for a day. It stands north of our most beautiful ancient city of Kyoto and on the shore of the Sea of Japan. Plutonium, I hear, is

lethal for more than twenty thousand years. Nuclear energy is like fire, a good servant but a bad master.

- Japan's government, like its U.S. counterpart, continues raising the debt ceiling to astronomical levels. It has shown absolutely no interest in reducing the number of well-paid government employees (Japan's only growth industry), even during the past two "lost decades," or reducing the crowd of representatives and senators (the island nation, smaller than California, has 722 senators and representatives in the Diet for its 125 million people, compared to 535 Congress members for a U.S. population of 307 million). The 2011 catastrophe has provided only another excuse to expand government-sponsored rescue measures and justify more hiring.
- Dysfunctional or corrupt actions by the government are, at last, being exposed by some muckraking in the mass media.
- News leaks have shown how Toshiba, which built the ruined Fukushima Daiichi reactors, had submitted to then–prime minister Naoto Kan one month after the nuclear disaster a worst-case scenario. Kan decided to keep it "ultra top secret" and let only four confidants view it. If the Japanese people were to read it, he feared, Tokyo would be instantly emptied. Is this the real reason the government and Tokyo Electric kept admonishing Japanese not to panic?
- The media have also been following the water—in this case, the seawater that brave firefighters and Self-Defense troops poured in immeasurable quantities onto the burning reactors. Where did all that water, contaminated by plutonium, disappear to? Into the Pacific Ocean or the ground, of course. But the truth about the contamination has been hard to find. Meanwhile, radioactive water leaks have been reported inside the ruined Fukushima complex as recently as February 2012. The *Asahi Shimbun*, Japan's premier daily, published in January the names of prominent politicians who have been regularly receiving "money donations" from Tokyo Electric. Former prime minister Taro Aso and some current members of Prime Minister Noda's cabinet were on the list. The intimacy between the government and the nuclear industry was again laid bare.
- The earthquake and tsunami destroyed one small town after another, one fishing village after another. Those who survived and were old had nowhere to go. The government built "refugee cottages" for those who had lost everything. These were built in remote mountainous regions, supposedly for safety. Many of those who had no choice but to relocate died of despair. Some committed suicide, abandoned on the lush green archipelago where residents are expected to live longer than anywhere else in the world.

False reassurance

Is the Japanese government lying to us? Yes. Perhaps it violates good manners to say so, but good manners should no longer be expected from ordinary Japanese who have been inhaling highly radioactive dust and vapor since March 11, 2011. But we continue to behave. I assume it is a matter of pride that each of us refuses to be selfish in a crisis.

Cesium, a new word in our daily vocabulary, began showing up in dangerous concentrations in our national beverage, green tea. Green tea is supposed to be good for our health, perhaps a secret ingredient of that celebrated Japanese longevity. Japan's largest tea farm happens to be in Shizuoka, about two hundred miles south of Fukushima. Soon after high levels of radioactivity showed up in tea, radioactive elements began invading our dairy products, poultry, pigs, cattle, vegetables, fruit, and mother's milk. They cast their cloud over seafood caught off Fukushima, in one of the world's richest fishing zones. Who can comprehend the apparent and hidden magnitude of radioactive contamination that threatens never to end?

Japanese were often admonished, with little subtlety, to avoid panicking about the radioactive danger.

Expert reassurances abounded. As soon as the disaster hit Fukushima and for months after, one scientist after another from famous universities and government agencies appeared on nightly news programs, intoning with an air of superior knowledge that radioactive dust and vapor in the air or fish or rice failed to pose "an immediate health risk." We, unschooled in the fields of radioactivity or medicine, wondered, if not immediately, then when? Will we have cancer?

The experts lectured us that our intense anxiety and aversion about all things radioactive were groundless. They even implied, with little subtlety, that our deepening fear resembled herd thinking, a panic attack. Were they paid to say that the lethal leak was actually a small amount when it was the largest in the world? Or that the accident could be controlled with available safety procedures when the reactors still lie in ruins and no one can account for the deadly water and steam?

Those scholars and experts do not appear on national TV anymore. No one wonders why.

But when the experts disappeared, Tokyo Electric Power Company appeared, acknowledging on television that a reactor meltdown had indeed occurred within the first few hours of the quake and tsunami. This admission of a triple meltdown popped up two months after the accident, during which time Tokyo Electric had obstinately refused to admit to any such thing. The confession came too late for those people who had stayed but a little distance away from the reactors and were unknowingly rained upon by radioactive dust and vapor day after day. Tens of thousands of children lived nearby.

