North Korea is playing dangerous games !

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Understand EMP threat? U.S. enemies do

By F. Michael Maloof

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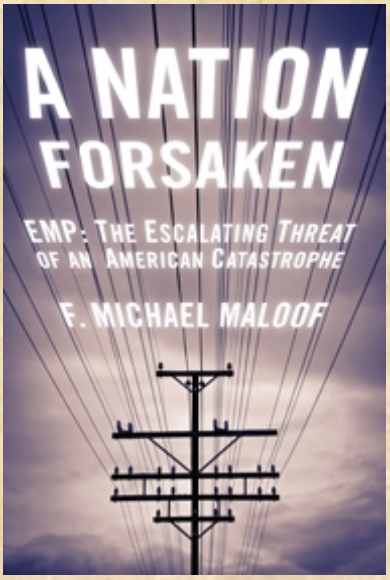
A December 1998 Iranian military journal published an article titled "Electronics to Determine Fate of Future Wars," and it detailed how an electromagnetic pulse, or EMP, attack on the electronic infrastructure of the United States caused by the detonation of a nuclear bomb over the U.S. would be crippling.

"Once you confuse the enemy communication network you can also disrupt the work of the enemy command- and decision-making center," the journal said. "Even worse today when you disable a country's military high command through disruption of communications, you will, in effect, disrupt all the affairs of that country.

"If the world's industrial countries fail to devise effective ways to defend themselves against dangerous electronic assaults then they will disintegrate within a few years," the Iranian journal added. "American soldiers would not be able to find food to eat nor would they be able to fire a single shot."



The journal went a step further in telling how an EMP attack on the U.S. electric infrastructure from the detonation of a nuclear bomb high above the U.S. would severely cripple the U.S.

The Iranians, who do not yet have nuclear weapons but are working on it, learned about the effects of electromagnetic pulse attacks from the history of some of the first nuclear weapons tests conducted first by the United States in 1945 and later by the Russians and Chinese, who also are expert on EMP.

Military experts say that Iran has been involved in conducting mid-air detonations which are critical to acquire the EMP effect. The tests were linked in with the launching of the Iranian Shahab III from the deck of a ship and then exploding the warhead in mid-air.

Experts say that there really is no other reason to test for such mid-air explosions except to develop an EMP weapon.

In March 2005, a staff member to the U.S. EMP Commission referred to research that had been done in determining which countries had the knowledge and possible intentions of undertaking an EMP attack.

"The survey found that the physics of EMP phenomenon and the military potential of EMP attack are widely understood in the international community, as reflected in official and unofficial writings and statements," said Dr. Peter Vincent Pry before the U.S. Senate Subcommittee on Terrorism, Technology and Homeland Security.

He said that in addition to Iran, the following countries have knowledge about EMP and its effects following an attack: Britain, France, Germany, Israel, Egypt, Taiwan, Sweden, Cuba, India, Pakistan, Iraq, North Korea, China and Russia.

"Many foreign analysts – particularly in Iran, North Korea, China and Russia – view the United States as a potential aggressor that would be willing to use its entire panoply of weapons, including nuclear weapons, in a first strike," Pry said. "They perceive the United States as having contingency plans to make a nuclear EMP attack, and as being willing to execute those plans under a broad range of circumstances."

Pry said that Russian and Chinese military scientists in open source writings describe the basic principles of nuclear weapons designed specifically to generate an enhanced-EMP effect, called Super-EMP weapons, which can destroy even the best protected U.S. military and civilian electronic systems. Both countries have been considering limited nuclear attack options that employ EMP as the primary or only means of attack.

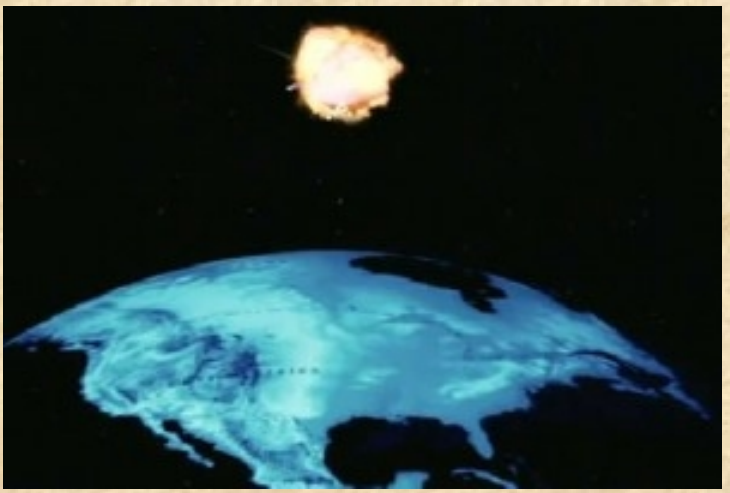
In electromagnetic pulse, a highly intense burst of electromagnetic energy generated from a nuclear weapon, a massive solar storm or from radio-frequency, or RF, weapon, is used.

In early July 2008 testimony, then-Assistant Secretary of Defense for Asian and Pacific Security Affairs James J. Shinn told the House Armed Services Committee that China, which is a threat to Taiwan, was working on exotic electromagnetic pulse weapons that can devastate electronic systems using a burst of energy similar to that produced by a nuclear blast.

"The consequence of EMP is that you destroy the communications network," Shinn said. "And we are you know, and as the Chinese also know, heavily dependent on sophisticated communications, satellite communications, in the conduct of our forces. And so, whether it's from an EMP or it's some kind of a coordinated anti-satellite effort we could be in a very bad place if the Chinese enhanced their capability in this area."

Now, the Chinese say they are developing EMP warheads on new missiles designed to hit U.S. aircraft carriers that enter into its sphere of influence in the South China Sea.

The U.S. was aware of the prospect for an



electromagnetic pulse when it detonated a nuclear device on July 16, 1945, thanks to the expectation of an EMP by Enrico Fermi, an Italian-American nuclear physicist renowned for his development of the first nuclear reactor and development of quantum theory, nuclear and particle physics, among other things. In 1938, he was awarded the Nobel Prize in Physics for his work on induced radioactivity.

According to reports at the time, all signal lines were shielded and, in many cases doubly shielded. However, many records still were lost. Similarly, a British nuclear test in 1953 resulted in instrumentation failure attributed to "radioflash," the British term for EMP.

Then in July 1962, there were several high-altitude nuclear tests known as Operation Fishbowl. They significantly advanced the knowledge of EMP effects.

One such test, called Starfish Prime, was conducted at some 400 kilometers, or 250 miles, above the Pacific Ocean.

Starfish Prime test showed that the effects of a high-altitude nuclear detonation were much larger than first thought. The effects were so significant that the detonations caused electrical damage in Hawaii almost 900 miles from the site of the detonation.

It knocked out streetlights, set off burglar alarms and damaged the microwave link of the local telephone company, according to a report by Charles N. Vittitoe of Sandia National Laboratories in a June 1989 article titled "Did High-Altitude EMP Cause the Hawaiian Streetlight Incident?"

Starfish Prime then was followed in November 1962 by two other high-altitude tests – Bluegill Triple Prime and Kingfish – which provided enough EMP data for scientists to accurately identify the physical mechanisms producing the EMPs.

While the damage in Hawaii wasn't very significant, scientists conclude that if that same explosion had occurred over the northern portion of the continental United States, damage would have been more significant due to the greater strength of the Earth's magnetic field over the U.S. At higher latitudes, there also are other anomalies that intensify the effects of an EMP.

To understand the characteristics of an EMP, scientists have divided EMP pulses into three components: E1, E2 and E3.

E1 is developed from a nuclear explosion. It is considered to be the most intense. The pulse from a nuclear explosion creates a very intense electromagnetic field of electrically charged objects. This component is produced when gamma radiation from a nuclear detonation knocks electrons out of atoms in the upper atmosphere. These electrons then travel in a

downward direction at an estimated speed of 90 percent of the speed of light of 186,000 miles/second.

Damage from the E1 component is caused by electrical breakdown voltages such as insulators being overwhelmed, thereby destroying electronic components in computers and communications equipment. The intensity and speed at which the pulse hits is too quick for ordinary lightning protecters to guard the equipment.

The interaction of the Earth's magnetic field and the downward flow of electrons is what produces a very large, intense but brief electromagnetic pulse which hits within five nanoseconds.

According to experts, the process of the gamma rays knocking electrons out of the atoms at a high altitude causes this region of the atmosphere to become an electrical conductor due to ionization. The strength of the pulse will depend on intensity of the gamma rays produced by the weapon, the rapidity of the gamma ray burst from the weapon and the altitude at which the detonation occurs.

