Is repetition of 9/11 possible?

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Dirty News

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Iran's Nuclear Sites

Source: http://www.stratfor.com/image/irans-nuclear-sites

Analysis

Iran has learned a lesson from Israel's bombing of Iraq's Osirak reactor in 1981 and Syria's nuclear reactor in 2007. Over the years, Tehran has deliberately dispersed key elements of its program across the country -- placing some in hardened and deeply buried facilities -- to make it difficult for an attacker to eliminate the program in a single strike. Tehran is also engaged in a concerted denial and deception campaign intended to obfuscate the status and location of its nuclear sites. Iran presents a significant intelligence challenge for its adversaries. Any would-be attacker would need to possess an accurate and comprehensive understanding of the program's layout, the tactical capability to hit a large and protected target set, and the ability to manage the consequences of an attack.

New report paints dire picture of Japanese Fukushima response

Source:http://www.homelandsecuritynewswire.com/dr20120229-new-report-paints-dire-picture-of-japanese-fukushima-response

A new report reveals that last year's nuclear crisis at Japan's Fukushima Daiichi atomic energy plant was dangerously close to spiraling out of control as senior officials bickered internally, lacked critical information on the extent of the damage, and covertly considered the possibility of evacuating Tokyo.

The *New York Times*, which obtained an advance copy of the study, reports that according to the investigation, senior government officials, the manager of Fukushima nuclear plant, and Tokyo Electric Power (Tepco), the plant's operator, had crippling communication breakdowns and did not trust each other.

This internal bickering impeded response efforts and at times resulted in the release of contradictory information.

"We barely avoided the worst-case scenario, though the public didn't know it at the time," Funabashi said in an interview with the *Times*.

In the early stages of the crisis, the plant manager, Masao Yoshida, was frantically calling top officials in Prime Minister Naoto Kan's administration assuring them that he could contain the incident if he was allowed to keep workers in place and ignore orders from Tepco to not use sea water to cool the rapidly overheating reactors.

At the same time, Tepco president Masataka Shimizu was working against Yoshida, making conflicting calls to Kan's office arguing that the facility needed to evacuate its entire staff, a potentially catastrophic move.

According to the report, if all of Fukushima Daiichi's employees were evacuated, the plant would have continued to degrade resulting in the release of even greater quantities of radioactive material, which would then force the evacuation of other nuclear facilities nearby and cause more meltdowns.

Yukio Edano, the chief cabinet secretary at the time, warned that such a "demonic chain reaction" of plant meltdowns could force the evacuation of Tokyo, 150 miles to the south.

"We would lose Fukushima Daini, then we would lose Tokai," Edano said in reference to two other nuclear facilities. "If that happened, it was only logical to conclude that we would also lose Tokyo itself."

Furthermore the report details the anxiety of the Kan government over

their lack of knowledge about the status of the more than 10,000 spent fuel rods stored near the damaged reactors. With the cooling systems damaged and a series of hydrogen explosions rocking the facility, senior officials feared the relatively unprotected storage pools could release even more radiation.

The fate of the storage pools was unknown for five days, until a Japanese military helicopter was eventually able to confirm that the pool at greatest risk was still safely filled with water.

Speaking to the *Times*, Funabashi criticized the Kan administration for purposely downplaying the seriousness of the nuclear accident and hiding critical information from its citizens as well as the United States.

Funabashi said in the early stages of the nuclear crisis, the U.S –Japan relationship was quite "precarious," until the two countries instituted daily meetings on beginning 22 March.

The report acknowledged that the Japanese government had not fully disclosed details about the potential dangers of the Fukushima incident, but also blamed the United States for overstating the risks. As evidence, the investigation points to when U.S. officials incorrectly warned that the spent fuel rods in the storage pool at greatest risk were exposed to air, in danger of melting down, and releasing large amounts of radiation.

Ultimately, though, the 400-page report pins the blame on the Japanese government for its failure to properly warn residents of the potential danger the accident posed, which resulted in deep-seeded mistrust between the Japanese people and the government. These feelings of distrust spurred the independent investigation, which is rare in Japan where the public often accepts official versions of events.

The investigation, led by the Rebuild Japan Initiative Foundation, had unprecedented access to Japan's top nuclear regulators and government officials including Naoto Kan, the prime minister at the time. Headed by Yoichi Funabashi, the former editor in chief of the *Asahi Shimbun* and one of Japan's most respected thought leaders, the foundation interviewed more than 300 people.

The report, completed by thirty lawyers, journalists, and university professors, is set to be released later this week.

North Korea tested Iranian warhead or "dirty bomb" in 2010 for $55m

Source: http://www.debka.com/article/21794/

German and Japanese intelligence sources Monday, March 5, confirmed – and qualified - to debkafile reports in the German Der Spiegel and Welt am Sonntag that Western intelligence had known for 11 months that at least one of North Korea's covert nuclear tests in 2010 was carried out on an Iranian radioactive bomb or nuclear warhead.

Those sources report five facts are known for sure:

1. North Korea carried out two covert underground nuclear explosions in mid-April and around May 11 of 2010 equivalent to 50-200 tons of TNT.

2. Two highly lethal heavy hydrogen isotopes, **deuterium** and **tritium**, typical of a nuclear fission explosion and producing long-term contamination of the atmosphere, were detected and analyzed by Comprehensive Nuclear-Test-Ban Treaty Organization (CTBOTO) monitoring stations in South Korea, Japan and Russia.

3. The presence of tritium in one of the tests led several intelligence agencies watching North Korea's nuclear program and its longstanding links with Iran and Syria to examine the possibility that Pyongyang had tested the internal mechanism of a nuclear warhead on Iran's behalf. This strongly indicated to German and Japanese intelligence that Iran had already developed the nuclear warhead's outer shell and attained its weaponization.

4. Another possibility examined was that North Korea had tested an Iranian "dirty bomb" – i.e. a conventionally detonated device containing nuclear substances. **Tritium would boost its range, force and lethality.** This was one of the conclusions of atmospheric scientist Larsk-Erik De

Geer of the Swedish Defense Research Agency in Stockholm, who spent a year studying the data collected by various CTBOTO stations tracking the North Korean explosions.

On February 3, De Greer published some of his findings and conclusions in Nature Magazine. His paper will appear in the April/May issue of the Science and Global Security Journal.

5. The Japanese and German sources found confirmation of their suspicions that North Korea had abetted Iran's nuclear aspirations in three events:

a) Shortly after the April explosion, a large group of Iranian nuclear scientists and technicians arrived in Pyongyang. They apparently came to take part in setting up the second test in May.

b) In late April, Tehran shipped to Pyongyang a large quantity of uranium enriched to 20+ percent – apparently for use in the May test.

c) Straight after the May test, the Central Bank of Iran transferred $55 million to the account of the North Korean Atomic Energy Commission. The size of the sum suggests that it covered the fee to North Korea not just of one but the two tests – the first a pilot and the second, a full-stage test.

It is not by chance that this incriminating disclosure about Iran's nuclear achievements sees the light Monday, just hours before US Barack Obama receives Israeli Prime Minister Binyamin Netanyahu in the White house for an argument over an expeditious military action to stop Iran going all the way to a nuclear weapon.

The disclosure invalidates the main point the US President made in his speech Sunday to the pro-Israeli lobby AIPAC convention in Washington that there was still time for diplomatic pressure and sanctions to bring Iran's leaders to a decision to halt their nuclear momentum before military action was called for, whether by the US or Israel.

It now appears that Western intelligence has known about the North Korean tests for Iran for eleven months. Therefore, it is too late for him to try and persuade the Israeli prime minister that there is still time to spare for cutting short a nuclear Iran.

It was announced in Washington Monday that no joint American-Israeli communiqué would be issued at the end of their talks, meaning they will have agreed to disagree: Obama, to stand by his opposition to military action against Iran; Netanyahu, to decide what Israel must do in the interests of its security.

There is no doubt he would have preferred an American initiative for - or partnership in - an operation for curtailing the Iranian nuclear threat. But that is not part of Obama's policy.

New radiation sensor developed

Source: http://www.homelandsecuritynewswire.com/dr20120306-new-radiation-sensor-developed

Scientists have created one of the most advanced radiation sensors in the world: an X-ray detector that can reveal the composition of materials in a fraction of a second

At the Micro and Nano Laboratory in Gaustadbekkdalen in Oslo, scientists have created one of the most advanced radiation sensors in the world: an X-ray detector that can reveal the composition of materials in a fraction of a second.

The sensor has been developed by SINTEF nanotechnologists, and is already an exclusive component in great demand by industries that supply advanced analytical instruments for materials science. SINTEF is the largest independent research organization in Scandinavia.

A SINTEF release reports that this type of sensor is known as a silicon drift diode (SDD), and it is the basic component of a number of instruments that are used in everything from medical X-ray systems to monitoring

experiments at CERN, where scientists are searching for the most basic building blocks of matter.

Another application is in art and archaeology, where the detector can identify which materials have been used and just what they consist of.

"The sensor consists of a double-sided microstructure that is fabricated on silican wafers. Such structures are complex, and difficult to produce. Today, we are one of only two or three suppliers of such sensors in the whole world," says research scientist Niaz Ahmed.

Although the tiny device measures no more than 8 x 8 millimeters it takes eight weeks to produce, and the entire fabrication needs to take place in a super-clean environment.

"Even a single grain of dust is capable of destroying the whole process by short-circuiting the equipment, or damaging its nano-scale structures. This is why the advanced laboratory is equipped with vibration-reducing foundations and air-filtration systems that remove particles as small as 100 nanometers from the laboratory.

The sensor is produced by oxidizing the silicon wafer in several stages, creating a physical structure on nanometer scale. Once this has been done, the scientists dope it with charged atoms at various levels. The result is an incredibly light-sensitive diode which, once it has been connected to the appropriate electronics, can reveal changes in the physical structure of most materials.

The sensor uses spectroscopy, which is based on sending light through a transparent object. When the light beam emerges from the other side of the object, the sensor read off changes in its characteristics.

"To put it simply, we can say that the sensor sorts the light into its individual energy levels by counting the photons and calculating their energy," says Ahmed.

Unlike standard silicon-based sensors, the way the DSSs work requires them to have structures on both surfaces of the sensor chip.

"This can only be done with the help of advanced equipment and extremely high levels of accuracy," says the SINTEF scientist, and explains how.

The release notes that one side of the sensor is called the "window side", and is turned towards the source of radiation.

It absorbs the X-ray beam almost without loss. The other side is known as the "ring side" and has a concentric annular structure; i.e. the rings have the same centre but increase in radius, something like a parabolic aerial in microformat. This means that the electrons generated by the radiation source are captured by the central electrode, which in turn enables the X-ray sensor to discard all the irrelevant electronic signals, or "noise."

"Because it easily distinguishes between different materials by registering differences in the absorption energy of their component elements, the chip can be used to identity forbidden materials such as lead, cadmium and mercury," explains Ahmed.

Due to its unique sensitivity, the Norwegian-developed sensor is in very high demand on the world market. The researchers have also managed to make it so efficient that it uses very little energy, which is important when the sensor is connected to other electronics.

Stateless terrorists with a dirty bomb now real threat for UK

Source: http://www.telegraph.co.uk/news/uknews/law-and-order/9126896/Stateless-terrorists-with-a-dirty-bomb-now-real-threat-for-UK-says-Clegg.html

In a stark message, the Deputy Prime Minister will say materials to make a dirty bomb are so readily available that no police force can hope to contain such a threat.

And while such an atrocity was unthinkable just a generation ago, no country can now afford to ignore the potential risk, he will add.

Last year, The Daily Telegraph disclosed that al-Qaeda is actively trying to secure nuclear material and recruiting rogue scientists to build a radioactive "dirty" bomb.

Mr Clegg's warning comes as tensions over Iran's nuclear programme continued to grow yesterday.

David Cameron said an Iranian nuclear weapon was a danger to all and not just the Middle East and did not rule out military action.

Mr Clegg will call for more co-operation between countries to combat the threat of terrorism, crime and economic collapse during a speech in The Hague this evening.

He will say: “And it is only by working together that we have any hope of tackling the new threats.

“Take a terrorist-executed nuclear attack: unthinkable just a generation ago but now a possibility the international community cannot afford to ignore, thanks to an increased availability of nuclear material combined with more information about making the weapons on the internet, as well as thriving smuggling networks.

“That is a stateless threat, impossible for any national police force, no matter how advanced, to contain.

“But together we can agree and enforce the rules that will prevent such attacks. And I’m travelling to a major summit in Seoul later this year to that very end.”

The prospect of a terror group developing a nuclear weapon or dirty bomb has long been a deep concern for the security services.

Leaked diplomatic documents last year showed a leading atomic regulator had privately warned that the world stands on the brink of a "nuclear 9/11".

Security briefings suggested that jihadi groups was also close to producing "workable and efficient" biological and chemical weapons that could kill thousands if unleashed in attacks on the West.

Thousands of classified American cables obtained by the WikiLeaks website and passed to The Daily Telegraph detailed the international struggle to stop the spread of weapons-grade nuclear, chemical and biological material around the globe.

At a Nato meeting in January 2009, security chiefs briefed member states that al-Qaeda was plotting a programme of "dirty radioactive IEDs", makeshift nuclear roadside bombs that could be used against British troops in Afghanistan.

As well as causing a large explosion, a "dirty bomb" attack would contaminate the area for many years.

In a separate development, the Cabinet was yesterday briefed on Iran's nuclear programme amid continuing fears that the Tehran regime is seeking to acquire the bomb.

National Security Adviser Sir Kim Darroch led the presentation, which also featured "a number of experts".

The discussion came after US President Barack Obama held talks with Israeli Prime Minister Binyamin Netanyahu yesterday in Washington to discuss the issue.

The Israelis have shown increasing signs of impatience that diplomatic pressure has so far failed to persuade Tehran to abandon the programme, prompting speculation they could mount air strikes.

But while Mr Cameron insisted an Isareali attack was not the “right thing” at present, he told MPs on the Commons liaison committee: "Nothing is off the table.

"It is difficult to say that because no one wants to see conflict in any way. But I think it's very important that the world sends a message to Iran that a nuclear-armed future is not something that we want to see.

"If the sanctions don't work there will come a moment of a very difficult decision."

He added: ""I don't believe that an Iranian nuclear weapon is just a threat to Israel.

"It is also clearly very dangerous for the region because it would trigger a nuclear arms race but also its a danger more broadly, not least because there are signs that the Iranians want to have some sort of intercontinental missile capability.

"So we have to be clear this is potentially a threat much more widely."

What would one big nuke do to Israel?

Source: http://blog.american.com/2012/02/what-would-one-big-nuke-do-to-israel-this/

Iran has called Israel a “one bomb state,” meaning one nuclear bomb could effectively end the existence of the tiny, New Jersey-sized nation. Israel has a population of 7.8 million people. Some 42 percent of the population live in the Tel Aviv metro area. Over at io9, there was a story about a website called Nukemap, which, using Google Maps, allow you to see what would happen if different-sized nuclear weapons exploded over a particular city. This is what would happen if a 45 kiloton nuke, roughly the size of the kind of weapon Pakistan has, exploded in Tel Aviv.

Effects radii for 45 kt blast (smallest to largest):

Fireball radius: 0.14 km / 0.09 mi

Maximum size of the nuclear fireball; relevance to lived effects depends on height of detonation.

Air blast radius: 0.98 km / 0.61 mi

20 psi overpressure; heavily built concrete buildings are severely damaged or demolished; fatalities approach 100%.

Radiation radius: 1.73 km / 1.08 mi

500 rem radiation dose; between 50% and 90% mortality from acute effects alone; dying takes between several hours and several weeks.