The prime minister's top aide said on television that Tokyo Electric had not kept the cabinet informed during the first two months and that it was shocked, very shocked. We too were shocked—at the incompetence and arrogance.

An end to a seductive mythology

We realize now that the government and the power executives think we are not intelligent enough to understand the technical jargon about nuclear power. Of course, we were not familiar with those esoteric terms when the disaster struck. But we do understand we are facing a nuclear winter on this beautiful archipelago, placed on the Ring of Fire, and may not live long enough even to see such a winter.

Historically, and to this day, we have respected authority (the government) and faithfully observed our laws and regulations to the point of overdoing it. We don't riot. We don't loot. We don't kill. We are taught in our schools and families that the central government, composed of our best and brightest, strives hard every day to guide our nation to safety, prosperity, and fulfillment.

We understand we are facing a nuclear winter, and may not live long enough even to see such a winter.

Are the best and brightest betraying us now? Is Japan's postwar democracy failing us at the moment when we most need its collective wisdom? Our government seems neither willing nor able to reciprocate our loyalty, or foster the courage and resilience we need to recover from the disaster. Worse, we fear that what

our government wants is a leap of faith and a blind eye toward its glaring incompetence. Political parties continue squabbling for power and exploiting our worst postwar disaster, which continues degenerating beyond anyone's ability to stop it. Government bureaucrats who regulate the nuclear industry retire and then find new, higher-paying jobs working for the industry they used to monitor. Officials are still looking for ways to dispose of hundreds of thousands of tons of rubble, much of it radioactive, a far bigger burden than can be disposed of in the disaster area itself.

Japan may have buried its twenty thousand dead—at least those who did not vanish under the debris or the waves—but thousands of people continue to await the return of their livelihoods, lost amid the wreckage and the nuclear nightmare. They hope for the day when they might go back to their homes and work to rebuild their lives. Most do not know, and have not been informed by the government or Tokyo Electric, that they can never return to the hometowns where contamination will remain lethal far beyond their life spans.

The power company and the government, joined at the hip, lecture Japanese that we have received the benefit of nuclear power generation and, because of such power, we enjoyed postwar prosperity. Hence we should not complain. Did ordinary people have any choice in deciding that Japan would develop nuclear power? No, other than the residents of small, remote communities on the shoreline who were wooed by promises of huge tax benefits, jobs for local people, and new infrastructure such as bridges, roads, swimming pools, auditoriums, and gyms. They had little choice but to accept.

The government and Tokyo Electric together constructed a most seductive mythology that nuclear power is safe, cheap, and clean. To maintain that facade, they hid numerous nuclear accidents or underplayed their health hazards.

Since bombs fell on Hiroshima and Nagasaki, Japan has cultivated a religion that condemns nuclear arms. Along the way, however, Japan metamorphosed into a strange creature that felt immune to things nuclear. Few Japanese left the country within the first weeks after the Fukushima meltdown. We can remain calm even in the midst of a horrible reality. Meanwhile, the falsehood of safe, cheap, and forever clean energy is swept away like the receding sea.

Toshio Nishi *is a research fellow at the Hoover Institution.*

Turkey to have 23 nuclear units, minister says

Source:http://www.hurriyetdailynews.com/turkey-to-have-23-nuclear-units-minister-says.aspx?pageID=238&nID=22486&NewsCatID=348

'We want to meet our increasing energy needs by erecting at least 23 nuclear units by the year 2023,' says Energy Minister Taner Yıldız at WEF's Istanbul meeting. AA photo