The E2 component is produced by weapon neutrons and is considered to be an intermediate time pulse. It lasts for up to a second after the beginning of the EMP. This E2 component has many similarities to EMPs produced from lightning and can easily be protected since lightning protection readily is available.

If an electronic component is protected only from an E2 pulse, an E1 pulse will destroy it.

E3 pulse is very slow, and has similarities to a geomagnetic storm caused by a solar flare. Like a geomagnetic storm, E3 can produce geomagnetically induced currents in long electrical conductors, which then can damage components such as power line transformers, according to a January 2010 report by Metatech Corporation titled "The Late-Time (E3) High-Altitude Electromagnetic Pulse (HEMP) and its impact on the U.S. Power Grid." This study was done for Oak Ridge National Laboratory.

Above the 250-mile altitude, there will be no EMP effects on earth, since the gamma rays would disperse over the longer distance. Where there is no magnetic field, there would be virtually no EMP.

Up to 250 miles above the earth over Kansas, for example, scientists say that the effects of an EMP pulse would cover virtually the entire continental United States.

"Since it is a geometrical line-of-sight effect, a detonation at a height of a few hundred kilometers would encompass within its line of sight essentially the entire United States, with the effect growing weaker the larger the distance from the burst point," according to Dr. Michael J. Frankel, who was executive director of the EMP Commission.

"For assessment purposes, a SCUD class missile launched from a nearby offshore location might reach a height of about 100 kilometers, sufficient to encompass within its effects footprint most of the eastern seaboard, with its great density of people and infrastructure," he said.

In recognizing this threat, especially if such countries as North Korea and Iran acquired nuclear weapons, Congress under Title XIV of the Floyd D. Spence National Defense Authorization Act, or NDAA, for Fiscal Year 2001 had established the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack, also referred to as the EMP Commission.

The provision originally was sponsored by Rep. Roscoe Bartlett, R-Md.

Bartlett, who recently lost his bid for re-election, has been a major proponent of preparing the nation against the prospect of an EMP attack.

An EMP attack is "an event we will not avoid," he told National Public Radio in 2009. He also said that any remediation after the fact would cost upwards of $2 trillion.

"The more sophisticated we become, the more vulnerable we are," Bartlett said. "There's a huge concern about cyber-attacks on the grid. Well, a really robust nuclear EMP lay-down means microelectronics across the country would be shut down and you have no power…
"There's one event that we will not avoid and that is a solar electromagnetic interference – solar storm," he said. "If we have a big one like the one that occurred back in 1859, that would shut down the whole grid for quite a long while … It would cost us between $1 trillion and $2 trillion in damages, and the loss of life could be horrendous if in fact you were without electricity for months at a time."
The 1859 solar storm to which Bartlett referred also is referred to as a solar super storm, or Carrington Event. It is said to have been the most powerful solar storm in recorded history.
To a number of critics of an anti-missile defense system, however, the EMP Commission was regarded as the "cornerstone of right-wing advocacy on national defense policy," according to the leftist-leaning Institute for Policy Studies based in Washington, D.C.
In criticizing the provision, the IPS said that those advocates were "seeking to spread alarm about the purported threat of EMP attacks, which would involve the detonation of nuclear weapons in the upper atmosphere to generate a pulse that would knock out electronics-based infrastructure."
The IPS said those people "have repeatedly used the findings of this commission to advocate increased funding for costly weapons programs such as missile defense and push alarmist notions that 'rogue states' like Iran and North Korea pose an existential threat to the United States."
Bartlett first raised the alarm after he and former Congressman Curt Weldon, R-Pa., had met in 1999 with their Russian Duma, or parliament, counterparts about assaults by the North Atlantic Treaty Organization during the Kosovo crisis occurring at the time.
The two had conferred with Vladimir Lukin, who at the time was chairman of the Duma's International Affairs Committee and had been a high-level official of the then-Soviet national security apparatus under former Soviet Premier Mikhail Gorbachev.
Lukin told the congressmen that if Moscow really wanted to hurt the United States without fear of retaliation, Russia would launch a missile from a submarine, explode it high over the country and shut down its power grid and communications for six months.
The EMP Commission made its first report to Congress in July 2004 in which it stated that a nuclear-generated EMP is "one of a small number of threats that has the potential to hold our society seriously at risk and might result in the defeat of our military forces."
Its duties were to assess the nature of a high-altitude EMP threat to the U.S. from potentially hostile states or non-state actors – terrorists – that have or could acquire nuclear weapons and ballistic missiles needed to conduct such an attack. The commission was to look at such a threat for the next 15 years.
It also was to determine the vulnerability of the U.S. military and especially the civilian infrastructure in terms of emergency preparedness. It also was to determine just how quickly the U.S. could repair and recover from damages on military and civilian systems from an EMP attack. In addition, the commission was to determine the feasibility and cost of hardening critical military and civilian systems against such an attack.
"EMP is one of a small number of threats that can hold our society at risk of catastrophic consequences," the executive report said. "EMP will cover the wide geographic region within line of sight to the nuclear weapons. It has the capability to produce a significant damage to critical infrastructures and thus to the very fabric of U.S. society, as well as to the ability of the United States and Western nations to project influence and military power."
The executive report pointed out that the common element that can have such a devastating impact on the critical infrastructure is primarily electronics.
Just what constitutes the critical infrastructure facilities of the United States?
Section 1016 (e) of the U.S.A. Patriot Act of 2001 defines them as "Systems and assets … so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters."
These critical infrastructure facilities include electric power, oil refineries, water treatment plants, banking systems, pipelines, transportation systems, and communications. They all depend on electrical and electronic systems to

operate. Yet, they can be very vulnerable to the pulse effects of a nuclear weapon or radio-frequency weapons.

"The primary avenues for catastrophic damage to the nation are through our electric power infrastructure and thence into our telecommunications, energy and other infrastructures," the report said. "These in turn can seriously impact other important aspects of our nation's life, including the financial system; means of getting food, water, and medical care to the citizenry; trade; and production of goods and services."

The report pointed out that certain types of low-yield nuclear weapons can be used to generate "potentially catastrophic EMP effects" over a wide geographic area and "designs for variants of such weapons may have been illicitly trafficked for a quarter-century."

The concern to the commissioners in their preliminary 2004 report was that the U.S. had developed more than most other nations as a modern society heavily dependent on electronics, telecommunications, energy, information networks and financial and transportation systems that use modern technology.

"This asymmetry is a source of substantial economic, industrial, and societal advantages, but it creates vulnerabilities and critical interdependencies that are potentially disastrous to the United States," the report added.

"The current vulnerability of our critical infrastructures can both invite and reward attack if not corrected," the executive report said. "Correction is feasible and well within the nation's means and resources to accomplish."

It went on to say that an EMP attack had the capability to produce "significant damage to critical infrastructures and thus to the very fabric of U.S. society."

The preliminary report made a strong point on the interdependence of elements of the infrastructure that could show a cascading effect if subject to an EMP attack.

"All of the critical functions of U.S. society and related infrastructures – electric power, telecommunications, energy, financial, transportation, emergency services, water, food, etc – have electronic devices embedded in most aspects of their systems, often providing critical controls," the report said.

"Electric power has thus emerged as an essential service underlying U.S. society and all of its other critical infrastructures," the report said. "Telecommunications has grown to a critical level but may not rise to the same level as electrical power in terms of risk to the nation's survival."

All other infrastructures and their critical functions, the report said, are dependent on the support of electric power and telecommunications, suggesting that emphasis be placed on protecting these two high-leverage systems.

At the time, the 2004 executive report recommended that the U.S. government spend up to $200 billion over 20 years to "harden" U.S. critical infrastructure.

Among other things, it also recommended that the U.S. ensure that it had "vigorous interdiction and interception efforts to thwart delivery" – namely, an anti-ballistic missile defense system – of a nuclear weapon.

At this point, however, none of the monies has been expended to harden the nation's vulnerable electrical grid system. Nor has the Obama administration implemented a full anti-ballistic missile system, especially in the Northeast, leaving the most populated portion of the United States very vulnerable to any missile attack.

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Multiple scenarios for EMP catastrophe

By F. Michael Maloof

Source: http://www.wnd.com/2012/12/weapon-in-the-hands-of-a-david-against-goliath/

America's critical national infrastructures all are

linked together – and to the power grid – and that opens the door for a variety of different scenarios in which an electromagnetic pulse event would create a catastrophe, analysts have warned.

The danger was recognized years ago already, when the 2008 report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack said the threat from "highly interlocked critical infrastructures may be greater than the sum of the vulnerability of its parts."

In presenting what was the EMP commission's final report to Congress in July 2008, William R. Graham, chairman of the commission, told the House Armed Services Committee that the risk of an EMP attack may be greater today than it was at the height of the Cold War.

