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October 24, 2013

Iranian Breakout Estimates, Updated September 2013

By Patrick Migliorini, David Albright, Houston Wood, and Christina Walrond1

Source: http://www.isis-online.org/uploads/isis-reports/documents/Breakout_Study_Summary_24October 2013.pdf

SUMMARY

Since October 2012 when ISIS last published detailed breakout assessments about Iran's gas centrifuge uranium enrichment program, Iran has steadily expanded the number of IR-1 centrifuges installed at both its Fordow and Natanz gas centrifuge plants.2 Additionally, it has started installing its more advanced centrifuge model, the IR-2m centrifuge, at the Natanz Fuel Enrichment Plant (FEP). These substantial changes merit updating our previous breakout estimates of the time Iran would need to produce one significant quantity (SQ) of weapon-grade uranium (WGU), taken as 25 kilograms of WGU, using its existing safeguarded nuclear facilities and low enriched uranium (LEU) stocks as of August 2013.

For several years, experts at ISIS and the School of Engineering and Applied Science at the University of Virginia (UVA) have quantified Iran's ability to adapt its enrichment program to produce WGU. Iran maintains a number of options should it choose to breakout of the Nuclear Nonproliferation Treaty (NPT). This report evaluates those options in various realistic combinations to examine Iran's current ability to produce WGU. We also look for the first time in this report at breakout times in the case of Iran having a covert centrifuge plant of advanced centrifuges.

As in the October 2012 iteration, the estimates in this report do not include the additional time that Iran would need to convert WGU into weapons components and manufacture a nuclear weapon. This extra time could be substantial, particularly if Iran wanted to build a reliable warhead for a ballistic missile. However, these preparations would most likely be conducted at secret sites and would be difficult to detect. If Iran successfully produced enough WGU for a nuclear weapon, the ensuing weaponization process might not be detectable until Iran tested its nuclear device underground or otherwise revealed its acquisition of nuclear weapons. Therefore, the most practical strategy to prevent Iran from obtaining nuclear weapons is to prevent it from accumulating sufficient nuclear explosive material, particularly in secret or without adequate warning. This strategy depends on knowing how quickly Iran could make WGU.

We evaluated a range of breakout scenarios based on the current

enriching IR-1 centrifuges and LEU stockpiles, total installed IR-1 centrifuges, and a possible covert facility containing IR-2m centrifuges. This analysis utilizes a modified form of the well-known four-step enrichment process that was developed under A.Q. Khan for Pakistan's centrifuge program and transferred to other countries, such as Iran. Using all four steps, Iran would enrich natural uranium to 3.5 percent in step one, then to 20 percent in step two, then to 60 percent in step three, and finally to WGU in step four. This analysis considers the four-step, three-step, and two-step process also with the use of existing LEU stockpiles.

The table lists the major estimated breakout times of the four scenarios considered in this report. Today, Iran could break out most quickly using a three-step process with its installed centrifuges and its LEU stockpiles as of August 2013. In this case, Iran could produce one SQ in as little as approximately 1.0–1.6 months, if it uses all its near 20 percent LEU hexafluoride stockpile. Using only 3.5 percent LEU, Iran would need at least 1.9 to 2.2 months and could make approximately 4 SQs of WGU using all its existing 3.5 percent LEU stockpile.

A covert plant offers Iran additional options for cascade configuration and relatively fast breakout times, where the calculations utilize LEU stocks as of August 2013. The estimates vary based on cascade configuration and the actual separative capacity of the IR-2m centrifuge. In the ideal scenario with optimized cascade structure and very good centrifuge performance, it is possible that Iran could use a covert plant to break out in as little as approximately one to two weeks. However, it's more likely that Iran would require more time and the covert plant would have a less optimal cascade arrangement. In that case, breakout times would increase. With LEU inventory as of August 2013, Iran could break out in as little as 1.3-2.6 months in a covert plant with a more realistic cascade organization. In the case where only a stock of 3.5 percent LEU were used, Iran could break out in as little as 2.2-4.5 months. These times would be relatively long in the case of a breakout at declared centrifuge plants, where detection would be relatively prompt and where the enrichment would occur at a known location. However, when the enrichment is carried out at a secret location, these breakout times offer less assurance. Even though the IAEA would detect the diversion of the safeguarded LEU, the location of the enrichment site would be unknown, severely complicating any response aimed at stopping further enrichment.

If Iran had a stock of about 250 kg of near 20 percent LEU hexafluoride, breakout times would be significantly shorter in the two step process than in the three step arrangement. However, when the stock of near 20 percent LEU hexafluoride falls to about 205 kg, then the three step process with the use of the LEU inventory is about the same as the two step process with 205 kg of near 20 percent LEU hexafluoride.

The shortening breakout times have implications for any negotiation with Iran. An essential finding is that they are currently too short and shortening further, based on the current trend of centrifuge deployments. As a result, the current negotiations should result in:

- lengthening the breakout times,
- shortening the time to detect breakout, and
- gaining assurance that a secret centrifuge plant is unlikely to be built or finished.

Increased transparency

There are several additional transparency measures that are important, although a discussion of these measures is outside the scope of this report. But two points are worth mentioning. The first is that transparency measures by themselves have inherent limits and cannot address fully the risk posed by short breakout times.3 Nonetheless, Iran should be pressed to increase the frequency of inspections at enrichment plants, install remote camera monitoring at enrichment plants, implement early notification of the construction of nuclear plants4, ratify the Additional Protocol, and establish full inspections of its centrifuge research, development, and manufacturing complex.

Lengthening breakout

A negotiation should be guided by the need to lengthen breakout times significantly from their current values. A reasonable minimum breakout time should be six months or preferably longer. If breakout took greater than or equal to six months, the IAEA could clearly detect it long before one SQ is produced, and the international community would have time to marshal a response to stop Iran

producing enough WGU for a nuclear weapon.
The process of lengthening breakout times involves several variables. The key ones are the number of centrifuges, the stocks of LEU, the enrichment level of the LEU, and the type of centrifuges installed. In practical terms, a six month breakout at declared sites could be achieved several ways. Based on the estimates in this report, four cases are evaluated that result in a breakout time of at least six months.
1) The near 20 percent LEU hexafluoride stock is frozen at an August 2013 level and no further near 20 percent is produced. Any amount of near 20 percent LEU hexafluoride in excess of the August level is blended down to 3.5 percent LEU hexafluoride or shipped out of the country. All existing near 20 percent LEU oxide is shipped out of the country or irradiated in the Tehran Research Reactor (TRR), since this stock could be reconverted into hexafluoride form well within six months and used in a breakout. No IR-2m centrifuges are involved in enriching uranium. And stocks of 3.5 percent LEU are not affected. In this case, extrapolating one of the subcases of Scenario 2, namely the three-step process with the use of all installed IR-1 centrifuges and all near 20 percent LEU hexafluoride inventory, a six month breakout limit would necessitate Iran having no more than 3,000-5,000 centrifuges at Natanz and Fordow.
2) Iran no longer has near 20 percent LEU. In this case, Iran would need to blend down or ship out of the country all its stock of near 20 percent LEU, other than what is irradiated in the TRR. In addition, only IR-1 centrifuges would be enriching uranium. Extrapolating Scenario 2, in this case the three-step process with all installed IR-1 centrifuges and only a 3.5 percent LEU stock, a six month breakout limit would necessitate Iran having no more than 5,800 to 6,800 IR-1 centrifuges.
3) There is no inventory of LEU in Iran. In this case, Iran would need to blend down or ship out all its stocks of 3.5 percent and near 20 percent stocks of LEU, leaving in Iran only those stocks irradiated in the TRR. Any new 3.5 LEU produced would need to be rapidly blended down or shipped out of Iran. In addition, no IR-2m centrifuges are involved in enriching uranium. Extrapolating Scenario 2, namely the four-step process with all installed centrifuges, a six month breakout limit would require Iran having no more than 16,600 to 20,900 IR-1 centrifuges. However, this case is not realistic in a centrifuge plant with so many centrifuges. There would be expected to be several product tanks in the plant that would receive 3.5 percent LEU from the cascades. And these product tanks would be expected to hold at least one tonne of 3.5 percent LEU hexafluoride.
4) Iran has one tonne of 3.5 percent LEU hexafluoride in the centrifuge plant and no near 20 percent LEU. The other conditions include no IR-2m centrifuges deployed and rapid blend down of the LEU or shipment of the LEU out of the country. In this case, breakout using the four-step process and all installed IR-1 centrifuges as of August 2013 would take an estimated 2.5 to 3.0 months.5 Extrapolating this calculation, a six month breakout would require Iran having no more than 7,700-9,200 IR-1 centrifuges.
These cases show that limiting the numbers of centrifuges and eliminating the near 20 percent LEU stock are the most important goals if breakout times are to be lengthened significantly. One major implication is that Iran should not have more than about 9,000 IR-1 centrifuges and should have considerably fewer than 9,000 IR-1 centrifuges if Iran keeps a stock of near 20 percent LEU whether in the form of hexafluoride or unirradiated uranium oxide.
If Iran substitutes IR-2m centrifuges for IR-1 centrifuges, then the equivalent limits would be roughly one fifth to one third smaller. So, a limit of 9,000 IR-1 centrifuges would be equivalent to 1,800-3,000 centrifuges. However, a more effective goal is to seek a halt to the deployment and use of IR-2m centrifuges in Iran.

Reducing chances of a covert centrifuge plant

Increasing the probability that there are not additional, covert enrichment plants cannot be achieved solely by increasing transparency, such as ratifying the Additional Protocol, despite its critical value. More important is an Iranian commitment to confine its enrichment activities to Natanz, halt further centrifuge manufacturing except to replace broken ones or build new ones for declared, agreed-upon centrifuge expansions at Natanz needed to

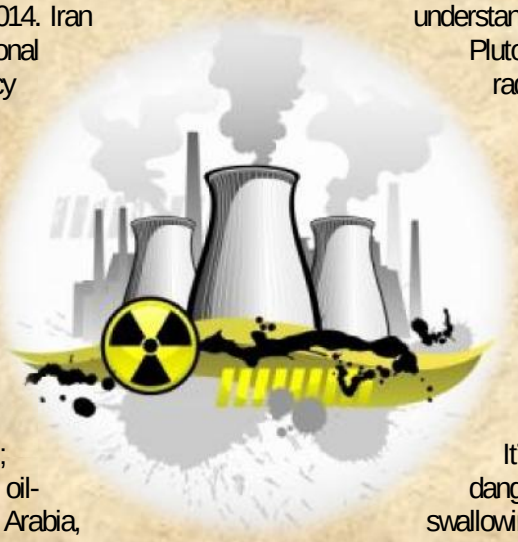
produce LEU for near-term insertion in a reactor, halt the development and deployment of advanced centrifuges, and commit not to conduct illicit nuclear smuggling to obtain centrifuge-related goods.

All of these steps are achievable and reasonable if Iran is committed to convincing the world that its nuclear program is indeed peaceful.

The Iranian Nuclear Secret: A Plutonium-Based Atom Bomb

Source: http://i-hls.com/2013/10/the-iranian-nuclear-secret-a-plutonium-based-atom-bomb/?utm_source=activetrail&utm_medium=email&utm_campaign=English%20Newsletter%2030/10/2013

The Iranian nuclear reactor in Arak, already operating under the code name IR-40, is capable of producing 10-12 kilograms of plutonium a year. 6-10 kilograms are needed to produce one atom bomb. This means that Iran will have enough plutonium to manufacture a nuclear weapon by June 2014. Iran doesn't allow International Atomic Energy Agency inspectors access to the Arak reactor, nor access to the active heavy water facility it had built next to the reactor, which is fueled by natural uranium. According to western intelligence estimates Iran's strategic goal isn't the destruction of Israel; Iran plans to take over the oil-producing states: Saudi Arabia, Iraq and the Persian Gulf emirates. The Iranian leaders believe that if they'll become a nuclear superpower and gain control over all Middle-Eastern oil resources, Iran won't be "just another state" anymore – it will become a global Islamic empire.



After Iranian President Hassan Rouhani spoke at the U.N. General Assembly, it seemed that his friendly and placating facade convinced many western leaders, U.S. President Barack Obama among them, that the impossible is finally happening: Iran is willing to seriously discuss its uranium enrichment operations, which will eventually lead to the development of nuclear weapons. Sadly, Iran once again successfully deceived the west, this time under a new, more presidential leadership.

Talks with Iran are still ongoing, supposedly progressing towards some sort of "understanding", but the Iranian leadership – in secrecy and while preventing any international oversight – manufactures plutonium-based nuclear weapons in the Arak reactor. Arak is situated in north-western Iran, about 260 kilometers from Tehran, and the reactor, active since June 2013, already produces 40 megawatts.

A short scientific explanation is required to understand exactly what's at stake. Plutonium is a metallic, highly radioactive artificial element, its symbol is Pu and its atomic number 94. In nature it can be found only in miniscule amounts, but never as an ore like uranium. It's a byproduct of the fission processes in nuclear reactors cooled by heavy water systems. It's highly radioactive and dangerous, and inhaling or swallowing more than a millionth of a gram can cause cancer or death. The vast majority of plutonium on Earth is man-made. It was first discovered in 1941, as a lab byproduct in the UC Berkeley particle accelerator. Nuclear researchers, headed by chemistry Nobel Prize winner Glenn Theodore Seaborg, bombarded uranium 238 with deuterium 1. This bombardment resulted in an unstable material called neptunium 238, with a half life of 2.1 days. A few days later the neptunium deteriorated and became plutonium, which can be used to achieve chain reactions in nuclear weapons.

Iran has wanted Plutonium for nuclear weapons for some time now. For a few years Iran tried to purchase the dangerous element covertly from various sources, especially from the former soviet union member states. Western intelligence agencies exposed several of these failed attempts. Having failed to purchase plutonium on the "black market", the

Iranians decided to build a heavy water facility for their own use. Iran does not allow IAEA (International Atomic Energy Agency) inspectors to visit the Arak reactor, and also bans visits to the heavy water production facility, which is located next to the reactor itself, fueled by natural uranium. Their reason for refusing to cooperate with the IAEA is simple. According to international treaties a reactor fueled by natural uranium doesn't have to be subject to IAEA inspections. This fact helps Iran hide its practical use of the Arak reactor, also known as IR-40. When operating at full capacity the reactor can manufacture 10-12 kilograms of plutonium a year. It takes 6-10 kilograms to create one atom bomb. These numbers mean that Iran will have enough plutonium for a bomb in June 2014.

The Iranian-made Arak reactor reflects the very advanced capabilities of the Islamic republic in this area, even though many of the materials and technologies it required were either stolen or purchased, using covert procurement networks operated by the Iranian Ministry of Intelligence and straw companies established by the Revolutionary Guard. One of the problems facing those who intend to operate a nuclear reactor in order to produce plutonium is obtaining heavy water. It turns out, however, that the production of heavy water is a relatively simple process, similar to producing ammonia, alcohol and more, materials whose production processes are already known to the Iranian regime. Heavy water can also be produced using regular water. Heavy water is produced in several countries around the world, such as Argentina, Canada, India and Norway. Canada is the world leader in heavy water production.

The London Telegraph recently published a report on the Iranian "plutonium option", including satellite imagery commissioned by the IAEA. According to the report the steam column rising above the reactor is indicative of heavy water production, and this demonstrates the fact that the Iranian regime has more than one way to manufacture nuclear weapons. According to IAEA experts the Arak imagery reflect Iran's progress in building plutonium-producing facilities, as an alternative to the development of uranium-based nuclear weapons.

A nuclear bomb's most dangerous attribute isn't the massive blasts nor the extreme temperatures at the blast center, it's the radiation itself. The radiation rises into the atmosphere and gets carried over thousands of kilometers by winds and clouds, eventually reaching the surface along with the rain. Radioactive rain waters reach the human body, entering it through drinking water and natural foods. Radiation lasts for many years, and above a certain level can be extremely lethal, turning entire areas to lifeless wastelands. Radiation victims suffer from bone cancer, liver deterioration or blood cell destruction. Most become sterile, their cells suffering from hereditary transformations and some of their descendants born with debilitating mutations.

A plutonium bomb isn't a new invention. Such a bomb was used for the first time in history at the end of World War II, when the American Air Force dropped one on the Japanese city of Nagasaki on August 9th, 1945. The bomb, nicknamed Fat Man, caused the death of 40,000 people and left tens of thousands suffering from radiation sickness.

One of the main issues the international community is dealing with these days is what, exactly, does Iran hope to gain by developing nuclear weapons and by funding global terror, a policy which at first glance seems completely irrational and dangerous for Iran itself. Above all, the question is why do they target Israel with their propaganda, when most agree that Israel is no threat to Iran's existence. According to the world powers' intelligence estimates Iran's strategic goal isn't the destruction of Israel – Iran wants to take over the oil producing states: Saudi Arabia, Iraq and the Persian Gulf emirates.

The Iranian leaders believe that if they'll become a nuclear superpower and gain control over all the oil sources in the Middle East, they'll no longer be considered "just another state". Iran, according to them, will become global Islamic empire. Iran's leaders already made some public declarations that shed light on these imperial aspirations. According to these declarations the scientific infrastructure of the Arak reactor will also be used to develop the new, 336 megawatt reactor which is being built in the Darkhovin site, close to the city of Ahvaz. This reactor, with a capacity ten times that of the Arak reactor, can produce 100-120 kilograms of plutonium a year – meaning it can also produce ten times as many atom bombs.

Where should U.S. radioactive waste be buried?

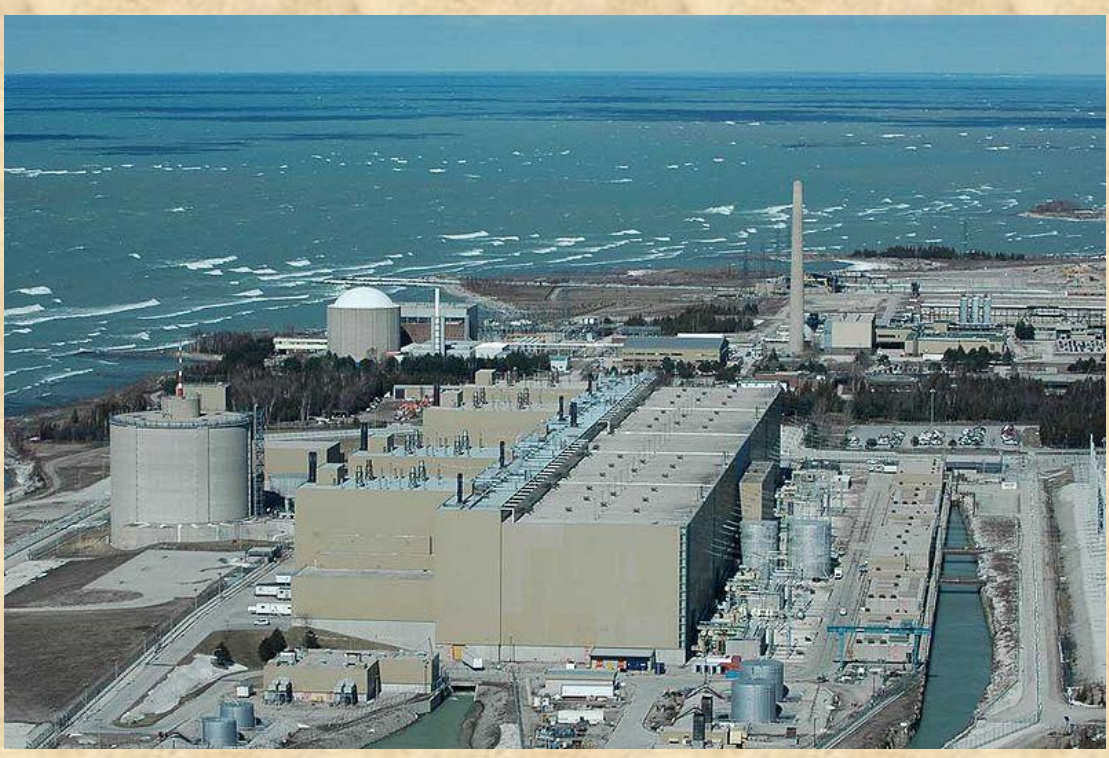
Source: http://www.homelandsecuritynewswire.com/dr20131030-where-should-u-s-radioactive-waste-be-buried

As the United States makes new plans for disposing of spent nuclear fuel and other high-level radioactive waste deep underground, geologists are key to identifying safe burial sites and techniques. Scientists at the Geological Society of America (GSA) meeting in Denver described the potential of shale formations; challenges of deep borehole disposal; and their progress in building a computer model to help improve understanding of the geologic processes which are important for safe disposal of high-level waste.

A GSA release reports that in the United States, about 70,000 metric tons of spent commercial nuclear fuel are located at more than seventy sites in thirty-five states. Shales and other clay-rich (argillaceous) rocks have never been seriously considered for holding America's spent nuclear fuel, but it is different overseas. France, Switzerland, and Belgium are planning to put waste in tunnels mined out of shale formations, and Canada, Japan, and the United Kingdom are evaluating the idea.

At the GSA meeting, U.S. Geological Survey hydrogeology expert C. E. Neuzil of Reston, Virginia, reported that some shales are so impermeable that there is little risk of radioactivity from buried nuclear waste reaching ground or surface water.

"This is usually difficult to demonstrate," Neuzil says, "but some shales have natural groundwater pressure anomalies that can be analyzed — as if they were permeability tests — on a very large scale." This capability, explained Neuzil, was shown recently at the



Bruce Nuclear Site (photo), a proposed low/intermediate waste repository 1,200 feet underground in Ontario, Canada. Argillaceous rocks have additional attractive qualities, Neuzil said: They are common, voluminous, and tend to be tectonically quiet — meaning no earthquakes to crack the walls of a fuel-rod burial chamber.