Air blast radius: 2.6 km / 1.61 mi

4.6 psi overpressure; most buildings collapse; injuries universal, fatalities widespread.

Thermal radiation radius: 3.27 km / 2.03 mi

Third-degree burns to all exposed skin; starts fires in flammable materials, contributes to firestorm if large enough.

Peacemaker Redux: 2012 Nuclear Security Summit

By Young-mok Kim

Source: http://www.huffingtonpost.com/youngmok-kim/2012-nuclear-security-summit_b_1327497.html

Less than 10 minutes left. Timer on a nuclear bomb is ticking down. 47th Street, nearing the UN building. He was once a loving father and a devoted husband. 46th Street. Tears running down his face, he still remembers holding the lifeless body of his daughter, still warm. 45th Street. Almost there. His backpack is getting heavy. 44 East: in it is the bomb that can undo civilization as we know it.

This is a scene from a blockbuster movie, *The Peacemaker*. I suggest you watch it, if you still haven't. The story goes that a Balkan-based terrorist group smuggles one of the nuclear warheads hijacked in mid-transit from the former Soviet Union into New York City. The two heroes, in this case Dr. Julia Kelly (Nicole Kidman) and Lt. Col. Thomas Devoe (George Clooney), attempt to stop their evil plot and save the city -- and perhaps the world.

Hollywood dramatization aside, of course, nuclear terrorism is not an easy feat, because it takes a whole nation to create a nuclear bomb. But, the situation drastically changes if a terrorist group somehow procures enough fissile material to make a crude device. With its catastrophic devastation that lingers for decades, detonation of even a very primitive type could cause deleterious consequences.

According to the International Atomic Energy Agency's Illicit Trafficking Database (ITDB) a total of 2,164 confirmed incidents of unauthorized possessions, trafficking and thefts/loss were recorded in the past two decades. In 2006 a Russian citizen was apprehended in Georgia for attempting to traffic 100 grams of HEU for $1 million. In August 2010 an attempt to smuggle U-238 refined "yellowcake" was uncovered; and in June of last year quantities of U-235 from Moldova were ceased before shipping. Given such frequency, threats of nuclear terrorism are not limited to the imagination of Hollywood screenwriters, but a grim reality.

Since a total of over 2,000 tons of HEU and plutonium exist around the world, President Barack Obama initiated an ambitious undertaking of hosting the first Nuclear Security Summit in Washington D.C. in April of 2010. This was a gathering of 47 heads of state and leaders of international organizations committed to work towards securing all vulnerable nuclear materials and safeguarding nuclear materials and facilities under their jurisdictions.

However, nuclear terrorism is only one part, albeit a serious one, of many nuclear related threats that loom over us. Another alarming issue

is the question of nuclear safety. Take, for instance, the Fukushima Daiichi accident. Following the earthquake and tsunami in Japan on March 11, 2011, a series of equipment failures, nuclear meltdown and releases of radioactive materials caused serious worries on a global scale.

The world's nuclear power industry, in parallel with individual efforts, has been working hard to put in place enforceable and comprehensive nuclear safety standards or regulatory bodies to safeguard against any accidents. The World Association of Nuclear Operators (WANO) and international agencies like IAEA function as ad-hoc watchdogs and regulatory entities, but their oversight and authority remain constrained. Compounding the issue is that the currently available nuclear technologies and reactors are made from various origins with different designs and standards. Therefore, the need for broader and higher standards is more salient than ever.

For instance, North Korea's nuclear program, putting aside the questions of weaponization or proliferation, should draw international attention. The nuclear fallout from a possible accident in Yongbyon or in any other sites in North Korea would be devastating for the region and the world.

According to Nuclear Threat Initiative's Nuclear Materials Security Index -- an international benchmarking project to compare nuclear materials security -- North Korea ranked the lowest among the countries with "one kilogram or more of weapons-usable nuclear materials." According to the report, their deficient investments in safety regulation are substandard at best. Also, their lack of international expertise and oversight compounds the uncertainty. The confluence of these two elements, as well as other risks, prescribes a probable recipe for a disaster. Indeed, the recent agreement between the U.S. and the DPRK to freeze Pyongyang's nuclear and missile development programs is the most welcoming first step. But, the issue of nuclear safety should not be overlooked.

The fact of the matter is that despite all these possibilities of danger, nuclear energy provides more benefits than harm, if it is safely harnessed. First, nuclear power is green, unlike other conventional fossil fuel-based plants. Also, reliability and high load factor -- more output per cost of fuel -- are the major contributing factors in stable electricity prices. With relatively low uranium costs and many technological improvements to the plants' efficiency, stable and low electricity cost have contributed significantly to economic development of many countries.

South Korea has been a long beneficiary of nuclear power. As the world's fifth largest country to have nuclear energy generation capacity, Korea is set to become one of the major players in the global nuclear energy and technology. As such, Korea is firmly committed to advancing more efficient and safe nuclear power and strengthening international cooperation on nuclear security and safety.

In late March Seoul hosts the second global nuclear security summit. President Obama and United Nations Secretary General Ban Ki-moon will be among the 50 heads of state and international organizations attending this largest summit in recent history. They will seek to adopt a list of specific action plans that expand the momentum of nuclear security generated in 2010. Among them is the issue of nuclear safety. Bolstering global nuclear safety architecture would enhance international interface of nuclear safety. It would also make the discussion more comprehensive.

The meeting will also seek to build public confidence in nuclear energy. Undermined by the recent incident, continued advancement of safe and secure civilian nuclear energy is crucial in sustaining the world's economic growth. In fact, most of the nuclear reactors in the world have been resistant to any accident, while danger from lower level of radiation has been a bit exaggerated.

The Seoul summit is the first forum -- at the highest level -- to address these issues. Veritably, the world audience is curious and anxiously awaiting to see how the episodes will turn out to make the world safer.

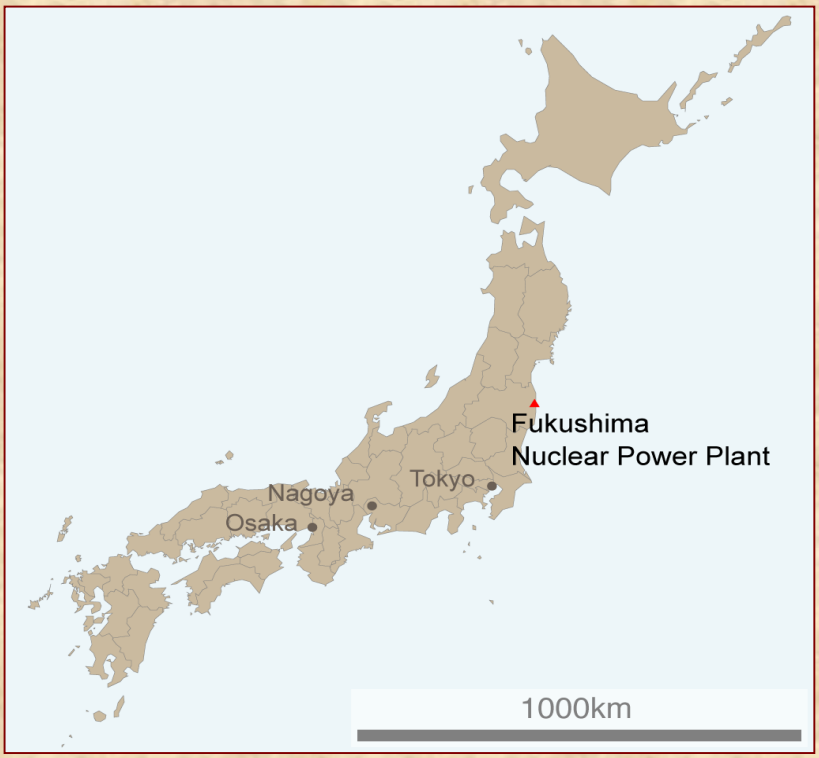
So yes, it is time to watch *The Peacemaker*, the redux; and observe what is being played out in this Summit. But, don't forget. Another highly anticipated sequel, the Peacemaker: A Terrorist's Nuclear Ambition, is also in the works.

Young-mok Kim *is the Consul General of the Republic of Korea in New York*

Fukushima lesson: be ready for unanticipated nuclear accidents

Source:http://www.homelandsecuritynewswire.com/dr20120311-fukushima-lesson-be-ready-for-unanticipated-nuclear-accidents

A year after the crisis at Japan's Fukushima Daiichi nuclear power plant, scientists and engineers remain largely in the dark when it comes to fundamental knowledge about how nuclear fuels behave under extreme conditions, according to a University of Michigan nuclear waste expert and his colleagues.



In a review article in this week's edition of the journal *Science*, U-M's Rodney Ewing and two colleagues call for an ambitious, long-term national research program to study how nuclear fuels behave under the extreme conditions present during core-melt events like those that occurred at Fukushima following the 11 March, 2011, magnitude 9.0 earthquake and tsunami.

A University of Michigan release reports that three of the plant's six boiling-water reactors suffered partial core-melt events that involved tremendously high temperatures and powerful radiation fields, as well as interaction between seawater and nuclear fuel. Many tons of seawater were used to cool the overheated reactors and nearby spent-fuel storage ponds, and direct discharge of contaminated seawater to the ocean and groundwater occurred through approximately 8 April.

"What I realized while watching all of this was how little we actually knew about what happens if you take hot seawater and pour it on nuclear fuel," said Ewing, a professor in the Department of Earth and Environmental Sciences, the Department of Nuclear Engineering and Radiological Sciences, and the Department of Materials Science and Engineering. Ewing is also a member of the U.S. Nuclear Waste Technical Review Board. "No one, as far as I know, had asked the question, 'Well, what happens when you do this? Are we doing something really good or really bad?'" Ewing said. "That kind of information really wasn't available, and that expertise, as far as I could see, wasn't there to be called upon."

The use of seawater at Fukushima underscores the need for fundamental nuclear-fuel knowledge that can be applied over a range of unanticipated situations, Ewing said. The research should include studies of the various radioactive materials released from damaged fuel during a core-melt incident, as well as a thorough examination of how nuclear fuel interacts with fresh water and seawater, he said.

Such studies could lead to predictive models that would help nuclear plant operators respond to unforeseen events, taking appropriate and timely action to minimize impacts on the environment and human health. The Science paper reviews the current

understanding of nuclear-fuel interactions with the environment during core-melt accidents.

"Almost by definition, an accident will be something

Universal Detection unveils radiation detection Smartphone app

Source:http://www.environmental-expert.com/news/universal-detection-technology-unveils-the-smart phone-application-for-its-radsmart-radiation-detection-device-284368

Last week Universal Detection Technology unveiled its first generation Smartphone app designed to detect nuclear radiation levels on a variety of surfaces including food.

The RadSmart device, developed in conjunction with Honeywell, is capable of measuring radiation levels and sending the collected data to a Smartphone.

The device was developed in response to growing concerns over food contamination following the nuclear disaster at the Fukushima Daiichi atomic power plant last March. Japanese consumers have been wary of consuming food after it was revealed that radiation had been detected in everything from vegetables, beef, milk, and baby formula.

"A year after the Fukushima disaster, the focus of the Japanese government has increasingly moved to the decontamination of the disaster area," said Jacques Tizabi, the chairman and CEO of Universal Detection. "RadSmart has been designed for this specific scenario as it will be able to geo-locate the particular test surface and compare data before and after decontamination."

Armed with the device, users can detect radiation contamination in food or other surfaces, log the readings, and share the readings with others via a social networking feature.

RadSmart relies on a Cesium Iodide (CsI) scintillator to detect radioactive gamma rays as they are the most sensitive detection mechanism for gamma rays. According to a release by Universal Detection, the device has a detection range of 0.001 to 9.999 μSv/h, making it sensitive enough to measure normal radiation levels to 100 to 200 times that intensity.

The Secret Threat from Syria's Nuclear Weapons Program

Source: http://www.lignet.com/#ixzz1p72DkXXR

The United States must start thinking about how to secure Syria's nuclear program and to locate the missing uranium and nuclear weapons-related technology of the program before they can find their way into the hands of the Iranians or terrorist groups, LIGNET managing editor Fred Fleitz said in an interview this week.

Photo released by the CIA in 2008 of Syria's al-Kibar nuclear reactor while it was under construction.

"If Assad thinks he's in danger, he just may decide to transfer some technology, or maybe some uranium, to Iran," Fleitz said of the Syrian president, who has earned international opprobrium for his brutal crackdown on the opposition.

"When we think about a post-Assad Syria, we shouldn't be overlooking this," said Fleitz.

Fleitz, a long-time senior analyst with the CIA and senior staffer on the House Intelligence Committee until the spring of 2011, said there are many outstanding questions about Syria's nuclear program that date to the Bush administration.

Most of what is known about Syria's nuclear program came to light in reports of Israel's 2007 strike on the al-Kibar nuclear reactor in the Syrian desert about 20 miles outside the town of Deir el-Zor. The reactor, which was reportedly close to being operational, was destroyed by Israeli air strikes on September 6, 2007."We know since this reactor wasn't near any cities and didn't have any infrastructure to produce power, this was not a reactor that was built for peaceful purposes," Fleitz told journalist John Bachman. "This was a reactor that was built to make plutonium for weapons." In 2008, a U.S. intelligence briefing revealed that the al-Kibar reactor was built by North Korea, and was almost identical to one in Yongbon, North Korea, that is used to produce plutonium for North Korea's nuclear weapons. The briefing also revealed that the reactor was very close to being operational.

But Fleitz says this isn't the end of the story — Syria's nuclear program still poses a threat, especially if the Assad government falls and the country descends into chaos.

"In the eyes of some in the press, that was that. The threat was gone. But that's not necessarily the case," said Fleitz. "This reactor reportedly was close to operations, which raises the question: Where are the fuel rods for this reactor? Now, it's possible that North Korea was going to ship these fuel rods to Syria. However, it's also very likely that Syria was building a fuel fabrication building somewhere in the country to keep this reactor fueled. Also, since this reactor was likely for plutonium for weapons, there would have to be buildings to process that plutonium, to reprocess and extract the plutonium and then make it into weapons fuel. Where are those buildings? What technology does Syria have that other powers could

possibly exploit or terrorist groups could exploit?"

The United States, said Fleitz has never bothered to ask these questions, or tried to answer them.

"Iran is running out of uranium, for enrichment, and it's been looking all over the world for sources for uranium — supposedly for its power program, but most experts believe is for its weapons program. If there is an amount of uranium in Syria that Syria had amassed for its al-Kibar reactor, Iran's going to want it. And I think that's something that, in addition to worrying about Syria's chemical and biological weapons program, the United States has to think about Syria's nuclear weapons program and all the associated infrastructure and buildings and materials and uranium that had built up for this program. I think this is a serious threat."

Many experts believe the al-Kibar reactor couldn't have been put together without Iranian assistance, and that it may have in fact been an Iranian project, the manifestation of Iran's attempt to pursue plutonium for use as fuel in nuclear weapons. Fleitz says there's a "strong likelihood" that Iran and Syria were indeed collaborating on al-Kibar, building the facility "where the world wouldn't be watching, in the middle of the Syrian desert."

Chemical weapons

The Bush administration had repeatedly charged that Syria had stockpiles of chemical and biological weapons, basing this on U.S. intelligence reports. These weapons, says Fleitz, would "pose a significant threat" if they were to fall into the wrong hands.