He pointed out that not only can relatively low-yield nuclear weapons be used to create potentially catastrophic EMP effects over wide geographic areas, but the number of countries developing or already possessing such a capability is increasing.

He was referring to the fact that there has been an increased number of "adversaries" who are seeking nuclear weapons, ballistic missiles and "asymmetric," or unconventional, ways of overcoming U.S. conventional superiority using

one or a small number of nuclear weapons.
In this context, he was implying Iran and North Korea.
But a nuclear exchange involving any of the nations such as India, Israel and Pakistan whose leaders have nuclear weaponry also would have serious electromagnetic pulse effects on the United States, its assets abroad and its allies.
Even more alarming, any number of regional terror organizations might acquire the weaponry to create such a catastrophe.
And there are multiple open doors for such problems, not just willful nuclear aggression, such as the natural results of electromagnetic solar storms that scientists from National Aerospace and Space Administration and the National Academy of Sciences expect during the 2012-2014 time frame.
These scientists say that their models are showing an intensity that could at least equal magnetic solar storms of 1859 and 1958. Indeed, the sun already is showing signs of emerging from what is referred to as a solar minimum in which the solar flares on the surface of the sun are predominantly dormant. The flares have recently begun to show increased activity, a cycle that occurs every 11 years.
Graham's focus, however, was on the effects of an electromagnetic pulse from a nuclear explosion.
Third World countries with existing nuclear weapons or those developing such a capability have been testing conventional weapons by exploding them in midflight to approximate the effects of an electromagnetic pulse. Such testing has been going on for years. Even the Russians and Chinese continue to talk about having such a capability and using it against the United States as a way to overwhelm its strategic weapons superiority.
Graham said that the electromagnetic fields produced by weapons deployed with the intent of producing an electromagnetic pulse have a high likelihood of damaging U.S. electrical power systems, electronics and information systems upon which the American society depends.
"Their effects on critical infrastructures could be sufficient to qualify as catastrophic to the nation," Graham told the committee.
He pointed out that just one or a few high-altitude nuclear detonations could produce electromagnetic pulse effects that would potentially disrupt or damage electronic systems over much of the United States, virtually simultaneously, at a time determined by an adversary.
"EMP is one of a small number of threats that can hold our society at risk of catastrophic consequences," Graham said.
He pointed out that an electromagnetic pulse will cover a wide geographic area within line of sight to the nuclear weapon and produce significant damage to critical infrastructures that support "the fabric of U.S. society and the ability of the United States and Western nations to project influence and military power."
Left unsaid in his testimony is that the "adversaries" know this vulnerability all too well, given the extent of reliance of the U.S. on infrastructures that have electronics and electrical power as their base.
In effect, an electromagnetic pulse attack becomes a weapon in the hands of a David against a Goliath.
"Our vulnerability is increasing daily as our use of and dependence on electronics continues to grow in both our civil and military sectors," Graham said. "The impact of EMP is asymmetric in relation to the potential antagonists who are not as dependent on advanced electronic technologies" as the U.S. is.
In this connection, a Third World adversary would have the capability of attacking the U.S. with a high-altitude nuclear weapon-generated electromagnetic pulse without having a high level of sophistication.
Graham said the adversary would not need a long-range ballistic missile to undertake an electromagnetic attack against the United States, since it could be launched from a freighter off the U.S. coast using a short-or medium-range missile. The nuclear warhead would be sent to a high altitude where it would explode, creating the electromagnetic pulse.
And it would not necessarily have to be a country which would or could launch such a missile off of America's shores. It also could be a terrorist proxy that would undertake an attack without revealing the identity of the perpetrators.
While Graham was referring at the time of his testimony to Iran, a few other countries have similar existing nuclear capabilities and could use terrorist proxies to launch conventional attacks on the U.S. that would include exploding a

high-altitude nuclear device using just a short-range ballistic missile.
Those two countries would be North Korea and Pakistan. Ironically, Iran as yet doesn't have a nuclear weapon it could put on a missile and launch.
Pakistan in particular has created a number of what the U.S. would regard as terrorist groups to act as its proxy against India.
At least one, the Pakistani Taliban, also known as the Tehrik-i-Taliban Pakistan, or TTP, attempted in May 2010 to explode a car bomb in New York's Time Square. While the attempt was unsuccessful, evidence has shown that it was the TTP that trained the bomber, Faisal Shahzad.
Based on a compilation by the South Asia Intelligence Review, which provides weekly assessments and briefings on terrorism in the region, there are some 12 domestic and some 32 transnational terrorist and four extremist organizations in Pakistan. They are:

Domestic organizations

1. Tehrik-i-Taliban Pakistan (TTP)
2. Lashkar-e-Omar (LeO)
3. Sipah-e-Sahaba Pakistan (SSP)
4. Tehreek-e-Jaferia Pakistan (TJP)
5. Tehreek-e-Nafaz-e-Shariat-e-Mohammadi (TNSM)
6. Lashkar-eJhangvi (LeJ)
7. Sipah-e-Muhammad Pakistan (SMP)
8. Jamaat-ul-Fuqra
9. Nadeem Commando
10. Popular Front for Armed Resistance
11. Muslim United Army
12. Harkat-ul-Mujahideen Al-alami(HuMA)

Trans-national organizations

1. Hizb-ul-Mujahideen (HM)
2. Harkat-ul-Ansar (HuA, presently known as Harkat-ul Mujahideen)
3. Lashkar-e-Toiba (LeT)
4. Jaish-e-Mohammad Mujahideen E-Tanzeem (JeM)
5. Harkat-ul Mujahideen (HuM, previously known as Harkat-ul-Ansar)
6. Al Badr
7. Jamait-ul-Mujahideen (JuM)
8. Lashkar-e-Jabbar (LeJ)
9. Harkat-ul-Jehad-al-Islami(HUJI)
10. Muttahida Jehad Council (MJC)
11. Al Barq
12. Tehrik-ul-Mujahideen
13. Al Jehad
14. Jammu & Kashir National Liberation Army
15. People's League
16. Muslim Janbaz Force
17. Kashmir Jehad Force
18. Al Jehad Force (combines Muslim Janbaz Force and Kashmir Jehad Force)
19. Al Umar Mujahideen
20. Mahaz-e-Azadi
21. Islami Jamaat-e-Tulba
22. Jammu & Kashmir Students Liberation Front
23. Ikhwan-ul-Mujahideen
24. Islamic Students League
25. Tehrik-e-Hurriat-e-Kashmir
26. Tehrik-e-Nifaz-e-Fiqar Jafaria
27. Al Mustafa Liberation Fighters
28. Tehrik-e-Jehad-e-Islami
29. Muslim Mujahideen
30. Al Mujahid Force
31. Tehrik-e-Jehad
32. Islami Inquilabi Mahaz

Extremist groups

1. Al-Rashid Trust
2. Al-Akhtar Trust
3. Rabita Trust
4. Ummah Tamir-e-Nau

As the South Asia Intelligence Review pointed out, many of these terrorist organizations continue to operate with a high degree of freedom in and from Pakistan.
Given the increasingly rocky relationship between Pakistan and the U.S. however, Pakistani terrorist groups could act as a proxy for the Pakistani government to launch a similar attack.
As it now stands, Pakistan is also close to Iran, and with the spotlight on Iran, either Pakistan or North Korea could either use terrorist entities of its own creation, in the case of Pakistan, or hire out proxies.
A 2007 report by the U.S. Congressional Research Service, or CRS, has said that North Korea may have given arms to Lebanon's Hezbollah and Sri Lanka's Tamil Tigers, which Washington regards as terrorist groups.
Given the on-again, off-again discussions to get North Korea to dismantle its nuclear program, Washington refused to remove Pyongyang from the terrorist list unless it agreed to allow inspectors into its nuclear sites. In

October 2008, the Bush administration removed North Korea from the terrorist list.

Despite the removal from the list, North Korea could re-establish a relationship with terrorist groups if it suited its purposes. In fact, the removal now gives Pyongyang plausible deniability should it decide to enlist the help of proxies to carry out an electromagnetic pulse attack using a nuclear weapon mounted on one of its missiles.

Adding concern to all this is the launch by North Korea in recent weeks of a multi-stage ballistic missile that experts say could reach the western portion of the United States.

Critics might say that these countries with a nuclear weapon or with plans to develop one don't have the capability of mounting a miniaturized nuclear warhead on a missile and shoot it.

However, that may not necessarily be the case.

In his testimony before the July 10, 2008, House Armed Services Committee, Graham revealed that United Nations investigators had found the design for a miniaturized advanced nuclear weapon that would fit on ballistic missiles "currently in the inventory of Iran, North Korea and other potentially hostile states" in the possession of Swiss businessmen.