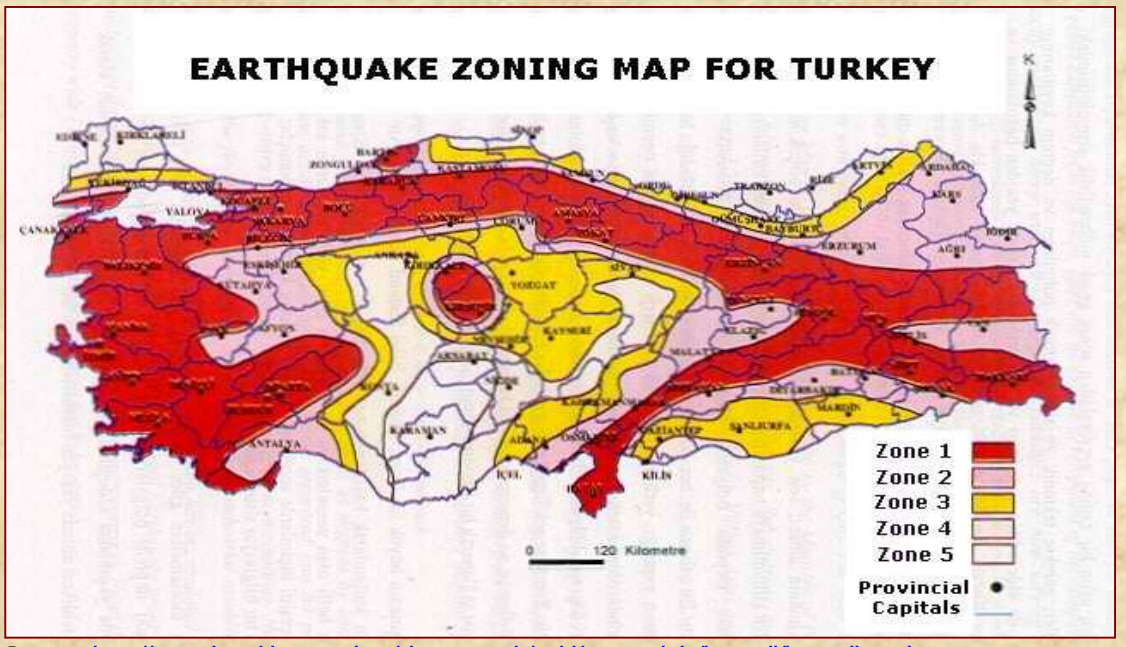
Turkey is determined to build nuclear power plants, and will establish 23 nuclear units by 2023, Minister of Energy and Natural Resources Taner Yıldız said yesterday at a panel discussion titled "The New Energy Corridor," part of the World Economic Forum.

There are more than 440 nuclear power plants in the world, and while nuclear power plants involve risks, they also offer many opportunities, Anatolia news agency quoted Yıldız as saying.

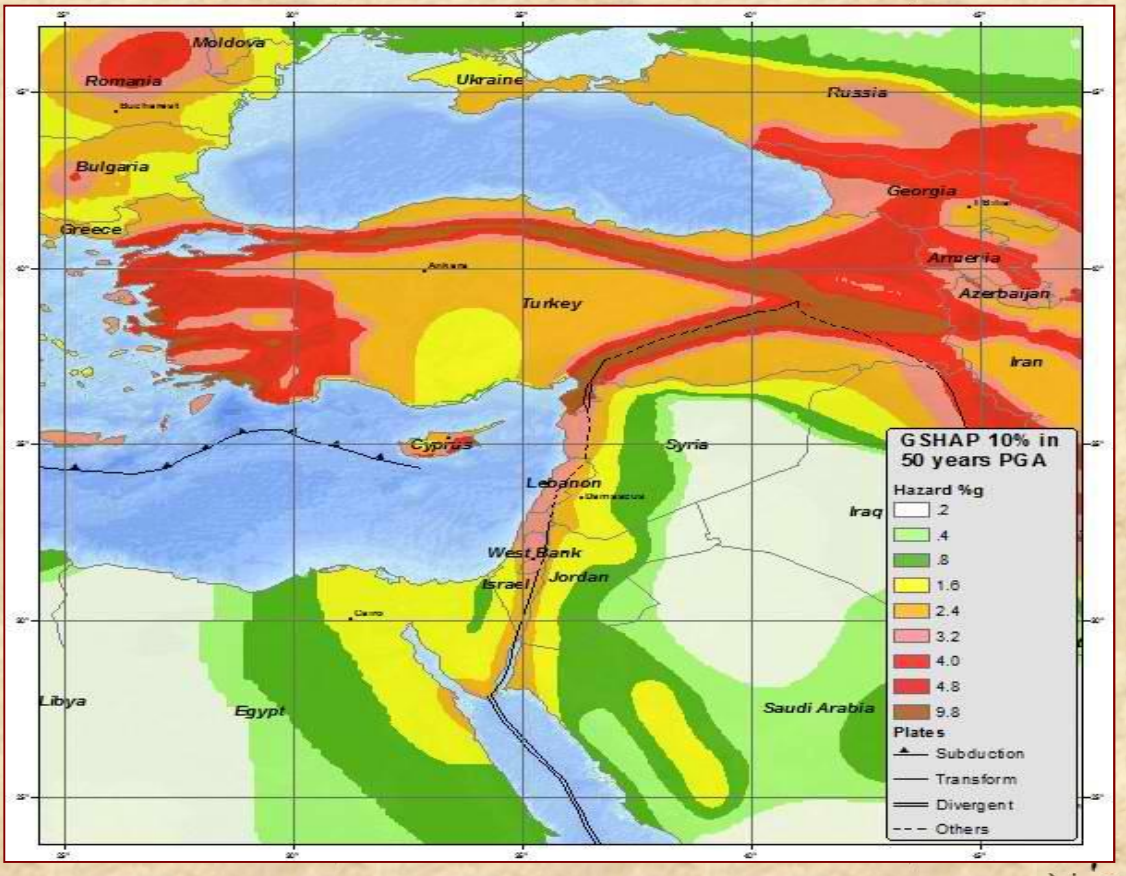
"We are a country without a nuclear power plant. However, we are determined to have nuclear power plants. We want to meet our increasing energy needs by erecting at least 23 nuclear units by the year 2023. This implies building nuclear power plants in three regions of Turkey," Yıldız said. At least half of all nuclear power plants are located in three countries, the United States, France and Japan, Yıldız said,