Another disposal option for nuclear waste is deep boreholes. The 2012 presidential Blue Ribbon Commission on America's Nuclear Future recommended more research, and the U.S. Department of Energy is now developing an R&D plan. The U.S. Nuclear Waste Technical Review Board (NWTRB), however, has statutory responsibility for evaluating the technical validity of DOE's nuclear waste activities, and is on the record with the position that

deep boreholes present many technical challenges and studying them "should not delay higher priority research on a mined geologic repository."

At the GSA meeting, Review Board senior staff professional Bret W. Leslie and Stanford University geophysicist Mary Lou Zoback, an NWTRB member, presented the board's assessment of:

- The technical feasibility of drilling a borehole of the proposed depth (three miles) and width (about twenty inches), which has never been done
- The exposure risk for workers, who would have to repackage waste currently stored in canisters that are wider than the width of the proposed boreholes
- The reliability of existing sealing technology
- The large number of deep boreholes that would be required—nearly 700

Whether nuclear waste winds up in tunnels, boreholes, or both, the planning will be helped by new analytical tools. One is a new computer model that will evaluate the behavior of various forms of nuclear waste, and waste containers and barriers, if stored in various rocks. The model is being developed under the auspices of the Center for Nuclear Waste Regulatory Analyses (CNWRA), the NRC's federally funded research and development center, and was described at the GSA meeting by NRC performance analyst Jin-Ping Gwo

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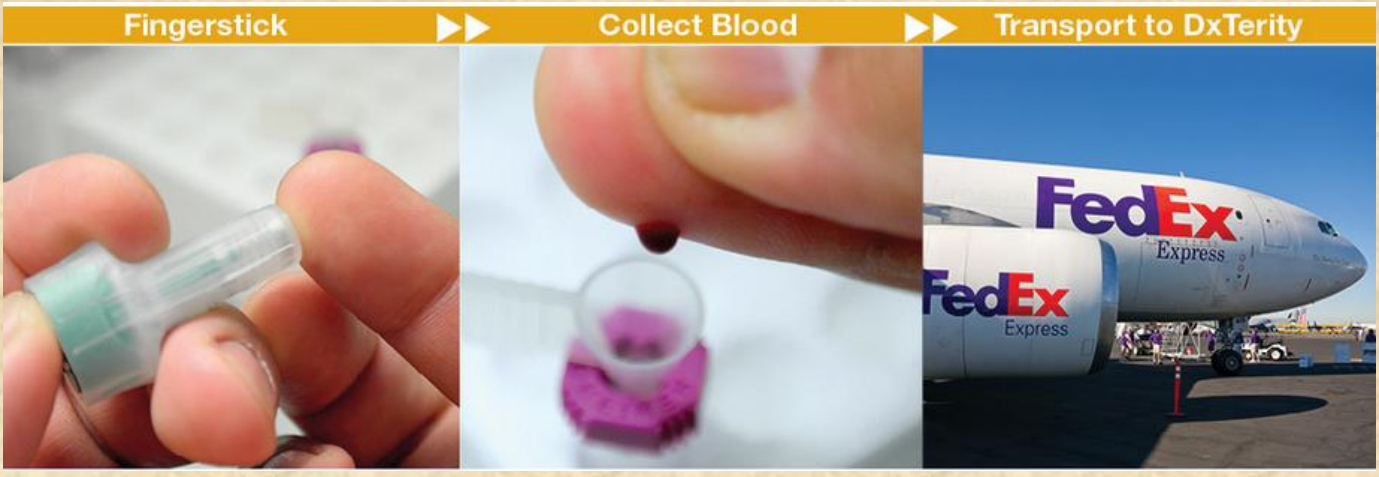
Measure radiation exposure from blood

Source: http://www.dxterity.com/redidxcom/redi_dx.php

REDI-Dx™ (Radiation Exposure Dosage Index)* is a test designed to provide an estimate of individualized levels of absorbed radiation exposure (biodosimetry) following a nuclear incident. Exposure to ionizing radiation induces rapid, complex, and predictable changes in an individual's cellular gene expression and REDI-Dx measures these changes by analyzing the relative expression of a panel of biomarkers tied to cell death, cell signaling, and DNA damage repair. A multivariate algorithm is used to calculate the apparent absorbed radiation dose.

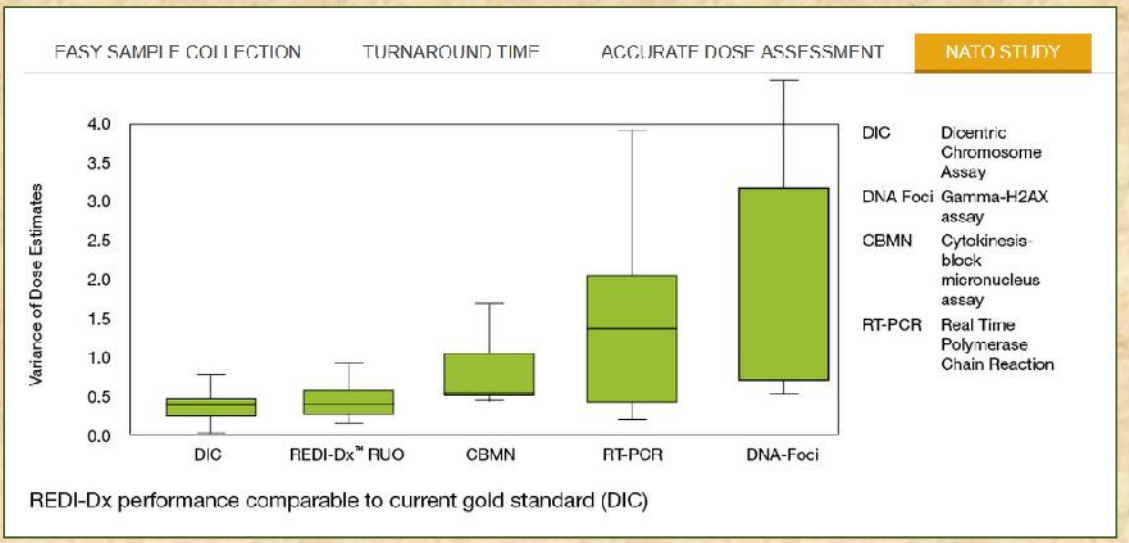
The test is designed to integrate easily into existing emergency response plans. REDI-Dx uses a small blood sample that is collected from the patient by fingerstick or venous blood draw within 7 days of the exposure. The blood sample is mixed with a buffer (DxCollect) to stabilize it for transport at ambient temperature, and high throughput processing in a centralized laboratory can provide same day results to the physician.



Fast, simple, and affordable biodosimetry solution

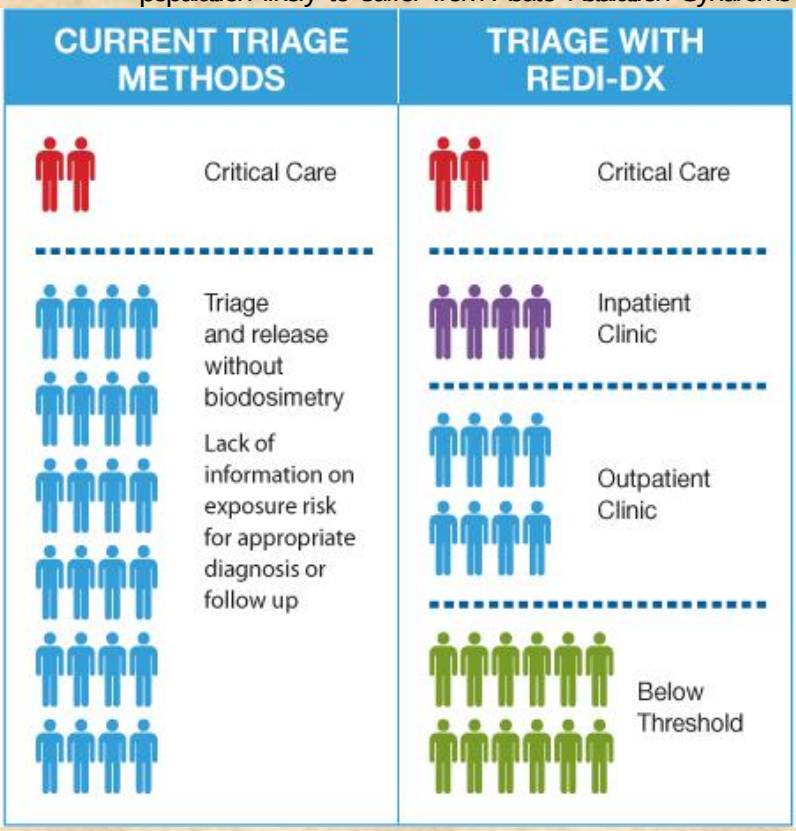
REDI-Dx is being developed as part of an ongoing collaboration between DxTerity Diagnostics and Duke University, with funding from the U.S. Department of Health and Human Services' Biomedical Advanced Research and Development Authority (BARDA). Broad population studies are underway to identify potential confounding conditions related to ethnicity or

disease state, and a submission for FDA clearance is planned for early 2015. DxTerity is in the process of preparing an Emergency Use Authorization package for submission in late 2013



RESPONDERS

In a mass radiological event, medical response and triage will involve large patient populations with widely varying radiation exposures as well as conventional trauma. Responding to the incident will require timely decisions on clinical treatment, including the ability to diagnose the portion of the population likely to suffer from Acute Radiation Syndrome (ARS). The onset and severity of ARS symptoms is directly related to the dose of radiation absorbed, and providing an effective response to the radiological event requires a diagnostic method to identify which individuals need immediate versus near-term treatment, while transferring those among the "watchful waiting" and non-exposed out of the triage path. REDI-Dx* is designed to estimate individualized levels of radiation exposure from a fingerstick collected blood sample.



Triage and treatment prioritization

The ability to prioritize triage and treatment of asymptomatic patients likely to develop acute radiation syndrome (ARS) is vital in any nuclear response scenario. In a radiological event, the challenge of response is compounded by the delayed clinical manifestation of ARS, a critical unknown factor complicating any response initiative. The onset and severity of ARS symptoms is directly related to the dose of radiation absorbed where the effects of damage to gastrointestinal organs can be seen in hours, hematology in days, and the central nervous system over weeks. Thus, effective response requires a diagnostic method to identify which individuals need immediate versus near-term treatment, while transferring those among the "watchful waiting" and non-exposed out of the triage path. For the emergency response teams deciding how to manage

tens of thousands of victims, it is critical to provide actionable information that can be integrated into platforms for response management and patient tracking as well as critical care clinics and emergency rooms.

Minimize logistics, maximize capabilities

DxTerity Diagnostics is developing REDI-Dx to meet the challenging needs of radiological response from sample collection to patient tracking to delivery of results. REDI-Dx is designed to integrate into existing platforms for response management and patient tracking. Patient samples are collected with simple, easy to use fingerstick blood collection kits to greatly reducing the burden on emergency responders and medical personnel. Patient samples are stable at ambient temperature for up to 7 days without refrigeration, eliminating the need for expensive and complex shipping logistics. Once received by DxTerity, the testing results can be available within 24 hours.

CLINICIANS

After a mass scale radioloigcal event, hospitals and clinics will be inundated with patients with a spectrum of conditions from anxiety to critical comorbid injuries of acute radiation exposure and trauma. These clinicians will be responsible for providing care and information to admitted critical care patients, new patients seeking care, and the "worried well". Having a fast and simple biodosimetry tool could help in easing the surge in medical resources by quickly helping to stratify patients. REDI-Dx* is designed to be that tool for estimating a patient's absorbed dose which can provide critical information in the clinic decisions surrounding triage and care.

Article Published in Men's Health over Fukushima Concerns

A challenging diagnosis

Acute Radiation Syndrome (ARS) is an illness caused by exposure to radiation across most or all of a patient's body. The dose of radiation must be high (above 0.7 Gy) and occur over a very short period of time (from seconds to minutes). The hematopoietic by the GI tract and the neurologic Diagnosing ARS can be difficult symptoms are not specific, and occur for hours or days after

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In the event of a mass scale radiological incident, hospitals and clinics will be inundated with patients with a spectrum of conditions from anxiety to critical comorbid injuries of acute radiation exposure and trauma. Clinicians will be responsible for providing care and information to exposed patients and the "worried well". Having a fast and simple biodosimetry test is critical to correctly stratifying patients according to absorbed radiation exposure and determining the best course of treatment. REDI-Dx is designed to be that test.

Next generation biodosimetry solution - today

DxTerity Diagnostics is addressing the challenges around estimating a patient's radiation exposure. The Radiation Exposure Dosage Index Diagnostic or REDI-Dx is being developed as an innovative molecular gene expression test for acute radiation exposure that can estimate dose by measuring a panel of genomic markers in blood. REDI-Dx is designed to be a simple and effective solution for biodosimetry that can be used in the management of scarce medical resources in radiological emergencies.

And the winner is….

By Ilja Bonsen
Source: http://www.cbrneportal.com/and-the-winner-is/

Kuala Lumpur - During a spectacular awards ceremony the winners of the first edition of the NCT CBRNe Awards were announced. The **NCT CBRNe Awards** are the new industry prizes for CBRNe products, solutions and developments in the international CBRNe Community and are initiated by IB Consultancy, CBNW Magazine and Military technology to reward companies and organisations that have made an outstanding contribution to the CBRNe Community.

The NCT CBRNe Awards Ceremony highlighted the opening of the second edition of the NCT CBRNe Asia Conference, Exhibition and Demonstration, organised by IB Consultancy. The show was hosted in the brand new Aloft Hotel grand ballroom in Kuala Lumpur, Malaysia. Special guest of the night was Chief of the Malaysian Armed Forces, Honorable General Tan Sri Dato' Sri Zulkifeli Bin Mohd Zin, who stressed the importance of CBRN research and development in order to counter the CBRN threat in Asia and globally.

This year's edition counted four Award categories, of which three were handed out by a distinguished jury comprising: Guy Roberts (NATO), Lt. General Yugala (ret) (Royal Thailand Army), Lt. Col. Frank Kaemper, (Bundeswehr); Stephen Elliott (Mönch Publishing Group), Dave Sloggett (CBNW Magazine;), Dr. Zalini Yunus, (STRIDE Malaysia) and Ilja M. Bonsen (IB Consultancy).

The first Award of the evening went to the Reward Project. This project was granted the NCT CBRNe Innovation Award for the most innovative product, service or research paper. The Jury stated that "the developed detection and surveillance system offers a perfect solution for end-users to enhance crucial capabilities in RN analysis, risk communication and surveillance in case of a radiation incident".

The NCT CBRNe Capability Award for the country or organisation having improved its CBRNe capabilities or having had an impact on the capabilities of another country or organisation went to the Second Line of Defence Initiative of the US Department of Energy. According to the Jury "the aim and results of this initiative are impressive: building up capacities internationally in order to detect, deter and interdict illicit trafficking of particularly RN materiel confronts one of the major issues of CBRN proliferation in the 21st century."

The NCT CBRNe Product Award was won by DxTerity Diagnostics' for its REDI-Dx biodosimetry product, as "it has a clear end-user benefit, economic efficiency and an excellent match between requirements and the offered solution." In addition, "against the background of mass casualty incidents like in Fukushima, it permits fast analysis and treatment of victims on the basis of low-cost testing," according to an impressed Jury.

Along with the three Awards handed out by the jury, the NCT CBRNe Community Award was granted by the CBRNe Community to Bruker for illustrating itself in bringing benefits to CBRNe end-users. Bruker's RAID M100 Detector – Chemical Agent Detector is designed to detect chemical warfare agents and toxic industrial chemicals on personnel, equipment, platforms and in the environment. In this special opportunity for members of the CBRNe Community to assess peer recognition, the RAID M100 Detector received an overwhelming number of votes during the awards show and online voting rounds.

Handheld Radiation Detector Gives First Responders Ability to Detect Radiation in Harsh Conditions

Source: http://www.hstoday.us/single-article/handheld-radiation-detector-gives-first-responders-ability-to-detect-radiation-in-harsh-conditions/a4164cc8d88d0e74055556b38cbbe0c8.html

Thermo Scientific's new RIIDEye X handheld radiation isotope identifier provides first responders the ability to detect radiation in harsh and unpredictable conditions. Police, firefighters, Border Patrol agents and even military personnel "have a new versatile handheld gamma and neutron radiation isotope identifier engineered for use in severe environmental conditions," Thermo Scientific said in an announcement.

"The RIIDEye X was designed to provide the fastest, most accurate radiation detection in the most challenging conditions our customers encounter," said Scott Masiella, spectroscopy product line manager for Thermo Fisher Scientific. "In addition, RIIDEye X was engineered for use by personnel with little experience in radiation measurement, giving a wide range of first responders a new tool needed to quickly detect radiation in the field."

The RIIDEye X handheld radiation isotope identifier is "designed to protect first responders from harmful

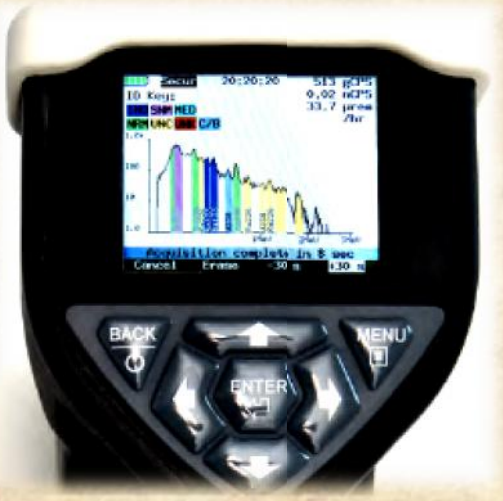
radiation by enabling users to detect and identify radiation in the environment and give users feedback on radiation location, type and quantity," Thermo Scientific said, adding that "This new instrument is designed to locate and identify gamma and neutron radiation sources within cargo, food, solids, liquids, and semi-solids, or persons."

The company said RIIDEye X is reinforced with a dust proof and water resistant casing, and is compact and lightweight enough to easily be used "in nearly any environment and can withstand drops from up to one meter."

"Since its first release last year, the RIIDEye instrument has been redesigned to significantly improve the detection and identification of harmful radiation in severe conditions," the company said, noting that "The new RIIDEye X now uses CLYC technology for neutron detection, and new algorithms for improving speed and accuracy. In addition, RIIDEye X's improved interface makes complicated spectroscopic readings easy to understand."

Key innovations of the RIIDEye X include:

- Patented Quadratic Compression Conversion (QCC) algorithm enables real-time data delivery for identification and measurement;
- Special Nuclear Materials (SNM) Assist enhances SNM detection by auto-calculating scan times to enable confident results; and
- CLYC Neutron detector uses no He3 and is located in the handle to enhance performance detection.



The REAL Fukushima Danger

Source: http://www.washingtonsblog.com/2013/09/the-real-fukushima-danger.html

The Real Problem…

The fact that the Fukushima reactors have been leaking huge amounts of radioactive water ever since the 2011 earthquake is certainly newsworthy. As are the facts that:

- Tepco *doesn't know* how to stop the leaks
- Scientists have *no idea* where the cores of the nuclear reactors are
- Radiation could hit Korea, China and the West Coast of North America *fairly hard*

But the real problem is that the idiots who caused this mess are probably about to cause a *much bigger* problem.

Specifically, the greatest short-term threat to humanity is from the ***fuel pools*** at Fukushima.

If one of the pools collapsed or caught fire, it could have severe adverse impacts not only on Japan … but the rest of the world, including the United States. Indeed, a Senator called it a national security concern for the U.S.:

The radiation caused by the failure of the spent fuel pools in the event of another earthquake could reach the West Coast within days. That absolutely makes the safe containment and protection of this spent fuel a security issue for the United States.

Nuclear expert Arnie Gundersen and physician Helen Caldicott have both said that people should evacuate the Northern Hemisphere if one of the Fukushima fuel pools collapses. Gundersen said:

Move south of the equator if that ever happened, I think that's probably the lesson there.

Former U.N. adviser Akio Matsumura calls removing the radioactive materials from the Fukushima fuel pools "an issue of human survival".

So the stakes in decommissioning the fuel pools are high, indeed.

But in 2 months, Tepco – the knuckleheads who caused the accident – are going to start doing this very difficult operation on their own.

The New York Times reports:
Thousands of workers and a small fleet of cranes are preparing for one of the latest efforts to avoid a deepening environmental disaster that has China and other neighbors increasingly worried: removing spent fuel rods from the damaged No. 4 reactor building and storing them in a safer place.

The Telegraph notes:
Tom Snitch, a senior professor at the University of Maryland and with more than 30 years' experience in nuclear issues, said "[Japan officials] **need to address the real problems, the spent fuel rods in Unit 4 and the leaking pressure vessels**," he said. "There has been too much work done wiping down walls and duct work in the reactors for any other reason then to do something…. This is a critical global issue and Japan must step up."

The Japan Times writes:
In November, Tepco plans to begin the delicate operation of removing spent fuel from Reactor No. 4 [with] **radiation equivalent to 14,000 times the amount released by the Hiroshima atomic bomb**. …. It remains vulnerable to any further shocks, and is also at risk from ground liquefaction. Removing its spent fuel, which contains deadly plutonium, is an urgent task…. **The consequences could be far more severe than any nuclear accident the world has ever seen. If a fuel rod is dropped, breaks or becomes entangled while being removed, possible worst case scenarios include a big explosion, a meltdown in the pool, or a large fire. Any of these situations could lead to massive releases of deadly radionuclides into the atmosphere**, putting much of Japan — including Tokyo and Yokohama — and even neighboring countries at serious risk.

CNBC points out:
The radioactive leak at Japan's Fukushima nuclear plant is far from under control and could get a lot worse, a nuclear energy expert, who compiles the annual "World Nuclear Industry Status Report" warned.
The big danger – and it was identified by Japan's atomic energy commission – is if you lose water in one of the spent fuel pools and you get a spent fuel fire.