The U.N. said that the Swiss businessmen were affiliated with the Pakistani nuclear scientist, Abdul Qadeer Khan, more commonly known as A.Q. Khan, and his nuclear smuggling network. The Swiss businessmen were identified as members of the Tinner family. They were brothers Marco and Urs, and their father, Friedrich.

Just a month prior to Graham's testimony, a U.N. report had revealed that the Khan international smuggling ring that had sold nuclear bomb-related parts to Iran, Libya and North Korea also had acquired blueprints to miniaturize an advanced nuclear weapon. The U.N. report suggested that the plans also were secretly shared with a number of countries and possibly with unidentified rogue groups.

In investigating the smuggling of A.Q. Khan's operations, the U.N. uncovered computer contents said to include more than 1,000 gigabytes of seized data that Swiss police had found on computers of Swiss businessmen in 2006. Although unconfirmed, U.S. intelligence had directed Swiss authorities to the Tinner family members.

The drawings found on their heavily encrypted computers provided details for building a compact nuclear device that could be fitted on the type of ballistic missiles used by Iran and what the report said were more than a dozen other developing countries.

The U.N. report was authored by David Albright, who is a prominent nuclear weapons expert with the Washington-based Institute for Science and International Security and very knowledgeable of the A.Q. Khan network.

"These advanced nuclear weapons designs may have long ago been sold off to some of the most treacherous regimes in the world," Albright's U.N. report said. "To many of these countries, it's all about size and weight," Albright said, adding that the countries need to be able to fit the nuclear device on the missiles in their possession.

"These would have [been] ideal for two of Khan's other major customers, Iran and North Korea," Albright said. "They both faced struggles in building a nuclear warhead small enough to fit atop their ballistic missiles, and these designs were for a warhead that would fit."

At the time, Albright said that he could not be certain that the design for miniaturizing a nuclear weapon to fit on the ballistic missiles of Iran and North Korea actually had been delivered.

However, the tenor of testimony by Graham of the EMP commission – who had access to the nation's highest level of security clearances to prepare the commission report – strongly suggested that Iran and North Korea may have acquired those plans from Khan's smuggling network.

"This fact suggests that other advanced nuclear weapon designs may already be in the possession of hostile states and of states that sponsor terrorism," Graham said. "This fact also suggests that it would be a mistake to judge the status and sophistication of rogue nuclear weapon programs, based solely on their indigenous national capabilities, since outside assistance may well have been provided."

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Airborne pods tracing nuclear bomb's origins

Source: http://www.homelandsecuritynewswire.com/dr20130111-airborne-pods-tracing-nuclear-bomb-s-origins

If a nuclear device were to unexpectedly detonate anywhere on Earth, the ensuing effort to find out who made the weapon probably would be led by aircraft rapidly collecting airborne radioactive particles for analysis.

The three pods, with additional hardware, software and ground-control equipment, are expected take their place on aircraft in the Air Force's investigatory arsenal in the next few years.

Sandia National Laboratories researchers prepare pods that, airborne, will track radiation to its source and analyze particulates and gases to identify a nuclear bomb's origins. (Photo by Randy Montoya)

Relatively inexpensive unmanned aerial vehicles (UAVs), equipped with radiation sensors and specialized debris-samplers, could fly right down the throat of telltale radiation over a broad range of altitudes without exposing a human crew to hazards.

A Sandia Lab release reports that a Sandia National Laboratories-developed airborne particulate-collection system demonstrated those kinds of capabilities in the blue skies above Grand Forks Air Force Base in Grand Forks, North Dakota, in late September. Dubbed "Harvester" for obvious reasons, the system "tasted" the atmosphere with two particulate sampling pods. A third pod would provide directional guidance for a real event by following the trail of gamma radiation.

When they do so, they will have traversed the infamous technological "Valley of Death," in which many promising researched and developed ideas die before reaching production.

The successful Grand Forks demonstration was part of a formal Department of Defense (DoD) Joint Capability Technology Demonstration (JCTD) that mated the Harvester modular pods to the long wings of a Department of Homeland Security Customs and Border Protection-provided MQ-9 Reaper UAV (the Reaper is a more powerful cousin of the better-known Predator).

While the tests did not include any radioisotope releases, the pods were able to collect and identify naturally occurring radioisotopes of lead and bismuth produced from the radioactive decay of atmospheric radon. In addition, radioactive beryllium-7 produced from cosmic ray-induced break-up (spallation) of

naturally occurring carbon-14, also showed up on the filters, providing a uniform measure for debris distribution.

A researcher checks air flow in the Harvester particulate sampling pod. (Photo by Randy Montoya)

The modular pods eliminate the need for costly, permanent aircraft modifications that would limit the number of aircraft platforms on which Harvester can be flown.

"There's a high likelihood the Air Force will make Harvester operational in 2014 to augment its current manned aircraft collection capability," said Sandia project lead Joe Sanders. "For maximum responsiveness, we continually engaged with the Air Force to address its technological and operational needs throughout the project."

The Harvester's Directional Gamma Radiation Sensor (DGRS) helps guide the aircraft toward the radioactive plume using four large sodium iodide radiation detectors and a complex processing algorithm. The Harvester equipment operator informs the pilot, located far away in a UAV ground control station, to fly toward the plume's "hot spot."

"The operator will see a vector that shows peak plume intensity up and to the right, let's say," Sanders said. "It's the equivalent of a guide saying, 'You're getting warmer.'"

Air passes through the samplers, each about the size of a small snowmobile, as the Reaper cruises at 200 mph. This rams particles into filter paper like light hitting a photographic plate, causing the particles to stick to the filter fibers. A separate radiation sensor analyzes the filter in real time to estimate the type and quantity of radioactive particles collected. More extensive examination of the filters occurs after the aircraft has landed.

Because gas analysis can complement particle analysis, Sandia is developing a third type of pod called the Whole Air Sampling Pod (WASP) to demonstrate the feasibility of collecting multiple, large-volume air samples that can be analyzed for radioactive gases. Radioxenons, radioisotopes of the noble gas xenon, if detected, can provide a tell-tale indication of a nuclear detonation.

"While not small, the 9-foot-long, 650-pound WASP is designed to be compatible with an MQ-9 Reaper UAV," Sanders said. "WASP has not yet been flight-tested but has performed well in the laboratory, and the DoD's interest in modular gas sampling is growing. We look forward to demonstrating the WASP technology, and expect that it will also cross the Valley of Death."

The release notes that Harvester was developed by Sandia with support from the Albuquerque office of National Technical Systems, an

international engineering firm. The early research and development phase was funded by the National Nuclear Security Administration's Office of Nonproliferation Research and Development. The later development and qualification phase was funded by the Defense Threat Reduction Agency and the Office of the Secretary of Defense's Acquisition, Technology and Logistics Rapid Fielding Office as part of the JCTD.

War Preparation Indicator

Beijing hardens subways for nuclear, gas attacks

Source: http://freebeacon.com/war-preparation-indicator/

China recently upgraded its subway system in Beijing and revealed that its mass transit was hardened to withstand nuclear blasts or chemical gas attacks in a future war, state-run media reported last month.

The disclosure of the military aspects of the underground rail system followed completion and opening of a new subway line in the Chinese capital Dec. 30, along with the extension of several other lines. The subway upgrade is part of an effort to ease gridlocked traffic in the city of 20 million people.

According to Chinese civil defense officials quoted Dec. 5 in the *Global Times*, a newspaper published by the Chinese Communist Party Central Committee, the subway can "withstand a nuclear or poison gas attack."

A U.S. official said the disclosure of the subway's capabilities to withstand attack is unusual since it highlights Beijing's strategic nuclear modernization program, something normally kept secret from state-controlled media. The strategic nuclear buildup includes the expansion of offensive nuclear forces, missile defenses, and anti-satellite arms.

China is building new long-range mobile missiles, including the DF-41, and plans to deploy up to eight new ballistic missile submarines. Reports from Asia indicate the Chinese military is also planning to build new long-range strategic nuclear bombers.

Russia too is expanding its nuclear forces with new submarines and missiles. Moscow announced last year that it is also constructing some 5,000 underground bomb shelters in

Russia's capital in anticipation of a possible future nuclear conflict.

By contrast, the U.S. government has done little to bolster civil defense measures,

preferring the largely outdated concept of mutual assured destruction that leaves populations vulnerable to attack and building only limited missile defenses that the Obama administration has said are not designed to counter Chinese or Russian nuclear strikes.

The Obama administration instead is seeking deep cuts in U.S. nuclear forces as part of President Barack Obama's policy of seeking the elimination of all nuclear arms.