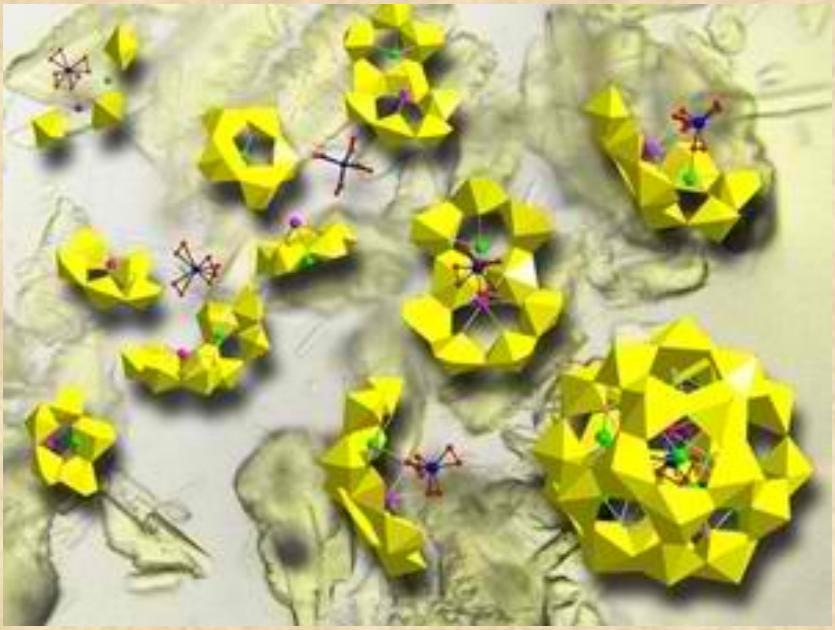
"In all likelihood they are well guarded and well protected," said Fleitz, and dismissed media speculation about the weapons being used on invading troops as unlikely.

"Now in terms of falling into the hands of terrorist groups, that is a real worry. The worry that militia groups could seize these weapons, such as militias in Libya did after that conflict, is a real concern."

Molecule may aid nuclear waste clean-up

Source: http://www.ed.ac.uk/news/all-news/120312-nuclear

Scientists have produced a previously unseen uranium molecule in a move that could improve clean-up of nuclear waste.



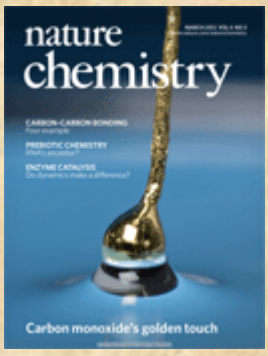
The distinctive butterfly-shaped compound is similar to radioactive molecules that scientists had proposed to be key components of nuclear waste. These molecules, however, were thought too unstable to exist for long.

A University of Edinburgh release reports that researchers have shown the compound to be robust, which implies that molecules with a similar structure may be present in radioactive waste.

University of Edinburgh scientists, who carried out the study, say their findings suggest the molecule may play a role in forming clusters of radioactive material in waste.

These are difficult to separate during clean-up. Improving treatment processes for nuclear waste, including targeting this type of molecule, could help the nuclear

industry move towards cleaner power generation.
Ideally, all the radioactive materials from spent fuel can be recovered and made safe or used again.



This would reduce the amount of waste and curb risks to the environment.
The Edinburgh team worked in collaboration with scientists in the United States and Canada to verify the structure of the uranium compound.
They made the molecule by reacting a common uranium compound with a nitrogen and carbon-based material. Scientists used chemical and mathematical analyses to confirm the structure of the molecule's distinctive butterfly shape.
The study, funded by the Engineering and Physical Sciences Research Council, the EaStCHEM partnership, and the University of Edinburgh, was published in *Nature Chemistry*.

— Read more in Polly L. Arnold et al., "Strongly coupled binuclear uranium–oxo complexes from uranyl oxo rearrangement and reductive silylation," Nature Chemistry 4 (21 February 2012): 221–7

Abstract
The most common motif in uranium chemistry is the d^0f^0 uranyl ion $[UO_2]^{2+}$ in which the oxo groups are rigorously linear and inert. Alternative geometries, such as the *cis*-uranyl, have been identified theoretically and implicated in oxo-atom transfer reactions that are relevant to environmental speciation and nuclear waste remediation. Single electron reduction is now known to impart greater oxo-group reactivity, but with retention of the linear OUO motif, and reactions of the oxo groups to form new covalent bonds remain rare. Here, we describe the synthesis, structure, reactivity and magnetic properties of a binuclear uranium–oxo complex. Formed through a combination of reduction and oxo-silylation and migration from a *trans* to a *cis* position, the new butterfly-shaped Si–OUO_2UO–Si molecule shows remarkably strong U^V–U^V coupling and chemical inertness, suggesting that this rearranged uranium oxo motif might exist for other actinide species in the environment, and have relevance to the aggregation of actinide oxide clusters.

Scientists develop a dirty bomb detection system

Source:http://www.homelandsecuritynewswire.com/dr20120318-scientists-develop-a-dirty-bomb-detection-system

Scientists at the University of Liverpool (UK) are developing a test for nuclear materials that could prevent the construction of atomic weapons and dirty bombs.
Governments are increasingly concerned about the availability of radioactive and nuclear material in countries with weak or ineffective control systems — particularly around areas of production, reprocessing, storage, and transportation. The £3 million international project, funded by the European Commission, will deliver a prototype mobile detection system to reduce the risk of radioactive and nuclear materials being used for terrorism.

A University of Liverpool release reports that the cycle of activities in power and research reactors in both the civil and defense sectors produce Special Nuclear Material (SNM), including plutonium, which can be used for the construction of atomic weapons and dirty bombs. The project, supported by the International Atomic Energy Agency and the European Atomic Energy Community, aims to ensure SNM remain out of reach of individuals and groups who might attempt to use them illegally.
Professor Christos Touramanis (photo) from the university's

Department of Physics, said: "Current systems to detect SNM have a number of limitations. Materials tend to be smuggled inside commercial containers and special enclosures inside can minimise the escaping tell-tale radiation. The system we're developing will rely heavily on noble gas detection modules supported by robust, lightweight electronics and intelligent analysis algorithms, integrated in portable units that can be used by security personnel at ports of entry."

The international consortium developing the technology includes universities and industry with expertise in detecting neutrons and gamma rays, state-of-the-art electronics and powerful spectrum analysis software. Border control agencies are providing evaluation in real world situations.

Plutonium emits neutrons of high energy and detection systems work by picking up on this tell-tale 'signature'. Neutron detection, however, has traditionally relied heavily on Helium-3, an isotope which is becoming scarce, and expensive to use. The university is developing noble (inert) gas sensors which will detect neutron emissions and sit at the heart of the new system. The detectors can be made efficient in small systems and robust for security forces to carry in the back of a car and use wherever required.

The release notes that the work, which forms part of the university's research in the area of security and conflict, draws upon the university's expertise in the development of particle detectors, both for fundamental science in experiments like the Large Hadron Collider at CERN and in applications in the areas of homeland security and medical physics.

An elemental force: Uranium production in Africa, and what it means to be nuclear

By Gabrielle Hecht

Source: http://bos.sagepub.com/content/68/2/22.full

Uranium from Africa was, and remains, a major source of fuel for atomic weapons and power plants throughout the world. Uranium for the Hiroshima bomb, for example, came from the Belgian Congo. During any given year of the Cold War, between 20 percent and 50 percent of the Western world's uranium came from African places: Congo, Niger, South Africa, Gabon, Madagascar, and Namibia. Today, there is a renewed uranium boom throughout the continent. The author writes on the ambiguities of the nuclear state, and the state of being nuclear, and why the nuclear designation matters. She looks at two countries to uncover different dimensions of nuclearity: Niger, which has long struggled with France over the price of its uranium; and Gabon, where cancer and other illnesses related to four decades of uranium production remain invisible.

In January 2003, US President George W. Bush declared in his State of the Union address that "the British government has learned that Saddam Hussein recently sought significant quantities of uranium from Africa." The intelligence, his administration insisted, was unequivocal: Iraq had tried to purchase 500 tons of yellowcake from Niger. *Trust us*, said officials, trotting out more questionable evidence: *Saddam is building "the bomb."*

If the death toll were not so huge, the suffering and violence not so vast and ongoing, the next part of the story would be comical. The so-called evidence—procured by a shady Italian businessman—turned out to be forged. In fact, the forgeries were so inept that when International Atomic Energy Agency (IAEA) experts finally saw them in March, they immediately guessed the documents were fake and proved it within hours. By then it was too late, of course. The war had already begun.

As the story unfolded, layers of intrigue accumulated in the US press. Former diplomat Joseph Wilson wrote to the *New York Times*, describing his visit to Niger and discrediting Bush's claims. The administration retaliated by outing Wilson's wife, CIA operative Valerie Plame. The media set out to "follow the yellowcake road," and did so by focusing on Americans—Wilson, Plame, and various Bush officials—rather than on the actual heart of the story: The transmutation of "uranium from Africa" into "atom bomb for Iraq," an alchemy that—still

today—most people don't question. The (nonexistent) 500 tons of yellowcake became the most visible element of the dubious evidence concerning Iraqi atomic bomb efforts.

So what explains the power of the phrase "uranium from Africa"? Why did the claim work so well from a political and cultural perspective? Had the forged evidence concerned Kazakhstan—another major producer—would the administration have talked about "uranium from Asia"? Highly unlikely. In mainstream Western political imagination and media, Africa remains the Dark Continent, mysterious and politically corrupt—plausible qualifications for a nuclear supplier. And what better candidate for shady dealings than Niger, a nation most Americans couldn't distinguish from Nigeria? Consider also the assumption that acquisition of uranium would constitute prima facie evidence of a bomb program's existence. Before uranium becomes weapons-usable, it must be mined as ore, processed into yellowcake, converted into uranium hexafluoride, enriched, and pressed into bomb fuel. "Uranium" is therefore as underspecified technologically as "Africa" is underspecified politically.

The Niger episode reflects the ambiguities of the nuclear state, and the state of being nuclear. But what exactly is a nuclear state? Does a uranium enrichment program suffice to make one of Iran, as its president Mahmoud Ahmadinejad has claimed? Or are atomic bomb tests the deciding factor? Such ambiguities cannot be dismissed as doublespeak or grandiose ranting. They matter too much to be discounted so easily.

The nuclear status of uranium is an important aspect of these ambiguities. When does uranium count as a nuclear substance? When does it lose that status? And what does Africa have to do with it? Such issues lie at the heart of today's global nuclear order. Or disorder, as the case may be. The questions themselves sound deceptively simple. Understanding their significance and scope requires knowing their history.

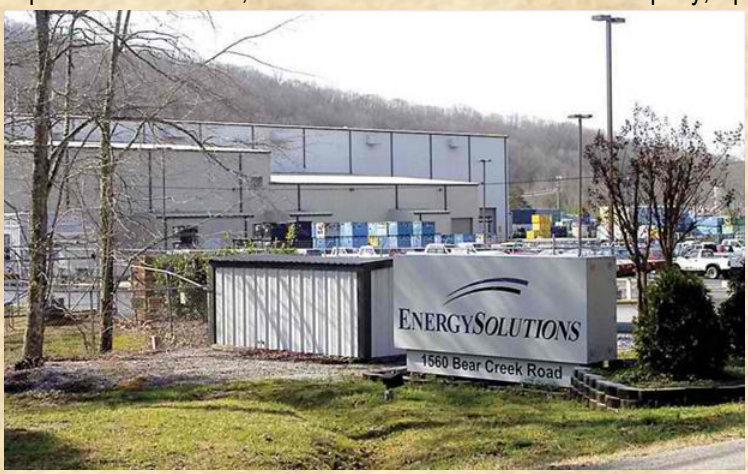
Gabrielle Hecht *is professor of history at the University of Michigan. She is the author of* The Radiance of France: Nuclear Power and National Identity after World War II *(MIT Press, new edition, 2009)* and Being Nuclear: African and the Global Uranium Trade *(MIT Press, 2012).*

NOTE: Read full paper at Newsletter's website – "CBRNE-CT Papers" section

Radioactive waste may be bound for State

Source: http://timesfreepress.com/news/2011/mar/18/radioactive-waste-may-be-bound-state/

An East Tennessee plant recently applied to import and treat 1,000 tons of German radioactive waste, a move some say makes good business sense but has environmental activists concerned for the state's health.



EnergySolutions, a Utah-based multinational company, operates radioactive waste disposal facilities in Oak Ridge, Tenn., including an incineration facility at Bear Creek. The commercial plant has treated low-level radioactive waste — such as x-ray equipment and medical waste — for American businesses and the government since it opened more than 20 years ago.

A German company has proposed sending radioactive medical and industrial waste to Oak Ridge for incineration so it can be shipped back to Germany and stored as ash.

EnergySolutions officials said their company is one of just a few that can treat waste in that way.

But some environmental activists call importing radioactive waste "a dangerous mistake."

"I don't understand why any state, no matter how desperate they are for jobs, would bring this known toxic, hazardous material," said Diane D'Arrigo, radioactive waste project director at the Nuclear Information and Resource Service, a North Carolina group.

D'Arrigo said radioactive waste transport and burning runs a high risk of locally releasing low levels of radiation that are known to contribute to diseases such as lung cancer and leukemia, according to the Mayo Clinic.

"There's no safe level. There's no threshold dose for most of these health effects," she said. "Even a little bit increases a person's risk."

EnergySolutions spokesman Mark Walker said the facilities are as safe as they can be and any radiation released is lower than natural background levels.

The company has a state license to treat waste regardless of its country of origin and applied in November for U.S. Nuclear Regulatory Commission permission to import, treat and export international waste.

NRC spokesman David McIntyre said approval can take several months. Company officials have said if the NRC approves, EnergySolutions could begin shipping waste as early as April or as late as the end of the year.

Health & Safety

Since EnergySolutions came to Tennessee more than 20 years ago, there has never been a death or injury from exposure to materials, according to Walker.

The company meets Tennessee Department of Environment and Conservation licensing regulations on safety concerns such as radiation shielding and maintaining proper ventilation systems. EnergySolutions is required by TDEC to monitor radiation levels on site and in the area, and state regulators test the area once a year — twice as often as the federal government recommends.

TDEC official also take monthly water samples and quarterly sediment samples from nearby Grassy Creek, and both TDEC and EnergySolutions maintain separate ambient radiation monitors around the facility's perimeter fence.

But D'Arrigo said more outside testing is needed.

"Once a year is definitely not enough," she said. "When the thing is burning every day of the year, it is not going to necessarily be representative of the whole story."

Capacity

The Oak Ridge plant incinerates 15,000 tons of low-level radioactive waste every year, most of which comes from the United States. Though the incineration process does not reduce radioactivity, volume reduction helps keep radioactive waste storage facilities from filling, Walker said.

The company acknowledges that, on rare occasions, radioactive materials such as tritium are released during treatment. The company said releases are at rates 96 percent below the limit set by Tennessee, and TDOT officials confirmed all the materials released by EnergySolutions are within state regulations.

"There's more tritium in the atmosphere from cosmic rays from the sun than what we'd ever emit from there," Walker said.

Still, environmental activists worry about the potential health effects of radioactive ash escaping smokestacks.

"I believe them when they say it [filtration] captures whatever 90 percent they say it captures, but even if it does capture 99.9 percent, there is a .01 percent that's getting out," said Don Safer, chairman of the Tennessee Environmental Council.

"All it takes is one particle that is that fine to get into your lungs and you've got a high probability of getting lung cancer."

According to the NRC regulatory guide, breathing is the most common way radioactive material is ingested. When radioactive materials do get ingested, they most often pass through several organs and are excreted within a few days.

Irradiated material passing through a person's body can permanently change cells, sometimes causing cancer in the host or genetic birth defects in an exposed person's child.

Safer said that's why incineration isn't a healthy way to dispose of any waste.

"It's absolutely essential that the filters work 100 percent, 100 percent of the time," he said.