adding that there was a relationship between a country's development and its nuclear power plants. "We can see that accidents, as in Fukushima, do not [negatively] affect decisions to have and operate nuclear power plants," Yıldız said.

► **EDITOR'S COMMENT:** Can man beat nature?



Source: http://www.koeri.boun.edu.tr/depremmuh/eski/eqspecials/kocaeli/kocaeli_eq.htm

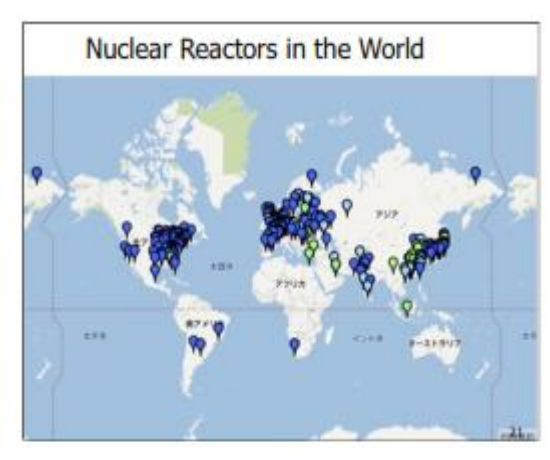


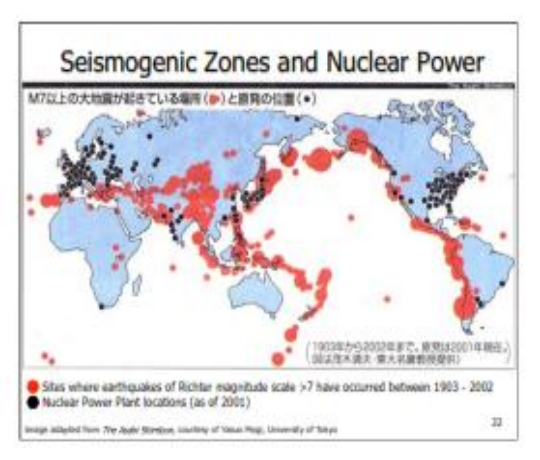
Source: http://earthquake.usgs.gov/earthquakes/world/turkey/gshap.php

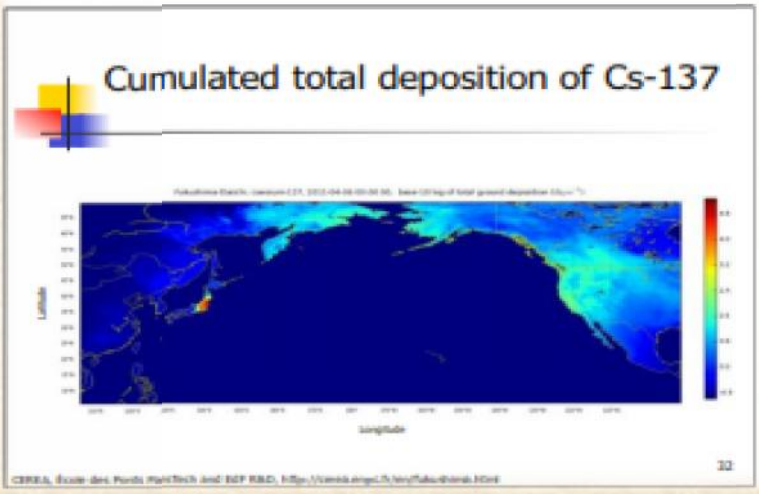
Atomic Age Symposium II – University of Chicago (May 5, 2012)

