



NUCLEAR SECURITY



A FORTNIGHTLY NEWSLETTER ON NUCLEAR DEFENCE, ENERGY AND PROLIFERATION FROM CENTRE FOR AIR POWER STUDIES

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OPINION- Augustin Simo

Amid Disaster, Scientific Consensus and Reliable Data

It's no great surprise that estimates of Chernobyl's fatalities differ widely. As my roundtable colleague Sonja Schmid noted earlier in Round Two, the World Health Organization reported in 2005 that Chernobyl fatalities would approach 4,000. The next year, Greenpeace estimated that nearly 100,000 fatal cancers would result from the disaster. These numbers are far apart, but calculating radiological risk is always problematic. Where low doses of radiation are concerned, uncertainties are very large. Likewise for risks to specific population groups. Assessment approaches, meanwhile, vary from one organization to another. The correct death toll from Chernobyl probably won't be decided for a long time, if ever. The death toll surrounding Fukushima is an open question too. Better statistical evidence is needed to support projected death tolls stemming from nuclear disasters—there has been a lack of quantitative studies that can validate estimated death totals in exposed populations to which certain risk factors are applied.

Unfortunately, lack of consensus about estimating casualties undermines public trust in nuclear power. Indeed, if the nuclear scientific community adopted a uniform approach to estimating

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disaster-related casualties, public unease with nuclear power might become more manageable. Ideally, the scientific community would reach consensus and, all at once, begin implementing that new consensus. Such an approach would likely lead to greater acceptance of nuclear power than is engendered by the current diversity of scientific opinion. In any event, scientific studies indicate that the psychological harm caused by a nuclear accident may be more damaging than radiation effects are. Schmid has noted that stress associated with evacuation amounts to a legitimate form of trauma; so does simple fear. For any disaster preparedness and response system, knowing how to manage these

psychological effects presents a serious challenge.

First Priorities

Meanwhile, Schmid writes that disaster preparedness and response “are in large part technical,” but not “*just* technical.” She is correct, of course. But in any disaster, the technical aspects of preparedness and response must be first priorities. From the moment an incident begins, data must be gathered that can help define the scope of the emergency and provide guidance for actions by first responders. Continuous, real-time monitoring must be conducted to assist in assessing the incident’s immediate consequences and its potential impacts on people and the environment. And reliable data must underpin any public declaration by officials or experts. Officials must, as Manpreet Sethi writes, “have quick access to informed scientific opinion and expert judgment so they can make good decisions in extreme time pressure.”

But data, and the interpretation of data, can easily become controversial—particularly when local officials enter the picture. For example, beginning very early in the Fukushima disaster, Japan’s Nuclear Safety Technology Center “began releasing forecasts of the diffusion of radioactive materials (plume forecasts).” But Fukushima Prefecture decided that the information provided wasn’t up to date enough and never officially announced it. Disagreements of this sort can delay necessary action. Further risk of delayed action lies in the secrecy inherent in nuclear establishments. An excessive desire to preserve secrecy can delay interaction with foreign experts and institutions. This tendency must be resisted because, during

Further risk of delayed action lies in the secrecy inherent in nuclear establishments. An excessive desire to preserve secrecy can delay interaction with foreign experts and institutions. This tendency must be resisted because, during an emergency, it’s absolutely crucial for the international expert community to share views and approaches in a timely way.

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Source: <http://thebulletin.org>, 12 May, 2016.

OPINION - George Friedman

Ballistic Missile Defence and Reality

A US BMD system site in Romania became operational on 5 May. The system is intended to defend against attacks by one or a few missiles. The system has been under consideration and construction for several years – it came online in December, but had to be integrated into NATO’s larger BMD framework before it could become operational. Missile defence in Europe has become as much a political symbol as a weapon. I would argue that if political symbols matter, then it has served a purpose, because it is hard to envision the military purpose of the system.

The system is designed to block one or a few (the precise number is likely unknown) missiles targeted toward a large area. This would be ineffective against Russia, should it wish to launch a nuclear strike against Europe, because the system would be easily saturated by a relatively small number of missiles and would be completely irrelevant if the Russians launched a massive strike, which is certainly something they could do. If some other nuclear power decided to launch an attack, it would likely have fewer missiles to launch, so the system could be effective. The problem with this is that it is unclear why a country with relatively few missiles would launch a strike at all, and totally unclear why their target would be Europe. Nuclear weapons were developed by the

US in World War II as a substitute for massed bombing attacks. World War II bombers were so inaccurate that the destruction of a single factory required thousands of bombs. Inevitably, since most factories needed workers and were in cities, the destruction of a few factories required the destruction of a city.

Over 100,000 people were killed in Tokyo over the course of three days in massed air raids. A comparable number died in Nagasaki and Hiroshima.

The size of the bomb dropped on Hiroshima was not necessary for mass destruction. It was primarily needed for efficient mass destruction. It was precisely that efficiency that stunned people. They had gotten used to casualties between 1914 and 1945, but the idea of a single weapon killing so many people turned nuclear bombs from weapons to the embodiment of hell. Hiroshima is remembered around the world. The Bombing of Tokyo not so much.