"It's rare anymore to burn radioactive waste materials. How rare is indicated

by the Germans wanting to ship the stuff over here to burn it," he said. "It's pretty telling that .... it even makes economic sense to do it."

Transport

The plan is still in the early stages, so EnergySolutions is unsure how much the contract would be worth.

German isotope production company Eckert & Ziegler, which supplies radioactive medical and industrial supplies such as X-ray equipment, proposes to send leftover radioactive waste to a yet-to-be determined East Coast port by boat. The waste would be trucked via interstate highways and Tennessee Route 95 or Route 58 to Oak Ridge incinerators, according to EnergySolutions' import license application.

"The biggest danger is the transportation in and out," said state Sen. Andy Berke, D-Chattanooga, who is against the deal. "The potential implications are monstrous. I certainly hope that things go right, but when you're talking about some of the most dangerous material on our planet, we want to use every possible safeguard."

There are no plans for the German waste to be stored in Tennessee. Last year EnergySolutions drew fire when it proposed importing radioactive Italian waste for treatment in Tennessee and storage in Utah, but Walker said EnergySolutions is now committed to not storing foreign waste in the U.S.

Still, Berke worries about waste and ash transport.

In 2008, a dam at TVA's Kingston Fossil Plant ruptured, releasing 5.4 million cubic yards of coal ash slurry just miles away from Oak Ridge. The ash was nonradioactive but contained such toxic chemicals as arsenic, mercury, lead and selenium.

Berke wants to ensure the area doesn't see another ash spill — particularly not a radioactive one — which could affect important natural resources such as the Tennessee River.

"Any kind of environmental issues don't just concern the local area, they concern the river and the entire environment," he said. "We're 20 miles or so away from a coal ash spill that should remind us of the dangers of playing with this type of waste."

Politics

Laurence Miller, a professor of nuclear engineering at the University of Tennessee at Chattanooga, takes his radioactive waste management class on a tour of EnergySolutions every year. He said the facility is entirely safe and called the idea that the German waste would raise additional health concerns "total nonsense."

"From the standpoint of a health issue, it's no different from what they've been doing," he said. "If you are worried now, then why were you not worried for the last 10 years?"

If people want to take issue with importing German waste, they should focus on politics, not health, Miller said.

"The issue should be: We don't want to process anybody's foreign stuff," he said. "From the standpoint of politics, if you don't want to burn someone else's trash, then that's a totally different issue."

That issue isn't lost on Berke, who worries that accepting the waste would open the doors for Tennessee to become other countries' "nuclear trash can."

Safer said he's also unhappy with the future political implications of the deal.

"The reality is that once this stuff starts coming in regularly from foreign countries, it will come in from all over the world," he said. "Once this is established as a business model for EnergySolutions, I don't think it's going to be very long before they're looking to bring other materials in."

But EnergySolutions officials said they already are treating foreign waste from countries such as Mexico, Canada, the U.K. and Japan, making Germany's materials a logical expansion of what's already being done.

"It's just not in any shape, form or fashion a precedent-setting event," said Thomas Magette, senior vice president of nuclear regulatory strategy at EnergySolutions. "The idea of opening the door is just misplaced because it's been going on for decades."

For Safer, the bottom line is that foreign countries should deal with their own waste.

"We're doing things that in other parts of the world are very controversial," he said.

"Tennessee is just volunteering to be the world' s radioactive waste processor and doing things that most of the rest of the world will not think about doing to radioactive waste."

ENERGYSOLUTIONS

Based in Salt Lake City, Utah, EnergySolutions recycles, processes and disposes of nuclear material

across the United States, United Kingdom and Canada. The Oak Ridge facility is the only one of its type operated by the company, which generates about $1.5 billion in revenue annually. The company has been active in Tennessee for more than 20 years.

Breakthrough in next gen nuclear detectors

Source: http://www.defpro.com/news/details/33126/?SID=d399a219da6571672330a4a674769a0f

Researchers have long struggled to develop radiation detectors that can spot a nuclear device hidden away in a shielded case, but a recent breakthrough could change all that.

Existing passive detectors have limited ranges, while active detectors require large amounts of power and both have difficulty sensing shielded materials. To overcome these challenges, researchers have created the Multi-Mode Passive Detection System (MMPDS) which uses the universe's constant stream of naturally occurring cosmic radiation.

When a vehicle or container with nuclear material passes between the MMPDS' sensor arrays, the device will measure the change in the path of muons, high energy particles that have been a constant in the universe since the Big Bang. Denser materials cause greater changes in the paths of muons thereby allowing the sensors to identify the location of nuclear material even if it is shielded by lead and steel.

Since MMPDS is a passive system, it is relatively cheap to construct and operate.

So far MMPDS has successfully undergone initial testing and is currently being deployed at the port of Nassau in the Bahamas

Developed by Decision Sciences, MMPDS was created largely with private venture capital funding and some assistance from the Los Alamos National Laboratory.

Good news: metal-reducing bacteria interact with plutonium oxide

Source: http://www.homelandsecuritynewswire.com/dr20120320-good-news-metalreducing-bacteria-interacts-with-plutonium-oxide

Recent work by scientists at Pacific Northwest National Laboratory (PNNL) has shed new light on the perplexing environmental chemistry of plutonium. They demonstrated that under anaerobic, or oxygen-free, conditions, plutonium(IV) hydrous oxide, the most common subsurface form of plutonium, does not become very soluble. In fact, this amorphous Pu solid becomes more crystalline when it contacts dissimilatory iron-reducing bacteria (DIRB).

Other compounds disposed with the Pu, however, also interact with it. When Pu comes in contact with EDTA, a chelating agent, its oxidation state decreases, and the resulting chemical form is dramatically more soluble. In addition, Pu's reduction and increase in solubility is dramatically increased by the electron shuttle anthraquinone-2,6-disulfonate, or AQDS.

PNNL says that underneath some locations at the Hanford Site in southeastern Washington State, plutonium and other radioactive contaminants exist as a result of past plutonium production efforts at the site.

Scientists at PNNL and collaborators have been studying the biogeochemistry of the subsurface to understand the environmental factors impacting the fate and transport of Pu in the subsurface.

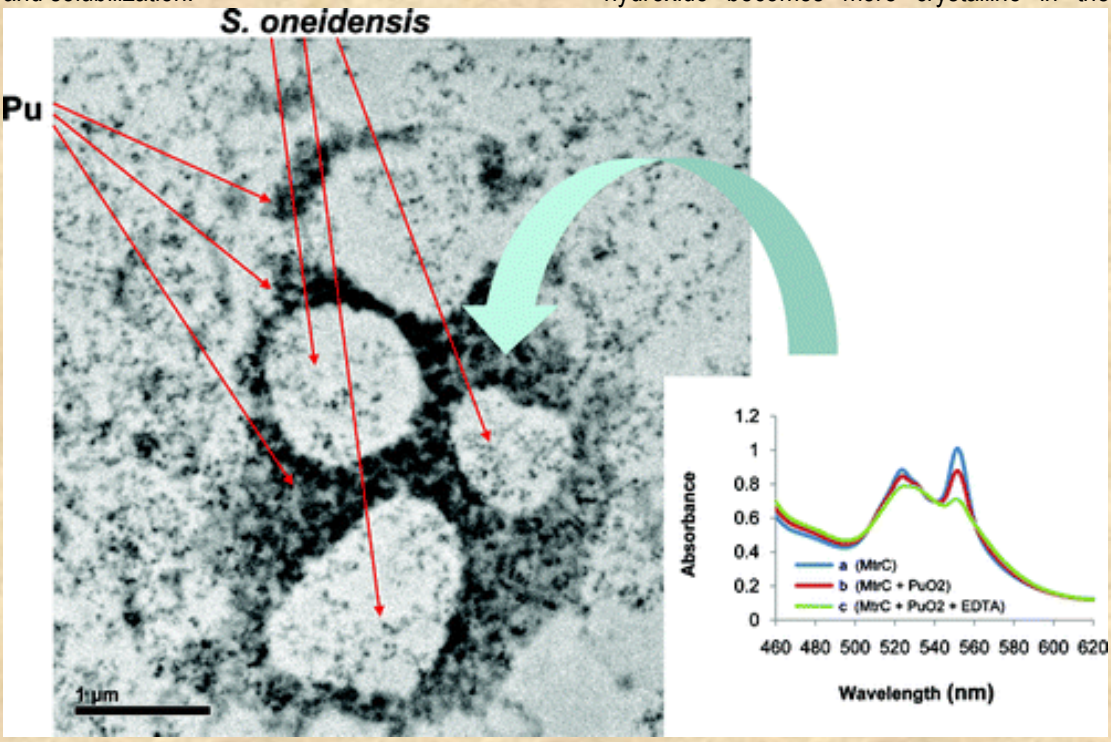
This information is needed to develop effective approaches for isolating and removing the contaminants before they can impact humans and the environment. Plutonium in particular is a challenge to study, because of

the complexity of its chemistry and the difficulty of working with it because of the extensive safety precautions required.

The purpose of this study was to determine the extent to which the iron-reducing bacteria, Shewanella oneidensis and Geobacter sulfurreducens, reduce and solubilize Pu(IV) hydrous oxide in the presence and absence of potential abiotic complexants. A second purpose was to determine the effect of AQDS on the rate and extent of Pu(IV) reduction and solubilization.

biotically or abiotically. They used liquid scintillation counting, solvent extraction, and optical absorbance spectrometry to show that in the absence of EDTA, Pu(IV) hydroxide reduction results in many orders of magnitude less Pu mobilization than in the presence of EDTA.

Using X-ray absorption spectroscopy at Argonne National Laboratory and transmission electron microscopy at the University of Nevada, Las Vegas, they showed that Pu(IV) hydroxide becomes more crystalline in the



The research, which appears in the American Chemical Society journal *Environmental Science & Technology*, adds to the understanding of potential processes affecting prediction of plutonium mobility. It provides additional evidence that Pu(III) combined with a chelating agent is more likely to be mobile, thus able to reach the water table and other environment, than Pu(IV) combined with the same agent. It also highlights the environmental importance of colloidal plutonium — meaning that instead of moving as a dissolved salt, the radionuclide may move as a very tiny suspended form.

PNNL says that the scientists systematically studied mobilization and speciation, or evolution, of plutonium in the presence of various combinations of DIRB, EDTA, and AQDS, along with hydrogen (H2), a strong reductant and energy source for bacteria that can be formed in the environment either

presence of DIRB or MtrC, an electron transfer protein isolated and characterized by PNNL scientists from Shewanella oneidensis. Abiotic controls provided novel results on abiotic reduction and solubilization of plutonium hydrous oxide in the presence of H2.

"Beyond its direct environmental relevance to plutonium mobility, our study gave us an unusual opportunity to interrogate plutonium redox chemistry using biology, while also exploring biology using an unusual solid-phase geochemical, plutonium hydrous oxide," said Andy Plymale, a PNNL scientist and lead author of the paper.

The scientists want to address the fate of the reduced and soluble Pu(III)-EDTA under conditions that could re-oxidize the Pu. Also of interest is the extent to which the Pu(III) could form mobile colloids under environmental conditions. Likewise, of environmental interest

are the effects of natural subsurface milieu on the solubility of the reduced Pu; for example, recent work at PNNL showed that phosphate, a common nutrient anion, can form strong insoluble precipitates with Pu(III), retarding its mobility.

Andrew E. Plymale wt al., "Biotic and Abiotic Reduction and Solubilization of Pu(IV)O2•xH2O(am) as Affected by Anthraquinone-2,6-disulfonate (AQDS) and Ethylenediaminetetraacetate (EDTA)," Environmental Science & Technology 46, no. 4 (24 January 2012): 2132–40

ABSTRACT
This study measured reductive solubilization of plutonium(IV) hydrous oxide ($Pu(IV)O_2{\cdot}xH_2O_{(am)}$) with hydrogen ($H_2$) as electron donor, in the presence or absence of dissimilatory metal-reducing bacteria (DMRB), anthraquinone-2,6-disulfonate (AQDS), and ethylenediaminetetraacetate (EDTA). In PIPES buffer at pH 7 with excess H_2, *Shewanella oneidensis* and *Geobacter sulfurreducens* both solubilized <0.001% of 0.5 mM $Pu(IV)O_2{\cdot}xH_2O_{(am)}$ over 8 days, with or without AQDS. However, $Pu_{(aq)}$ increased by an order of magnitude in some treatments, and increases in solubility were associated with production of $Pu(III)_{(aq)}$. The solid phase of these treatments contained $Pu(III)(OH)_{3(am)}$, with more in the DMRB treatments compared with abiotic controls. In the presence of EDTA and AQDS, $PuO_2{\cdot}xH_2O_{(am)}$ was completely solubilized by *S. oneidensis* and *G. sulfurreducens* in ~24 h. Without AQDS, bioreductive solubilization was slower (~22 days) and less extensive (~83–94%). In the absence of DMRB, EDTA facilitated reductive solubilization of 89% (without AQDS) to 98% (with AQDS) of the added $PuO_2{\cdot}xH_2O_{(am)}$ over 418 days. An in vitro assay demonstrated electron transfer to $PuO_2{\cdot}xH_2O_{(am)}$ from the *S. oneidensis* outer-membrane *c*-type cytochrome MtrC. Our results (1) suggest that $PuO_2{\cdot}xH_2O_{(am)}$ reductive solubilization may be important in reducing environments, especially in the presence of complexing ligands and electron shuttles, (2) highlight the environmental importance of polynuclear, colloidal Pu, (3) provide additional evidence that Pu(III)-EDTA is a more likely mobile form of Pu than Pu(IV)-EDTA, and (4) provide another example of outer-membrane cytochromes and electron-shuttling compounds facilitating bioreduction of insoluble electron acceptors in geologic environments.

Threat from terrorists using nuclear weapons and speed boats

By Duncan Gardham (Security Correspondent)
Source:http://www.telegraph.co.uk/news/uknews/terrorism-in-the-uk/7499140/Threat-from-terrorists-using-nuclear-weapons-and-speed-boats.html

NOTE: This a 2010 article

A classified review of the country's ability to fight an attack by terrorists using nuclear devices or other weapons of mass destruction has recently been completed and an international meeting is to be held in Washington next month to discuss nuclear security.

The threat was also highlighted in three separate unclassified reports published on Monday.

Downing Street released an update to the National Security Strategy in which it stated that "the UK does face nuclear threats now" and added that there was "the possibility that nuclear weapons or nuclear material [could] fall into the hands of rogue states or terrorist groups."

Another report on the Government's "Contest" counter-terrorism strategy said there was a danger that the increased expertise of insurgents in making homemade bombs in Afghanistan has increased the threat from a so called radiological "dirty bomb."

It added that there was a "significant increase in the illicit trafficking of radiological materials, the availability of chemical, biological radiological and nuclear (CBRN) related technologies over the internet and the increased use of CBRN material for legitimate purposes," which could be acquired by terrorist organizations.

A further report on Britain's strategy for countering chemical, biological radiological and nuclear terrorism described al-Qaeda as the "first

transnational organisation to support the use of CBRN weapons against civilian targets and to try to acquire them."

It said al-Qaeda had established facilities to conduct research into CBRN weapons when Afghanistan was under the control of the Taliban before 2002.

To deal with the possibility of an attack, the government has set up 18 sites around the country with trained officers who would coordinate the response of the emergency services.

Police and fire services have been given extra equipment to detect potential attacks and more

Since then the terrorist group has approached Pakistani nuclear scientists, developed a device to produce hydrogen cyanide and used explosives in Iraq combined with chlorine gas cylinders.

The International Atomic Energy Authority has recorded 1,562 incidents where nuclear material has been lost or stolen between 1993 and 2008, mostly in the former Soviet Union, and 65 per cent of the losses were never recovered.