Source: http://lucian.uchicago.edu/blogs/atomicage/files/2010/12/Chicago5.5-uploadver.pptx.pdf

Some interesting slides from the presentation of Hiroaki Koide (Research Reactor Institute, Kyoto University, Japan) relevant to Fukushima catastrophe:







Very strong earthquake along the Fethiye, Turkey coast creates panic among tourists and injures +50 people

Source:http://earthquake-report.com/2012/06/11/very-strong-earthquake-along-the-fethiye-turkey-coast-creates-panic-among-tourists-and-injures-50-people/

A very strong dangerous earthquake occurred on June 10 at 15:44 local time along the Turkey and Greece Coast and scared hundred thousands of people in tourist destinations like Dalaman, Oludeniz and Fethiye. the earthquake was also well felt in many of the Greek Islands.

Airborne sensor to find terrorist nuclear-radioactive bombs

Source:http://www.avionics-intelligence.com/articles/2012/06/homeland_securityofficialsaskindustry todevelopairbornesensortofi.html

The U.S. Department of Homeland Security (DHS) in Washington is asking industry to develop an airborne sensor able to detect and pinpoint nuclear or radioactive terrorist bombs before they go off. The sensor should be able to determine quickly if a radiological or nuclear source is present while flying over cities, oceans, and the countryside.

The DHS Domestic Nuclear Detection Office (DNDO) issued a broad agency announcement Tuesday (HSHQDC-12-R-00065) for the Airborne Radiological Enhanced-sensor System (ARES) program to find improved ways to detect and localize radiological sources from the air.

The solicitation specifically asks industry to develop helicopter-mounted sensors, as well as software algorithms that act on multisensor '/;data for improved detection of packages containing nuclear and radioactive materials. The idea is to foil terrorist attempts to detonate nuclear or radioactive bombs in areas that would put large numbers of people or sensitive installations in jeopardy.

The ARES program will complement a previous DHS effort to develop a prototype Stand-Off Radiation Detection System (SORDS) to detect nuclear or radioactive bombs from land vehicles. SORDS focused gamma-ray imaging technologies.

The ARES program focuses on airborne nuclear and radioactive detection system that is sensitive, provides a low false alarm rate in a complex and changing environment in which naturally occurring radioactive material is present. The ARES system should produce automated real-time results, and identify the type and location of nuclear or radioactive sources at typical helicopter flight altitudes and speeds.

Today's aerial sensor technology, DHS researchers point out, does a poor job of compensating for changing background that includes naturally occurring radioactive material, and

have limited capability to localize sources in real-time.

The ARES program seeks sensors with improved sensitivity to detect and localize nuclear and radioactive sources, and the ability to suppress false alarms from enhanced naturally occurring radiation with improved situational awareness or additional sensors.

Algorithms developed in the ARES program should provide information in real time during flight, and use several different sensors for enhanced detection, localization, and identification of moving and static nuclear and radioactive sources.

The sensor component of the ARES program will have three phases -- a nine-month phase that focuses on sensor hardware and size; a yearlong phase to build a prototype system; and another yearlong phase to demonstrate the system.

The algorithm component of the ARES program will have four phases -- a six-month phase for trade studies and simulations; a second six-month phase for initial coding; a yearlong phase to optimize algorithms; and a nine-month phase to demonstrate the technology.

► Companies interested should submit proposals no later than 20 July 2012 by e-mail to atdbaa12-2proposals@hq.dhs.gov. E-mail questions or concerns to atdbaa12-2questions@hq.dhs.gov.