According to the *Global Times* report, the new subway lines were "designed to be used in the event of an emergency, for underground evacuation from one station to another, emergency shelter, and storage for emergency supplies."

A military engineer identified only as Hu and as part of the Chinese military's Second Artillery Corps, which builds and deploys China's nuclear arsenal, helped design the civil defense aspects of the subway.

Special steel-reinforced gates installed on all subway tunnels and used to separate stations are one key feature of the reinforced subway. Hu said it is designed to protect people who seek shelter during a heavy storm, toxic gas attack, or a nuclear strike.

"The station has three hours of breathable air after the gates are closed, isolating the station from the outside world," Hu was quoted as saying.

"Although each gate weighs around 7 tons, it takes just three minutes for two adults to open or close it manually," she said.

The new blast gates were introduced into subway construction projects in 2007.

A second Chinese official, identified in the report as Liang, said each subway also has an air filtration system in case of a chemical weapons gas attack. The system is designed to keep air flowing into the station.

A worker checks a gate at Chengshousi Subway Station on the second phase of Subway Line 10 Tuesday. The gate can seal off subway stations and tunnels in case of a poison gas or nuclear attack. Photo: Li Hao/GT

"People can actually shelter in the subway for more than three hours because of this system," Liang said.

Above-ground subway exits also can be sealed during an attack, Liang said, using heavy blast doors concealed behind temporary walls.

Additional civil defense barriers and doors are being installed in the Beijing subway later, according to Cao Yanping, deputy director of the Beijing Municipal Civil Air-Raid Shelter.

Jiang Hao, a Chinese military engineer from the 4th Engineer Design & Research Institute of General Staff Department, told the newspaper that blast gates already are in use in cities such as Nanjing, in Jiangsu Province, and Shenyang, in Liaoning Province.

"The new facilities also have other defensive capabilities like emergency communication equipment at each

station, which makes effective communication possible during a conflict," Jiang Hao, the engineer, told reporters in Beijing.

China's network of underground tunnels for nuclear weapons and missiles was disclosed only recently, and highlighted in Georgetown University's Asian Arms Control Project, dubbed it China's "Great Underground Wall."

The Pentagon first disclosed the nuclear tunnel complex stretching an estimated 3,000 miles in its annual report to Congress on the Chinese military in 2011.

"China's strategic missile force, the Second Artillery Corps (SAC), has developed and utilized [underground facilities] since deploying its oldest liquid-fueled missile systems and continues to utilize them to protect and conceal their newest and most modern solid-fueled mobile missiles," the report stated.

The facilities are used for storing and hiding missiles and nuclear warheads, and for command bunkers hardened against nuclear attacks.

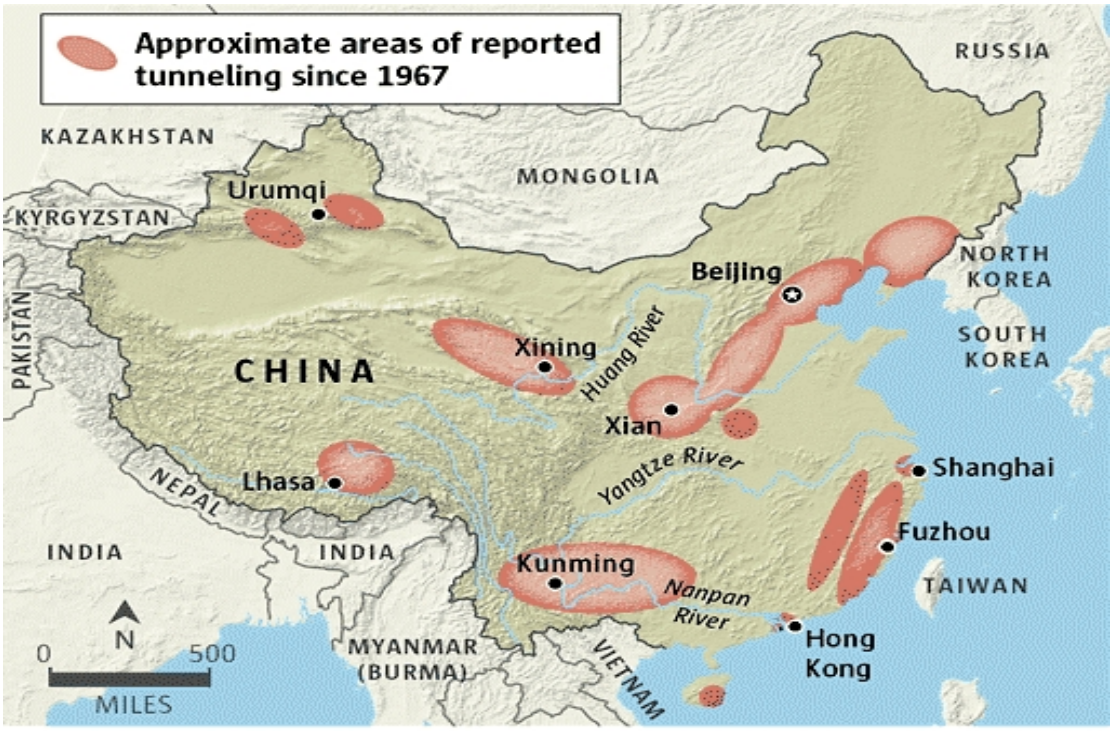
China has been tunneling and hiding its nuclear forces since the early 1950s but the first public disclosure of the effort came in 2010 during the anniversary of the Second Artillery Corps.

Until then, both Beijing and the Pentagon kept most details of Chinese underground nuclear facilities and arms secret.

The defensive nature of China's "underground great wall"

Source: http://thebulletin.org/web-edition/features/the-defensive-nature-of-chinas-underground-great-wall

There has been a lot of prominent discussion lately (in the *Washington Post* and *Wall Street Journal*, among other places) about the size of China's nuclear arsenal, based on a study by Georgetown



University professor Phillip Karber, "Strategic Implications of China's Underground Great Wall." The study considers the question of why China has built a vast network of tunnels -- often called China's "underground great wall" -- that stretch for some 3,000 miles. Karber's report suggests that the tunnels could hide as many as 3,000 nuclear weapons.

A top national security strategist during the Cold War, Karber recently led a group of his Georgetown students in a study of the underground system. The three-year study was sparked, Karber said, by the devastating 2008 earthquake in Sichuan, when some of the tunnels caved in and radiation teams were dispatched to the area, leading to speculation that the tunnels held nuclear weapons.

The existence of the underground great wall was no secret. In December 2009, a report by China's state-run CCTV mentioned the tunnels, built by the Second Artillery Corps and used mainly to shield China's nuclear strategic missiles. Under Karber's guidance, the students took an Internet-based, open-source approach to understanding the underground great wall, using Google Earth, blogs, online journals, video clips, satellite imagery and photos, and fictional TV docudramas about Chinese artillery soldiers as sources for their research. Based on that research and several controversial assumptions, Karber's report argues that China's nuclear arsenal could be thousands of warheads larger than previously believed, stirring a debate about Chinese intentions.

Karber's report, however, fails to answer key questions and leaps to unwarranted conclusions.

Perhaps the largest deficiency involves the amount of plutonium and highly enriched uranium (HEU) that China has available for weapon production. Newly available public information indicates that China has an existing military inventory of about 1.8 tons of plutonium and 16 tons of weapons-grade HEU. China stopped production of highly enriched uranium in 1987 and had cut off plutonium production by 1990. All of its military HEU and plutonium production facilities have been closed or converted to other uses, or are being decommissioned, and there are no reports of new production. China could well have the smallest military stockpile of HEU and plutonium available for weapons among the five acknowledged nuclear weapons states.

How many weapons might the Chinese fissile material inventory support? Calculating from average numbers for US and Russian warheads, which contain about 4 kilograms of plutonium in their primary stage and about 20 kilograms of highly enriched uranium in the secondary, 1.8 tons of plutonium could produce about 450 warheads; those warheads would also use about nine tons of HEU in their secondaries. The remaining seven tons of highly enriched uranium in China's stockpile might produce another 230 or so warheads (assuming 10 kilograms of HEU for the primary stage of the weapon and 20 kilograms for the secondary). So the Chinese stockpile of fissionable material would support perhaps 680 thermonuclear warheads.

To put it another way: Even if China's entire fissile material inventory were used, it would not support an arsenal of more than 1,000 warheads. In actuality, it is likely that part of China's fissile material stocks would be held in reserve for future needs. The other four of the declared nuclear-weapons states have converted half or less of their fissile material stocks into weapons. If the same percentage held for China, the upper bound on its arsenal would be around 500 warheads. In fact, Western intelligence agencies and non-governmental organizations estimate that China has approximately 200 nuclear warheads, 40 or fewer of which can reach the continental United States.