The government also says the security around stockpiles of decommissioned material is "variable and sometimes inadequate, leaving materials vulnerable to theft by insiders and criminal and terrorist organisations."

Legitimate uses for such materials also "significantly increases the risk that they may be diverted and exploited by terrorist organisations," it adds.

Gordon Brown said in a statement on Monday: "The Government is putting in place a package of enhanced nuclear security measures to demonstrate the UK's commitment to tacking the threat of nuclear terrorism and to encourage other nations to follow suit."

members of the army have been trained in making CBRN devices safe.

The government has also introduced a number of mobile radiation detection units to scan vehicles and foot passengers arriving at ports.

But the latest threat analysis also says the country is at risk from terrorists who could travel into London or other major cities by speed boat.

Lord West, the Security Minister, has admitted there are hundreds of thousands of small boats arriving in Britain unchecked every year.

He also pointed to the dangers from larger container ships that may be carrying chemicals or arms.

It is feared that ships or speed boats could sail into major cities such as London, Bristol, Liverpool, Newcastle, Glasgow or Belfast to launch their attacks.

The main Olympic site in Stratford, east London and the sailing venue in Portland, Dorset are said to be particularly at risk.

Lord West said: "I think the public would be surprised to discover that we do not know about every single contact [with a vessel.]"

He said that the various agencies responsible for guarding the coastline did not know "with any clarity what is going on around our coasts."
A special "strategic horizons unit" within the Cabinet Office has been examining Britain's vulnerability to terrorists.
They have highlighted the threat from waterborne attack following the attacks on Mumbai in India in November 2008, in which the terrorists arrived in small boats.
To deal with the threat, the government is planning a £350,000 nerve centre at Northwood in Middlesex, the home of Britain's nuclear deterrent command, to try and spot suspicious boats.
It will be based at the Royal Navy's top secret Maritime Command Headquarters, which receives intelligence from MI6, MI5 and GCHQ.
The command centre was part of an underground city of 1,500 workers that included the Permanent Joint Headquarters at Northwood until 18 months ago when they were moved to new quarters above ground following a review of the nuclear threat.
The new National Maritime Information Centre will combine the response of the navy, coastguard, police and fisheries vessels in the event of an attack.
Only ships of more than 300 tons have to carry automatic identification system (AIS) equipment and Lord West said the knowledge about smaller craft was "pretty ropey."
The increase in the threat from terrorism is highlighted by arrests, which increased to 200 from 178 the previous year.
The Government's National Security Strategy says there has also been a "diversification of the threat" and a "growth on the capability and ambition" of al-Qaeda's affiliates in Yemen, Somalia and North Africa.

Missing Nukes Fuel Terror Concern as Obama Drawn to Seoul

Source: http://www.businessweek.com/news/2012-03-22/missing-nukes-fuel-terror-concern-as-seoul-meeting-draws-obama

The second global conference ever on nuclear material that has escaped state control is drawing President Barack Obama and Russian President Dmitry Medvedev. Nuclear violators Iran and North Korea won't be there.
The legacy of the Soviet Union's breakup, inadequate atomic stockpile controls and the proliferation of nuclear-fuel technology mean the world may be awash with unaccounted-for weapons ingredients, ripe to be picked up by terrorists.
"If material is loose, it may already be impossible to contain or account for it," said Graham Allison, director of Harvard University's international security program and a former nuclear-security adviser to President Ronald Reagan. "There are no precise figures for how much high-enriched uranium or plutonium is missing."
About 50 heads of state will attend the Nuclear Security Summit on March 26-27 in Seoul. Iran and North Korea, which are in violation of United Nations resolutions requiring them to halt their nuclear work, are among countries excluded from the summit because of organizers' desire to reach consensus. So are potential transit countries such as Moldova and Lebanon that smugglers may target to move nuclear material.
With security officials still seeking the most basic information about how much high-enriched uranium and plutonium has been lost or is unaccounted-for, leaders meeting in Seoul may have to settle for modest measures to protect their populations from the risk of a terrorist obtaining a nuclear weapon, Allison said. Even a small blast would cause enormous casualties and disrupt the world economy.

Dirty-Bomb Cost

A nuclear-armed terrorist attack on the U.S. port in San Jose, California, would kill 60,000 people and cost as much as $1 trillion in damage and cleanup, according to a 2006 Rand study commissioned by the Department of Homeland Security. Even a low-level radiological or dirty-bomb attack on Washington, while causing a limited number of deaths, would lead to damages of $100 billion, according to Igor Khripunov, the Soviet Union's former arms-control envoy to the U.S.
He is now at the Athens, Georgia-based Center for International Trade and Security.

Because a terrorist needs only about 25 kilograms of highly-enriched uranium or 8 kilograms of plutonium to improvise a bomb, the margin of error for material accounting is small. There are at least 2 million kilograms (4.4 million pounds) of stockpiled weapons-grade nuclear material left over from decommissioned bombs and atomic-fuel plants, according to the International Panel on Fissile Materials, a nonprofit Princeton, New Jersey research institute that tracks nuclear material.

That's enough to make at least 100,000 new nuclear weapons on top of the 20,000 bombs already in weapon-state stockpiles.

'Poorly Secured'

"The elements of a perfect storm are gathering," said former Democratic Senator Sam Nunn, founder of the Washington- based Nuclear Threat Initiative, in an e-mail. "There is a large supply of plutonium and highly enriched uranium-weapons- usable nuclear materials spread across hundreds of sites in 32 countries, too much of it poorly secured. There is also greater know-how to build a bomb widely available, and there are terrorist organizations determined to do it."

Greenpeace, the anti-nuclear environmental group, has shown the ease with which intruders could breach security at Electricite de France SA reactors. Activists on Dec. 5 exposed lapses at EDF nuclear reactors near Paris and in southern France, hiding inside one for 14 hours and unfurling a banner reading "Safe Nuclear Doesn't Exist" on the roof of another.

Invading Power Plants

Since then, EDF has reviewed existing barriers around reactor sites and added patrols with guard dogs and tasers, said Dominique Miniere, the company's director of nuclear production. If saboteurs were to penetrate a reactor site and disable the power supply, creating a similar effect as when the tsunami struck the Fukushima Dai-Ichi plant in Japan last year, there would be a danger of the nuclear fuel rods melting and radioactive particles being released into the air.

Criminals breached South Africa's Pelindaba nuclear facility in 2007, overpowering guards who oversaw the country's stock of bomb-grade material. The U.S. Defense Threat Reduction Agency dismissed staff over nuclear security concerns in May 2008 at a North Dakota base that dispatched nuclear bombs without proper controls.

In November 2010, Belgian activists evaded North Atlantic Treaty Organization guards to expose weak security protecting nuclear weapons at a base in Kleine Brogel. Activists spent several hours taking pictures of a bunker containing nuclear warheads before security guards apprehended them.

Greatest Threat

The Global Zero Initiative, whose U.S. arm is headed by former nuclear negotiator Richard Burt, said in a report last month that the greatest nuclear security threat in Russia comes from bases in the country's west that house tactical nuclear warheads targeting Europe. These bases provide inadequate security against theft or sabotage, according to the report, whose authors included Russian former arms-control negotiators.

At the end of the Cold War, the Soviet Union had about 22,000 nuclear weapons in storage in Russia and such satellite states as Armenia, Belarus, Kazakhstan and Ukraine. Allison says there are doubts that all the weapons-usable material was recovered when many warheads were repatriated and dismantled because of the chaos at the time and incomplete records.

About 100 grams of highly enriched uranium, lodged inside a nuclear fission chamber, was plucked out of a Rotterdam scrap- metal yard in 2009 by Jewometaal Stainless Processing BV's radiation-safety chief, Paul de Bruin. The scrap probably came from a decommissioned Soviet nuclear facility, he said.

Low Detection Chance

The discovery illustrated the ease with which nuclear material can bypass accounting checks and international radiation monitors. The shipment containing the uranium had already been checked for radioactivity.

"The inability to accurately account for weapon-usable nuclear material around the world is a major obstacle to eliminating the threat of nuclear terrorism," said Edwin Lyman, a senior physicist at the Cambridge, Massachusetts-based Union for Concerned Scientists, on March 14. Plutonium can be smuggled from some facilities "without a high probability of detection," he said.

One issue threatening to hobble the security summit is that all nations

aren't invited, wrote Burt, who is also a managing director at Washington's McLarty Associates. He negotiated nuclear-weapons cuts with the Soviets under President George H.W. Bush.

IAEA Role

Other countries that weren't invited include Belarus, home to about 500 pounds of high-enriched uranium that the U.S. wants removed, and Niger, the West African nation falsely accused of supplying uranium to Iraq before the 2003 war over an alleged nuclear-weapons program. Organizers opted to keep participation narrow in 2010 to foster more substantive debate, South Korea's International Atomic Energy Agency envoy, Cho Hyun, said in a March 15 interview.

By excluding some nuclear nations from the proceedings, the summit organizers risk undercutting the role of the Vienna-based IAEA, which verifies nuclear material worldwide.

"The summit's lack of universality affects the ability of the IAEA to take a visible role in nuclear security," said Cho, who was previously South Korea's chief negotiator for U.S. nuclear agreements. "The IAEA has been playing an essential role in strengthening international efforts for nuclear security."

Not Yet?

The 153-member IAEA, whose powers are granted by consensus, has published guides and helped install detection equipment, in addition to making sure fissile material isn't diverted for weapons in places like Iran. Lebanon asked the Vienna-based agency in 2008 to help install radiation monitors in Masnaa, along its border with Syria.

"Nuclear security is a global issue and it requires a global response," IAEA spokeswoman Gill Tudor said today in an e-mail, adding that the agency's security budget will need to grow in order for it to help member states. "The need to improve nuclear security greatly exceeds inflation."

In the absence of binding oversight or an international verification treaty, Harvard's Allison said he was surprised terrorists haven't already used nuclear materials in an attack.

"There is general agreement in national security circles that" a dirty bomb attack "is long overdue," he said. "Terrorists have known for a long time that nuclear reactors are potentially vulnerable to attack or sabotage."

Other officials say the threat of nuclear terrorism should be taken seriously without being overplayed in public.

"Those of us who are ringing the nuclear terrorism alarm take care to not overstate the odds of such an attack," former U.S. Energy Department Director of Intelligence Rolf Mowatt- Larssen wrote March 18 in an e-mail. "The population is also suffering from terror-warning fatigue."

"Governments are only now beginning to think about how to raise nuclear security standards worldwide," Washington-based Arms Control Association President Daryl Kimball said March 14. "Terrorists only need to exploit the weakest link in order to acquire nuclear material that could eventually lead to a detonation that would make the Fukushima disaster pale in comparison."

Dirty bombs traceable by DNA analysis

Source:http://www.guardian.co.uk/uk/2012/mar/27/dirty-bombs-traceable-dna-analysis-ministers?newsfeed=true

"Dirty bombs" – improvised nuclear or radiological devices – could be traced back to their source through new forensic and DNA analysis developed by the Ministry of Defence, ministers have said. A nuclear forensics capability applying conventional forensics techniques to radiologically contaminated evidence will be set up at the Atomic Weapons Establishment at Aldermaston next month, they disclosed.

Nuclear and radiological materials have unique fingerprints – chemical and physical characteristics, officials said. "Potentially, they could tell what part of the world they come from," said one official.

"As well as having practical application after an event, this capability is intended to have a deterrent effect: both to terrorists, and crucially to states by encouraging them to keep effective control over their fissile material so that they are

not implicated in an attack," said the MoD.
Nick Harvey, the armed forces minister, said: "The rise of international terrorism has made the struggle to keep nuclear material out of the wrong hands more acute … Having the forensic ability to trace the source of nuclear and radiological materials that could be used in such devices by utilising their unique chemical and physical "fingerprints" [could] encourage states to keep effective control over their nuclear material."
The government has agreed to share previously classified technology to help detect trafficking in nuclear materials, deputy prime minister Nick Clegg, told the Nuclear Security Summit in Seoul, South Korea.
"Nuclear terrorism is a very real and global threat," Clegg told the 53-nation meeting where he also dismissed as "baseless insinuations"

claims that Britain had sent a nuclear missile submarine to the Falklands.

He said the UK had ratified protocols under the

1969 Treaty of Tlatelolco, prohibiting nuclear weapons in Latin America and the Caribbean.
"Dangerous material must never be allowed to fall into the hands of terrorists – a successful attack would have catastrophic human and environmental consequences", Clegg told the Seoul conference.
He emphasised the importance of information security in preventing the spread of nuclear materials to terrorists. "We need to do more to focus on protecting the information that terrorists need to obtain and then use those materials – maps of nuclear sites, designs for improvised bombs, how to get past border security, beating emergency response teams and so on."

Nuclear summit focuses on terrorist nukes

Source: http://www.homelandsecuritynewswire.com/dr20120327-nuclear-summit-focuses-on-terrorist-nukes

This past Tuesday (March 27), nearly sixty of the world's leaders gathered in Seoul, South Korea, to discuss securing the world's supply of nuclear material.
The discussions involved the risk of a terrorist attack using radioactive material, but the focus was beyond the risk of radiological, or "dirty," bomb. A dirty bomb is composed of ordinary explosives packaged in radioactive material, such as is used in medical and industrial purposes. These devices spread radioactive material over a large area, rendering those areas unusable until thoroughly cleared of radioactive contamination.
The Seoul nuclear summit had a greater, more threatening concern. That concern had to do with securing and accounting for fissile material, the core material for a nuclear device.
There are two main concerns in this discussion.
First, an accounting of and securing of all fissile material scattered at various locations around the world. There are especially keen worries about the safety of fissile materials in the former

Soviet states, North Korea, Pakistan, Iran, and India.

After the collapse of the Soviet Union, many of its former member states, including Russia, sought to gain income from the sale of nuclear material.

Others, notably Iran and North Korea, have

been active players in the nuclear proliferation game. Pakistan, though it maintains tight control of its nuclear stockpile, has at least part of the guardianship of nuclear material under the control of the ISI, its intelligence service, which has long been suspected of jihadist sympathies, and even direct connections with organizations such as al Qaeda.

Pakistan is also the home of Dr. A. Q. Khan, a top Pakistani nuclear scientist who – on his own or with the tacit blessings of elements in the Pakistani regime – was active in selling nuclear materials, enrichment centrifuge designs, and nuclear warhead blueprints to Libya and Iran.

Other nations, even if not hostile to the West or active in proliferation programs, such as India, are not regarded to have tight enough control over their stockpiles of fissile material.

New Delhi insists that its nuclear stockpile is under tight control, but according to the *Washington Post*, India is among the top five nuclear security risks, requiring tighter control, more transparency, and greater security for nuclear materials in transit.

The *Post* reports that there have been at least two incidents in recent years in which supposedly secure nuclear material ended up in a scrap dealer's shop.

When we think of nuclear weapons, we think of sophisticated weapons and delivery systems requiring complex and difficult to engineer triggering mechanisms.

It bears remembering that Little Boy, the device detonated over Hiroshima, used a relatively crude and simple triggering device.

In Little Boy, the fissile material was separated by a distance of about three meters, half of it being a target mass, and the other being a uranium "bullet."

At detonation, an explosive charge accelerated the nuclear bullet toward the uranium target, allowing it to achieve critical mass, which initiated the chain reaction that resulted in the explosion.

The design, considered by modern standards to be inefficient in terms of energy release, is relatively easy to construct, particularly on a small scale, and would allow the terrorists employing such a device to achieve their two main goals: a dramatic display of the ability to deliver mass damage and death relatively easily, and the ability to construct and detonate such a device in comparatively inconspicuous ways.