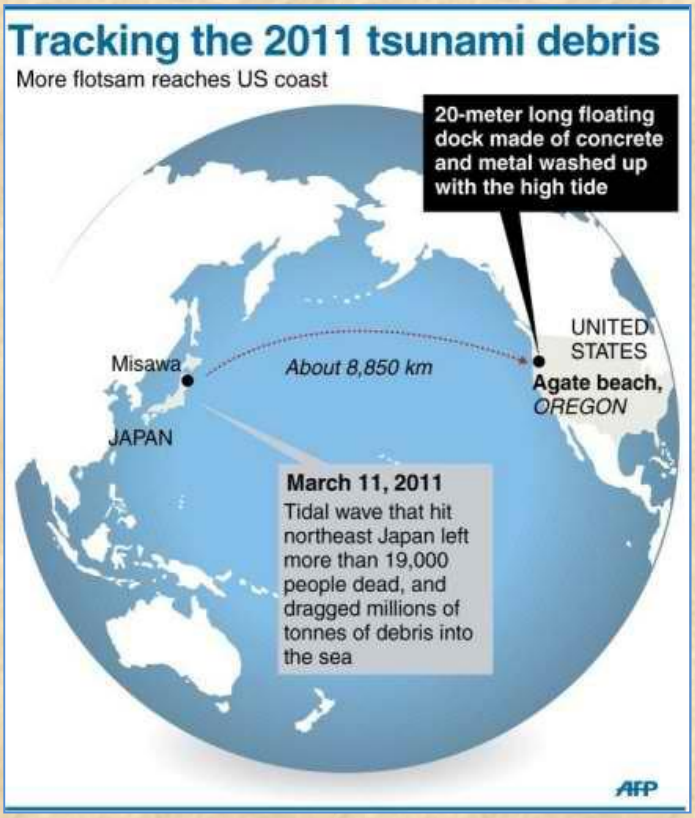
Fukushima 2011…

A girl who has been isolated at a makeshift facility to screen, cleanse and isolate people with high radiation levels, looks at her dog through a window in Nihonmatsu, northern Japan, March 14, 2011

Floating dock from Japan carries potential invasive species

Source:http://www.homelandsecuritynewswire.com/dr20120611-floating-dock-from-japan-carries-potential-invasive-species

When debris from the 2011 earthquake and tsunami in Japan began making its way toward the West Coast of the United States, there were fears of possible radiation and chemical contamination as well as costly cleanup.



A floating dock that unexpectedly washed ashore in Newport, Oregon, earlier this month, and which has been traced back to the Japanese disaster, has brought with it a completely different threat — invasive species.

Scientists at Oregon State University's Hatfield Marine Science Center said the cement float contains about thirteen pounds of organisms per square foot, and an estimated 100 tons overall. An Oregon State University release reports that the scientists have already gathered samples of 4-6 species of barnacles, starfish, urchins, anemones, amphipods, worms, mussels, limpets, snails, solitary tunicates, and algae — and there are dozens of species overall.

"This float is an island unlike any transoceanic debris we have ever seen," said John Chapman, an OSU marine invasive species specialist. "Drifting boats lack such dense fouling communities, and few of these species are already on this coast. Nearly all of the species we've looked at were established on the float before the tsunami; few came after it was at sea."

Chapman said it was "mind-boggling" how these organisms survived their trek across the Pacific Ocean. The low productivity of open-ocean waters should have starved at least some of the organisms, he said.

"It is as if the float drifted over here by hugging the coasts, but that is of course impossible," Chapman said. "Life on the open ocean, while drifting, may be more gentle for these organisms than we initially suspected. Invertebrates can survive for months without food and the most abundant algae species may not have had the normal compliment of herbivores. Still, it is surprising."

Jessica Miller, an Oregon State University marine ecologist, said that a brown algae (*Undaria pinnatifida*), commonly called wakame, was present across most of the dock — and plainly stood out when she examined it in the fading evening light. She said the algae is native to the western Pacific Ocean in Asia, and has invaded several regions including southern California. The species identification was confirmed by OSU phycologist Gayle Hansen.

"To my knowledge it has not been reported north of Monterey, Calif., so this is something we need to watch out for," Miller said.

Miller said the plan developed by the state through the Oregon Department of Fish and Wildlife and Oregon State Parks is to scrape the dock and to bag all of the biological material to minimize potential spread of non-native species. There is no way, however, of telling if any of the organisms that hitchhiked aboard the float from Japan have already disembarked in near shore waters.

"We have no evidence so far that anything from this float has established on our shores," said Chapman. "That will take time. However, we are vulnerable. One new introduced species is discovered in Yaquina Bay, only two miles away, every year. We hope that none of these species we are finding on this float will be among the new discoveries in years to come."

The possibilities are many, according to Miller. "Among the organisms we found are small shore crabs similar to our Hemigrapsus that look like the same genus, but may be a different species," Miller said. "There were also one or more species of oysters and small clam chitons, as well as limpets, small snails, numerous mussels, a sea star, and an assortment of worms."

Invasive marine species are a problem on the West Coast, where they usually are introduced via ballast water from ships. OSU's Chapman is well aware of the issue; for several years he has studied a parasitic isopod called Griffen's isopod that has infested mud shrimp in estuaries from California to Vancouver Island, decimating their populations.

The release notes that in 2010 an aggressive invasive tunicate was found in Winchester Bay and Coos Bay along the southern Oregon coast. Known as *Didemnum vexillum* (photo left), the tunicate is on the state's most dangerous species list and is both an ecological and economic threat because of its ability to spread and choke out native marine communities, according to OSU's Sam Chan, who chairs the Oregon Invasive Species Council.