CNN reports:
[Mycle Schneider, nuclear consultant:] *T*he situation could still get a lot worse. **A massive spent fuel fire would likely dwarf the current dimensions of the catastrophe and could exceed the radioactivity releases of Chernobyl dozens of times**. First, the pool walls could leak beyond the capacity to deliver cooling water or a reactor building could collapse following one of the hundred of aftershocks. Then, the fuel cladding could ignite spontaneously releasing its entire radioactive inventory.

Reuters notes:
The operator of Japan's crippled Fukushima nuclear plant is preparing to remove 400 tons of highly irradiated spent fuel from a damaged reactor building, a **dangerous operation that has never been attempted before on this scale**.
Containing radiation equivalent to **14,000 times the amount released in the atomic bomb attack on Hiroshima** 68 years ago, more than 1,300 used fuel rod assemblies packed tightly together need to be removed from a building that is vulnerable to collapse, should another large earthquake hit the area.
Tokyo Electric Power Co (Tepco) is already in a losing battle to stop radioactive water overflowing from another part of the facility, and **experts question whether it will be able to pull off the removal of all the assemblies successfully**.
"They are going to have difficulty in removing a significant number of the rods," said Arnie Gundersen, a veteran U.S. nuclear engineer and director of Fairewinds Energy Education, who used to build fuel assemblies.
The operation, beginning this November at the plant's Reactor No. 4, is **fraught with danger, including the possibility of a large release of radiation if a fuel assembly breaks, gets stuck or gets too close to an adjacent bundle**, said Gundersen and other nuclear experts.

That could lead to a **worse disaster than the March 2011 nuclear crisis** at the Fukushima plant, the world's most serious since Chernobyl in 1986.
No one knows how bad it can get, but independent consultants Mycle Schneider and Antony Froggatt said recently in their World Nuclear Industry Status Report 2013: "Full release from the Unit-4 spent fuel pool, without any containment or control, **could cause by far the most serious radiological disaster to date**."
***
The utility says it recognizes the operation will be difficult but believes it can carry it out safely.
Nonetheless, **Tepco inspires little confidence**. Sharply criticized for failing to protect the Fukushima plant against natural disasters, its handling of the crisis since then has also been lambasted.
***
The process will begin in November and Tepco expects to take about a year removing the assemblies, spokesman Yoshikazu Nagai told Reuters by e-mail. It's just one installment in the decommissioning process for the plant **forecast to take about 40 years** and cost $11 billion.
Each fuel rod assembly weighs about 300 kilograms (660 pounds) and is 4.5 meters (15 feet) long. There are 1,331 of the spent fuel assemblies and a further 202 unused assemblies are also stored in the pool, Nagai said.
***
Spent fuel rods also contain plutonium, one of the most toxic substances in the universe, that gets formed during the later stages of a reactor core's operation.
***
"There is a risk of an inadvertent criticality if the bundles are distorted and get too close to each other," Gundersen said.
He was referring to an atomic chain reaction that left unchecked could result in a large release of radiation and heat that the fuel pool cooling system isn't designed to absorb.
"The problem with a fuel pool criticality is that you can't stop it. There are no control rods to control it," Gundersen said. "The spent fuel pool cooling system is designed only to remove decay heat, not heat from an ongoing nuclear reaction."
The rods are also **vulnerable to fire should they be exposed to air**, Gundersen said. [The pools have already boiled due to exposure to air.]
***
Tepco has shored up the building, which **may have tilted and was bulging after the explosion**, a source of global concern that has been raised in the U.S. Congress.
***
The fuel assemblies have to be first pulled from the racks they are stored in, then inserted into a heavy steel chamber. This operation takes place under water before the chamber, which shields the radiation pulsating from the rods, can be removed from the pool and lowered to ground level.
The chamber is then transported to the plant's common storage pool in an undamaged building where the assemblies will be stored.
[Here is a visual tour of Fukushima's fuel pools, along with graphics of how the rods will be removed.]
Tepco confirmed the Reactor No. 4 fuel **pool contains debris** during an investigation into the chamber earlier this month.
Removing the rods from the pool is a delicate task normally assisted by computers, according to Toshio Kimura, a former Tepco technician, who worked at Fukushima Daiichi for 11 years.
"Previously it was a computer-controlled process that memorized the exact locations of the rods down to the millimeter and now they don't have that. **It has to be done manually so there is a high risk that they will drop and break one of the fuel rods**," Kimura said.
***
Corrosion from the salt water will have also weakened the building and equipment, he said.
And if an another strong earthquake strikes before the fuel is fully removed that topples the building or punctures the pool and allow the water to drain, a spent fuel fire releasing more radiation than during the initial disaster is possible, threatening about Tokyo 200 kilometers (125 miles) away.
ABC Radio Australia quotes an expert on the situation (at 1:30):
Richard Tanter, expert on nuclear power issues and professor of international relations at the University of Melbourne:

***

Reactor Unit 4, the one which has a very large amount of stored fuel in its fuel storage pool, that **is sinking**. **According to former prime Minister Kan Naoto, that has sunk some 31 inches in places and it's not uneven**. This is really not surprising given what's happened in terms of pumping of water, the aftermath of the earthquake and the tsunami, the continuing infusions of water into the groundwater area. This is an immediate problem, and if it is not resolved there is an extraordinary possibility **we really could be back at March 2011 again because of the possibility of a fission accident in that spent fuel pond in Unit No. 4**.

Xinua writes:

Mitsuhei Murata, a former Japanese ambassador to Switzerland has officially called for the withdrawalof Tokyo's Olympic bid, due to the worsening crisis at Fukushima, which experts believe is not limited to storage tanks, but also **potential cracks in the walls of the spent nuclear fuel pools**.

Japan Focus points out:

The spent-fuel pool … was damaged by the earthquake and tsunami, and is in a **deteriorating condition**. It remains vulnerable to any further shocks, and is also at risk from ground liquefaction.

***

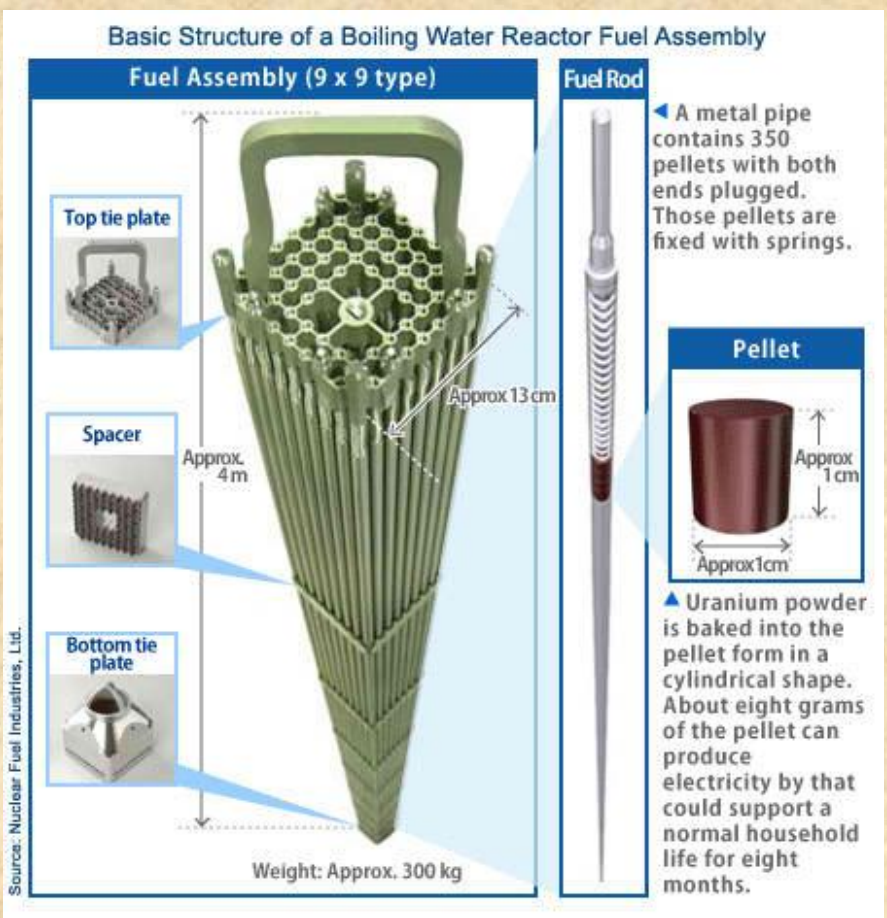
If a fuel rod is dropped, breaks or becomes entangled while being removed, possible worst case scenarios include a big explosion, a meltdown in the pool, or a large fire.

***

This is literally a matter of national security – another mistake by TEPCO could have incredibly costly, even fatal, consequences for Japan.

Like Pulling Cigarettes Out of a Crumpled Pack

Fuel rod expert Arnie Gundersen – a nuclear engineer and former senior manager of a nuclear power company which *manufactured* nuclear fuel rods – recently explained the biggest problem with the fuel rods (at 15:45):



I think they're belittling the complexity of the task. **If you think of a nuclear fuel rack as a pack of cigarettes, if you pull a cigarette straight up it will come out — but these racks have been distorted. Now when they go to pull the cigarette straight out, it's going to likely break and release radioactive cesium and other gases, xenon and krypton, into the air. I suspect come November, December, January we're going to hear that the building's been evacuated, they've broke a fuel rod, the fuel rod is off-gassing**.

***

I suspect we'll have more airborne releases as they try to pull the fuel out. If they pull too hard, they'll snap the fuel. **I think the racks have been distorted, the fuel has overheated — the pool boiled** – and the net effect is that it's likely some of the fuel will be stuck in there for a long, long time.

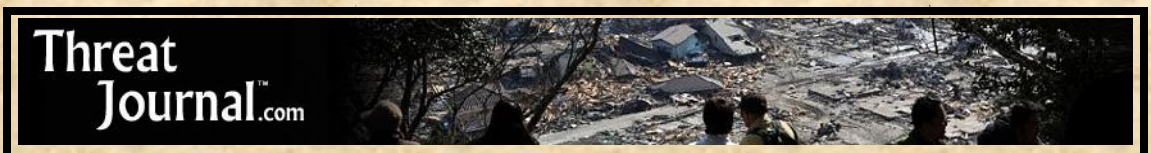
In another interview, Gundersen provides additional details (at 31:00):
The racks are distorted from the earthquake — oh, by the way, the roof has fallen in, which further distorted the racks.
The net effect is they've got the bundles of fuel, the cigarettes in these racks, and as they pull them out, they're **likely to snap a few**. When you snap a nuclear fuel rod, that releases radioactivity again, so my guess is, it's things like krypton-85, which is a gas, cesium will also be released, strontium will be released. They'll probably have to evacuate the building for a couple of days. **They'll take that radioactive gas and they'll send it up the stack, up into the air**, because xenon can't be scrubbed, it can't be cleaned, so they'll send that radioactive xenon up into the air and purge the building of all the radioactive gases and then go back in and try again.
It's likely that that problem will exist on more than one bundle. So over the next year or two, it wouldn't surprise me that either they don't remove all the fuel because they don't want to pull too hard, or if they do pull to hard, they're likely to damage the fuel and cause a radiation leak inside the building. So that's problem #2 in this process, getting the fuel out of Unit 4 is a top priority I have, but it's not going to be easy. Tokyo Electric is portraying this as easy. In a normal nuclear reactor, all of this is done with computers. Everything gets pulled perfectly vertically. Well nothing is vertical anymore, the fuel racks are distorted, it's all going to have to be done manually. The net effect is it's a really difficult job. It wouldn't surprise me if they snapped some of the fuel and they can't remove it.
And Chris Harris – a, former licensed Senior Reactor Operator and engineer – notes that it doesn't help that a lot of the rods are in very fragile condition:
Although there are a lot of spent fuel assemblies in there which could achieve criticality —there are also **200 new fuel assemblies which have equivalent to a full tank of gas, let's call it that. Those are the ones most likely to go critical first**.
***
Some pictures that were released recently show that **a lot of fuel is damaged, so when they go ahead and put the grapple on it, and they pull it up, it's going to fall apart**. The boreflex has been eaten away; it doesn't take saltwater very good.

Like Letting a Murderer Perform Brain Surgery On a VIP

What's the bottom line?
Tepco has an *abysmal* track record:

- Engineers warned Tepco and the Japanese government *many years* before the accident that the reactors were seismically unsafe … and that an earthquake could wipe them out
- The Fukushima reactors were fatally damaged *before* the tsunami hit … the earthquake took them out even before the tidal wave hit
- An official Japanese government investigation concluded that the Fukushima accident was a "man-made" disaster, caused by "collusion" between government and Tepco and bad reactor design
- Tepco knew right after the 2011 accident that 3 nuclear reactors had lost containment, that the nuclear fuel had "gone missing", and that there was in fact no real containment at all. Tepco has desperately been trying to cover this up for 2 and a half years … instead pretending that the reactors were in "cold shutdown"
- Tepco just admitted that it's known for 2 years that massive amounts of radioactive water are leaking into the groundwater and Pacific Ocean
- Tepco – with no financial incentive to actually fix things – has only been *pretending* to clean it up.
- Tepco's recent attempts to solidify the ground under the reactors using chemicals has backfired horribly. And NBC News notes: "[Tepco] is considering freezing the ground around the plant. Essentially building a mile-long ice wall underground, something that's never been tried before to keep the water out. One scientist I spoke to dismissed this idea as grasping at straws, just more evidence that the power company failed to anticipate this problem … and now cannot solve it."

Letting Tepco remove the fuel rods is like letting a convicted murderer perform delicate brain surgery on a VIP.
Top scientists and government officials say that Tepco should be removed from all efforts to stabilize Fukushima. An international team of the smartest engineers and scientists should handle this difficult "surgery".
The stakes are high …



Source: http://www.threatjournal.com/

According to Robert Alvarez, former Senior Policy Adviser to the Secretary of Energy, Deputy Assistant Secretary for National Security and one of the nation's leading experts on spent fuel pools, *"There is more than 37 million curies of long lived radioactivity stored up in the spent fuel just within this single pool. If another severe earthquake were to strike causing the pool to drain, or some other event such as an explosion, it could result in a catastrophic radiological fire releasing nearly* ***10 times the amount of Cs-137 [into the Earths atmosphere] as was released by the Chernobyl accident.***
And that is just one of approximately 200 different types of radioactive isotopes that could potentially be released.

According to Gregory Jaczko, former Chairman of U.S. Nuclear Regulatory Commission, the upcoming attempt to remove Fukushima Unit 4 spent fuel is *"unprecedented, the pool has significant structural damage and that the overall effort is very risky."*

According to Ernie Gunderson, Sr. Engineer at Fairewinds Energy and a former nuclear industry executive with more than 40 years experience, *"TEPCO has already admitted that the boron shields in the fuel racks separating the fuel bundles have deteriorated. These shields absorb neutrons and keep the the fuel cells subcritical."*

According to Yale University Professor Emeritus Charles Perrow, a frequent author for the Bulletin of Atomic Scientists, *"This has me scared."* In the event of an explosion, *"Tokyo would have to be evacuated because of cesium and other poisons that are there will spread very rapidly. Even if the wind is blowing the other way it's going to be monumental."*

According to Shunichi Tanaka, Japan's Nuclear Regulatory Chairman, *"I am much more worried about this than contaminated water."*

According to Mycle Schneider, an energy consultant and adviser to members of the European Parliament and the Int'l Atomic Energy Agency, *"A massive spent fuel fire would likely dwarf the current dimensions of the catastrophe and could exceed the radioactivity releases of Chernobyl dozens of times."*
His and other's concerns are not limited to Japan. An accident in this fuel removal process will have dramatic public health ramifications for the United States and Canada many times worse than the original Fukushima explosions and meltdowns.

28 Signs That The West Coast Is Being Absolutely Fried With Nuclear Radiation From Fukushima

By Michael Snyder

Source: http://www.globalresearch.ca/28-signs-that-the-west-coast-is-being-absolutely-fried-with-nuclear-radiation-from-fukushima/5355280

The map below comes from the Nuclear Emergency Tracking Center. It shows that radiation levels at radiation monitoring stations all over the country are elevated. As you will notice, this is particularly true along the west coast of the United States. Every single day, 300 tons of radioactive water from Fukushima enters the Pacific Ocean. That means that the total amouont of radioactive material released from Fukushima is constantly increasing, and it is steadily building up in our food chain. Ultimately, all of this nuclear radiation will

outlive all of us by a very wide margin. They are saying that it could take up to 40 years to clean up the Fukushima disaster, and meanwhile countless innocent people will develop cancer and other health problems as a result of exposure to high levels of nuclear radiation. We are talking about a nuclear disaster that is absolutely unprecedented, and it is constantly getting worse. The following are 28 signs

that the west coast of North America is being absolutely fried with nuclear radiation from Fukushima…

1. Polar bears, seals and walruses along the Alaska coastline are suffering from fur loss and open sores…

Wildlife experts are studying whether fur loss and open sores detected in nine polar bears in recent weeks is widespread and related to similar incidents among seals and walruses.

The bears were among 33 spotted near Barrow, Alaska, during routine survey work along the Arctic coastline. Tests showed they had "alopecia, or loss of fur, and other skin lesions," the U.S. Geological Survey said in a statement.

2. There is an epidemic of sea lion deaths along the California coastline…

At island rookeries off the Southern California coast, 45 percent of the pups born in June have died, said Sharon Melin, a wildlife biologist for the National Marine Fisheries Service based in Seattle. Normally, less than one-third of the pups would die. It's gotten so bad in the past two weeks that the National Oceanic and Atmospheric Administration declared an "unusual mortality event."

3. Along the Pacific coast of Canada and the Alaska coastline, the population of sockeye salmon is at a historic low. Many are blaming Fukushima.

4. Something is causing fish all along the west coast of Canada to bleed from their gills, bellies and eyeballs.

5. A vast field of radioactive debris from Fukushima that is approximately the size of California has crossed the Pacific Ocean and is starting to collide with the west coast.

6. It is being projected that the radioactivity of coastal waters off the U.S. west coast could double over the next five to six years.

7. Experts have found very high levels of cesium-137 in plankton living in the waters of the Pacific Ocean between Hawaii and the west coast.

8. One test in California found that 15 out of 15 bluefin tuna were contaminated with radiation from Fukushima.

9. Back in 2012, the Vancouver Sun reported that cesium-137 was being found in a very high percentage of the fish that Japan was selling to Canada…

- 73 percent of mackerel tested
- 91 percent of the halibut

• 92 percent of the sardines
• 93 percent of the tuna and eel
• 94 percent of the cod and anchovies
• 100 percent of the carp, seaweed, shark and monkfish

10. Canadian authorities are finding extremely high levels of nuclear radiation in certain fish samples…
Some fish samples tested to date have had very high levels of radiation: one sea bass sample collected in July, for example, had 1,000 becquerels per kilogram of cesium.

11. Some experts believe that we could see very high levels of cancer along the west coast just from people eating contaminated fish…
"Look at what's going on now. They're dumping huge amounts of radioactivity into the ocean — no one expected that in 2011," Daniel Hirsch, a nuclear policy lecturer at the University of California-Santa Cruz, told *Global Security Newswire*. "We could have large numbers of cancer from ingestion of fish."

12. BBC News recently reported that radiation levels around Fukushima are "18 times higher" than previously believed.

13. An EU-funded study concluded that Fukushima released up to 210 quadrillion becquerels of cesium-137 into the atmosphere.

14. Atmospheric radiation from Fukushima reached the west coast of the United States within a few days back in 2011.

15. At this point, 300 tons of contaminated water is pouring into the Pacific Ocean from Fukushima every single day.

16. A senior researcher of marine chemistry at the Japan Meteorological Agency's Meteorological Research Institute says that "30 billion becquerels of radioactive cesium and 30 billion becquerels of radioactive strontium" are being released into the Pacific Ocean from Fukushima every single day.

17. According to Tepco, a total of somewhere between 20 trillion and 40 trillion becquerels of radioactive tritium have gotten into the Pacific Ocean since the Fukushima disaster first began.

18. According to a professor at Tokyo University, 3 gigabecquerels of cesium-137 are flowing into the port at Fukushima Daiichi every single day.

19. It has been estimated that up to 100 times as much nuclear radiation has been released into the ocean from Fukushima than was released during the entire Chernobyl disaster.

20. One recent study concluded that a very large plume of cesium-137 from the Fukushima disaster will start flowing into U.S. coastal waters early next year…
Ocean simulations showed that the plume of radioactive cesium-137 released by the Fukushima disaster in 2011 could begin flowing into U.S. coastal waters starting in early 2014 and peak in 2016.

21. It is being projected that significant levels of cesium-137 will reach every corner of the Pacific Ocean by the year 2020.

22. It is being projected that the entire Pacific Ocean will soon "have cesium levels 5 to 10 times higher" than what we witnessed during the era of heavy atomic bomb testing in the Pacific many decades ago.

23. The immense amounts of nuclear radiation getting into the water in the Pacific Ocean has caused environmental activist Joe Martino to issue the following warning…
"Your days of eating Pacific Ocean fish are over."

24. The Iodine-131, Cesium-137 and Strontium-90 that are constantly coming from Fukushima are going to affect the health of those living the the northern hemisphere for a very, very long time. Just consider what Harvey Wasserman had to say about this…
Iodine-131, for example, can be ingested into the thyroid, where it emits beta particles (electrons) that damage tissue. A plague of damaged thyroids has already been reported among as many as 40 percent of the children in the Fukushima area. That percentage can only go higher. In developing youngsters, it can stunt both physical and mental growth. Among adults it causes a very wide range of ancillary ailments, including cancer.
Cesium-137 from Fukushima has been found in fish caught as far away as California. It spreads throughout the body, but tends to accumulate in the muscles.
Strontium-90's half-life is around 29 years. It mimics calcium and goes to our bones.

25. According to a recent Planet Infowars report, the California coastline is being transformed into "a dead zone"…
The California coastline is becoming like a dead zone.