Karber's report contains 357 PowerPoint slides but only a couple of charts and a few sentences that actually relate to the much-publicized claim that China's underground great wall of tunnels hides 3,000 nuclear warheads. That claim seems to be based on questionable reasoning. One of the report's bases for this conclusion is a US intelligence projection -- made late in the 1960s -- that China would have 435 nuclear weapons by 1973. Using a constant rate of growth above that estimate, Karber extrapolates that China could have built 3,000 weapons by 2010. This analysis is, to say the least, simplistic. US intelligence estimates of China's nuclear arsenal made much later reflect significantly lower weapons levels. In a declassified document, the CIA estimates China's total stockpile at between 200 and 300 warheads in 1996. In 2006, the US Defense Intelligence Agency estimated that "China currently has more than 100 nuclear warheads."

To support its contention about the number of warheads in the Chinese arsenal, Karber's report also mentions that "PRC data in 1995 gave the figure at 2,350." It should be noted, however, that this PRC figure was based mainly on a rumor originally asserted in a Hong Kong amgazine some 15 years ago, and official government documents and professional Chinese analysts do not back such a large warhead estimate.

In addition, Karber's report argues that China could have 3,000 warheads because it has deployed "more missiles" in recent years; the country must, therefore, have "more nuclear warheads." China does, indeed, have a large number of missiles, but most are armed with conventional weapons. The People's Liberation Army possesses as many as 1,000 non-nuclear ballistic and cruise missiles, according to estimates by the Nuclear Threat Initiative.

But Karber's key argument centers on the growth of China's tunnel system; he contends that more tunnels means more nuclear warheads. If the tunnels of the underground great wall were used only for storage of nuclear warheads, and if there were reason to think the tunnels were packed wall to wall with missiles, this logic might be reasonable. But there is another, far more plausible explanation for the size of the underground great wall. According to major Chinese media and other Chinese-language publications, China's underground great wall is not just a weapons-storage depot; China has moved its land-based missiles underground to protect them from a preemptive nuclear strike.

China has no reliable air-based or sea-based nuclear forces. Since 1980, when it initiated China's nuclear modernization, the Second Artillery Corps has focused on ensuring that the country's limited number of land-based strategic missiles can survive a first strike. With the development of the Soviet (now Russian) and US satellite surveillance capabilities and the increased accuracy of nuclear weapons, China became concerned about the vulnerability of its missiles, in particular its silo-based DF-5s and its cave-based DF-4s, which need to be pulled out of tunnels and caves and launched from surface sites. These liquid-fueled missiles require up to two hours of preparation for launch. In addition, unlike the United States and Russia, China does not have an early warning system, and its missiles apparently are not in a launch-on-warning posture.

Under its announced no-first-use doctrine, the Chinese government says it would launch a retaliatory nuclear attack only after it survived a nuclear strike. To assure the survival of an adequate number of weapons for retaliation, China has just two primary options: One is to build more warheads and launchers. But to survive a US preemptive attack that could involve as many as 1,000 warheads and extremely accurate targeting, China would need a huge nuclear arsenal. So rather than greatly expand its arsenal, China has chosen the second option: It has protected its small missile force by moving it underground. Many Chinese media outlets, including the People's Liberation Army's *National Defense Daily,* have reported that the engineering unit of the Second Artillery Corps began the underground great wall in 1985 and finished its first phase in about 10 years. By the mid 1990s, then, China had a reliable second-strike capability.

The road-mobile solid-fueled missiles (e.g., the DF-31 and DF-31A) China deployed around 2006 are less vulnerable than fixed-based surface missiles and silo-based missiles. But the United States is pursuing capabilities -- including long-range, precise conventional strikes and the monitoring of mobile targets from space -- that could make Chinese road-mobile missiles vulnerable again. So China continues to construct tunnels to protect its newer missiles.

The tunnel system is operated essentially as a missile-launch base, or an underground version of a ballistic missile submarine. Just as a submarine deterrent offers survivability, so too does this subterranean force. China builds many tunnels for the same reason a ballistic-missile submarine needs

a huge ocean in which to hide.
The tunnels of the underground great wall are hundreds of meters underground, deep in mountain areas, and are difficult to detect from space. Details of the tunnels have not been publicized for obvious security reasons, but it is known that they are scattered across China and are not all connected to one another. They are designed to withstand nuclear and conventional attacks. Rail lines and trucks move missiles, related equipment, and personnel within the network. All the activities necessary for launch preparation can be done in the tunnels. Some of the tunnels may also be used for logistical support or to house command and control facilities.
Beijing's willingness to reveal the existence of the underground great wall – as it did in the 2009 CCTV report -- shows that it wants potential adversaries to know China has a real and reliable retaliatory counterattack capability. From a Chinese perspective, the underground great wall enhances the mutual deterrence between China and the United States, improving strategic stability.
While many security analysts are skeptical about China's no-first-use policy, the underground great wall and the country's small, deeply de-alerted nuclear arsenal are evidence that the minimum-deterrence posture is genuine. Top Chinese leaders, from Mao Zedong to the current leader, Hu Jintao, have publicly embraced the posture. As Mao stated a few months after China's first nuclear test, "We don't wish to have too many atomic bombs ourselves. What would we do with so many? To have a few is just fine." Similarly, Deng Xiaoping once emphasized that China's small number of nuclear weapons "is only to show that we also have what you have. If you want to destroy us, you yourself have to suffer some retaliation as well."
China's minimal-deterrence policy has proven to be effective and smart, providing savings that can be used on economic development. It is unthinkable -- in the opinion of many China experts, including me -- that China would change that policy to pursue extremely expensive weapons parity with the superpowers.
There is one circumstance that could push China to expand its arsenal significantly -- continued development of US missile defenses that might neutralize a Chinese second strike. In fact, such development could become a major driver that speeds China's nuclear modernization.
To discourage Beijing from significantly building its nuclear forces, Washington should accept mutual deterrence with Beijing and limit its missile defenses, so they do not threaten the potential effectiveness of China's small arsenal. For Washington and Moscow to move toward deep cuts in their nuclear forces, China may have to reassure both capitals that it will cap its arsenal at a low level (say, 200 warheads). So long as the missile-defense issue is resolved, that reassurance will probably be relatively easy to obtain, because –– as much evidence shows -- China has long pursued and maintained exactly such a limited nuclear arsenal, hidden underground.

Was there an explosion at Iranian nuclear plant? Government denies reports of blast at top secret facility

Source: http://www.dailymail.co.uk/news/article-2269507/Iran-denies-reports-explosion-Fordow-underground-uranium-plant.html

Iran has denied reports of a major explosion at its Fordow nuclear facility, one of its most sensitive uranium enrichment sites.
The country has described the claims as Western propaganda which they say is intended to influence upcoming international nuclear negotiations.
The reports originate with Israeli intelligence sources in Tel Aviv, who since Friday have spoken of an explosion damaging the Fordow bunker which is situated deep under a mountain near the religious city of Qom.

The explosion is believed to have occurred early last week.

'The false news of an explosion at Fordow is Western propaganda ahead of nuclear negotiations to influence their process and outcome,' the Iranian state news agency IRNA quoted the deputy head of Iran's Atomic Energy Organisation, Saeed Shamseddin Bar Broudi, as saying late on Sunday night.

Iran's ISNA news agency backed up the denial, and quoted military commander Massoud Jazayeri as saying: 'I deny an explosion at the Fordow site.'

The Iranians do not appear to have evacuated the area surrounding the site, which sources claim suffered severe structural damage and may have 200 workers trapped inside.

In late 2011 Fordow began producing uranium enriched to 20 percent fissile purity - below the 90 per cent level used in nuclear bombs, but very high compared with the 3.5 percent level needed for nuclear energy plants.

The Islamic state says it is producing 20 percent uranium to make fuel for a research reactor in Tehran that produces medical isotopes, but the move provoked fears that the uranium could be converted to bomb-grade.

Several U.N. Security Council resolutions have ordered Iran to suspend all uranium enrichment.

Speculation over the explosion followed a report that international discussions on Iran's disputed nuclear programme may be resumed.

The European Union, the lead negotiator on the talks, said there was no such agreement.

Diplomats in Vienna, where the United Nations' nuclear agency is based, said they were looking into the reports of an incident at Fordow. One Western diplomat said he did not believe they were accurate.

Iran has accused Israel and the United States of trying to sabotage its nuclear programme, due to suspicions that it hides attempts to develop atomic bombs.

The Islamic republic says its atomic programme is entirely peaceful and Tehran has accused Israel and the U.S. of being behind cyber attacks on its nuclear programme and the assassination of its nuclear scientists.