It is difficult to assess how much of a threat the organisms on the newly arrived float may present, the researchers say. As future debris arrives, it may carry additional species, they point out. However, this dock may be unique in that it represents debris that has been submerged in Japan and had a well-developed subtidal community. This may be relatively rare, given the amount of debris that entered the ocean, the researchers say.

"Floating objects from near Sendai can drift around that coast for a while

before getting into the Kuroshio current and then getting transported to the eastern Pacific," Chapman said. The researchers hope to secure funding to go to Japan and sample similar floats and compare the biological life on them with that on the transoceanic dock.

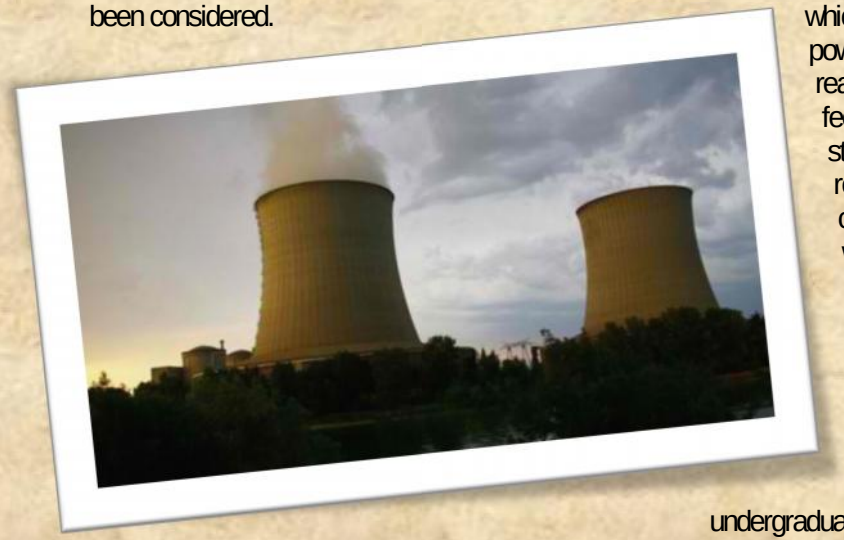
The scientists say the arrival of the dock is also a sobering reminder of the tragedy that occurred last year, which cost thousands of lives.

"We have to remember that this dock, and the organisms that arrived on it, are here as a result of a great human tragedy," Miller said. "We respect that and have profound sympathy for those who have suffered, and are still suffering."

Replacing uranium with thorium to lead to safer, sustainable nuclear power

Source: http://www.cam.ac.uk/research/features/a-safer-route-to-a-nuclear-future/

Since the development of nuclear power, many different strategies for the minimization and disposal of nuclear waste have been considered.



There are two types of nuclear waste: Fission product waste and actinide waste. Fission product waste is generally easier to manage, because it has relatively short half-lives. By contrast, actinide waste has much longer half-lives; disposal strategies usually envisage that it will have to be stored in purpose-built facilities for thousands of years.

A University of Cambridge release reports that as a result, many researchers have begun to consider the actinides as a resource instead of a waste product, using the reactors themselves to recycle the actinide waste and then reuse it as nuclear fuel.

"The idea of taking actinide waste and getting rid of it in nuclear reactors rather than disposing of it in the ground is well-established, but this hasn't been thought possible using current commercial reactor technology," Dr. Geoff Parks, of the University of Cambridge Department of Engineering, said.