If you haven't been to a California beach lately, you probably don't know that the rocks are unnaturally CLEAN – there's hardly any kelp, barnacles, sea urchins, etc. anymore and the tide pools are similarly eerily devoid of crabs, snails and other scurrying signs of life… and especially as compared to 10 – 15 years ago when one was wise to wear tennis shoes on a trip to the beach in order to avoid cutting one's feet on all the STUFF of life – broken shells, bones, glass, driftwood, etc.
There are also days when I am hard-pressed to find even a half dozen seagulls and/or terns on the county beach.
You can still find a few gulls trolling the picnic areas and some of the restaurants (with outdoor seating areas) for food, of course, but, when I think back to 10 – 15 years ago, the skies and ALL the beaches were literally filled with seagulls and the haunting sound of their cries both day and night…
NOW it's unnaturally quiet.
26. A study conducted last year came to the conclusion that radiation from the Fukushima nuclear disaster could negatively affect human life along the west coast of North America from Mexico to Alaska "for decades".
27. According to the Wall Street Journal, it is being projected that the cleanup of Fukushima could take up to 40 years to complete.
28. Yale Professor Charles Perrow is warning that if the cleanup of Fukushima is not handled with 100% precision that humanity could be threatened "for thousands of years"…
"Conditions in the unit 4 pool, 100 feet from the ground, are perilous, and if any two of the rods touch it could cause a nuclear reaction that would be uncontrollable. The radiation emitted from all these rods, if they are not continually cool and kept separate, would require the evacuation of surrounding areas including Tokyo. Because of the radiation at the site the 6,375 rods in the common storage pool could not be continuously cooled; **they would fission and all of humanity will be threatened, for thousands of years**."

Are you starting to understand why so many people are so deeply concerned about what is going on at Fukushima?

Michael T. Snyder *is a former Washington D.C. attorney who now publishes The Truth. His new thriller: entitled "The Beginning Of The End" is available online (Amazon).*

EMP: Can Israel Catapult Iran Back to the Stone Age?

Source: http://i-hls.com/2013/10/emp-can-israel-catapult-iran-back-to-the-stone-age/

While the western world is busy discussing Israel's options – by air or by sea – of attacking the Iran's nuclear facilities in order to put a stop to Iran's nuclear weapon development, the American intelligence community is beginning to realize that Israel plans a different sort of attack, referred to as a nuclear electromagnetic pulse, or NEMP. This type of pulse is generated by a high-altitude nuclear explosion. An invisible electric wave expands outwards from the source of the blast, similar in appearance to lightning and powerful enough to totally disrupt any electronic communications in the Islamic republic. The Sunday Times has already mentioned this option, in a report based on the professional opinion of American security experts, who predicted that Israel can, using this method of attack, catapult Iran back to the stone age.
An electromagnetic bomb utilizes technologies based on a very high-power electric shock, generated by the gamma radiation emitted by the nuclear blast. This radiation is highly disruptive to the normal activity of Earth's electromagnetic field. Such an electromagnetic pulse, generated by a nuclear explosion high up in the atmosphere, can destroy most of the critical systems across a vast region below. In military terms, a nuclear warhead which explodes at

high-altitudes and creates an EMP is called HEMP, High-altitude Electromagnetic Pulse.
In order to understand the destructive power of this radiation, the potential results of an Israeli strike on Iran should be mentioned: The pulse will totally paralyze the Iranian power infrastructure (generation and transmission), water supply, food, oil, transportation, financial deals, banking system services, emergency services, aeronautic communications (planes without radar and radio won't be able to navigate and will simply plummet down), all government services, all satellite communication (no radio or TV broadcasts, no geolocation services, no internet), all cellular phones, nuclear reactors and more. The meaning of this total destruction of all land, sea and air communications, in addition to all financial services, is a total economic collapse in Iran.
Scientifically, the electromagnetic pulse is not new to American researchers. As early as the cold war era both the U.S. and USSR attempted to develop bombs of this type, and to protect their armies and strategic infrastructure facilities against the pulse. The magnitude of the disturbances, which disrupted the Earth's magnetic field, was first documented during an American experiment. The ability of civilian and military communications to resist the pulse was tested, and as it turned out the pulse caused total system failures. According to the calculations it takes at least a 1 megaton atom bomb to generate the destructive EMP (a megaton equals one million kilograms of TNT). This meant the nuclear weapon had to be hydrogen-based.
After 9/11 the research into the possibly very severe effects of an EMP got a serious boost. In order to find out how to handle this threat, should an enemy state or Islamic terror organization try to attack the U.S. this way, the American Senate established a board of professionals who were tasked with "examining the threat to the United States posed by an EMP attack." The board, headed by Dr. William R. Graham, handed in a practical and concrete final report. According to the calculations of the assisting researchers, a nuclear detonation 100 kilometers above the Earth's surface will affect an area of about 4 million square kilometers. The damage depends on the bomb's power, of course. According to the report – and the respected FAS website (Federation of American Scientists) – the high-altitude detonation causes the intense electric shock to reach an extreme range, capable of affecting entire countries. The report, more than 200 pages long, was presented to the Senate in 2008. It served as the basis for the U.S. Homeland Security act, and it explicitly mentioned EMP attacks as "a potentially catastrophic threat to the entire United States," taking into account the many ten thousand civilian casualties in case of a total systems failure.
The relatively small hydrogen bombs mentioned in the report – which, according to U.S. Navy research, Israel possesses – can be delivered using an intercontinental ballistic missile, like the Jericho IV, or by cruise missiles launched from a Dolphin submarine. Another option, which would prevent the detection of the source of the launch, is to install a nuclear device on an intercontinental ballistic missile developed, according to foreign sources, by Israel; or to install the bomb on board a satellite, to be launched at a later date and detonated above Iran. By the way, Iran's total area is just 1,648,195 sq. km.

Palestinian leader Arafat was murdered with polonium

Source: http://www.reuters.com/article/2013/11/06/us-palestinians-arafat-idUSBRE9A50S520131106

Palestinian leader Yasser Arafat was poisoned to death in 2004 with radioactive polonium, his widow Suha said on Wednesday after receiving the results of Swiss forensic tests on her husband's corpse.
"We are revealing a real crime, a political assassination," she told Reuters in Paris.
A team of experts, including from Lausanne University Hospital's Institute of Radiation Physics, opened Arafat's grave in the West Bank city of Ramallah last November, and took samples from his body to seek evidence of alleged poisoning.
"This has confirmed all our doubts," said Suha Arafat, who met members of the Swiss forensic team in Geneva on Tuesday. "It is scientifically proved that he didn't die a natural death and

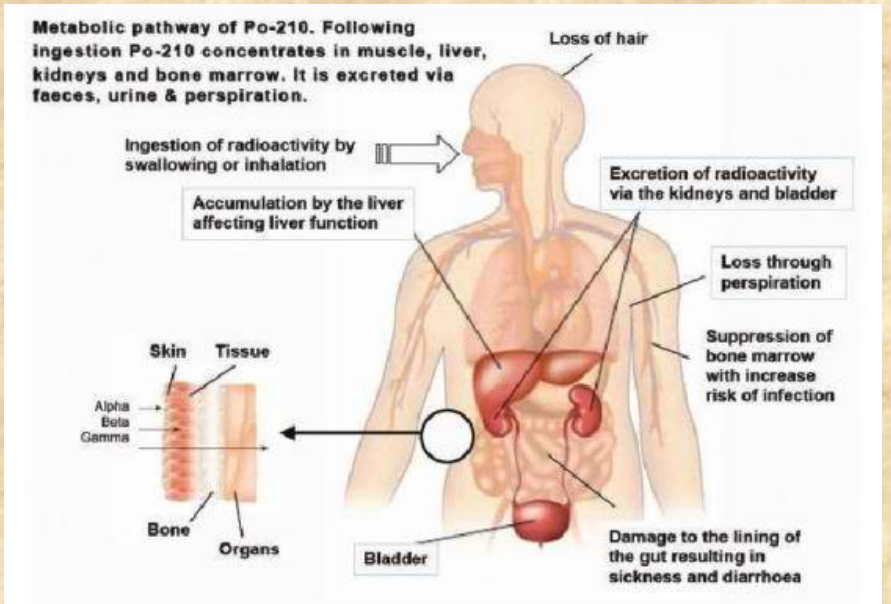
we have scientific proof that this man was killed."
She did not accuse any country or person, and acknowledged that the historic leader of the

Palestine Liberation Organization had many enemies.
Arafat signed the 1993 Oslo interim peace accords with Israel and led a subsequent uprising after the failure of talks in 2000 on a comprehensive agreement.
Allegations of foul play surfaced immediately. Arafat had foes among his own people, but many Palestinians pointed the finger at Israel, which had besieged him in his Ramallah headquarters for the final two and a half years of his life.
The Israeli government has denied any role in his death, noting that he was 75 years old and had an unhealthy lifestyle.
An investigation by the Qatar-based Al Jazeera television news channel first reported last year that traces of polonium-210 were found on personal effects of Arafat given to his widow by the French military hospital where he died.

That led French prosecutors to open an investigation for suspected murder in August 2012 at the request of Suha Arafat. Forensic experts from Switzerland, Russia and France all took samples from his corpse for testing after the Palestinian Authority agreed to open his mausoleum.

"Smoking Gun"

The head of the Russian forensics institute, Vladimir Uiba, was quoted by the Interfax news agency last month as saying no trace of polonium had been found on the body specimens examined in Moscow, but his Federal Medico-Biological Agency later denied he had made any official comment on its findings.
The French pathologists have not reported their conclusions publicly, nor have their findings been shared with Suha Arafat's legal team. A spokeswoman for the French prosecutor's office said the investigating magistrates had received no expert reports so far.
One of her lawyers said the Swiss institute's report, commissioned by Al Jazeera, would be translated from English into French and handed over to the three magistrates in the Paris suburb of Nanterre who are investigating the case.

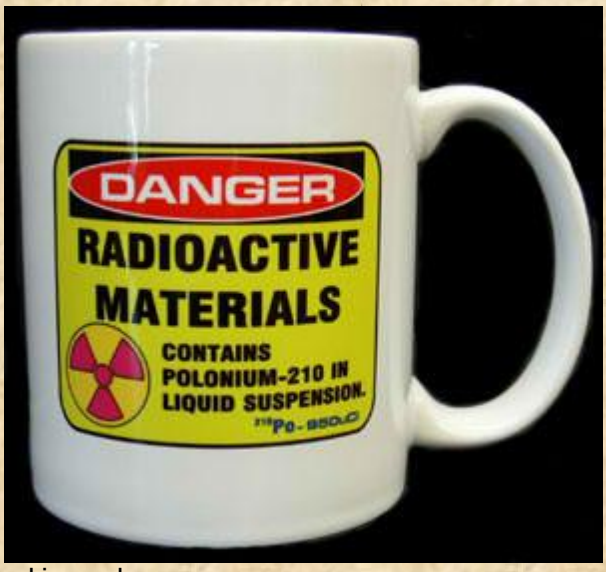


Professor David Barclay, a British forensic scientist retained by Al Jazeera to interpret the results of the Swiss tests, said the findings from Arafat's body confirmed the earlier results from traces of bodily fluids on his underwear, toothbrush and clothing.

"In my opinion, it is absolutely certain that the cause of his illness was polonium poisoning," Barclay told Reuters. "The levels present in him are sufficient to have caused death.

"What we have got is the smoking gun - the thing that caused his illness and was given to him with malice."

The same radioactive substance was slipped into a cup of tea in a London hotel to kill defecting Russian spy Alexander Litvinenko in 2006. From his deathbed, Litvinenko accused Russian President Vladimir Putin of ordering



his murder.

The British government refused to hold a public inquiry into his death after ministers withheld some material which could have shed light on Russia's suspected involvement.

Barclay said the type of polonium discovered in Arafat's body must have been manufactured in a nuclear reactor.

While many countries could have been the source, someone in Arafat's immediate entourage must have slipped a miniscule dose of the deadly isotope probably as a powder into his drink, food, eye drops or toothpaste, he said.

Brief recovery

Arafat fell ill in October 2004, displaying symptoms of acute gastroenteritis with diarrhoea and vomiting. At first Palestinian officials said he was suffering from influenza.

He was flown to Paris in a French government plane but fell into a coma shortly after his arrival at the Percy military hospital in the suburb of Clamart, where he died on November 11.

The official cause of death was a massive stroke but French doctors said at the time they were unable to determine the origin of his illness. No autopsy was carried out.

Barclay said no one would have thought to look for polonium as a possible poison until the Litvinenko case, which occurred two years after Arafat's death.

Some experts have questioned whether Arafat could have died of polonium poisoning, pointing to a brief recovery during his illness that they said was not consistent with radioactive exposure. They also noted he did not lose all his hair. But Barclay said neither fact was inconsistent with the findings.

Since polonium loses 50 percent of its radioactivity every four months, the traces in Arafat's corpse would have faded so far as to have become untraceable if the tests had been conducted a couple of years later, the scientist said.

"A tiny amount of polonium the size of a flake of dandruff would be enough to kill 50 people if it was dissolved in water and they drank it," he added.

The Al Jazeera investigation was spearheaded by investigative journalist Clayton Swisher, a former U.S. Secret Service bodyguard who became friendly with Arafat and was suspicious of the manner of his death.

Hani al-Hassan, a former aide, said in 2003 that he had witnessed 13 assassination attempts on Arafat's life, dating back to his years on the run as PLO leader. Arafat claimed to have survived 40 attempts on his life.

Arafat narrowly escaped an Israeli air strike on his headquarters in Tunisia in 1985. He had just gone out jogging when the bombers attacked, killing 73 people.

He escaped another attempt on his life when Israeli warplanes came close to killing him during the 182 invasion of Beirut when they hit one of the buildings they suspected he was using as his headquarters but he was not there. In December 2001, Arafat was rushed to safety just before Israeli helicopters bombarded his compound in Ramallah with rockets.

Reducing volume of nuclear waste by 90 percent possible

Source: http://www.homelandsecuritynewswire.com/dr20131107-reducing-volume-of-nuclear-waste-by-90-percent-possible

Engineers from the University of Sheffield have developed a way significantly to reduce the volume of some higher activity wastes, which will reduce the cost of interim storage and final disposal.

A University of Sheffield release reports that the researchers, from the University's Faculty of Engineering, have shown that mixing plutonium-contaminated waste with blast furnace slag and turning it into glass reduces its volume by 85-95 percent. It also effectively locks in the radioactive plutonium, creating a stable end product.

The approach could also be applicable to treating large volume mixed wastes generated during the eventual clean-up of the damaged Fukushima plant.

"The overall volume of plutonium contaminated wastes from operations and decommissioning in the United Kingdom could be upwards of 31,000 m³, enough to fill the clock tower of Big Ben seven times over," says lead researcher, Professor Neil Hyatt.

"Our process would reduce this waste volume to fit neatly within the confines of just one Big Ben tower."

The estimated minimum U.K. PCM [plutonium-contaminated material] inventory is 31,140 m³.

The current treatment method for non-compactable plutonium contaminated wastes involves cement encapsulation, a process which typically increases the overall volume. Professor Hyatt says:

"If we can reduce the volume of waste that eventually needs to be stored and buried underground, we can reduce the costs considerably. At the same time, our process can stabilize the plutonium in a more corrosion resistant material, so this should improve the safety case and public acceptability of geological disposal."

Although the ultimate aim for higher activity wastes is geological disposal, no disposal sites have yet been agreed in the United Kingdom.

Plutonium contaminated waste is a special type of higher activity waste, associated with plutonium production, and includes filters, used personal protective equipment (PPE), and decommissioning waste such as metals and masonry.

Using cerium as a substitute for plutonium, the Sheffield team mixed representative plutonium contaminated wastes with blast furnace slag, a commonly available by-product from steel production, and heated them to turn the material into glass, a process known as vitrification.

A key element of the research, funded by Sellafield Ltd and the Engineering and Physical Sciences Research Council (EPSRC), was to show that a single process and additive could be used to treat the expected variation of wastes produced, to ensure the technique would be cost effective.

"Cerium is known to behave in similar ways to plutonium so provides a good, but safe, way to develop techniques like this," explains Professor Hyatt. "Our method produces a robust and stable final product, because the thermal treatment destroys all plastics and organic material. This is an advantage because it is difficult to predict with certainty how the degradation of plastic and organic materials affects the movement of plutonium underground."

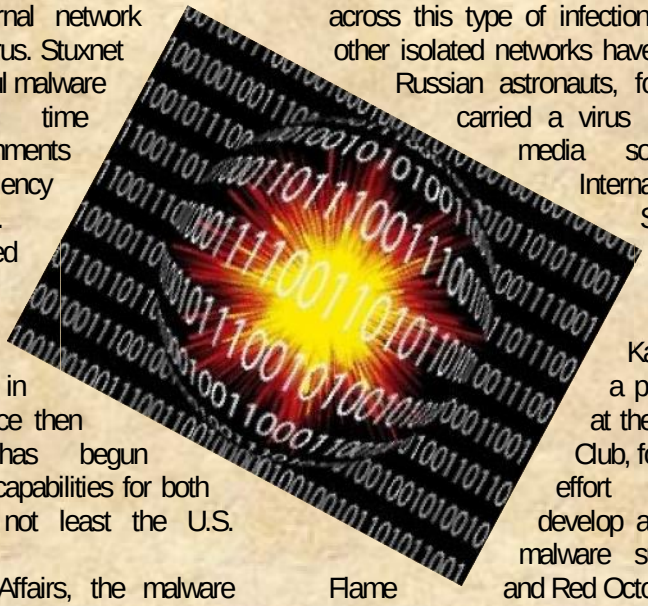
Professor Hyatt is now working on optimizing the vitrification process to support full scale demonstration and plans future investigation of small scale plutonium experiments.

— Read more in N. C. Hyatt et al., "Thermal treatment of simulant plutonium contaminated materials from the Sellafield site by vitrification in a blast-furnace slag," Journal of Nuclear Materials *444, nos. 1–3 (January 2014): 186–99*

Stuxnet Virus Detected in Russian Nuclear Facility

Source: http://i-hls.com/2013/11/stuxnet-virus-detected-in-russian-nuclear-facility/

Eugene Kaspersky of Kaspersky Antivirus has revealed that a staffer at a Russian nuclear plant informed him that the infection that was introduced to the internal network there was the Stuxnet virus. Stuxnet is well known – a powerful malware that for the first time demonstrated to governments the capabilities and efficiency of a true CYBER weapon. That disclosure has fanned the flames of debate on the importance of the use of software and malicious applications in information warfare. Since then every government has begun improving their CYBER capabilities for both defense and offense, not least the U.S. government.



According to Security Affairs, the malware Stuxnet is widely considered to have been developed by the U.S. Government in coordination with Israeli CYBER units, as a means to disrupt Iran's nuclear enrichment plans.

The risks related to the dispersal of uncontrolled malicious agents in CYBERspace, are that a hostile entity, such as a foreign government or a CYBER criminal gang, could reverse engineer their source code to create even more dangerous malware.

It may well be that the cause of the infection in the Russian nuclear plant could have been the same virus that was unleashed in the control system in the Iranian nuclear facilities in Natanz. Stuxnet infected the nuclear plant networks despite them being isolated from the internet, similar to the Iranian case. It was most probably done using a USB device.

Russian Intelligence agencies have come across this type of infection in the past, as other isolated networks have been infiltrated. Russian astronauts, for example, had carried a virus on a removable media source to the International Space Station, according to Kaspersky infecting machines there.

Kaspersky, during a presentation given at the Canberra Press Club, focused the on the effort necessary to develop a state-sponsored malware such as Gauss, Flame and Red October. The CYBER security expert revealed that in order to design such a malicious code requires a budget of at least $10 million.

Kaspersky stated that more than 50% of malware were written in Chinese, nearly 33% were written in Spanish or Portuguese, followed by Russian-coded malware. This last group is considerably very dangerous because the malicious code it produces is the most sophisticated in the world.

Kaspersky also added that Chinese malware appeared to 'not care' about operational security because security experts during the investigation have regularly found personal documents, photos and social networking accounts on servers used in attack campaigns.

New drone to monitor radiation following nuclear disasters

Source: http://www.homelandsecuritynewswire.com/dr20131118-new-drone-to-monitor-radiation-following-nuclear-disasters

Researchers have unveiled a large semi-autonomous drone called the ARM system which could be used to provide visual and thermal monitoring of radiation after a release of nuclear material. The system was developed in response to requirements for radiation monitoring

in event of the release of radioactive materials.
The Global Hawk UAV was used to monitor radiation from the Fukushima reactor // Source: vietnamnet.vn

University of Bristol researchers have unveiled a large semi-autonomous drone called the **ARM system** (photo below) which could be used to provide visual and thermal monitoring of radiation after a release of nuclear material.
The system was jointly funded by the Engineering and Physical Sciences Research Council and Sellafield Ltd and was developed in response to requirements for radiation monitoring in event of the release of radioactive materials.
An example of the potential applications are the nuclear incident at the Fukishima Daiichi power plant in March 2011, which was hit by a magnitude 9 earthquake and tsunami, to help detect radiation and prevent exposure to response crews.
A University of Bristol release reports that the ensuing hydrogen explosion from the incident, resulting from runaway corrosion of the fuel cladding, caused a significant atmospheric release of radioactive material. Most of this material was removed from the atmosphere by rainfall but contaminated a large area of land extending up to 200 km from the site. The inundation also disabled 23 of the 24 radiation monitoring stations surrounding the site, leaving disaster response teams effectively 'blind' to the ensuing radiation hazard.
Monitoring at and around the site was later performed by both government and non-government specialists in the hours and days following the event. Helicopter-based activities (including monitoring) were conducted at the risk of significant radiation exposure to the crews because a suitable alternative was not available.

Built by Dr. Oliver Payton and Dr. James Macfarlane, both members of Bristol's Interface Analysis Center (IAC) in the School of Physics, the ARM project is based around using unmanned aerial vehicles (UAV) with on-board microcomputers and sensors to provide an improved alternative to manned flights if such a disaster should ever occur again.
Dr. Tom Scott, the project lead and director of the Interface Analysis Centre in the University's School of Physics, said: "By using light-weight and low-cost unmanned aerial vehicles systems, we can immediately and remotely determine the spread and intensity of radiation following any such event. The systems have sufficient in-built intelligence to deploy them following an incident and are effectively disposable if they become contaminated."