Washington denied any role in the killings and no government has taken responsibility for the Stuxnet computer virus that destroyed centrifuges at Iran's Natanz uranium enrichment facility in 2010, despite widespread reports that it was the result of a U.S. and Israeli government project.

Israel has hinted at possible military action against Iran if diplomacy fails to resolve the dispute.

Avi Dichter, the Israeli Civil Defence Minister, could not say anything about the reported Fordow blast 'beyond what I heard in the media' but added: 'Any explosion in Iran which does not harm people but harms Iran's assets is a blessing.'

Three rounds of talks last year between Iran and Russia, the United States, China, Britain, France and Germany produced no resolution, increasing speculation that Israel could attack Iranian nuclear installations.

Could Scientists Have Prevented the Fukushima Meltdown?

By Jessica M. Morrison

Source:http://www.slate.com/articles/health_and_science/nuclear_power/2013/01/scientists_responsibility_for_fukushima_balancing_risk_and_responsibility.single.html

Workers carry out radiation screening on a bus for a media tour at Tokyo Electric Power Co.'s (Tepco) Fukushima Dai-Ichi nuclear power plant in Okuma Town, Fukushima Prefecture on May 26, 2012
Photo by Tomohiro Ohsumi/AFP/Getty Images

Three-Eleven is what they call the disaster. On March 11, 2011, all hell broke loose when a 9.0 magnitude earthquake struck the eastern coast of Japan. As if that weren't enough, a massive tsunami followed about an hour later, churning over everything in its path for some 200 square miles.

Entire cities were lost. Some 16,000 people died. But it wasn't over yet. The disaster would further its assault on locals and send chills down spines worldwide once the floodwaters receded and people realized the disaster that was unfolding in the seaside prefecture of Fukushima.

The tsunami topped a seawall and knocked out the power and backup generators at Fukushima Dai-Ichi nuclear power plant. That killed the pumps that bathed radioactive fuel rods in water and kept them from melting. The cores in three reactors melted down. Seawater was used for emergency cooling and was highly contaminated; unknown amounts escaped into the environment. The promise of safe, limitless power flickered around the world.

Before the disaster, about 600,000 people lived within 30 kilometers of the Fukushima Dai-Ichi nuclear power plant. By the end of March 2011, more than half of that population had been evacuated. Many will never return to their homes.

In October 2011, the Science Council of Japan organized a committee to rethink reconstruction with an eye toward the social responsibility of science and scientists. Little more than a year later, I visited Tokyo for a conference on the impact of Fukushima on the ocean and the future of nuclear power in Japan.

"Science and technology enable us to make more use of the natural environment," said Takashi Onishi, a professor of engineering and current president of the Science Council of Japan. "Then, we have been bringing people closer to the danger that a natural disaster may cause."

Standing before a conference room filled with jet-lagged international scientists and reporters, Onishi explained that seawalls intended to

protect against tsunamis gave residents a false sense of security. In another time, would people have lived so close?

Some people have said that Japan should have known better. The earthquake and tsunami were unprecedented, but they weren't out of the question. Others have accused the nuclear industry of being too friendly with their regulators.

There is a myth in Japan that nuclear power plants are so safe that to suggest safety improvements would be illogical, said Onishi. "[The accident] showed that nuclear power plants are not safe, although the myth of absolute safety of nuclear power plants has been dominating the policies of this country."

Japan has a complicated history with the split atom. Forever scarred by the sinister side of nuclear fission, the island nation has also relied on nuclear power to build its economy.

The Fukushima accident caused political fallout. First came reports that Japan would try to phase out nuclear power entirely by 2040, the *New York Times* reported in September 2012. Similar talk of nuclear phase out took place in Belgium, Germany, and Switzerland. By December, the tide seemed to turn as Japan's new prime minister, Shinzo Abe, hinted at nuclear growth. Even after one of the worst accidents in nuclear history, Japan cannot give up nuclear power.

What is the responsibility of Japan's scientists? To overcome the safety myth, scientists and policymakers need to strike a delicate balance of proximity and distance. This balance was lost in the case of Fukushima, said John Crowley, leader of UNESCO's Social Dimensions of Global Environmental Change team.

"The experts were far too close to the decision makers … the expertise was not independent enough," said Crowley. "If scientists are too far from the policy process, then science cannot meaningfully contribute to it, but if they are too close, then it distorts and perverts the science."

An independent review of the accident carried out by a Japanese council during the first six months of 2012 found a tangled mess of government agencies responsible for both promoting and regulating nuclear power. The report called the accident "man-made," accusing lawmakers, regulators, and the utility company of negligence. It's not clear what role nuclear scientists played before the accident, but the situation had the precarious proximity-to-distance balance of a 4-year-old in stilettos.

Finding balance can be tricky, and there is no universal consensus on the social responsibilities of scientists, let alone how far these responsibilities should go.

In the life sciences, concerns about how new information or technologies could be used for harm has shined a light on the larger ethical and social responsibilities of scientists. Similarly, psychologists and anthropologists are debating their roles in aid of military objectives. Should psychologists aid in interrogations? Do embedded anthropologists diffuse cultural conflict or reveal targets for attack?

In the 1950s, Congress addressed the risks and benefits of civilian use of radioactive material, said Scott Burrell, a spokesperson for the Nuclear Regulatory Commission. "Right from the get-go, the concept of incorporating social responsibility into the civilian use of radioactive material has been there."

The NRC is charged with ensuring the responsible use of nuclear materials and maintaining public safety when nuclear materials are in use, especially in the event of an accident. The agency relies on its own staff of experts, the scientific community, and concerned citizens to inform decisions.

"There is an expectation that is strongly embedded in society that there are people with certain expertise who we count on as a society to provide guidance and advice," said Mark Frankel, director of the Scientific Responsibility, Human Rights, and Law Program of the American Association for the Advancement of Science. "If there is a major policy issue before the U.S. Congress, one could say scientists have a responsibility to use their expertise in a way that helps our Congress to make better scientifically based and informed decisions." If you know something, society expects you to come forward, he said.

But that's an undertaking easier said than done for most. One of the great miscommunications between scientists and the lay public is about the nature of risk. Why? Well, risk is hard to explain.

For the public, the word *uncertainty* often implies a lack of knowledge or unpredictability. For scientists, this isn't the meaning at all. "If scientists say there is uncertainty, people assume that means they don't know,

but in many areas of science … it's completely the other way around," said Crowley. "The ability of scientists to put a figure on uncertainty isn't a sign of ignorance. It's a sign of how much they know."

Anticipating the risk of some future event—earthquakes, nuclear accidents, finances and economies—requires transparency in risk assessment that includes an estimation of the uncertainty, said Stephen Sparks a volcanologist at the University of Bristol. "Decision makers, politicians, and members of the public can find probabilities difficult to handle and explain … but we haven't got any other choice."

An Italian court found six scientists guilty of manslaughter after their expert earthquake counsel gave L'Aquila residents a false sense of security. The sheer absurdity of the case rocked the scientific community. Would L'Aquila set a dangerous precedent of criminalization of scientists? If too much were expected of scientists, if the personal risks were too high, would they stop talking?

Let's hope not.

Four million people live within 10 miles of a nuclear power plant in the United States. Expand the range to 20 miles, and that number grows to 18.5 million.

At the end of 2011, 435 nuclear power reactors were in operation worldwide and 65 new reactors were under construction.

It may be scary, but nuclear power is here to stay. So how do we finally come to terms with a technology rife with potential yet shrouded in tragedy? We rely on the masters of the atom, the gods of fission, the lords of radiation on high—nuclear scientists—to make it all make sense.

Across the science community, including the nuclear sciences, the discussion of social responsibility has begun. If Fukushima has taught us anything, it's that those in the know are best equipped to keep the industry honest and the public safe.

Jessica Morrison *is a Ph.D. candidate in civil and environmental engineering and earth sciences at the University of Notre Dame. She has written for the Chicago Tribune, Nature, and Scientific American.*

North Korea's conducts its third nuclear test

By Ben Frankel

Source:http://www.homelandsecuritynewswire.com/dr20130212-north-korea-s-conducts-its-third-nuclear-test

North Korea early Tuesday (EST) conducted its third underground nuclear test. The official North Korean announcement said the country has used a "miniaturized and lighter nuclear device with greater explosive force than previously" and that the test "did not pose any negative impact on the surrounding ecological environment."

James Clapper Jr., director of U.S. national intelligence, issued a statement saying that the third nuclear test showed North Korea to be capable of producing nuclear devices with substantial explosive power. "The explosion yield was approximately several kilotons."

The South Korean Defense Ministry said its sensors indicated the nuclear test had a yield of six to seven kilotons (about half the size of the bomb dropped in Hiroshima in August 1945). In 2006 North Korea tested a nuclear device with a yield smaller than one kiloton. Its second text, in 2009, with a yield estimated to be between two to six kilotons.