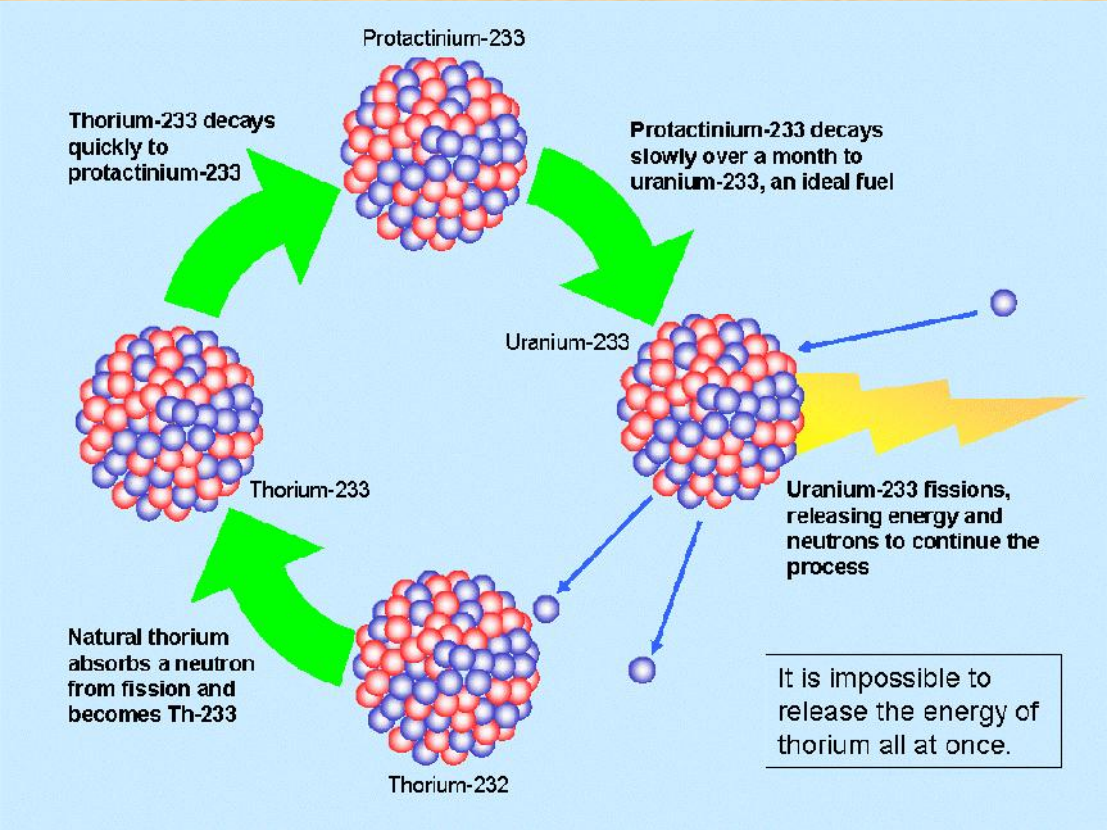
As well as the lack of suitable reactor technology, another issue with establishing an actinide recycling program is the uranium which is used as fuel in nuclear power plants. The safety of nuclear reactors relies upon negative feedback coefficients, which stabilize the power level in the reactor if operating conditions change. What has been shown when recycling actinide waste in a uranium fuel cycle is that it can be recycled just once or twice before the recycled fuel develops a positive feedback coefficient, making it unsafe for use.

As one of Parks's undergraduate students found, however, if uranium was replaced by thorium as a fuel source, current reactor technology could be used and the actinide waste could be safely recycled indefinitely.

The idea of using thorium as a fuel source is not new; prototype reactors using thorium were operated in the United States in the 1960s. "The reason why thorium was never seriously pursued as an alternative to uranium is believed to be because the uranium fuel cycle generates much more plutonium, which is the raw material used for nuclear weapons," said Parks. In addition to its greater resistance to proliferation than uranium, thorium is also about four times more abundant.

Ben Lindley, at the time a fourth-year undergraduate student, discovered that when recycling actinide waste in a thorium-based fuel cycle, the feedback coefficients stay negative, meaning that it can be

continuously recycled, leaving only the much shorter lived fission product waste to be disposed of.



Thorium could, in principle, be exploited immediately in existing nuclear reactors, but in order to maximise efficiency, Lindley is looking at ways of reconfiguring the design of such reactors. Now in the first year of his Ph.D. under the supervision of Dr. Parks, Lindley is working with Cambridge Enterprise to commercialize his research.

The release notes, however, that there are issues with using thorium. There is currently no thorium industry, so a great deal of infrastructure needs to be put in place before existing power plants can make the switch.

In order to address the dual concerns of electricity supply for an exponentially growing population and global warming, however, a major investment needs to be made in nuclear power. While Parks says nuclear is not the only part of the solution to those twin problems, it is a key component.

With the advantages that thorium presents, and finite resources of uranium, thorium is now being seen as a viable alternative.

"The reasons for choosing thorium are its abundance in comparison to uranium, its greater proliferation resistance and the possibility of a fuel cycle where the only waste is fission product waste," said Parks. "I think our vision of how nuclear power might work in the future addresses quite a lot of the concerns about it such as very long-lived radioactive waste which is a burden on future generations."

With the 50 percent increase in global population which is expected over the next fifty years, in order just to maintain per capita electricity consumption, a major power station would need to go online every day somewhere in the world. "The electricity-generating infrastructure to meet global energy demands is staggering when you think about it in those terms," said Parks. "And if it's going to be low-carbon, then nuclear has to play a role in that."