Over the past six months, the Bristol team has successfully demonstrated the capability of the system in rain, snow, and high winds to observers from Sellafield Ltd and the National Nuclear Laboratory. The release says that the proven and unrivalled sensitivity of the system for environmental radiation mapping has been demonstrated at radioactively contaminated sites in Southwest Romania as well as a naturally occurring anomaly site in Cornwall.

Dr. Scott added: "Concurrently with project RISER, which is developing micro-unmanned aerial vehicles for the indoor mapping of radiation, we have developed an outdoors system that is now ready for commercial deployment."

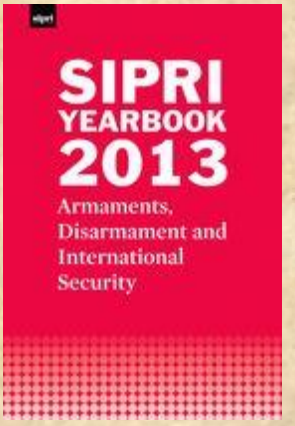
The University of Bristol is now working with the National Nuclear Laboratory to offer this technology in Japan as a tool for assisting with environmental surveying during the ongoing Fukishima clean-up operations and in the surround prefecture. The team is also working to develop UAV mapping and exploration algorithms for projects relating to the detection of buried explosives and depleted uranium ordinance.

New SIPRI Report Includes Data on Israeli Plutonium Production

Source: http://i-hls.com/2013/11/new-sipri-report-includes-data-on-israeli-plutonium-production/

According to calculations done by the researchers at SIPRI, one of the most influential research institutes in the world, Israel has produced 690-950 kilograms of weapons-grade plutonium at the Dimona reactor. This statistic was included in a recently published report. SIPRI researchers mention two reservations: The data was correct as of late December 2011, and only some of the plutonium was actually used to produce nuclear weapons.

According to scientific publications one nuclear bomb requires about 6 kilograms of plutonium, and so Israel could have manufactured 115-158 atomic bombs.



The SIPRI institute (Stockholm International Peace Research Institute) was established in 1966. It publishes annual reports based on data collected on the proliferation of nuclear, chemical and biological weapons, in addition to reports on international conflicts. The SIPRI reports are considered highly credible and are sent to important research institutes worldwide, to heads of states and to the media.

SIPRI researchers also referred to the Iranian nuclear weapons program this week on the institute's website. According to them the talks with the west are unlikely to succeed in any meaningful way: The negotiations between Iran and the five permanent members of the U.N. Security Council (together with Germany) on the future of the Iranian nuclear program have failed so far, mostly because of the deep distrust between the sides. The SIPRI experts add, somewhat ironically, that "Now it remains to be seen if the somewhat conciliatory atmosphere ahead of the renewed negotiations will lead to a limited first step towards a practical, long range agreement, or to a last step before negotiations fall apart."

Detecting radioactive material in nuclear waste water

Source: http://www.homelandsecuritynewswire.com/dr20131120-detecting-radioactive-material-in-nuclear-waste-water

As the Fukushima crisis continues to remind the world of the potential dangers of nuclear disposal and unforeseen accidents, scientists are reporting progress toward a new way to detect the radioactive materials uranium and plutonium in waste water. Their report on the design of a highly sensitive nanosensor appears in ACS' *Journal of Physical Chemistry C*.

An ACS release reports that Jorge M. Seminario and Narendra Kumar note that it is highly likely that radioactive uranium and plutonium have leaked into the soil and groundwater near nuclear facilities. This contamination poses a serious threat to the environment and human health. Although detecting these materials even at low levels is important for determining whether a leak is occurring, traditional methods of doing so are not effective. Recently, however, scientists have discovered that radioactive materials in water can clump onto flakes of graphene oxide (GO). Based on theoretical models and calculations, researchers predicted that GO could sense and identify extremely low levels — single molecules — of various substances. Seminario's team set out to see how best to adapt this for uranium and plutonium sensing.

Using the latest advances in supercomputing, they modeled several different variations of GO to figure out which one would be the most sensitive and selective in detecting uranium and plutonium in nuclear waste water. They concluded that attaching something called a carbonyl functional group to GO would serve as an effective nanosensor for these radioactive materials.

The authors acknowledge funding from the Argonne National Laboratory, the U.S. Defense Threat Reduction Agency and the U.S. Army Research Office.

— Read more in Narendra Kumar et al., "Design of Nanosensors for Fissile Materials in Nuclear Waste Water," Journal of Physical Chemistry C *117, no. 45 (16 October 2013): 24033–41*

Saudi Arabia Buys Pakistani Nukes

Source: http://www.thetrumpet.com/article/11118.19.0.0/world/wmd/saudi-arabia-buys-pakistani-nukes

What's worse than one radical Islamic nation with nuclear weapons? Two of them.

Right now, the world is abuzz with speculation over what is transpiring in the nuclear negotiations in Geneva. On one side is Iran, and across the negotiation table are the five permanent members of the UN Security Council—Russia, China, the United Kingdom, France and the United States—plus Germany. Conspicuously absent from the negotiating table are many of Iran's adversaries in the Middle East.

Disheartened by the talks, and fearing the inevitability of Iran obtaining nuclear weapons, one nation is using this time to safeguard its national security through more extreme measures.

According to a November 6 bbc report, Saudi Arabia has purchased nuclear weapons from Pakistan. The report claims the weapons are ready to be transported at any time.

The Saudis are the main counterbalance to Iran in the region. Being the largest and wealthiest of the Sunni Arabic nations, the Saudis are constantly at loggerheads with Iran.

The battle for dominance in the Middle East is being waged on multiple fronts at the moment. In Syria, the Saudis back the rebels; Iran backs President Bashar Assad. In Iraq, Saudi Arabia backs the Sunni minority; Iran backs the Shiite majority. In Egypt, Saudi Arabia backs the military; Iran supports the Muslim Brotherhood. In Bahrain, Saudi Arabia backs the Sunni royal family; Iran backs the Shiite majority.

Though the Saudis and Iranians may not be in direct conflict, the two sides are fighting plenty of proxy wars. It is a struggle for control of the region between two factions of Islam: Shiite and Sunni.

As Iran races toward the nuclear bomb, the likelihood of a regional crisis rises. For a long time, Saudi Arabia relied on foreign powers to keep Iran in check. That changed with the election of Hassan Rouhani. Perceived as a moderate, Rouhani has the international community—particularly America, one of Saudi Arabia's most crucial allies—falling head over heels.

Trumpet managing editor Joel Hilliker wrote: "An American reconciliation with Iran truly is a game-changer for Saudi Arabia. It absolutely shreds the U.S.-Saudi alliance. The Saudis are already speaking of a 'major shift' away from the U.S. One source told Reuters, 'Saudi doesn't want to find itself any longer in a situation where it is dependent" on America, which it

deems untrustworthy and treacherous.'"

We see this mindset transformed into action as Saudi Arabia arms itself with nuclear weaponry. The Saudis know they need to remain a credible threat to Iran, which is only moments away from obtaining nuclear weapons.

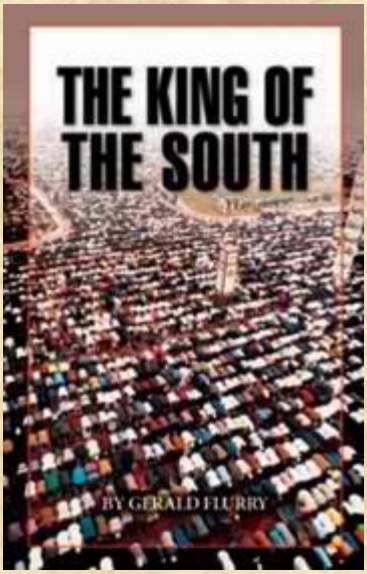
A lack of confidence in the U.S. to restrain Iran is forcing Saudi Arabia to extreme measures in its own policies.

As World Politics Review put it, "Despite the high-profile disagreements between U.S. leaders and the leadership of Israel, France, Saudi Arabia and other nations, America's friends prefer a more assertive and competent U.S. on the global stage, particularly in the Middle East.

"That doesn't mean American allies will hold back from trying to fill the spaces left empty by the United States."

While the Saudis would like America's aid to keep Iran under control, King Abdullah and his princes have their own plans for the Middle East. These plans are by no means moderate.

Would a Saudi nuclear deterrent to Iran using wmd be a good thing? Considering Saudi Arabia's history as an incubator of terrorism and its hostile stance toward Israel, it would not.



The same bbc article about the Saudi acquisition of nuclear weapons contains graphics showing surface-to-surface missile launch facilities that can target both Iran *and Israel.*

The Saudis obtaining nuclear weapons would undoubtedly put Israel on edge. Israel has felt the effects of American abandonment in the months following the election of Rouhani. For a second adversary to acquire nuclear weapons would only heighten Israel's fear of its neighbors and push it closer to acting alone in stopping the proliferation of nuclear weapons.

Israel has long been suspected of having its own nuclear weapons, although it has never acknowledged this fact.

The loss of confidence in the U.S. in the Middle East is quickly turning the region into a nuclear powder keg where everyone is holding a

match.

Saudi Arabia can deny its investment in nuclear weapons, and Iran can deny its attempts to build them, but one truth that always stands the test of time is that of Bible prophecy. God sheds light on what these nations are planning to do.

Daniel 11:40 speaks of Iran rising to power in the Middle East and the nations that will bow before it. (Read about it in our booklet The King of the South.)

Psalm 83 tells us that the Saudis (Ishmaelites) will outlive the king of the south and will plot to destroy Israel. (Understand this alliance against Israel by reading Gerald Flurry's article "A Mysterious Alliance.")

When you understand the prophecies that are destined to be fulfilled in the very near future, you can perceive why nations are acting as they do. You will be able to see that, despite some dreadful prophecies about to come to pass, there is still hope. Beyond the dark days ahead, there are numerous prophecies of peace and happiness to be fulfilled.

As nuclear proliferation threatens our very existence, take hope in the fact that Christ will return before man can destroy himself. From that time on, nuclear weapons—all weapons—will be done away with. And nations such as Saudi Arabia, Iran and Israel—once bitter enemies—will walk side by side in peaceful cooperation

Study: Nuclear force feeling 'burnout' from work

Source: http://www.capitalgazette.com/wire/nation/study-nuclear-force-feeling-burnout-from-work/article_da0a7801-7c36-5381-8b02-f20f1e1b4225.html

Key members of the Air Force's nuclear missile force are feeling "burnout" from what they see as exhausting, unrewarding and stressful work, according to an unpublished study obtained by The Associated Press.

The finding by researchers for RAND Corp. adds to indications that trouble inside the nuclear missile force runs deeper and wider than officials have acknowledged.

The study, provided to the AP in draft form, also cites heightened levels of misconduct like spousal abuse and says court-martial rates in the nuclear missile force in 2011 and 2012 were more than twice as high as in the overall Air Force.

These indicators add a new dimension to an emerging picture of malaise and worse inside the intercontinental ballistic missile force, an arm of the Air Force with a proud heritage but an uncertain future.

Late last year the Air Force directed RAND, a federally funded research house, to conduct a three-month study of attitudes among the men and women inside the ICBM force. It found a toxic mix of frustration and aggravation, heightened by a sense of being unappreciated, overworked, micromanaged and at constant risk of failure.

Remote and rarely seen, the ICBM force gets little public attention. The AP, however, this year has documented a string of missteps that call into question the management of a force that demands strict obedience to procedures.

Gen. Mark Welsh, the Air Force chief of staff, said in an interview Wednesday that he sees no evidence of fundamental problems in the ICBM force.

"There are issues like there are in every other mission area we have in the United States military, and we deal with the issues as they come up, and we deal with them pretty aggressively. But as far as getting the job done, they're getting the job done _ they do a great job of that every single day," Welsh said.

The AP was advised in May of the confidential RAND study, shortly after it was completed, by a person who said it should be made public to improve understanding of discontent within the ICBM force. After repeated inquiries, and shortly after the AP filed a Freedom of Information Act request for a PowerPoint outline, the Air Force provided it last Friday and arranged for RAND officials and two senior Air Force generals to explain it.

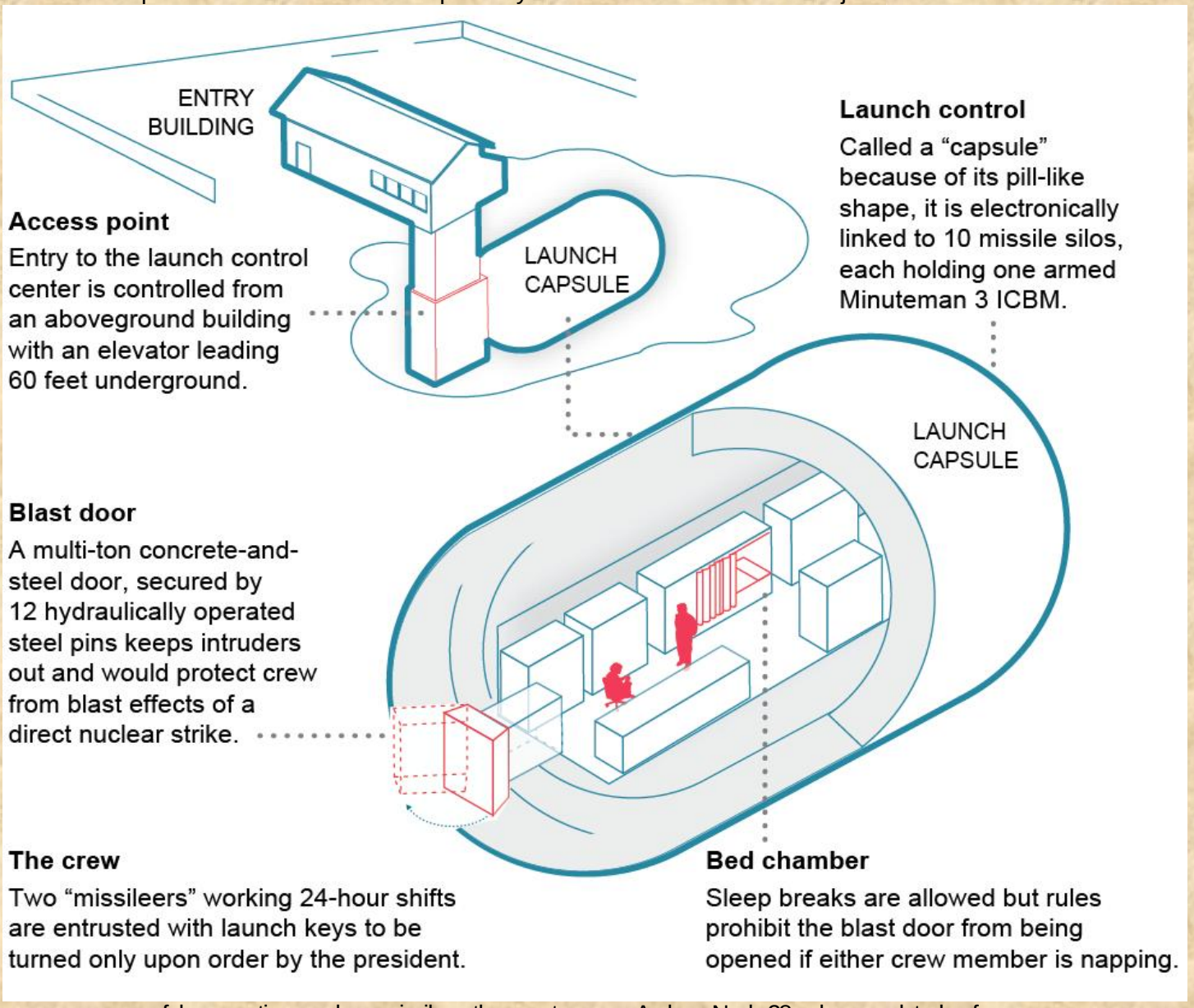
Based on confidential small-group discussions last winter with about 100 launch control officers, security forces, missile maintenance workers and others who work in the missile fields _ plus responses to confidential questionnaires _ RAND found low job satisfaction and workers distressed by staff shortages, equipment flaws and what they felt were stifling management tactics.

It also found what it termed "burnout." In this context, "burnout" means feeling exhausted, cynical and ineffective on the job, according to Chaitra Hardison, RAND's senior behavioral scientist and lead author of the study. She used a system of measure that asks people to rate on a scale of 1 to 7 _ from "never" to "always" _ how often in their work they experience certain feelings, including tiredness, hopelessness and a sense of being trapped. An average score of 4 or above is judged to put the person in the "burnout" range.

One service member said: "We don't care if things go properly. We just don't want to get in trouble." That person and all others who participated in the study were granted confidentiality by RAND in order to speak freely.

The 13 launch officers who volunteered for the study scored an

average of 4.4 on the burnout scale, tied for highest in the group. A group of 20 junior enlisted airmen assigned to missile security forces also scored 4.4.
This has always been considered hard duty, in part due to the enormous responsibility of



safely operating nuclear missiles, the most destructive weapons ever invented.
In its Cold War heyday, an ICBM force twice as big as today's was designed to deter the nuclear Armageddon that at times seemed all too possible amid a standoff with the Soviet Union and a relentless race to build more bombs.
Today the nuclear threat is no longer prominent among America's security challenges. The arsenal has shrunk _ in size and stature. The Air Force struggles to demonstrate the relevance of its aging ICBMs in a world worried more about terrorism and cyberwar and accustomed to 21st century weapons such as drones.
This new reality is not lost on the young men and women who in most cases were "volunteered" for ICBM jobs.

Andrew Neal, 28, who completed a four-year tour in September with F.E. Warren's 90th Missile Wing in Wyoming, where he served as a Minuteman 3 launch officer, said he saw marked swings in morale.
"Morale was low at times _ very low," Neal said in an interview, though he added that his comrades worked hard.
Neal says his generation has a different view of nuclear weapons.
"We all acknowledge their importance, but at the same time we really don't think the mission is that

critical," Neal said, adding that his peers see the threat of full-scale nuclear war as "simply nonexistent." So "we practice for all-out nuclear war, but we know that isn't going to happen."

Every hour of every day, 90 launch officers are on duty in underground command posts that control Minuteman 3 missiles. Inside each buried capsule are two officers responsible for 10 missiles, each in a separate silo, armed with one or more nuclear warheads and ready for launch within minutes.

They await a presidential launch order that has never arrived in the more than 50-year history of American ICBMs. The duty can be tiresome, with long hours, limited opportunities for career advancement and the constraints of life in remote areas of the north-central U.S., like Minot Air Force Base, N.D.

In his doctoral dissertation, published in 2010 after he finished a four-year tour with the 91st Missile Wing at Minot, Christopher J. Ewing said 71 of the 99 launch officers he surveyed there had not chosen that assignment.

RAND was looking for possible explanations for a trend worrying the Air Force _ higher levels of personal and professional misconduct within the ICBM force relative to the rest of the Air Force. Courts-martial in the ICBM force, for example, were 129 percent higher than in the Air Force as a whole in 2011, on a per capita basis, and 145 percent higher in 2012. Cases handled by administrative punishment were 29 percent above overall Air Force levels in 2011 and 23 percent above in 2012.

On Wednesday the Air Force provided the AP with statistics indicating that courts-martial and reports of spousal abuse are on a downward trend in recent months, while still higher than the overall Air Force in percentage terms. Administrative punishments also are trending downward.

Reported cases of spousal abuse in the ICBM force peaked in 2010 at 21 per 1,000 people, compared with 10.3 per 1,000 in the overall Air Force. The rate for the ICBM force dropped to 14.4 in 2011 and to 12.4 last year. It also has declined for the overall Air Force.

The RAND study and AP interviews with current and former members of the ICBM force suggest a disconnect between the missile force members and their leaders.

"There's a perception that the Air Force (leadership) doesn't understand necessarily what's going on with respect to the ICBM community and their needs," says Hardison, the behavioral scientist who led the study.

Defense Secretary Chuck Hagel delivered a "no-room-for-error" message when he visited U.S. Strategic Command in Nebraska last week to welcome Navy Adm. Cecil Haney as the nation's new top nuclear war-fighter, succeeding Air Force Gen. Robert Kehler.

"Perfection must be the standard for our nuclear forces," Hagel said, noting that "some troubling lapses in maintaining this professionalism" have been exposed recently by "close scrutiny" and "rigorous evaluations."

In Hardison's view, expectations of perfection are "unproductive and unrealistic."

"People who are even top performers, who are exceptionally good at their jobs, fear that they are going to make one mistake and that's going to be the end of their career," she said in an interview.

RAND's survey results, while revealing a level of discontent, are not definitive. Hardison said the findings need to be confirmed on a larger sample population and the results tracked over time.

Perhaps ironically, the person who raised concerns about problems in the missile force was Maj. Gen. Michael Carey, who was fired in October as commander of 20th Air Force, the organization responsible for the full ICBM fleet _ for alleged misconduct that officials have said was related to alcohol use.

In November 2012, Carey told Welsh that his organization's misconduct record was out of line with the broader Air Force and he wanted to find faster fixes.

One change already being implemented is ensuring that lower-level officers and enlisted airmen in the missile fields are given more decision-making authority, said Maj. Gen. Jack Weinstein, the interim successor to Carey. He said he also is seeking to ensure more stability in the ICBM force's work schedules so service members have more predictable periods to spend with their families.

Internally, concern about the ICBM force is not new.

In a little-noticed report published in April, a Pentagon advisory group that has studied the nuclear mission said weaknesses in the way the Air Force manages its ICBM workforce have made it hard to maintain.

"This should be a cause for serious concern," the Defense Science Board advisory group concluded.