This returns to the necessity of securing the world's supply of uranium and plutonium such that it cannot fall into the hands of the world's bad actors.

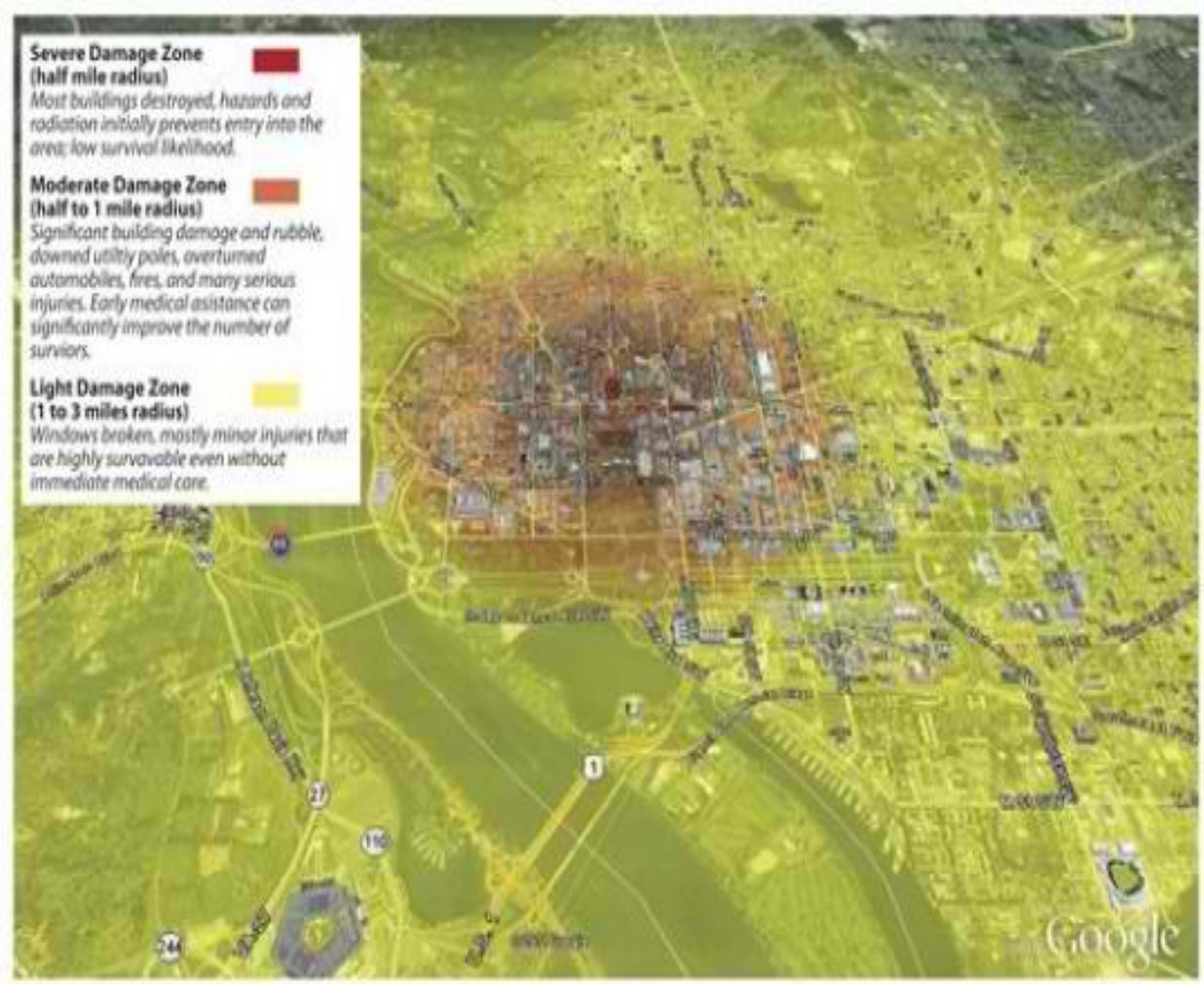
The *Washington Post* quotes Kenneth Luongo, cochair of the Washington-based Filssile Materials Working Group, as stressing that "There needs to be more political leadership from the top, and countries need to stop talking about what they're doing individually and acknowledge that this is a cross-border international issue."

DC nuke blast wouldn't destroy city

Source:http://www.boston.com/news/nation/washington/articles/2012/03/27/govt_report_dc_nuke_blast_wouldnt_destroy_city/?page=1

Hollywood has destroyed Washington -- or New York or Los Angeles -- lots of times with nuclear bombs detonated by terrorists. It turns out to be harder in real life.

Thinking about the unthinkable, a U.S. government study analyzed the likely effects from terrorists setting off a 10-kiloton nuclear device a few blocks north of the White House. It predicted terrible devastation for roughly one-half mile in every direction, with buildings reduced to rubble the way that World War II bombing raids destroyed parts of Berlin. But outside that blast zone, the study concluded, even such a nuclear explosion would be pretty survivable.



This map, released by the Federal Emergency Management Agency, and contained in a report from a study that analyzed the likely effects from terrorists setting off a 10-kiloton nuclear device a few blocks north of the White House. The map shows a summary of severe, moderate and light damage zones, and types of damage or injuries likely to be encountered by responders. The report predicted terrible devastation for roughly one-half mile in every direction, with buildings reduced to rubble the way that World War II bombing raids destroyed parts of Berlin. But outside that blast zone, the study concluded, even such a nuclear explosion would be pretty survivable. The little-noticed, 120-page study was hardly a summer blockbuster, produced in November 2011 by the Homeland Security Department and the National Nuclear Security Administration. It was called "Key Response Planning Factors for the Aftermath of Nuclear Terrorism," and even though the government considers it "for official use only" and never published it online, it circulated months later on scientific and government watchdog websites. (AP Photo/FEMA)

"It's not the end of the world," said Randy Larsen, a retired Air Force colonel and founding director of the Institute for Homeland Security. "It's not a Cold War scenario."

The little-noticed, 120-page study by the Federal Emergency Management Agency was hardly a summer blockbuster. The study, "Key Response Planning Factors for the Aftermath of Nuclear Terrorism," was produced in November by the Homeland Security Department and the National Nuclear Security Administration. Even though the government considers it "for official use only" and never published it online, the study circulated months later on scientific and government watchdog websites.

The report estimated the blast zone would extend just past the south lawn of the White House and as far east as the FBI headquarters. "Few, if any, above ground buildings are expected to remain structurally sound or even standing, and few people would survive," it predicted. It described the blast area as a "no-go zone" for days afterward due to radiation. But the U.S. Capitol, the Supreme Court, the Washington Monument, the Lincoln and Jefferson memorials, and the Pentagon across the Potomac River were all in areas described as "light damage," with some broken windows and mostly minor injuries.

The government study predicted 323,000 injuries, with more than 45,000 dead. A 10-kiloton nuclear explosion would be roughly 5,000 times more powerful than the truck bomb that destroyed the federal building in Oklahoma City in 1995.

The flash from the explosion would be seen for hundreds of miles, but the mushroom cloud -- up to five miles tall -- would only keep its shape for a few minutes. The flash would be so bright it could temporarily blind people up to 12 miles away, including drivers on Washington's Beltway. At least four area hospitals would be heavily damaged or couldn't function, and four others would experience dangerous radiation fallout. The government said it expects to send warnings afterward by television, radio, email, text message and social media services like Twitter and Facebook.

It predicted the seriousness of radioactive fallout, which would drift with prevailing winds that vary depending on the season and expose victims closest to the explosion to 300 to 800 Roentgens in the first two hours, or enough to kill nearly all of them. In the spring, fallout would drift mostly to the north and west of downtown Washington. But in the summer, it would drift mostly southeast. After two hours, the radioactive cloud would move over Baltimore with far less exposure.

"Unfortunately, our instincts can be our own worst enemy," the report said. After the bright flash of a nuclear explosion, people would rush toward windows to see but the resulting blast could break glass as far as three miles away just 10 seconds later and cause injuries.

Terrified victims would try to flee the area, but going outside could expose them to deadly amounts of radiation within a few minutes. A car offers no protection. The government's advice for everyone within 50 miles: Head downstairs into a parking garage or basement. Anyone caught outside who heads indoors should remove shirts or jackets and shoes and brush their hair to remove large fallout particles.

The blast zone could be smaller or larger, depending on the city. In more dense cities, including New York, towering buildings could help confine how far debris flies, though the radioactive fallout cloud would still drift over a larger area.

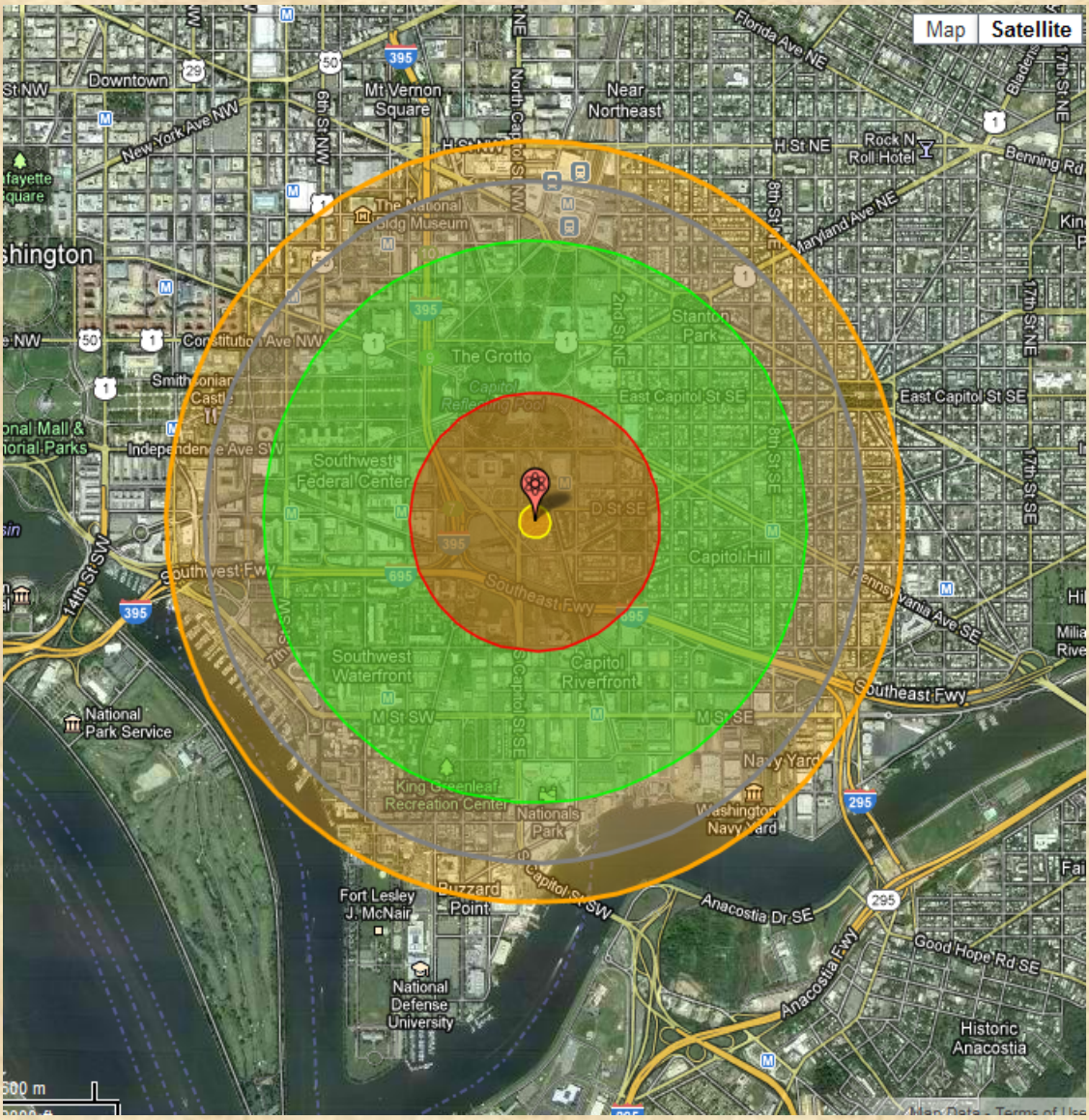
The key is to quickly head underground to parking garages or sturdy basements and wait, Larsen said. After about seven hours, radiation begins to disperse significantly, he said.

The government's study did not examine the plausibility of terrorists building a nuclear bomb or smuggling one into Washington, which is protected with radiation sensors and other technology designed to thwart such an attack. It didn't say why it chose the intersection -- 16th and K streets northwest -- as the epicenter for its fictional nuclear bomb.

The biggest difference between the disaster that the government studied and the nightmares of incoming ICBMs from the former Soviet Union is the size of the explosion. Cold War-era fears imagined massive hydrogen bombs detonated in the sky, not a smaller device -- one that might fit inside a parked van -- exploding on the street.

"Our images of nuclear war are either of Hiroshima or Nagasaki or what we saw in the movies during the Cold War," said Brian Michael Jenkins, a senior adviser to the president of the RAND Corporation. "If you are thinking about (a city) being wiped off the face of the earth, that's not what happens."

Same results from another source: http://nuclearsecrecy.com/nukemap/



Effects radii for 10 kt blast (smallest to largest):

Fireball radius: 0.08 km / 0.05 mi
Maximum size of the nuclear fireball; relevance to lived effects depends on height of detonation.

Air blast radius: 0.6 km / 0.37 mi
20 psi overpressure; heavily built concrete buildings are severely damaged or demolished; fatalities approach 100%.

Radiation radius: 1.3 km / 0.81 mi
500 rem radiation dose; between 50% and 90% mortality from acute effects alone; dying takes between several hours and several weeks.

Air blast radius: 1.58 km / 0.98 mi
4.6 psi overpressure; most buildings collapse; injuries universal, fatalities widespread.

Thermal radiation radius: 1.77 km / 1.1 mi
Third-degree burns to all exposed skin; starts fires in flammable materials, contributes to firestorm if large enough.

French nuke scientist on trial for 'terror plot'

Source: http://zeenews.india.com/news/world/french-nuke-scientist-on-trial-for-terror-plot_767009.html

A Franco-Algerian nuclear physicist went on trial on Thursday for allegedly plotting terror attacks in France, where an Islamist's killing spree has already overshadowed the presidential campaign.

A week after police shot dead Franco-Algerian Mohamed Merah for killing seven people in and around Toulouse, Adlene Hicheur stood trial charged with criminal association as part of a terrorist enterprise.

French police arrested Hicheur, a researcher studying the universe's birth -- the Big Bang -- at the European Organisation for Nuclear Research (CERN), in October 2009 after intercepting emails he wrote.

The trial began Thursday afternoon in a Paris courtroom and was to last two days, with the court to examine 35 emails between Hicheur and an alleged Al Qaeda contact.

At the start of the trial, Hicheur, 35, denounced the case against him.

"I see a lot of confusion and inaccuracies," he told the court. "It would be too tedious to revisit each of them (but) the assertions about me... are inaccurate, are subject to debate."

After more than two years in preliminary detention, Hicheur appeared visibly tired and thin during his court appearance. His father and brothers were in court to support him. Following Hicheur's arrest at his parents' home near CERN, which lies on the Franco-Swiss border northwest of Geneva, police discovered a trove of Al Qaeda and Islamist militant literature.

France's DCRI domestic intelligence agency's suspicions were raised following a statement from Al Qaeda in the Islamic Maghreb (AQIM) that was sent to President Nicolas Sarkozy's Elysee Palace in early 2008.