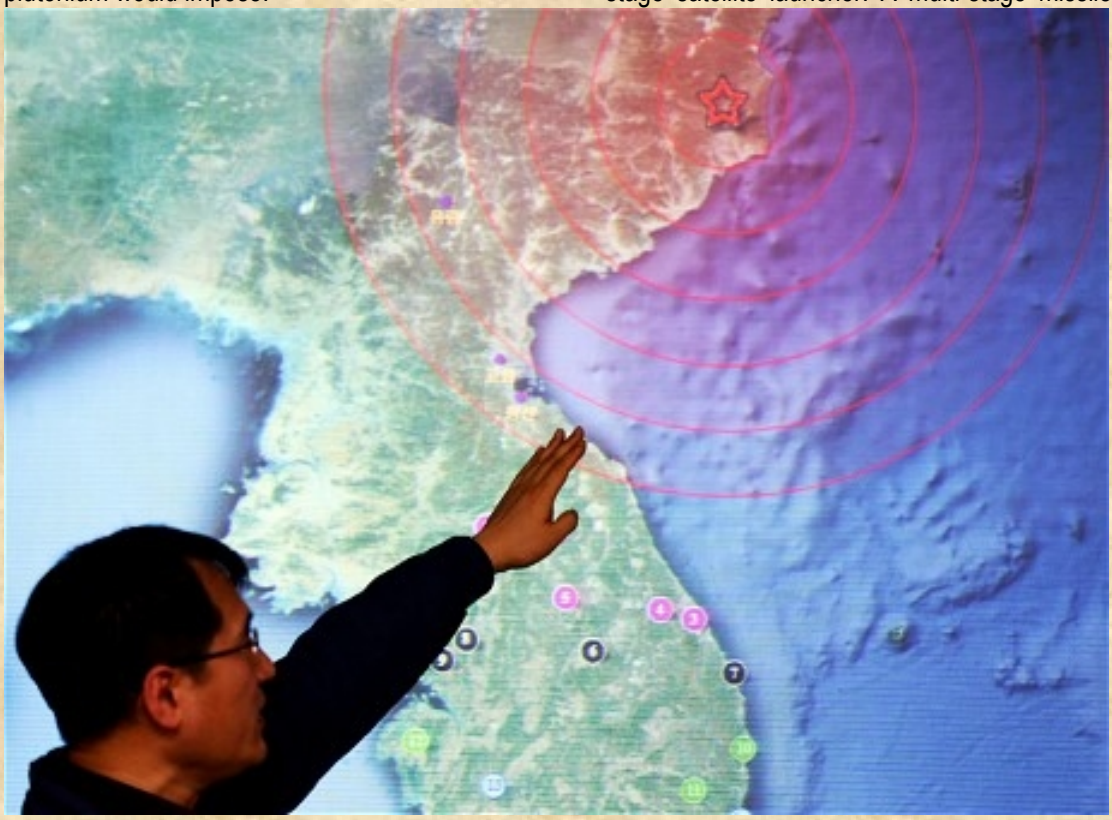
The yield of the test is only one measure of North Korea's nuclear progress. There afre two other important measures: the fissile material used and the device design.

Fissile material

North Korea has been trying for some time now to build nuclear weapons based on highly enriched uranium (HEU), rather than plutonium, which it used in the 2006 and 2009 tests. North Korea has an active uranium enrichment program.

North Korea has limited stocks of weapon grade plutonium. Experts say these stocks would be enough for six t eight Hirsohima-size weapon. Using HEU would allow North Korea to expand its nuclear arsenal more rapidly and

without the constraints the limited supplies of plutonium would impose.



Device design

The North Korean official press statement said the test used a "miniaturized and lighter nuclear device with greater explosive force than previously." This makes sense, since North Korea has been testing ballistic missiles of longer ranges, and a nuclear war head has to be miniaturized to fit on top of a missile.

If the North Korean statement is accurate, it means that the country is a step closer to marrying a long-range ballistic missile to a miniaturized nuclear warhead, making the country's nuclear weapons threat that much more potent. Two months ago, in December 2012, North Korea successfully tested a multi-stage satellite launcher. A multi-stage missile that carries a satellite can also carry a nuclear warhead.

The test is the first under the country's new leader, Kim Jong-un, and it comes on the day President Obama, in his State of the Union address, is going to call for deep reductions in nuclear arms. The president would call for bringing the number of deployed American weapons down to roughly 1,000, from the current 1,700. The START agreement signed with Russia in 2009 calls for the United States and Russia to reduce their arsenals to 1,550 nuclear weapons each.

***Ben Frankel** is the editor of the Homeland Security News Wire*

Bluefin Tuna From The Fukushima Nuclear Meltdown Still Have Traces Of Radiation

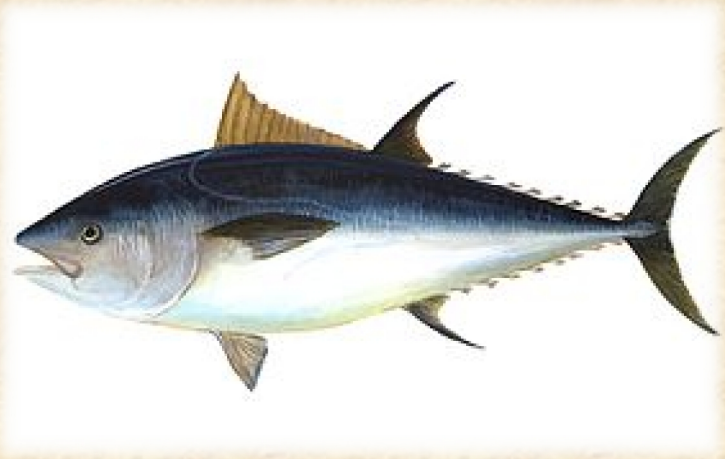
By Monte Burke

Source: http://www.forbes.com/sites/monteburke/2013/02/20/bluefin-tuna-from-the-fukushima-nuclear-meltdown-still-have-traces-of-radiation/

Last May I wrote a piece about Bluefin tuna caught off the coast of southern California that carried radiation from the Fukushima, Japan, nuclear plant that was damaged in the March 2011. The fish were caught in August 2011 as they migrated east 6,000 miles from their spawning grounds in Japan in search of prey.

In that piece I talked about how, perhaps counter-intuitively, the

radiation—which scientists say do not harm the fish—could actually be a good thing for the fish population. Bluefin, found in the Atlantic and



northern and southern Pacific, are among the most prized table fish in the world (a single 489-pound fish fetched $1.76 million at a Tokyo fish auction last month). Because of that, their stocks have plummeted to dangerously low levels. Scientists assert that the radiation levels found in these tuna are not high enough to harm humans. But it is safe to say that the general dining public does not like to hear about radiation in their food.

Last week one of the authors of the study from last year, Daniel J. Madigan from Stanford University's Hopkins Marine Station—along with five other scientists— published a new follow-up study. The main question that this new study wanted to answer: Would the migratory Bluefin tuna show up again a year later off the coast of California carrying radiation from Fukushima?

The answer was yes. (See below for the PDF of the study.) That means, ultimately, that there is still a high level of radiation in the waters near the Fukushima plant most likely because, as marine chemist, Ken Buessler, asserts, the plant is still leaking radiation into the ocean nearly two years later.

Madigan, in a phone interview, pointed out another interesting fact that he and his partners discovered: The radiation is, over time, excreted by the Bluefin. It is found in the fish's muscle tissue and just the act of swimming eventually helps them work it out of their bodies. Some of the fish they sampled (from recreational catches) showed no traces of radiation after a year of swimming in and around California waters.

(As a side note, the Pacific Bluefin, once believed to be among the healthiest populations of Bluefin, were recently discovered to have dropped 96.4% from unfished levels.)

Bluefin remain a heated topic among scientists, environmentalists and commercial fisherman. Madigan also pointed out that his initial study was attacked by vocal members of both the environmental community (which charged him with underplaying the radiation levels in some sort of government conspiracy) and the commercial fishing community (which accused him of overplaying the radiation levels as some sort of environmentalist conspiracy).

Monte Burke *covers the world of sports and business. He has written profiles of Robert Kraft, Nick Saban, John Malone and George H.W. Bush, among others. His recent book is "4th and Goal" (Grand Central Publishing), about former TD Ameritrade CEO Joe Moglia's return to coaching football. I am also the author of "Sowbelly: The Obsessive Quest for the World Record Largemouth Bass" which was named one of the best books of the year by Sports Illustrated and Amazon, and was chosen for Barnes & Noble's "Discover Great New Writers" program.*