It said the problem is especially acute in notoriously frigid Minot, where the Air Force has had trouble keeping people in its maintenance and security forces. Harsh climate is no excuse, it said.

"Minot weather has always been Minot weather. What has changed is the perception of negative career impacts, the slow response to concerns and the need for tangible evidence" that work conditions and equipment will improve, it said.

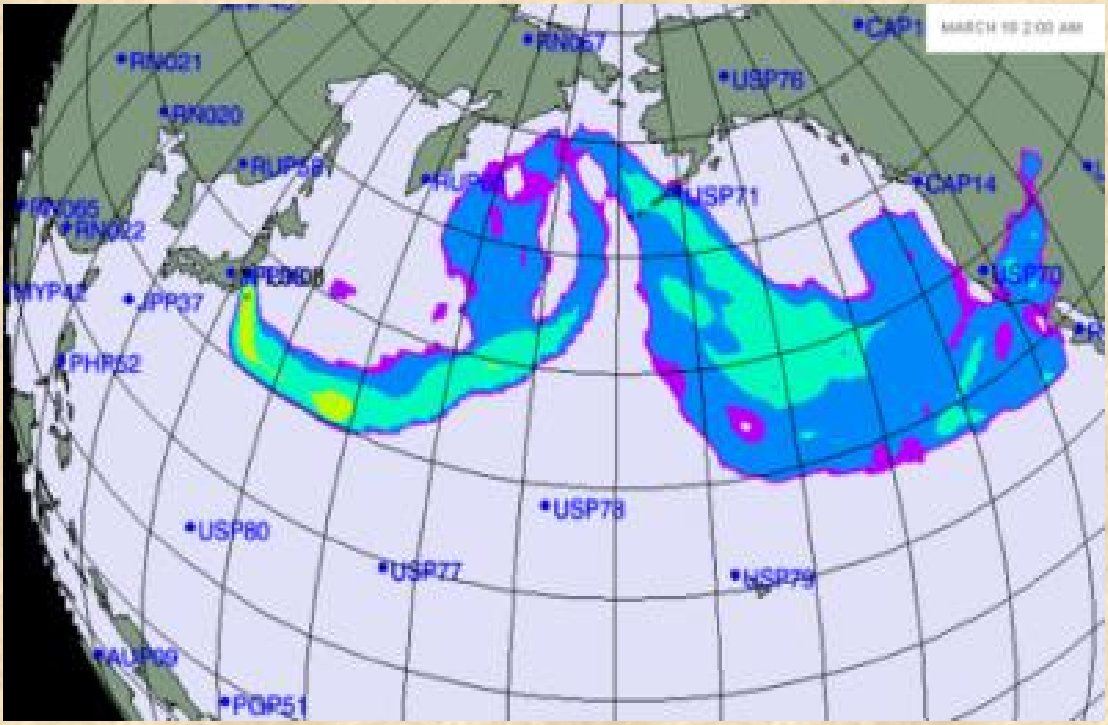
Kehler, the retiring head of Strategic Command, acknowledges that with national security attention focused elsewhere, it's easy to see why some nuclear warriors would be uneasy.

"What happens is, that translates into a very personal concern that's out there in all parts of the nuclear force, and that is: What's my future?"

Why TEPCO is Risking the Removal of Fukushima Fuel Rods. The Dangers of Uncontrolled Global Nuclear Radiation

By Yoichi Shimatsu

Source: http://www.globalresearch.ca/why-tepco-is-risking-the-removal-of-fukushima-fuel-rods-the-dangers-of-uncontrolled-global-nuclear-radiation/5359188



After repeated delays since the summer of 2011, the Tokyo Electric Power Company has launched a high-risk operation to empty the spent-fuel pool atop Reactor 4 at the Dai-ichi (No.1) Fukushima Nuclear Power Plant.

The urgency attached to this particular site, as compared with reactors damaged in meltdowns, arises from several factors:

- over 400 tons of nuclear material in the pool could reignite
- the fire-damaged tank is tilting badly and may topple over sooner than later
- collapse of the structure could trigger a chain reaction and nuclear blast, and
- consequent radioactive releases would heavily contaminate much of the world.

The potential for disaster at the Unit 4 SFP is probably of a higher magnitude than suspected due to the presence of fresh fuel rods, which were delivered during the technical upgrade of Reactor 4 under completion at the time of the March 11, 2011 earthquake and tsunami. The details of that reactor overhaul by GE and Hitachi have yet to be disclosed by TEPCO and the Economy Ministry and continue to be treated as a national-security matter. Here, the few clues from whistleblowers will be pieced

together to decipher the nature of the clandestine activity at Fukushima No.1.

Accidents happen

The delicate rod-removal procedure requires the lowering of a steel cylinder, called a transfer cask, into a corner of the pool and then using the crane to lift the 300-kilogram fuel assemblies (4..5-meter-tall bundle of fuel rods held inside a metal cage) one at a time from the vertical array of rods up and then down into the cask. The container can hold 22 assemblies for transfer to a temporary cooling unit built next to Reactor 4 before these are moved to a storage building.(1)

Lifting the 1,533 fuel bundles out of the pool is fraught with danger. If an assembly breaks away and falls, the impact could shatter other rods below, triggering an uncontrolled nuclear reaction. Compounding the threat, many rods are not intact but were fragmented into loose shards by a collapsing crane. In addition, many of the rods likely lost their protective cladding during the two fires that engulfed the spent-fuel pool on March 14 and 15, 2011.

The urgency of this transfer operation is prompted by the warping of the supporting steel frame by the twin fires that followed the March 11 quake. The pool is also tilting. If the unbalanced structure topples, the collapse would trigger nuclear reactions. A cascade of neutrons could then ignite the nearby common fuel pool for Reactors 1 through 6. The common pool contains 6,735 used assemblies.(2)

The Reactor 4 spent fuel pool contains an estimated 400 tons of uranium and plutonium oxide, compared with just 6.2 kilograms of plutonium inside Fat Man, the hydrogen bomb that obliterated Nagasaki in 1945. (While predictions are bandied about by experts and bloggers, there exists no reliable method for calculating the potential sum or flow rate of radiation releases, measured in becquerel or sievert units, after an accident. The tonnage involved, however, indicates only that a large-scale event is likely and a cataclysm cannot be ruled out.)

More than 1,700 tons of nuclear materials are reported to be on site inside Fukushima No.1 plant. (My investigative visits into the exclusion zone indicate the existence of undocumented and illegal large-scale storage sites in the Fukushima nuclear complex of undetermined tonnage.) By comparison Chernobyl 's reactors contained 180 tons of fuel not all of which melted down.

Despite the looming threat to residents in Fukushima , surrounding provinces and the capital Tokyo , the office of Prime Minister Shinzo Abe along with TEPCO hews to the tradition of risk denial and blackout of vital information. No contingency plan has been issued to Fukushima residents or to the municipalities of the Tohoku and Kanto region in event of a nuclear disaster during the SFP clearance effort. A concurrent drive to impose a draconian law against whistleblowers on grounds of national security is reinforcing the cover-up of data and testimony related to nuclear power plants, including the Fukushima complex.

Mystery of MOX super-fuel

A Mainichi Shimbun editorial mentions in passing that the Reactor 4 pool contains 202 fresh fuel assemblies.(3) The presence of new fuel rods was confirmed in the TEPCO press release, which described the first assembly lifted into the transfer cask as an "un-irradiated fuel rod." Why were new rods being stored inside a spent-fuel pool, which is designed to hold expended rods? What threat of criticality do these fresh rods pose if the steel frame collapses or if crane operators drop one by accident onto other assemblies, as opposed to a spent rod?

Against the official silence and disinformation, a few whistleblowers have come forward with clues to answer these questions. Former GE nuclear worker Kei Sugaoka disclosed in a video interview that a joint team from Hitachi and General Electric was inside Reactor 4 at the time of the March 11, 2011 earthquake. By that fateful afternoon, the GE contractors were finishing the job of installing a new shroud, the heat-resistant metal shield lining the reactor interior.(4)

TEPCO inadvertently admitted to the presence of foreign contractors at Fukushima No.1 up until March 12, 2012, when the management ordered their evacuation in event of a massive explosion during the rapid meltdown of Reactor 2. So far, leaks indicate the presence of the GE team and of a Israeli nuclear security team with Magna BSP, a company based in Dimona.(5)

Another break came in April 2012, when a Japanese humor magazine published a brief interview of a

Fukushima worker who disclosed that radioactive pieces of a broken shroud were left inside a device-storage pool at rooftop level behind the Reactor 4 spent-fuel pool.(6) This undoubtedly is the used shroud removed by the GE-H workers in February-March 2011.

A curious point here is that the previous shroud had been in use for only 15 months. Why would TEPCO and the Japanese government expend an enormous sum on a new lining when the existing one was still good for many years of service?

Obviously, the installation of a new shroud was not a mere replacement of a worn predecessor. It was an upgrade. The refit of Reactor 4 was, therefore, similar to the 2010 conversion of Reactor 3 to pluthermal or MOX fuel. The same model of GE Mark 1 reactor was being revamped to burn MOX fuel (mixed oxide of uranium and plutonium).

The un-irradiated rods inside the Unit 4 spent-fuel pool are, in all probability, made of a new type of MOX fuel containing highly enriched plutonium. If the frame collapses, triggering fire or explosion inside the spent-fuel pool, the plutonium would pulse powerful neutron bursts that may well possibly ignite distant nuclear power plants, starting with the Fukushima No.2 plant, 10 kilometers to the south.

The scenario of a serial chain reaction blasting apart nuclear plants along the Pacific Coast, is what compelled Naoto Kan, prime minister at the time of the 311 disaster, to contemplate the mass evacuation of 50 million residents (a third of the national population) from the Tohoku region and the Greater Tokyo metropolitan region to distant points southwest.(7) Evacuation would be impeded by the scale and intensity of multiple reactor explosions, which would shut down all transport systems, telecommunications and trap most residents. Tens of millions would die horribly in numbers topping all disasters of history combined.

Fires last time

The rod-transfer operation from Unit 4 is scheduled for completion by the end of 2014. That estimate is optimistic since it does not take into account the obstruction posed by fragments of shattered fuel rods that were overheated in the two fires that swept through Unit 4 spent-fuel pool on March 13 and 15, 2011, according to NHK television news.(8) Another factor for uncertainty is the impact of the explosion that rocked the roofline of the reactor building.

Basing its analysis on corporate information releases thus far, the Simply Info website states:

"TEPCO has changed their story on Unit 4 multiple times but eventually admitted to a very obvious explosion occurring at Unit 4 (on March 15). No video of Unit 4 exploding exists to date and it is assumed the explosion took place before dawn. One of TEPCO's later admissions regarding unit 4 is that they think hydrogen leaked into unit 4 from unit 3 via the venting pipes and a faulty valve. No reason was given as to why unit 4 did not then ignite when Unit 3 exploded."(9)

Soon after the Reactor 3 blast, an explosion occurred on the roofline of Reactor 4, blowing two 8-meter-wide holes through the outer wall. Although tattered, the spent-fuel pool survived the nearby explosion along with the device-storage pool containing the shroud. Photos of the building show holes and damage to a large section of walls and roof slabs on the northeast side of the upper structure (opposite the spent-fuel pool. Hydrogen gas, despite its high combustive energy per kilogram, lacks sufficient density to inflict such damage to reinforced concrete, as would a carbon-bonded gas like acetylene. A logical deduction then is that a cask of new fuel rods left on the roof during the GE-H refit was ignited by neutrons emitted from the SPF fire.

As for the spent-fuel pool, the first blaze broke out on March 14 and died down after several hours. On the following day, the pool reignited and had to be extinguished by firefighters. The nagging question is why the raging fires burned so long, since much of the hydrogen was dissolved in the remaining water at the bottom of the pool or would have burned off within a few seconds. While TEPCO conjectured that hydrogen gas pumped from Reactor 3 to 4, that scenario is a long stretch since most of the volatile gas would dissipated before arrival or ignited along the way.

An alternative possibility is of a tritium-plutonium reaction creating gas plasma inside the spent fuel pool. The condition of the cladding on the rods, which would have been melted by plasma, can indicate the heat source during those two fires. None dare mention are tritium-plutonium inter-reaction because that is the formula for a thermonuclear bomb,

that is, the H-bomb. MOX fuel does have the potential to generate sufficient tritium for a thermonuclear, and that is what so rattled Naoto Kan by March 12, 2011.

A Puzzled Civil Engineer

In July 2012, inside the exclusion zone about 14 kilometers south of Fukushima No.1 plant, I had a discussion with a manager with a major construction contractor, whose large team was working at the damaged nuclear facilities. The civil engineer said that the Reactor 4 building was of serious concern because the structure was split, with the halves leaning onto each other. He added that the tilt indicates "structural damage" to the ferroconcrete foundation. Even a 9.0 earthquake could not cleave the strong footing, he stressed.

When asked about what then could crack the foundation, the manager responded: "I am a civil engineer, not a nuclear expert." Nudged a bit more, he implied that a meltdown of nuclear fuel may have seared through the concrete. The intense heat can reconvert concrete into loose hydrated lime powder and sand, while cutting through rebar steel like a hot knife through butter.

The upgrade of the Reactor 4 shroud may well have involved the test-fitting of some MOX rods, which abandoned on the floor next to the reactor when the tsunami reached shore. In other words, in early March 2011 crane operators completely filled space inside the spent-fuel pool with new MOX rods and then simply left casks of assemblies on the roof and lowered more into the basement. That is the simplest explanation for the damage to the structural integrity of the reactor building. GE is not about to disclose its role in this disaster.

Notes

1. Tokyo Electric Power Company, press release, 18 November 2013
2. Former Ambassador Mitsuhei Murata, quoted by the Asahi Shimbun, "Doomsday scenarios spread about No.4 Reactor at Fukushima plant" 10 May 2012.
3. The Mainichi Shimbun, editorial "TEPCO must put safety above all else in Fukushima atomic fuel removal project."
4. "GE Nuclear Plant Inspector/Whistleblower Kei Sugaoko Speaks" youtube.com, 40 minutes
5. Israeli surveillance at Fukushima plant, Sarah Press, Israel21c, March 20, 2011 http://israel21c.org/news/israeli-surveillance-at-fukushima-plant/
6. Datsutte-miru magazine, Interview of a Fukushima worker by Oshidori Mako, April 15, 2012.
7. This writer attended the June 2013 seminar at the San Diego Board of Supervisors and issuedthe most detailed news report on Naoto Kan's remarks, "Japan's leader during Fukushima meltdown opposes nuclear power", posted at http://rense.com/general96/jpleader.html
8. NHK World news broadcast, 15 March 2011, reported by Platts (Sydney)
9. SimplyInfo, "Reactor 4", www.fukuleaks.org

***Yoichi Shimatsu**, former editor of the Japan Times Weekly in Tokyo, conducts independent radiation measurements and dispenses herbal therapy to local residents on his 10 journeys since May 2011 into the 20-kilometer Fukushima exclusion zone.*

Global Threat Reduction Initiative Efforts to Prevent Radiological Terrorism

By Warren Stern and Edward Baldini

Source: http://blogs.fas.org/pir/2013/11/global-threat-reduction-initiative-efforts-prevent-radiological-terrorism/

Saturday, August 17, 2013 at 2:35 am
Suburban location—Anywhere, United States

Three men enter a darkened building of a mid-size university closed for summer break. The university has unarmed security guards that make periodic checks of the campus building exteriors, and the local law enforcement agency is a county police department that interacts with the university on an "occasional" basis. The men enter a third floor laboratory housing a Cesium 137 irradiator. The irradiator is used by faculty and students to expose tissue samples to high

levels of radiation during their research. Using simple tools, they partially dismantle the device and remove the radioactive source capsule containing 3,000 curies of Cesium 137. The three perpetrators move the material in a crudely constructed lead bucket providing light shielding and minimal protection to them, and place the material in a self-storage locker ten miles away. The theft goes unnoticed until Monday morning when it is reported to the county police. The county police are not immediately concerned or recognize the significance of the theft or the amount of radioactive material taken.

Monday, August 19, 2013 at 10:45 am
Urban location—Anywhere, United States
Over the past two days, the three perpetrators have taken the radioactive material and assembled it with explosives stolen from a construction site into a Radiological Dispersal Device (RDD), commonly called a "dirty bomb." The device has been transported to a medium-sized city, one hundred miles from the university. All three men are suffering from radiation sickness but are able to detonate the device in the city's business and financial district. Seven people, in addition to the three terrorists, are killed in the explosion. The resulting contamination from the dispersal of the Cesium 137 produces general panic due to health concerns, along with potentially devastating financial consequences.

The above scenario is fictional but will serve as an introduction to the discussion of what could have been done to deter or interdict the attack. Could the university and local police have had strategies to better secure the radioactive materials that were stolen? Could the local police have been notified in a timelier manner through a closer working relationship with university radiation safety professionals? Could police have searched for the material after it had been stolen, while in transit, during assembly at self-storage facility, or while en route to the final target?
The attacks of September 11, 2001, heightened the nation's concerns regarding all forms of terrorism in the U.S., including the potential use of radioactive materials in a terrorist act. The possibility of such an attack has been of particular concern because of the widespread use and availability of radioactive materials in the United States industry, hospitals, and academic institutions. Loss or theft of such materials, in risk-significant quantities, could lead to their diversion for malicious use in a Radiological Dispersal Device. This past April's bombing at the Boston Marathon again raised such concerns. In the wake of the Boston attack, Richard Daddario, Deputy Commissioner for counterterrorism at the New York City Police Department, testified that the psychological and economic fallout from a radiological "dirty bomb" event could demand a much longer recovery than a conventional strike. [1]
An RDD is a device or mechanism that is intended to spread radioactive material from the detonation of conventional explosives or other means. An RDD detonation would likely result in few deaths (mainly from the explosion), but substantial social and economic impacts could result from public panic, decontamination costs, and denial of access to area for extended periods of time.
The economic consequences of an RDD attack could be enormous. As a point of reference, according to an estimate by *Bloomberg Businessweek*, it cost $333 million to shut down Boston for a day to facilitate the manhunt for Dzokhar Tsarnaev. Imagine the costs of closing a large portion of any major city for substantially longer periods. An attack at a port could also have major economic consequences. A 2007 study published in *Risk Analysis* estimated that the economic consequences from a shutdown of the harbors due to the contamination from a plausible dirty bomb scenario could result in losses in the tens of billions of dollars, including the decontamination costs and the indirect economic impacts due to the port shutdown. [2]

Global Threat Reduction Initiative
In order to prevent a radiological attack, the United States government sponsors a broad range of programs designed to prevent, detect and respond to the loss or theft of nuclear and radiological material. The Global Threat Reduction Initiative (GTRI) is a Department of Energy (DOE) program designed to reduce the amount of vulnerable nuclear and radiological material located at civilian sites worldwide and improve protection of these materials. Because the bulk of its work is pursued overseas, the program is best known for its international activities, in particular removing vulnerable nuclear material from, for example Kazakhstan, and securing high risk radioactive materials, for example in Russia. However, a lesser known and equally complex element of GTRI is its domestic component carried out in the United States. The domestic component

involves the interaction and cooperation between federal government officials, scientists and policy makers with state and local police, emergency officials, and operators of private and public institutions, such as hospitals.

This article is intended to describe the domestic component of the GTRI; how it is implemented, why it is needed and how state and local officials take advantage of the program. The goal of this article is to present the joint views of a local police official together with those of a scientist and former policy maker and to explore the technical and policy issues associated with domestic threat reduction programs.

The Context

Radiological materials are located throughout the United States (see Figure 1) with the majority of high activity sources located in large urban population centers. A successfully deployed RDD using radioactive sources commonly found in public facilities such as hospitals could potentially result in radioactive contamination that could require relocation of inhabitants, prohibit the use of facilities, and have debilitating economic impacts. [3]

Most radioactive sources in the U.S. are regulated by the Nuclear Regulatory Commission and state authorities. GTRI works with civilian sites to enhance security for their radiological materials; however, it does not regulate them. Participation with GTRI is voluntary on the part of sites although GTRI has an aggressive outreach program to encourage sites to participate. In addition, the Department of Homeland Security's Domestic Nuclear Detection Office provides assistance to state and local officials in establishing an overall architecture for detecting nuclear and radioactive material that are not under regulatory control, e.g. which have already been lost or stolen. This detection assistance supports the GTRI's efforts by providing equipment and training to establish a general baseline for state and local first responder nuclear and radiological detection capabilities, but is not focused on specific sites.

Some have expressed concern that funding for radiological threat reduction is better spent overseas, in particular in countries that do not have a strong regulatory infrastructure, as the U.S. does. Indeed, GTRI's overseas accomplishments are much more frequently in the news. In the U.S., the protection of sources is primarily the responsibility of the owner/operator, following the requirements of the regulator. So, why should the federal government spend funds to protect radiological sources when they should already be adequately protected? Through the current and evolving program, GTRI and partner agencies and institutions have created a strong partnership for a well-rounded domestic security program. The domestic portion of GTRI has evolved to one that seeks to fill the gaps that may exist in the very complicated relationship between local, state, and federal agencies in preventing and responding to radiological security incidents. The focus of the program is shifting toward sustainability of completed security upgrades and improved response capabilities and communication networks.

Figure 1: Locations in the U.S. with risk-significant quantities of radiological sources. [4]

Domestic Security Enhancement Program

Since GTRI's domestic security enhancement program began in 2008, it has worked with host sites to enhance security at more than five hundred buildings which host over four million curies of radioactive materials. GTRI physical security enhancements are applied on a voluntary basis to assist sites in the prevention and detection of any unauthorized access to radiological sources located in their facility. The physical protection principle of detection, specifically early detection, means that

detection of a theft is early enough in the act that it can be stopped at the site or nearby. Ideally, early detection should allow time for response forces to prevent an adversary from acquiring the radioactive material. GTRI's detection upgrades build upon sites' existing security measures but may include enhancing the following physical protection system components:

- Biometric access control devices
- Door alarms
- Motion sensors
- Cameras
- Duress buttons
- Radiation sensors
- Electronic tamper indicating seals
- Remote monitoring systems

The Insider Threat

A remote monitoring system (RMS) is a critical security measure for detecting an insider threat because the insider (by definition) will have access to the device containing the radioactive material, or to the material itself depending on the type of facility. The insider will also have authorization to use some or all of the site's access control and detection devices without sending an alarm of unauthorized access. In addition to detecting an insider, the RMS also improves the response by a site's local law enforcement or other responding agencies by providing them with critical assessment information immediately.