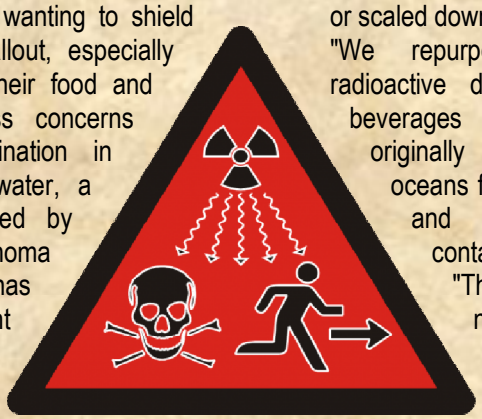
Police carried out surveillance on several email accounts including Hicheur's and his exchanges with Mustapha Debchi, an alleged AQIM representative living in Algeria.

In the emails Hicheur proposed "possible objectives in Europe and particularly in France", mentioning for example a French military base at Cran-Gevrier, close to CERN.

Capsule removes radioactive substances from beverages

Source:http://www.gizmag.com/capsule-removes-radioactive-substances-beverages/21984/?utm_source=Gizmag+Subscribers&utm_campaign=ebdf96d6c7-UA-2235360-4&utm_medium=email

With airborne radioactivity from Fukushima's still-critical damaged reactors circling the globe and more likely on the way from the mass incineration of earthquake debris, individuals are certainly justified in wanting to shield themselves from the fallout, especially when it shows up in their food and drink. Now, to address concerns about nuclear contamination in juice, milk and even water, a team of researchers led by Allen Apblett from Oklahoma State University (OSU) has announced development of a capsule that, when dropped in liquid, can easily and effectively remove numerous radioactive substances and thus prevent the consumer from ingesting them.

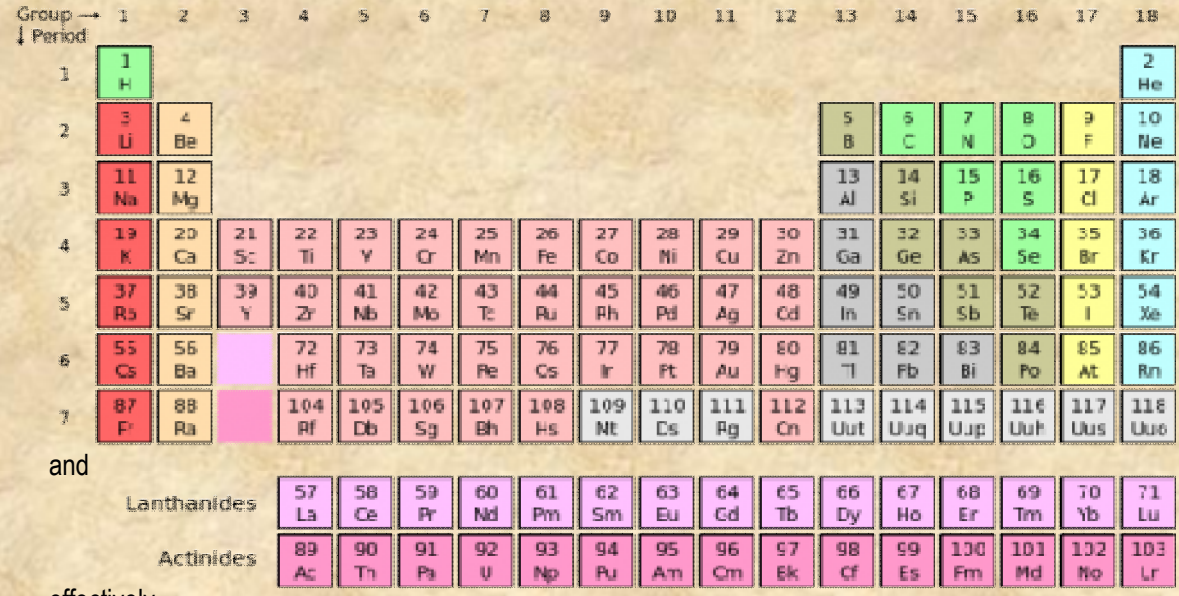


The nuclear industry-proven radionuclide-busting technology is already well on its way to commercialization and can be sized up to accommodate large industrial food processors or scaled down for use at home in the kitchen.

"We repurposed and repackaged for radioactive decontamination of water and beverages a tried-and-true process that originally was developed to mine the oceans for uranium and remove uranium and heavy metals from heavily contaminated water," Apblett said. "The accident at the Fukushima nuclear plant in Japan and ongoing concerns about possible terrorist use of nuclear materials that may contaminate food and water led us to shift the focus of this technology," he added.

A major component of the OSU team's process is metal oxide

nanoparticles which bind or react with radioactive substances and other heavy metals and effectively remove them from solution. Metal oxides form when metals combine with oxygen, rust being a perfect example. By loading a porous capsule with nanoparticles and stirring it around in contaminated liquid, it acts as a sort of "reverse tea bag" and absorbs actinide metals such as uranium and plutonium (see bottom row of periodic table below) along with heavy metals like lead and arsenic to (in the lab, at least) undetectable levels. The capsule can then be discarded, and the liquid safely consumed.



Within months after the earthquake and tsunami in Japan last year, the Nuclear Engineering department at UC Berkeley detected elevated levels of radioactive cesium (wind-blown from Fukushima) in milk produced around the San Francisco area, so it would seem that OSU's nanoparticle solution for radiation-laced beverages has a ready and willing market. Let's just hope they get their capsules to us before too much more time passes. The big question is, what do we do with them after they've done their job?

The OSU team presented their findings at the 243rd National Meeting & Exposition of the American Chemical Society in San Diego, California.

International collaborative effort to develop better radiation detection tool

Source: http://www.homelandsecuritynewswire.com/dr20120404-international-collaborative-effort-to-develop-better-radiation-detection-tool

In mid-February, the Flash Portal Project was launched with the aim of furthering the development and testing of a new technology to detect shielded nuclear materials.

A little more than a month ago, the FLASH Portal Project was launched in Zurich, Switzerland. FLASH is an international collaboration effort dedicated to improving public security against nuclear and radiological threats.

Artis Radiation Detectors of Zurich, Switzerland, notes in a release that the effort aims to validate new methods to reduce background interference, thus allowing authorities to detect dangerous nuclear materials more precisely and reliably. The project team plans to develop an upgrade for the existing globally deployed base of radiation portal monitors.

The company says that the innovative method being developed and tested could be incorporated into radiation portal monitors, in the process significantly improving their performance.
Preliminary work by Arktis Radiation Detectors Ltd indicates that this method could serve better to detect shielded nuclear materials. The project team will complete work and provide test results by the end of the year.

The FLASH Portal Project is supported in part by the U.S. Government's Technical Support Working Group (TSWG). Arktis notes that it won the 2011 Global Security Challenge, sponsored by TSWG.
The collaborating parties are Arktis Radiation Detectors Ltd. in Switzerland, the U.K. Atomic Weapons Establishment (AWE), and the European Commission's Joint Research Centre (JRC)

Traces of Japan's nuclear reactor explosions found in New Hampshire

Source: http://now.dartmouth.edu/2011/05/dartmouth-researchers-find-traces-of-japan%E2%80%99s-nuclear-reactor-explosions/

On 11 March 2011, the day of Japan's devastating earthquake, earth sciences staff member Joshua Landis and graduate students Nathan Hamm and John Gartner began collecting data from soil, streams, and precipitation. The group takes weekly measurements to support environmental research conducted by Dartmouth students and faculty in the earth sciences.
The group routinely measures beryllium-7 (Be-7), a natural radionuclide they use as a tool to study sediment and contaminant transport, using a gamma spectrometer. Gamma spectroscopy allows the measurement of unique gamma rays emitted by chemical elements present in soil, streams and precipitation. It enables researchers to see the entire gamma ray spectrum including other natural or man-made sources of radiation.
A Dartmouth University release reports that in samples collected the week of 18 March 2011, the lab found radioactive iodine-131 (I-131) in precipitation samples collected from Shattuck Observatory. This form of iodine is not a naturally occurring radiation source. According to Landis, I-131 would never be found in New Hampshire except as a result of a nuclear disaster or bomb. The timing of their findings points toward the incidents at Fukushima Daiichi, and is consistent with findings elsewhere in the United States.

"I-131 is uniquely a fission product, produced in nuclear reactors," says Landis. "While also present in nuclear waste, it decays with a half-life of eight days and thus is virtually eliminated after a few months of storage time. Presence of I-131 is thus diagnostic of 'criticality' of a reactor." A half-life refers to the period of time it takes for a decaying substance to decrease by half.
Fortunately, the team has not yet found evidence of cesium- 137 (Cs- 137), a particularly harmful product of nuclear fission with a half-life of 30 years. Cs-137 contamination has been a major cause for concern in Japan following the Fukushima crisis. It can easily contaminate food and water, and concentrates in tissue and bones if it enters the human body.
Finding I-131 but no Cs-137 is explained by the two isotopes' distinguishing characteristics. "Iodine forms a number of volatile compounds. It was released in steam explosions at the Fukushima Daiichi reactors and, consequently, injected directly into the atmosphere.
Cs-137, on the other hand, is gaseous only at very high temperatures, and travels long

distances in association with dust particles," says Landis. "I suspect this is why we have not seen measurable contamination here in Hanover: the transport distance is too great, and the cesium is falling out over the Pacific and, perhaps, the western United States before arriving in New England."

So, what does this mean for residents of Hanover?

Landis says, "The amount is very small, but because iodine is efficiently absorbed by the human body or by vegetation as a micronutrient, there is certainly some minor risk." To put that in context, he explains, "In the unlikely event that someone ingested or inhaled all of the radioiodine deposited on a square meter of a Hanover lawn, the exposure would be a fraction of that received from a single chest x-ray or from cosmic radiation during a cross-country round-trip airplane flight."

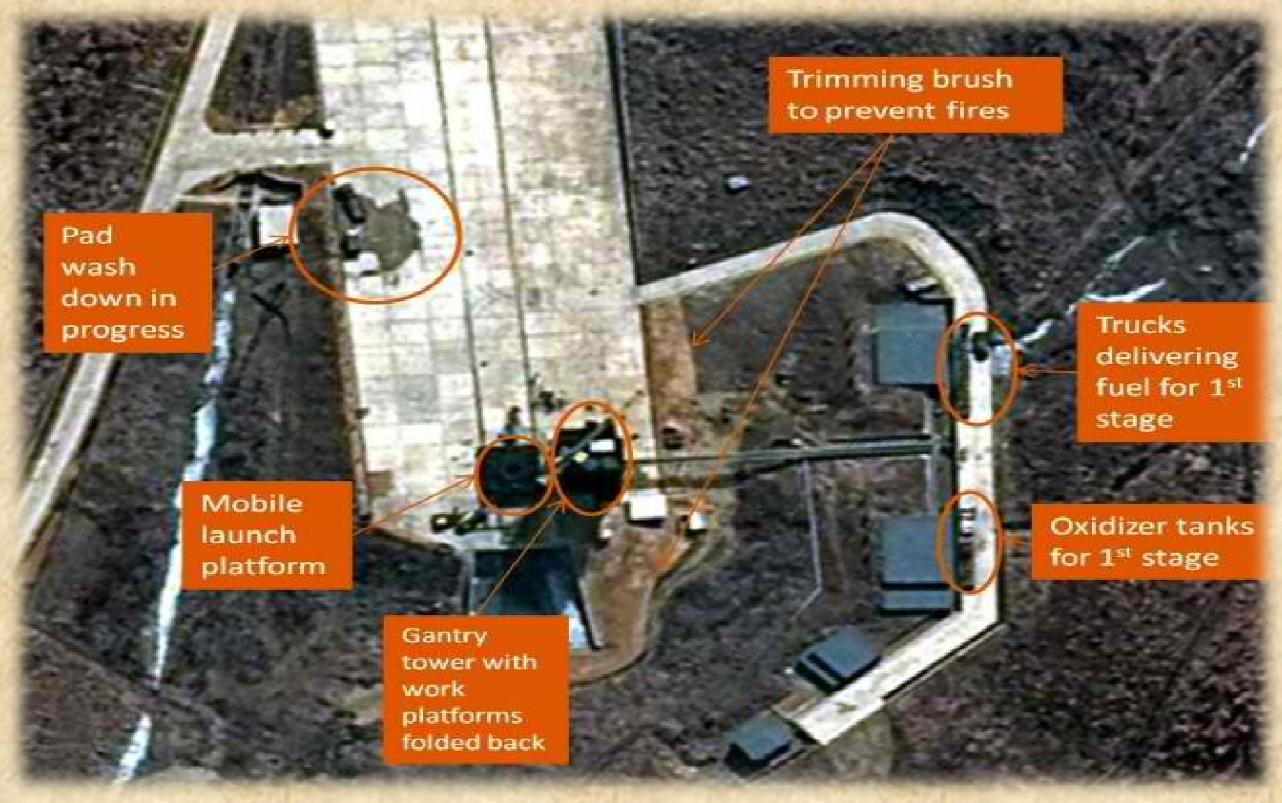
Furthermore, though I-131 deposition in Hanover has persisted in the month following the disaster, levels are diminishing rapidly. The remainder will decay in the next two to three months, predicts Landis.

The group's research is advised by Professors Carl Renshaw and W. Brian Dade in earth sciences and Professor Frank Magilligan in geography.

Sat Spies North Korea Readying Rocket Launch

Source: http://www.wired.com/dangerroom/2012/04/sat-spies-rocket-launch/

North Korea's Sohae Satellite Launching Station. Photo: JHU / DigitalGlobe, Inc.



North Korea appears to be ramping up preparations for its internationally-condemned mid-April rocket launch, new satellite images have revealed.

The images, released by the US-Korea Institute at Johns Hopkins School of Advanced International Studies, show a mobile radar trailer — which engineers use to gather real-time information about the rocket's engines and guidance systems — and rows of seemingly empty fuel and oxidiser tanks.

The institute's North Korean analysts 38 North have scrutinized satellite imagery taken last week of the Sohae Satellite Launching Station in the North Pyongan province. They appear to

show that North Korea has "undertaken more extensive preparations than previously understood."

It is no secret that North Korea plans to launch the Unha-3 rocket carrying the Kwangmyongsong-3 (Bright Star 3) satellite sometime between 12 and 16 April to coincide with the 100th birthday of Kim Il Sung, the founder of the country. North Korea has said that the 100-kilogram satellite will orbit the Earth at an altitude of 500 kilometers for two years to study the country's crops and natural resources.

However, Washington says that North Korea uses these sorts of launches to test missile systems for nuclear weapons that could target the United States. North Korea has conducted two nuclear tests, but analysts do not think that it has the technology needed to shrink a nuclear weapon and mount it onto a missile.

If North Korea was to launch a rocket, it would end an agreement from February 29 in which the United States said it would ship food aid to impoverished North Koreans in exchange for a moratorium on missile and nuclear tests.

This would be the fourth long-range rocket launch since 1998. The most recent launch — the Unha-3 in April 2009 — was condemned by the UN and meant that North Korea pulled out of six-nation nuclear disarmament talks. This led to tensions between North and South Korea, with at least 50 South Koreans killed in attacks that they blamed on the North.

Japan's Defence Minister Naoki Tanaka has already said that it will shoot down a North Korean rocket if any falling debris looked as though it would threaten Japan's territory

South Korea has made similar comments about shooting down the North Korean rocket if it passes over its territory, with defence ministry spokesman Yoon Won-shick calling the launch "a very reckless, provocative act" that undermines peace on the Korean peninsula.

Based on previous rocket launch timelines, it is likely that Unha-3 will be ready to launch on April 12.

Is Fukushima Completely Trashing the Pacific?