For most U.S. sites, timely notification to local law enforcement is critical to prevent potential theft attempts. The RMS integrates what GTRI calls critical alarms (e.g., device tampering to gain access to the radioactive source(s), increased radiation levels indicating that the source has been removed from its shielding, communications loss between the site and monitoring station, or loss of power) with real time live video images. For increased protection, the RMS is housed in a tamper-indicating housing with battery back-up to ensure its continued operation. To address information security concerns, the RMS also encrypts the video and alarm data. The RMS can send alarm and video data simultaneously to onsite and offsite security and local law enforcement monitoring stations to prevent single-point failures in a site's security and response planning.

Enhancing Delay Measures

Along with early detection capabilities, GTRI also provides sites with delay enhancements that impede an adversary's progress to access nuclear and radiological materials. By increasing the delay time and adding valuable minutes in an adversary's attack time lines, responders have more time to interrupt the adversary before they can remove and steal these materials. GTRI's delay systems may include:

- Device tie downs
- Security cages
- Security grating
- Hardened doors/rooms
- Ballistic glass
- In-Device Delay Kits

A particularly important delay enhancement is the In-Device Delay kit for irradiators. The National Research Council, a private nonprofit institute, performed a risk and consequence analysis, which showed Cesium Chloride irradiators pose relatively higher security risks compared to other radiological materials. [5] To help mitigate this risk, GTRI and DHS developed In-Device Delay (IDD) kits for Cesium irradiators that can be installed on the device. The installation of the IDD kits on selected irradiators significantly increases the time and/or difficulty involved if an intruder tries to remove a source—while not impacting the functionality of the irradiator—and consequently is an important element of security enhancements.

Response Capabilities

One of the most important elements of any security system is a timely, well-equipped, well-trained response team of appropriate size to interrupt and neutralize the adversary before they gain access to the radioactive source or immediately after they gain access. First responders from state and local law enforcement do not work with nuclear material or radiological sources on a daily basis and may lack knowledge of the risks posed by these materials. GTRI has therefore made a focused effort to provide security personnel and local law enforcement with the tools and training to help prepare them to respond to an event involving nuclear or radiological material.

In 2008 GTRI began to sponsor table top exercises for GTRI partners at select nuclear and radiological sites in the United States. These exercises are conducted at predominately private institutions, hospitals and universities and bring together key decision-makers from the actual agencies that would respond to a terrorist WMD incident. At the exercise, host level players include on-site security forces, radiation safety personnel, facility managers and public affairs personnel. At the city and state levels, players can include police, fire, hazmat, EMS, Office of Emergency Management, regulatory agencies and National Guard Civil Support Teams. At the federal level players can include the FBI, DOE/NNSA nuclear response assets the Federal Emergency Management Agency, the Nuclear Regulatory Commission, the Department of Homeland Security and the Environmental Protection Agency.

The overall exercise objectives are to promote cross-sector communication, cooperation, and team-building among public and private sector first responders and to exercise FBI lead responsibility for criminal investigation. In addition, the exercise allows players to examine newly developed tactics, techniques, and procedures resulting from GTRI voluntary security enhancements. The exercises promote attack prevention through intelligence sharing and a coordinated approach to neutralize the threat, along with site specific integrated response planning with federal, state, local, and private sector partners.

Since the first GTRI exercise in December 2008, there have been 29 *Silent Thunder* table top exercises at state and private universities, hospitals, research and test reactors, the U.S. Department of Agriculture and National Institutes of Health. To date, 329 FBI agents and 3760 players and observers have participated in these GTRI table-top exercises.

Additionally, at the Y-12 National Security Complex in Oak Ridge, Tennessee, GTRI offers participants a three-day alarm response training course. This training includes hands-on exercises and classroom training and teaches site personnel and local law enforcement how to protect themselves and their communities when responding to alarms indicating possible theft of radiological materials.

Removing Disused Sources Before They Can Become a Threat

The final element of GTRI's domestic radiological security effort involves the removal of sources that are unused and may ultimately be lost or stolen due to lack of attention. In addition to security enhancements, GTRI's Off-Site Source Recovery Program (OSRP) removes thousands of excess or disused sources in the United States annually. The initial scope of the project included a narrow group of sources (those that fell into the regulatory category of Greater than Class C (GTCC) low-level radioactive waste), but since the terrorist attacks of September 11, 2001, OSRP's scope has expanded to include the recovery of other sources. [6] Over the years, OSRP has recovered more than 30,000 sources from more than 1,000 sites located in all 50 U.S. states, Washington D.C., and Puerto Rico.[7] By removing sources from facilities that no longer had a use for them, GTRI has removed the risk of these materials to be potentially used in a RDD, thus resulting in permanent threat reduction.

From "Global" Threat Reduction to "Local" Threat Reduction

At its core, the GTRI domestic program is a partnership between federal officials, state and local officials and facility operators. One example of this is in Philadelphia, where over a dozen sites are protected in the Philadelphia Metropolitan Area by the GTRI Program, ranging from hospitals and universities, drug manufacturers and government research labs, to one of the American Red Cross's largest blood distribution centers. Law enforcement agencies (the Philadelphia Police Department being the largest), have benefited tremendously from GTRI's tabletop exercises, training at the Y12 National Security Complex, and personal radiation detectors provided by the GTRI Program.

The Philadelphia region had an existing Preventive Radiological Nuclear Detection (PRND) program supported by the Domestic Nuclear Detection Office (DNDO) of DHS that the NNSA was able to use as a vehicle to integrate their source security into the overall effort to prevent radiological and nuclear terrorism. This created a very effective two tiered "inside-out" and "outside-in" prevention strategy. The existing deployment of nuclear detection assets protected special events and provided a 24/7 "steady state" coverage from threats from outside the region. The regional law enforcement agencies, assisted by DNDO, were able to field a range of detection equipment on a daily basis, including aircraft, mobile and marine systems. The addition of the GTRI program allowed for the protection of radiological sources of concern within and near relevant facilities while bolstering the defense against an "insider threat" due to the closer relationships created by participation. This "inside-out" approach took Philadelphia's protection and response effort to the next level by adding source security as a priority. The previous outwardly focus PRND program was equipment and personnel driven while the GTRI Program stresses relationship building between the partner sites and their local law enforcement agencies.

The scenario depicted at the beginning of this article would have multiple chances at prevention/interdiction in the Philadelphia model. The GTRI alarm systems and response programs would have protected the material and facilitated an immediate response and the existing detection assets could be deployed to recover any stolen material. Together, the two programs form an effective deterrent.

The University of Pennsylvania has been the largest beneficiary of the GTRI Program in the area, and has served as a model site for others in the nation for implementing the security and emergency response upgrades. All partners, facility and law enforcement, have enjoyed a

much closer relationship that extends to joint training and exercises as well as facility operators providing subject matter expert support to the overall PRND effort.
Due in part to the GTRI program, in October 2013, all the protected facilities alarm notifications are received in the regional "Fusion Center", the Delaware Valley Intelligence Center (DVIC), creating another layer of defense and allowing for a regional protection and response capability.

Conclusion

As mentioned at the outset of this paper, some in the policy community believe U.S. radiological protection dollars are better spent overseas, where regulatory controls are not as effective as those in the United States. It is true that despite years of effort, many other countries do not have strong regulatory infrastructures for managing access to radiological and nuclear material and funding overseas is well spent. However, as illustrated above, this view does not fully take into account the multifaceted needs of radiological security, which requires the integration of the facility operators, state, local and federal capabilities. Moreover, while sources overseas are generally less well regulated and protected than U.S. sources, radiological sources in the U.S. should receive special attention because they pose the greatest risk: diversion closest to a target of the attack minimizes the likelihood of detection through the global detection capabilities overseas and at U.S. borders. In this view, it makes little sense for the federal government to help provide for a security measure overseas, but not domestically, where the risk may be higher.
A recent Government Accountability Office (GAO) report is instructive in regard to the limitations of regulatory controls. GAO was asked by Congress to determine the extent to which NRC's regulations ensure the security of radiological sources at U.S. medical facilities and the status of NNSA's efforts to improve the security of sources at these facilities. GAO reviewed relevant laws, regulations, and guidance; interviewed federal agency and state officials; and visited 26 hospitals and medical facilities in Washington, D.C. and 7 states. The review concluded that existing regulatory requirements do not consistently ensure the security of high-risk radiological sources at the 26 selected hospitals and medical facilities visited. According to the review, one reason for this is that the requirements are broadly written and do not prescribe specific measures that hospitals and medical facilities must take to secure medical equipment containing sealed sources, such as the use of cameras or alarms. Rather, the requirements provide a general framework for what constitutes adequate security practices, which is implemented in various ways at different hospitals. Some of the medical equipment in the facilities visited was more vulnerable to potential tampering or theft than that of other facilities because some hospitals developed better security controls than others. [8]
Protecting America from a radiological attack requires a strong alliance between facility operators, state, federal and local officials. In the U.S., the NRC sets the regulatory framework that includes security requirements, licensing, inspection, and enforcement. But the regulatory framework is insufficient for all threats; rather it provides a common baseline level of security. GTRI works with sites to build upon these security standards set by NRC and state regulations. GTRI's voluntary security enhancements provide sites with security best practices which further enhance security above regulatory requirements. Because the GTRI upgrades are voluntary and may have cost implications for the facility operators as well as state and local authorities, it is essential that all partners are aware of the threats and risks involved in working with certain radioactive material as well as programs to mitigate these risks.

Notes:

1. "Officials Warn of 'Dirty Bomb' Danger in Aftermath of Boston Bombing," *Global Security Newswire*, April 25, 2013. http://www.nti.org/gsn/article/us-officials-warn-dirty-bomb-danger-aftermath-boston-bombing/
2. H. Rostoff and D. von Winterfeldt, "The Risk and Economic Analysis of Dirty Bomb Attacks on the Ports of Los Angeles and Long Beach." *Risk Analysis* 27, (2007).
3. One of the key challenges in protecting America from radiological threat is the broad range of radioactive materials used throughout the country. Not all pose the same risk and economic realities create a need to focus on the highest risk materials. As such, the first step in the GTRI program was to identify which materials potentially pose the highest risk. To better understand the potential consequences of malevolent use of radiological materials, the specific isotopes of concern, and the vulnerabilities of devices using these materials, GTRI

commissioned three key studies to examine these issues in depth. These studies formed the basis for GTRI's domestic voluntary radiological source security enhancement efforts.
4. Tensmeyer, Peter, Kristina Hatcher, Ioanna Iliopulos, Kenneth Sheely, Paul Moskowitz. "Protecting US Cities from Radiological Threats: Cooperative Efforts between GTRI and Local Law Enforcement." Proceedings of the Institute of Nuclear Materials Management Ann, (2010): 1
5. "Radiation Source Use and Replacement." National Research Council, Washington DC, 2008. http://www.nap.edu/catalog.php?record_id=11976
6. Off-Site Source Recovery Project: Overview. 2011. http://osrp.lanl.gov
7. Off-Site Source Recovery Project: Overview. 2011. http://osrp.lanl.gov
8. Additional Actions Needed to Improve Security of Radiological Sources at U.S. Medical Facilities, GAO-12-925, Sept 10, 2012

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Lieutenant Edward Baldini *is a twenty four year veteran of the Philadelphia Police Department and has been assigned to the Counter Terrorism Operations Unit since its inception in spring 2002. He has assisted in development of Counter Terrorism Training at the local, state and national level. He has been very active with Preventive Radiological/Nuclear Detection (PRND) mission and has assisted the Domestic Nuclear Detection Office (DNDO) and the National Nuclear Security Administration (NNSA) in several initiatives. He holds a Bachelor's Degree from Philadelphia University and a Master's Degree from the Naval Postgraduate School in Monterey, California. He is also a graduate of Northwestern University Center for Public Safety's School of Police Staff and Command.*

Source: http://blogs.fas.org/pir/2013/11/uranium-mining-u-s-nuclear-weapons-program/

From 1942 to 1971, the United States nuclear weapons program purchased about 250,000 metric tons of uranium concentrated from more than 100 million tons of ore. Although more than half came from other nations, the uranium industry heavily depended on Indian miners in the Colorado Plateau. Until recently, their importance remained overlooked by historians of the atomic age, but Navajos dug up nearly 4 million tons of uranium ore while being sent into harm's way without their knowledge, becoming the most severely exposed group of workers to ionizing radiation in the U.S. nuclear weapons complex.

Robert Alvarez *is a Senior Scholar at IPS, where he is currently focused on nuclear disarmament, environmental, and energy policies. Between 1993 and 1999, Mr. Alvarez served as a Senior Policy Advisor to the Secretary and Deputy Assistant Secretary for National Security and the Environment. While at DOE, he coordinated the effort to enact nuclear worker compensation legislation. In 1994 and 1995, Bob led teams in North Korea to establish control of nuclear weapons materials. He coordinated nuclear material strategic planning for the department and established the department's first asset management program. Bob was awarded two Secretarial Gold Medals, the highest awards given by the department.*

Most ports vulnerable to smuggling of 'dirty' bombs or WMDs: Home Ministry

Source: http://economictimes.indiatimes.com/news/politics-and-nation/most-ports-vulnerable-to-smuggling-of-dirty-bombs-or-wmds-home-ministry/articleshow/26811256.cms

The home ministry has raised concerns over the reluctance of ports managed by loss-making state-run companies to invest in modernising their security infrastructure even as they are prime terror targets and vulnerable to smuggling of radiological 'dirty' bombs or weapons of mass destruction.

In a report, the ministry has lamented that IB recommendations to strengthen port security remain unimplemented and most Indian ports are still not equipped with container scanners, radiological "dirty" bombs or weapons of mass destruction.

In a report, the ministry has lamented that IB recommendations to strengthen port security remain unimplemented and most Indian ports are still not equipped with container scanners, radiological detectors, modern access control systems or anti-intrusion devices to strengthen their perimeter security.

The ministry will discuss this issue with the US at a two-day conference that starts on Wednesday. Its officials will study America's counter-terrorism efforts in creating the Container Security Initiative (CSI), which is a four-element structure in the US for using intelligence and automated information to identify containers that pose a risk to terrorism, pre-screening those containers at the port of departure itself before they arrive at US ports, using detection technology to quickly pre-screen such containers and using tamper-evident containers.

"The security infrastructure at most of the Indian ports is archaic and as most of the ports in the public sector are incurring losses, the managements are reluctant to invest in modernising security infrastructure," the ministry's document prepared for the conference says. It says the "high cost" of inspecting all ship containers and the shipping delays inherent in

the process are the "main inhibiting factor" in carrying out the exercise.

The 12 major ports in India are managed by the Port Trust of India under central government's jurisdiction — they are guarded by the CISF — while 139 operable minor ports are under the jurisdiction of the respective state governments. "... Container shipping is an amalgam of many different actors; the exporter, the importer, freight forwarder, customs broker, excise inspectors, truckers, railroad workers, dock workers and the crews of the vessels themselves. This provides many loopholes to terrorist infiltration," the document says.

The ministry says locations of ports in highly urbanised areas and security of their landside perimeter pose a big challenge. "Container ships anchored at port facilities are particularly vulnerable to both hijacking and explosive devices as they are stationary targets. Most crew of cargo ships is unarmed and would be defence-less to an armed attack. Disabling of a ship at port which is blocking a thorough way is enough to halt all activity at the port for an extended period of time," the report says.

Indian officials have in recent past visited the ports in the US to learn about the technology being used there to secure the ports.

Defending against electromagnetic-pulse attacks

Source: http://www.homelandsecuritynewswire.com/dr20131204-defending-against-electromagnetic pulse -attacks

We are all familiar with the power of electromagnetic attacks from the movies: in "Ocean's Eleven," George Clooney's gang disables Las Vegas' power grid, and Keanu Reeves' henchmen hold off the enemy robot fighters from their spaceship in the "Matrix Trilogy." The heroes in the films succeed by sending out a very strong electromagnetic pulse. This changes the voltage in the vicinity so that regulators, switches, and circuit boards in electronic equipment go crazy. You cannot smell, taste, or feel this radiation. Those affected by it do not know why computers or machines breakdown or from which direction the attack comes.

"What works on the silver screen is also conceivable in reality," confirms Michael Jöster from the Fraunhofer Institute for Technological Trend Analysis (INT) in Euskirchen, just south of Cologne, Germany. A Fraunhofer INT release reports that the researchers there are concentrating on the question of how these attacks can be detected. They have developed a measurement instrument for this purpose that is capable of determining the strength, frequency, and direction of electromagnetic attacks. The engineering requirements are steep: the detector must measure very high field strengths from very short pulses, yet not be destroyed or damaged itself.

Identifying the type, location, and duration of the attacks

Four specialized antennas make up the INT demonstration instrument that sample the environment around the subject device to be protected. Each of these covers a quadrant of 90 degrees and detects all types of electromagnetic sources. A high-frequency module preconditions the signals for measurement and determines when the electromagnetic pulse started and stopped. A computer in a monitoring station connected via an optical conductor then calculates the values for the signal and presents them on a screen.

"We identify the type and location of the source of the invisible attack as well as its duration as though we had a sixth sense. Those affected by the attack can use this information to mount a rapid and appropriate protective response," explains Jöster. The threat scenarios are real: criminals disrupt computer networks of banks, exchanges, and companies. They cause confusion in

order to bypass monitoring points or overcome alarm systems, enabling them to penetrate into secure areas. Individual cases of these kinds of attacks have already been documented: thieves used electromagnetic waves to crack the security systems of limousines in Berlin. Their weapons are no larger than a suitcase. High-power microwave sources are suitable for those kinds of attacks, for example.

Depending on the field strength, the attacker using these high-power microwaves can be located several meters from the target of the attack. "Located In the right position, it is enough to press a button to trigger the pulse. Just like in "Ocean's Eleven" or "The Matrix," the electronic systems nearby can fail or be damaged," says Jöster.

The release notes that electronic devices can withstand a certain amount of radiation. This is measured in volts per meter (V/m) — called the electromagnetic compatibility (EMC). Otherwise, they would not operate reliably. Every device could interfere with others in its immediate vicinity.

Depending on the category of usage, they therefore have to fulfill specific EMC requirements. These are significantly higher for industrial applications than for common things like Smartphones, televisions, or stereo equipment. One example where safety is important is automotive engineering. "The importance of electronic components will continue to increase in the future. Completely shielding individual devices from electromagnetic radiation would certainly be theoretically possible, but much too expensive though. Systems are needed that can detect these kinds of attacks. If you know what is attacking, you can also react correctly to it," says Jöster.

Stolen radioactive material in Mexico found, no risk to population, official says

Source: http://www.foxnews.com/world/2013/12/04/stolen-radioactive-material-found-in-mexico/

Stolen radioactive material that was reported missing in Mexico early Wednesday has been recovered and there's no risk to the surrounding population, a Mexico official said.

The highly radioactive material was found in an empty lot about a half a mile from Hueypoxtla, an agricultural town of about 4,000 people, but it poses no threat or a need for an evacuation, said Juan Eibenschutz, director general of the National Commission of Nuclear Safety and Safeguards.

"Fortunately, there are no people where the source of radioactivity is," Eibenschutz said.

The cargo truck hauling the extremely dangerous material that had been used in medical equipment was stolen from a gas station early Tuesday, and authorities had put out an alert in six central states and the capital looking for it. Police and the military joined in the hunt.

The truck was taking the cobalt to a nuclear waste facility in the state of Mexico, which is adjacent to Mexico City.

Eibenschutz said direct exposure to cobalt-60 could result in death within a few minutes. He said hospitals near the area were asked to report if they treat anyone exposed to radioactivity.

"This is a radioactive source that is very strong," Eibenschutz told The Associated Press.

But, he added, the material poses no threat to human life if kept at least 500 yards (500 meters) away.

Eibenschutz didn't know the exact weight of cobalt, but said it was the largest amount stolen in recent memory, and the intensity of the material caused the alert.

The material was used in obsolete radiation therapy equipment that is being replaced throughout Mexico's

public health system. It was coming from the general hospital in the northern border city of Tijuana, Eibenshutz said.
Before the container was found, he said the thieves most likely wanted the white 2007 Volkswagen cargo vehicle with a moveable platform and crane.
Eibenschutz said there was nothing to indicate the theft of the cobalt was intentional or in any way intended for an act of terrorism.

Mexico's National Commission on Nuclear Safety and Safeguards released this image of some of the cargo carried by a stolen truck that was hauling radioactive material. (CNSNS / December 4, 2013)

The truck marked "Transportes Ortiz" left Tijuana on Nov. 28 and was headed to the storage facility when the driver stopped to rest at a gas station in Tepojaco, in Hidalgo state north of Mexico City.
The driver, Valentin Escamilla Ortiz, told authorities he was sleeping in the truck when two men with a gun approached about 1:30 a.m. Tuesday. They made him get out, tied his hands and feet and left him in a vacant lot nearby.
When he was able to free himself, he ran back to the gas station to get help.
On average, a half dozen thefts of radioactive materials are reported in Mexico each year and none have proven to be aimed at the cargo, Eibenschutz said. He said that in all the cases the thieves were after shipping containers or the vehicles.
Unintentional thefts of radioactive materials are not uncommon, said an official familiar with cases reported by International Atomic Energy Agency member states, who was not authorized to comment on the case. In some cases, radioactive sources have ended up being sold as scrap, causing serious harm to people who unknowingly come into contact with it.
In a Mexican case in the 1970s, one thief died and the other was injured when they opened a container holding radioactive material, he said.
The container was junked and sold to a foundry, where it contaminated some steel reinforcement bars made there.
Eibenschutz said all foundries in Mexico now have equipment to detect radioactive material.