Source: http://threatjournal.com/

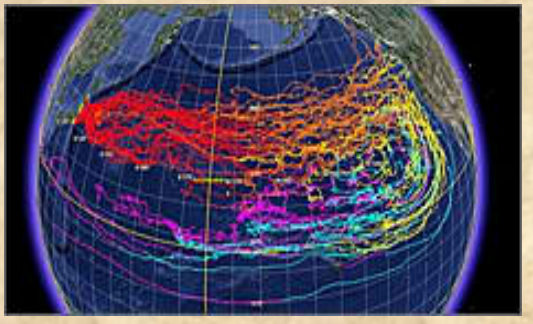
I have spent countless nights dreaming of (and days working towards) a slow trade winds circumnavigation. Chasing the sun to far away lands, fascinating people and cultures, spectacular night watches while a spinnaker pulls you along on a perfect run, pretty girls with flowers in their hair, a line in the water to catch my dinner, etc..

Now I am beginning to wonder if such a trip is even realistic.

Here are some facts contributing to the emerging realization that my route probably need to change.

Lets start with the ocean itself. The Fukushima nuclear power plant is a seaside facility. The plant leaks highly contaminated water like a sieve, not to mention intentional dumping. Well developed and continually refined ocean circulation and transport models, in use long before the Fukushima disaster, clearly demonstrate that contaminants will be moved far and wide. Experts say the radioactive contamination 'plume' has likely already reached Hawaii. The disaster has been going on for over a year now. Pure logic dictates that it will continue for decades or until the facility is ultimately decommissioned. I will have assumed room temperature by then.

Then there is the sea life. The radioactive contaminants collect (bioaccumulation) at each level of the food chain and have already started

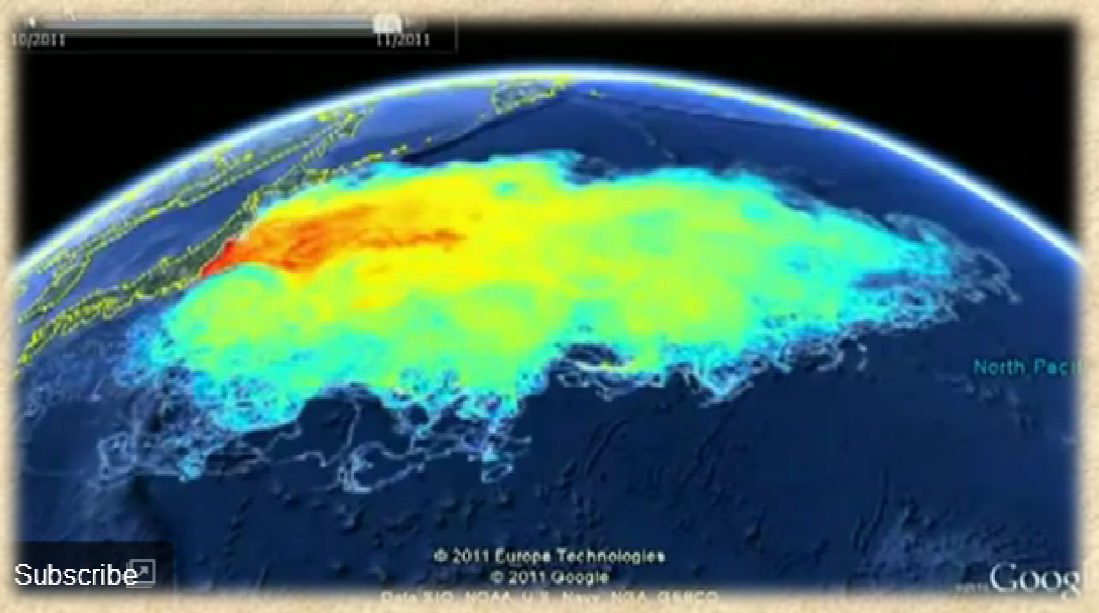


showing up on dinner plates in homes here in North America. In just one study, data from the Japanese government itself says that 16 of 22 species of fish exported to Canada have radioactive contamination. There are also seals and walruses turning up on shores in Canada and Alaska with strange rashes, oozing sores and more. Let us not forget about the reports that polar bears are now also being stricken by similar problems.

And consider the recent reports of radioactive contaminants, traced to Fukushima, being found widespread in sea kelp on the California coast.

these problems, which should tell you it is serious.

To date, I have not heard much discussion in public scientific forums about what will happen



Add to this the enormous raft of tsunami backflush sloshing around in the middle of the Pacific. The makings of entire coastal communities, including homes, warehouses, cars, human remains, shipping containers, loose lumber, boats, animals carcasses and stadiums worth of other debris have been working their way across the pacific driven by currents and winds.

While the main consolidation of debris measures many hundreds of miles across, the entire field is actually spread much much wider. At least one offshore cruising site has already reported on the debris field as a hazard to navigation.

Some of the less encumbered debris, believed propelled by faster winds and surface currents, have already started washing up in North America. And we can't forget the potential for some of the debris to also be contaminated. Even Congress is being directly warned about

when the Fukushima debris raft collides with the existing trash field already spinning in the Pacific known as the Great Pacific Garbage Patch (photo). I suspect it will just consolidate into an even larger spinning raft of garbage. One filled with radioactive hotspots.

Which brings me back to my thoughts about a circumnavigation. The next couple years will reveal much. While I maintain hope in doing such a trip, I fully expect the Pacific north of the equator will be trashed. Will it still be navigable? Definitely yes, but increasingly dangerous for smaller vessels due to floating debris. This was already a problem before Fukushima.

And what about dragging a line and catching dinner? After reading the articles above and knowing since grade school that fish migrate, would you still put anything from the Pacific Ocean in your mouth?

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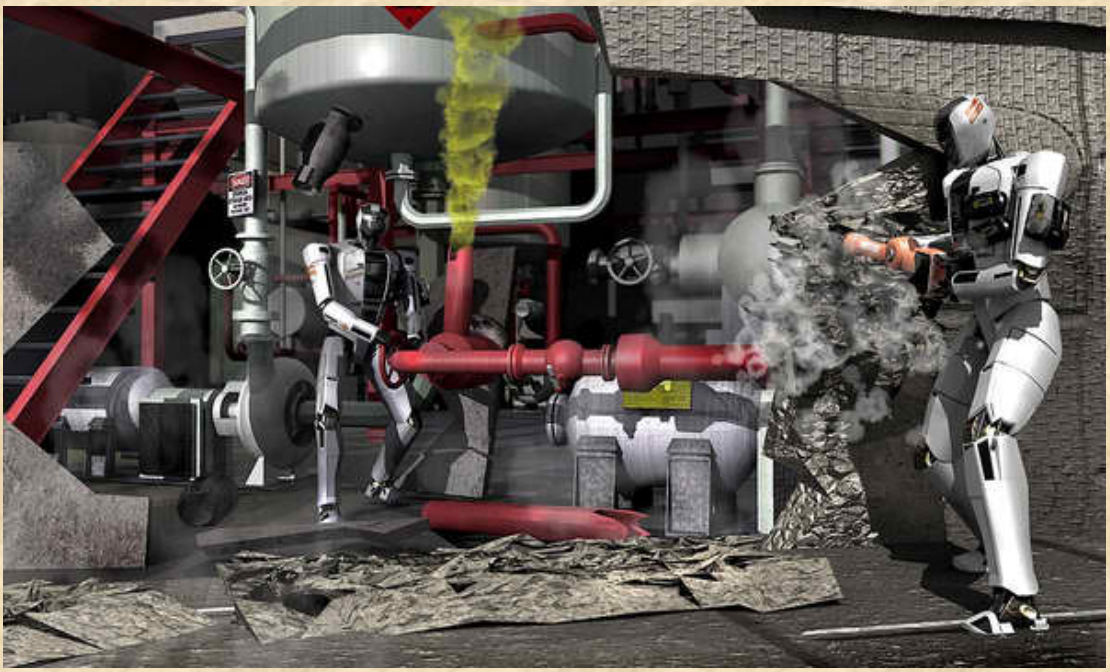
SPECIAL UPDATE

Seeking Robots to Go Where First Responders Can't

By John Markoff

Source: http://www.nytimes.com/2012/04/10/science/pentagon-contest-to-develop-robots-to-work-in-disaster-areas.html?_r=1

In the event of another disaster at a nuclear power plant, the first responders may not be humans but robots. They may not even look humanoid.



The Pentagon's research and development agency is to announce a competition on Tuesday to design specialized robots that can work in disaster zones while operating common tools and vehicles. And while such tasks may well inspire humanoid designs, roboticists say they may also lead to the robotic equivalent of the Minotaur — a hybrid creature that might have multiple arms and not just legs but treads.

Rumors of the challenge have already set professional and amateur robot builders buzzing with speculation about possible designs and alliances. Aaron Edsinger, a founder of Meka Robotics in San Francisco, said he was speaking with fellow roboticists around the country and was considering a wide array of possible inspirations.

"Analogs to animals such as spiders, monkeys, bears, kangaroos and goats are useful inspiration when considering parts of the challenge," he said.

In the Tuesday announcement, the Defense Advanced Research and Planning Agency, or Darpa, lists eight likely tasks the robot will need to perform — among them driving a vehicle to a simulated disaster site, moving across rubble, removing rubble from an entryway, climbing a ladder, using a tool to break through a concrete wall, finding and closing a valve on a leaking pipe, and replacing a component like a cooling pump.

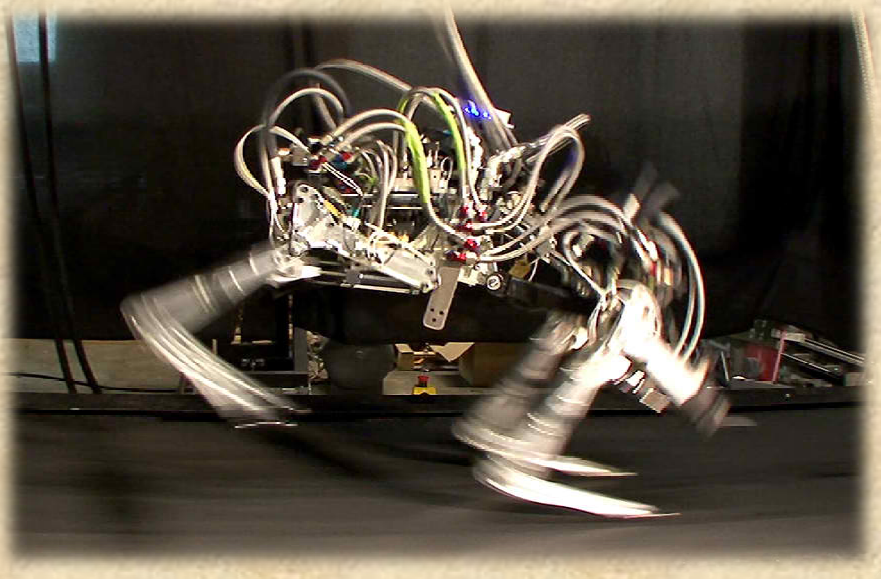
Mr. Edsinger said the challenge would be not in completing any one of the tasks but rather in integrating them into a single mission. "I feel we have already have systems that can achieve each individual task in the challenge," he said.

The idea for the competition came from the Fukushima nuclear disaster in Japan a year ago, said Gill Pratt, a program manager in Darpa's defense sciences office. "During the first 24 hours," he added, "there were things that should have been done but were not done because it was too dangerous for people to do them."

The agency has not yet announced how much it intends to spend on the program or the size of the prize. It is calling the program a "robotics challenge," which is distinguished from a series of "grand challenge" events it held in 2004, 2005 and 2007, with $1 million and $2 million

prizes for a contest to design autonomous vehicles to drive in desert and urban settings.
Corporate and university teams will compete to enter the robots in contests in 2013 and 2015. The robots will not need to be completely autonomous, but rather will be "supervised" by human operators, much as ground-based pilots now fly military drones.
The competition underscores the rapid progress being made in autonomous systems in military, manufacturing and home applications. Robotics researchers have said that these advances are largely a result of the falling cost of all kinds of sensors, as well as developments in perception technologies that make it possible for robots to move in unplanned environments.

A number of ambitious humanoid robots have already been designed by industrial researchers. The Honda Asimo was unveiled in 2000 and by 2005 could operate for a full hour on batteries. Last year it demonstrated the ability to run as fast as six miles an hour.



Darpa officials said they were hoping for international participation in the robot competition. Indeed, the challenge echoes a proposal made in November by Hirochika Inoue, the father of humanoid robot development in Japan.
Despite Japan's significant investment in robotics, he noted that the country did not have any robots capable of completely replacing humans at the time of the Fukushima disaster.
"Many people wanted to do it by robots," he said in an e-mail, "but we had not prepared."
In the United States, both General Motors and Boston Dynamics, a small research lab financed by the military, have developed humanoid robots. G.M.'s Robonaut 2 is now on the International Space Station, where it is being tested as an astronaut's assistant.
Boston Dynamics, which has attracted attention for a transport robot called **BigDog** (top) and more recently for a four-legged running robot called **Cheetah** (bottom), has a humanoid robot called Atlas.
In its announcement, Darpa says it will distribute a test hardware platform with legs, torso, arms and head to assist some of the teams in their development efforts.
Several robot researchers said a version of the Boston Dynamics Atlas was a likely candidate for this role, but Mr. Pratt said his agency would also provide a software simulator to allow the widest possible participation in the challenge.
"We're opening the aperture as wide as we can," he said.
John Markoff, senior writer for The New York Times, writes for the paper's science section.

NRC reveals radioactive water spill at Limerick nuke plant

Source:http://www.pottsmerc.com/article/20120412/NEWS01/120419797/nrc-reveals-radioactive-water-spill-at-limerick-nuke-plant&pager=full_story

"Several thousand gallons" of water containing as much as five-times the government's "safe" level of **radioactive tritium** was accidentally released at Exelon Nuclear's Limerick Generating Station (photo) last month and then flushed into the Schuylkill River, The Mercury learned Thursday.

However the concentrations of contamination in the water were considered so low that they presented "no immediate health and safety concerns," according to the Nuclear Regulatory Agency, which is why **the incident was not reported publicly until 23 days after it happened.**

It was 3 a.m. Monday, March 19 when "a manhole cover overflowed during a scheduled and permitted radiological release," according to an incident report posted on the NRC web site.

"As a result, several thousand gallons of water overflowed briefly, formed puddles in the area, and was discharged" through a permitted discharge to Possum Hollow Creek, which flows from the plant grounds into the Schuylkill River," according to information from the NRC.

The notification issued to the NRC by Exelon stated "several (water) samples showed increased levels of tritium that were well below permitted Commonwealth and Federal effluent limits."

NRC spokesman Neil Sheehan wrote in an e-mail that the "maximum level of radioactivity detected in Possum Hollow Creek . . . on the day of the event was 495 picocuries per liter of tritium."

He noted that the Environmental Protection Agency's "safe drinking limit for tritium per liter is 20,000 picocuries per liter."

However, Sheehan also noted that one water sample collected from a puddle near the manhole from which the water first emerged, had a tritium concentration of 113,000 picocuries per liter, more than five times the safe drinking water level.

"Of course the water leaked out onto the ground on the plant grounds would not be used for" drinking, Sheehan said.

However all that water, which Exelon estimated something less than 15,000 gallons, was legally dumped into the Schuylkill River, which is a drinking water source for several downstream communities, including Phoenixville and Philadelphia.

An alternative opinion about Fukushima incident

Source: http://www.jimstonefreelance.com/fukushima1.html

EDITOR'S COMMENT: Study it and make you own conclusions – is it just a conspiracy theory or the other side of the coin?