Mexico has Problem Tracking Medical, Industrial Radiological Materials

Source: http://www.hstoday.us/single-article/mexico-has-problem-tracking-medical-industrial-radiological-materials/327d74139157269d3c3d2b279d3eb205.html

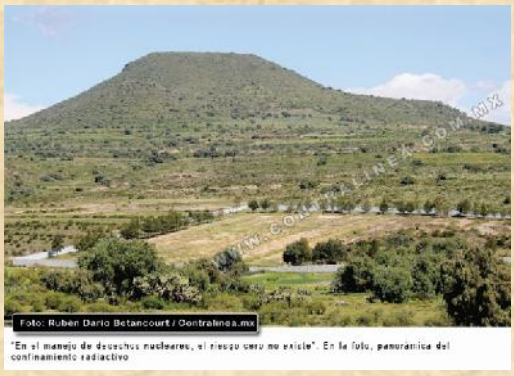
The theft at gunpoint Monday of a truck carrying radiotherapy equipment containing the highly radioactive isotope cobalt-60 while being transported from a Mexican hospital to a waste storage site, has renewed concerns over the Mexican government's inability to keep track of radiological materials.

During the past decade, numerous radiological sources disappeared in Mexico and have yet to be recovered.

According to reports and experts, the disposal and transport of radioactive sources and waste in Mexico is a particular vulnerability.

"Stationary vehicles make prime opportunities for theft in many countries, *Homeland Security Today* was told by Brandon Behlendorf, senior

researcher at the University of Maryland-based National Consortium for the Study of Terrorism



and Responses to Terrorism (START). "The fact that vehicles transporting radiological materials for storage were stationary for any length of time is concerning for radiological security in Mexico."

Referring to the theft Monday of cobalt-60, START researcher Michelle Jacome told *Homeland Security Today* that "What appears to be a crime of opportunity underscores the fact that most established criminal organizations would generally regard the risks associated with radioactive smuggling disproportionate to the benefits, and would be less likely to carry out such an operation."

In recent years, Mexico reportedly has faced considerable difficulties in controlling and tracking radioactive materials used in medicine and industry.

The government reportedly does not have adequate mechanisms used to track radiological sources -- especially small quantities of radioactive sources -- used in medicine and industry. This reputedly often is because a large number of radioactive materials enter the country illegally because of high importation and licensing costs.

The apparently inadvertent theft this week of a radiotherapy device containing cobalt-60 isn't the first time that this radioactive isotope has been stolen in Mexico.

In 2011, a "sealed unit of cobalt-60" from a decommissioned Picker 3000 radiotherapy machine (left photo) that wasn't in the records of Mexico's National Commission on Nuclear Safety and Safeguards (CNSNS) was discovered in Ciudad Juarez, a city directly across the border from El Paso, Texas.

The origin of the cobalt-60 is unknown because CNSNS was unable to find any record for a technical expert who should have been responsible for managing the dangerous material.

In 1983, another radiotherapy machine that contained approximately 6,000 1-millimeter pellets of cobalt-60 that was originally smuggled into Mexico from the United States eventually was sold by hospital employees to a scrap yard in Ciudad Juarez (photo). Eventually the radioactive pellets were processed into more than 6,000 tons of re-bar sold and distributed throughout the country.

The now radioactive reinforcing rods were detected when a truck en route to Los Alamos Scientific Laboratory in New Mexico took a wrong turn and its

radiation detectors were activated by the rods.
It's been estimated that as much as 900 tons of the contaminated reinforcing rods were shipped to the United States. By 1985, more than 17,000 buildings were identified having been constructed using the contaminated re-bar. At least 10 individuals received significant

exposure, one died and four were injured.
Throughout Latin America over the last 20 years, there have been numerous significant seizures of "orphaned" or stolen radiological and nuclear (RN) materials, primarily in Colombia and Venezuela. Similar to the truck hijacking Monday, criminals have stolen several trucks transporting radiological materials in Latin America over the years.
And there have been more ominous instances of radiological materials getting into the wrong hands.
On March 26, 2008, Colombian authorities announced they'd recovered 66 pounds of depleted uranium alongside a road south of Bogotá in an area known to be a stronghold of the Marxist guerilla group, the Revolutionary Armed Forces of Colombia (FARC). According to US counterterrorism officials, FARC has ties to jihadist terrorists operating in Central and South American, and Mexican-based transnational criminal organizations.
Disturbingly, FARC computers seized during a March 1, 2008 raid on FARC camps in Ecuador by Colombian authorities found evidence that the group was in discussions with unspecified governments to sell as much as 50 kilos of uranium. Files on the computer of slain FARC leader Raul Reyes also mentioned an arms dealer.
"The fact that the container [that was stolen Monday] was open and the source material [the cobalt-60] was exposed highlights the point that, ultimately, most cases of missing sources are more of a risk to public health rather than to national security," said START researcher David Vielhaber.
"It is important for the public to be informed that the explosion of a device containing cobalt–60 would be a mass disruption-type event and not an event of mass destruction," Vielhaber said, adding, "Serious casualties from this type of event would mostly be attributed to the explosion of the device itself and not the exposure to the material."

Mexico Hospital Admits 6 with Radiation Exposure

Source: http://www.voanews.com/content/mexico-hospital-admits-6-with-radiation-exposure/1805475.html

Dec 6, 2013 – Officials in Mexico say six men suspected of stealing radioactive material have been detained and are being tested for possible radiation exposure in a hospital.
A health minister for central Hidalgo state, Pedro Luis Noble, says some of the men are experiencing nausea and dizziness, a possible sign of radiation poisoning. Officials say the suspects are under police guard in a Hidalgo hospital.
Friday's news comes hours after authorities said they had recovered all of a stolen shipment of highly radioactive cobalt-60 that was abandoned in a field in central Mexico.

Potential Nexus between Terrorism, Transnational Crime Organizations, and RN Weapons

Source:http://www.start.umd.edu/start/publications/br/STARTBackgroundReport_StolenTruckWithCo60_Dec2013.pdf?utm_source=START+Announce&utm_campaign=b7336542aa-START+Background+Report+Radioactive+Theft&utm_medium=email&utm_term=0_a60ca8c769-b7336542aa-14081393

Although unfounded, the recent incident in Mexico stirred concern regarding the potential for criminal organizations to acquire, smuggle, and sell radiological materials, possibly to terrorist organizations. While there are many potential intersections between TCOs and terrorists, ranging from hybrid organizations to ideologically- or kinship-based collaboration, the scenario that seems to be of most concern to policymakers is TCOs utilizing their existing pathways and infrastructures for smuggling drugs, human beings and other cargo into the United States in order to provide a "delivery service" for terrorists to smuggle RN weapons or materials into the United States.
It is immediately apparent that TCOs in the Latin American region will have substantial disincentives to collaborate with terrorists, especially when it comes to RN materials. There are many reasons for this, including:

- the profit-seeking motivations of most TCOs;
- the risks involved in terms of both safety to TCO members and potential retribution from authorities; and
- a desire on the part of TCOs not to disrupt the market for their goods (the U.S. public).

Similarly, many terrorists would hesitate to entrust RN materials, which are often hard to acquire and work with, to TCOs with vastly differing worldviews and who might expose the terrorists to additional risk of detection.
Nonetheless, there are circumstances under which such collaboration might occur. A terrorist group might simply not have the means of moving RN materials into the United States on their own and would thus be forced to outsource the task to other illicit entities. In this scenario, terrorists might opt to insert RN materials surreptitiously into TCO smuggling networks by disguising this as other goods or by co-opting lower-level TCO members as freelancers. There are also certain, albeit unlikely, shifts that could occur within a TCO that might make it more amenable to the risks involved with smuggling RN materials. These could include if a TCO is in rapid decline and has little to lose, if it has ethnic or kinship ties with a terrorist organization, or if a TCO begins to develop a political ideology that becomes antithetical to the United States. There are isolated cases of all of these happening at various times and places around the world, however, the vast majority of TCOs and many terrorist groups will have little to gain from this type of collaboration and the disincentives for TCOs to become involved in RN smuggling will predominate. The feared nexus will therefore most likely occur in only the rarest of circumstances and any response efforts should be weighed against a range of other, often more pressing, threats.

Cobalt-60 and the Potential for Radiological Terrorism

The International Atomic Energy Agency (IAEA) classifies cobalt-60 (Co-60) as a category 1 radioactive source that "if not safely managed or securely protected, would be likely to cause permanent injury to a person who handled it or who was otherwise in contact with it for more than a few minutes." Co-60 has a half-life of 5.27 years and is used in a variety of industrial and medical applications, including teletherapy, sterilization, and food irradiation. Co-60 decays to nickel-60 while emitting beta and high-energy gamma radiation. While small sheets of aluminum or even foil can block most beta radiation, the blockage of gamma radiation requires significant amounts of aluminum or concrete. The material's emission of high-energy gamma rays and its comparatively widespread availability have long made Co-60 a radioisotope of particular concern to homeland security officials.
Mexican authorities have informed the IAEA that the Co-60 source was in transport to a radioactive waste storage center, which likely refers to the low-level radioactive collection, treatment and storage center Mexico operates at Maquixco, located north-east of Mexico City. This suggests that the source in question was in the process of being retired after several years of usage in a hospital, and therefore radioactive

decay would have reduced the activity of the source to a point where it was no longer usable in medical applications. Consequently, the source's usefulness as a radioactive material for use in a radiological dispersal device (RDD) or the threat it poses to public health would be exponentially smaller compared to its original composition.

That said, it is important to keep in mind that the detonation of a RDD, or "dirty bomb," would likely constitute an event of *mass disruption* rather than *mass destruction*. The immediate casualties resulting from such an attack would be caused by the conventional explosives used by an adversary to disperse the radioactive material, not by exposure to the material itself. However, individuals present at the site of the attack could experience short- and long-term health effects depending on their proximity to the material and the duration of exposure. At a minimum, a radiological attack would entail considerable costs for cleaning up the attack site and may lead to at least the temporary displacement of people residing in the area where the attack occurred. The disruptive psychological impact on a public largely unaware about the effects of radiological terrorism would likely be far more damaging than the actual physical destruction, and could result in billions of dollars in economic damage and could stress the public health system.

While its natural decay has likely substantially reduced its potency, the Co-60 source still poses a serious public health hazard to anyone who has direct exposure without proper protection.

Major acid leak at Kakadu uranium mine

Source: http://www.news.com.au/national/major-acid-leak-at-kakadu-uranium-mine/story-fncynjr2-1226777797925

A burst tank at the Ranger uranium mine in Kakadu National Park has released what traditional owners say is up to a million litres of acidic radioactive slurry, in what they describe as one of the biggest nuclear accidents in Australian history.

The site could be closed for up to two months as mine operators seek to contain it, said Justin O'Brien, chief executive of the Gundjeihmi Aboriginal Corporation (GAC), which represents the traditional Mirarr people of the area.

At 1am on Saturday morning a hole was discovered in the side of a leach tank, with staff evacuated before it collapsed.

"This is up to a million litres of radiological material in the form of an acid exploding from a drum, bending a crane, twisting metal all around it, pouring down into stormwater drains, with 20 or so people ordered to evacuate," said Mr O'Brien.

It is the third security breach at the site in just over a month.

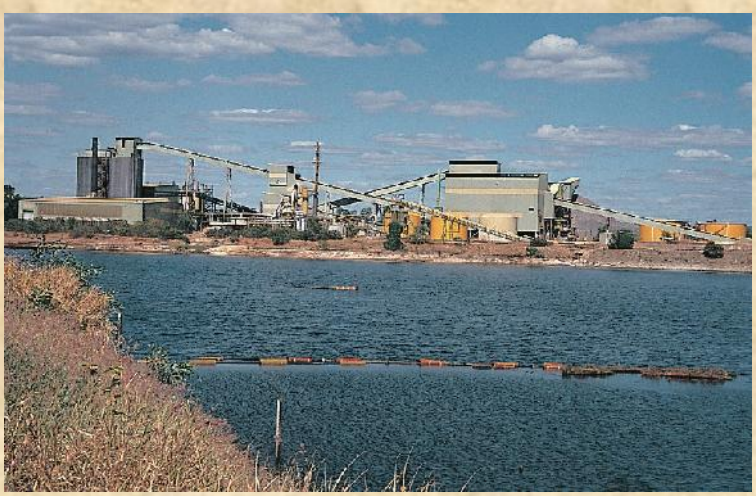
Mine operator Energy Resources of Australia (ERA) is seeking to mine at the site for a project called Ranger 3 Deeps but has agreed to do so only with the consent of the traditional owners.

"Day by day, litre by litre, incident by incident, they're losing whatever trust traditional owners have in them," Mr O'Brien told AAP.

He said Ranger 3 Deeps was off the table.

Recent breaches demonstrated that the mine's claims of being the most

regulated in the world were incorrect and regulators had been found wanting, he said.
GAC will write to the expert advisory bodies of



the World Heritage Committee requesting international help and is calling for a comprehensive external audit of what Mr O'Brien said was an endemically failing site.
In a statement, ERA said the material was contained on site and has had no environmental impact and no personnel were harmed.
The capacity of the tank was approximately 1450 cubic metres and there was no explosion. But it was not yet known how much of the material had leaked out, ERA general manager of operations Tim Eckersley said in a statement.
A crane that had been used to assist in blocking the original hole was damaged when the tank gave way.

There were multiple processes in place at the mine designed to contain such a spill, he said.
"Containment systems stopped the flow and this has meant there is no impact to the surrounding environment," Mr Eckersley said.
"ERA is focusing on clean up and recovery and the protection of the environment and the health and safety of our people remains paramount."
Environmental groups are calling for a halt to operations at the mine pending an independent audit of the structural integrity of the plant, along with a review of the impacts of operations at Ranger.

"The time for mining a problematic and polluting mineral in a World Heritage area is over," Australian Conservation Foundation spokesman Dave Sweeney said.

India-Pakistan nuclear war would lead to world-wide famine: study

Source: http://www.homelandsecuritynewswire.com/dr20131213-indiapakistan-nuclear-war-would-lead-to-worldwide-famine-study

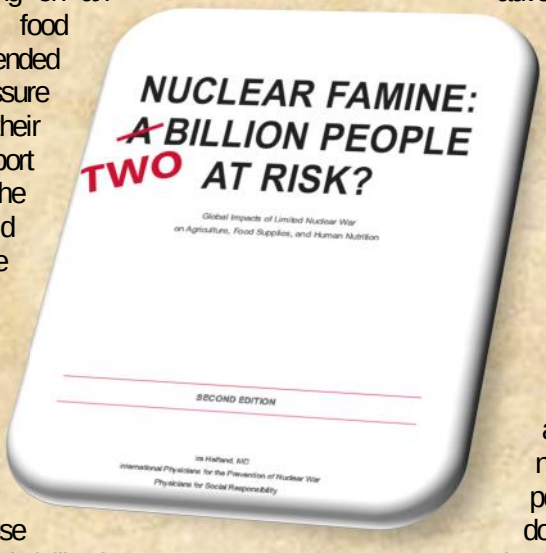
A nuclear war between India and Pakistan could result in worldwide famine, have damaging effects on global climate, and create widespread economic instability.
Global Security Newswire reports that a recent study by Physicians for Social Responsibility (PSR) — Nuclear Famine: Two Billion People at Risk? Global Impacts of Limited Nuclear War on Agriculture, Food Supplies, and Human Nutrition — updates an earlier study on the impacts of a nuclear war between the two South Asian countries. The earlier study, published in 2012, estimated that corn and soybean

production in the United States would decline by 10 percent on average for ten years. The study also predicted a 21 percent decline in Chinese middle-season rice production during the first four years and an average 10 percent decline in the following six years.

The 2012 study by PSR predicted that an India-Pakistan nuclear war could put more than one billion people at risk of starvation. The more recent study, released last month, adjusts this figure and calculates that an India-Pakistan nuclear war would put more than two billion people at risk.

The updated analysis includes a study that shows that Chinese winter wheat production could decline by 50 percent during the first year and by more than 30 percent over ten years. Increasing crop prices due to a reduction of supply would worsen food shortages.

"Significant, sustained agricultural shortfalls over an extended period would almost certainly lead to panic and hoarding on an international scale as food exporting nations suspended exports in order to assure adequate food supplies for their own populations," the report says. "This turmoil in the agricultural markets would further reduce accessible food."



Ira Helfand, a medical doctor from Northampton, Massachusetts and lead author of the report, told *GSN* that the equivalent of 100 Hiroshima-size bombs could "probably cause the end (of) modern industrial civilization as we know it." Helfand said that a war on such a scale would represent the use of half of India and Pakistan's nuclear arsenals, or a "tiny portion" of the U.S. and Russian stockpiles.

"This is an unbelievably huge shock to the international system," Helfand said. "We saw what happened to the world's economy when the housing bubble collapsed in the United States — [here] we're talking about a shock to the international economic-social system orders of magnitude larger than that. I think it's quite hard to imagine how this much-more-fragile-than-we'd-like-to-think system can survive that."

The chain of events which would lead to the catastrophe described in the report begins with firestorms caused by nuclear detonations. These detonations would send more than six-million metric tons of soot into the atmosphere, shutting out sunlight and creating a global cooling effect scientists call "nuclear winter."

Cooling of the Earth's atmosphere and other anticipated climatic impacts would dramatically reduce crop yields, disrupting markets and causing famine. "Even a limited use of nuclear weapons essentially is an act of suicide," Helfand said. "These weapons simply have to be understood to be completely useless. From the U.S. perspective, if we were to use even a tiny fraction of our own arsenal against an adversary on the other side of the planet, we would end up causing this global catastrophe that would have terrible repercussions here at home."

Helfand says that President Obama and other world leaders are doing little to reduce and eliminate nuclear arms. "There is this notion at the moment in policy circles that we don't really have to worry about nuclear war — just nuclear terrorism because the U.S. and Russia are never going to fight a war," Helfand said. "I don't know where they get that sense of confidence from — I certainly don't have it watching the jockeying between the U.S. and Russia over the last year and knowing how many times we have stumbled accidentally into near-disaster situations even after the end of the Cold War."

— Read more in Ira Helfand, MD, Nuclear Famine: Two Billion People at Risk? Global Impacts of Limited Nuclear War on Agriculture, Food Supplies, and Human Nutrition, 2nd. ed. (Physicians for Social Responsibility, November 2013)

► **Read the full study at:** http://www.ippnw.org/pdf/nuclear-famine-two-billion-at-risk-2013.pdf

USGOV Ordering 700,000 Boxes of Potassium Iodide for Nuclear Emergencies

Source:https://www.fbo.gov/index?s=opportunity&mode=form&id=5cd0c1800435272c80ad292aeb9d1ba7&tab=core&_cview=0http://bit.ly/18KE3Ks

The Department of Health and Human services has published a solicitation for the acquisition of 700,000 20-pill boxes of potassium iodide (KI) tablets, a key item that should be present in the preparedness stocks of every American home, and in particular, those homes anywhere near a nuclear power facility or research reactor.

As many readers know, one of the primary radioactive constituents released during a nuclear meltdown such as experienced at Fukushima, Chernobyl, and Three Mile Island, or the detonation of a nuclear device, is radioactive iodine (Iodine-131). Potassium iodide (KI) and potassium iodate (KIO3), which are relatively safe compounds, are used to saturate the thyroid with safe, stable iodine and thus prevent the uptake of radioactive iodine. Radioactive iodine poses a special health risk because of its cancer-causing effect on the thyroid gland. This is one the most common serious health ramifications of a major nuclear accident.

Following the initial meltdowns and explosions at the Fukushima nuclear plant in Japan, government officials waited 5 DAYS to order the distribution of the pills. By then, most of the nearly 100,000 residents had evacuated the area. Potassium iodide is most effective when taken just before exposure, or within two hours after. It has little effect when administered days after exposure.

The result is that the number of reported cases of thyroid cancers in Japan are climbing fast. The chances are very good the numbers are even higher as the Japanese government is said to be actively preventing detailed reporting on the health ramifications of the incident.

Here in the U.S., a new study published just last month in the peer-reviewed Open Journal of Pediatrics shows that fallout from the Fukushima disaster has resulted in a significant excess of hypothyroidism in babies in California.

If one questions the veracity of such studies, also consider that the quantity of radioactive iodine released was so great that it was detected in sea kelp on the California coast as well as in Washington state cow milk.

Additionally, a steady stream of news reports reveal that sailors serving aboard the aircraft carrier Ronald Reagan, which rendered aid to coastal areas of Japan in the immediate aftermath of the tsunami, are known to be developing thyroid cancer and a myriad of other radiation-related ailments.

Changes in confirmed plus borderline cases of congenital hypothyroidism in California as a function of environmental fallout from the Fukushima nuclear meltdown

By Joseph Mangano, Janette Sherman, Christopher Busby

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ABSTRACT

Radiation exposure has been linked to increased risk of congenital hypothyroidism (CH) for decades. CH is a relatively uncommon condition, occurring in about 1 of 2000 US births. Thyroid Stimulating Hormone (TSH) levels for each child born in California permitted an analysis of combined confirmed and borderline CH cases. Borderline/confirmed CH cases are more than seven times greater than just confirmed cases. Airborne levels of gross beta nuclear radiation in the US were elevated in the period starting several days after the Fukushima nuclear meltdown, especially in west coast states like California. The borderline/confirmed CH rate for newborns during the last 9.5 months in 2011 (exposed to Fukushima *in utero*) vs. births during other periods in 2011 and 2012 (not exposed) was significantly elevated, suggesting that adverse health effects to the newborn thyroid were not restricted to just a small number of confirmed CH cases. The sensitivity of the fetus to radiation exposure, plus the presence of thyroid-seeking radioiodine, suggest further analysis of Fukushima's potential to cause adverse health effects in newborns is needed.