Nuclear weapons became reasonably associated with the apocalyptic end of the world. Novels were written on it. I recall three: "Alas, Babylon," "On the Beach" and "Fail-Safe." Each was about catastrophic nuclear war, but none attempted to explain the political origins of the war. The decision-making that led to the war was left out. "Fail-Safe" postulated a technical glitch that led to war. "On the Beach" had some vague mention of Albania (of all places), but no discussion of why the missiles were launched. "Alas, Babylon" had a navy fighter fire a missile at a Soviet plane over Syria that went awry and hit a warehouse that had nuclear weapons stored there. One exploded leaving the Soviets to launch an all-out nuclear attack on the US.

The origins of the war were left murky because while everyone could imagine a nuclear war, no one could imagine a coherent line of reasoning that would lead a country to launch a war against

another nuclear power. This was simply because there was no rational reason. The military reason – destroying targets in cities through mass destruction – was obviated with advanced

precision weapons. The battlefield use of the weapons depended on the generosity of the enemy in massing forces and the indifference to one's own forces. As for annihilating cities, that was not where the enemy forces were, and doing so would achieve nothing. In the 1973 Arab-Israeli War, Israel, under

heavy pressure, contemplated the use of nuclear weapons. It chose not to for several reasons, but mainly because it would achieve nothing militarily. It could have destroyed Damascus, but the Syrian army and its field commanders were not there. Attacking the forces on the Golan would have killed both sides' forces. The political calculation that obviated nuclear war was rationality. Therefore, those terrified by nuclear war, turned to another explanation: madness. "Dr. Strangelove" assumed that a US Air Force general lost his mind and sent his B-52s to attack the Soviet Union. However, to make this work, the bomber pilot had to be mad as a hatter, the Russian ambassador to the US was nuts, and Dr. Strangelove, who appeared to the National Security Advisor, was completely insane. Everyone in the room was crazy.

During the 1950s, it was assumed that once China had gotten nuclear weapons, world holocaust would follow. Mao was known to be insane. One of his comments was that losing a few hundred million people in a nuclear exchange would not be a problem for China. Mao was not squeamish about death on a massive scale,

but he was not that crazy. More important, the other people in the room were not that crazy. Absent a psychosis as widespread as we find in "Dr. Strangelove," somebody in the room loves their family enough to kill the loon. The madman scenario is the only coherent explanation for

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The madman scenario is the only coherent explanation for starting a nuclear war, but it confronts a hard reality. Since WW II, no nation has used nuclear weapons for any purpose. For the US in Vietnam and the Soviets in Afghanistan, nuclear weapons had no utility.

starting a nuclear war, but it confronts a hard reality. Since WW II, no nation has used nuclear weapons for any purpose. For the US in Vietnam and the Soviets in Afghanistan, nuclear weapons had no utility. Even if they had, both countries would have accepted defeat rather than use them. The empirical reality is that of all the nations that have nuclear capability, and wish ill toward their neighbor, none have used it. You would have to be crazy to use it. It is always posited that the current enemy doesn't value human life as we do. Thus, Iran and North Korea might launch attacks. Kim Jong Un is clearly enjoying playing God too much to spoil that. In Iran, the sheer corruption is comforting. People who love accumulating money are rarely suicidal. The madman theory doesn't work.

Wars are of course waged by helicopters, armored fighting vehicles and well-trained infantry firing wire-guided missiles at tanks. This is the substance of war. The problem with BMD is that the money spent to build it could have been spent preparing Romania, Poland and the Baltics for war. But the US has a fixation with complex weapons designed to handle improbable threats, and Poland and Romania regard building this system as a symbol of American commitment to defending them. All this defends them against is a threat that is improbable for two reasons. First, nuclear attacks are unlikely. Second, a European city is unlikely to be a target over cities like Tel Aviv, Mumbai or Karachi. Nuclear weapons are not trivial. A nuclear attack would be terrible, and however unlikely, it is a threat that must be negated. To assert otherwise is to be casual with the fate of humanity. Ideally, we would destroy nuclear weapons, but nuclear weapons do not live in silos. They live in the minds of people who know how to build them. Destroying the weapons will not destroy the knowledge. But whatever the risk, it is essential to be rational in assessing risk. The threat of a nuclear strike is extremely low. The probability of conventional war is much higher. Ballistic missile defence addresses an apocalypse for which even great novelists could not imagine

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a convincing origin. But conventional wars have been waged many times since World War II. The money spent on BMD should have been spent on far more probable threats.

Source: <http://www.euractiv.com>, 9 May 2016.

OPINION-The Hindu

Dirty Bombs: What Are They and How Dangerous Are They?

The aim of a 'dirty bomb' is to cause harm by spreading radioactive material that can contaminate an area and poison the human body. In April 2016, major nations and organisations seeking to prevent nuclear terrorism and proliferation of nuclear material, gathered in Washington for the Nuclear Security Summit (NSS). On the agenda of the U.S.-led discussions were strategies to block terror groups such as the Islamic State from obtaining radioactive material and setting off a 'dirty bomb', or worse. Here, we try and answer a few questions on dirty bombs and its usage.

What is a 'dirty bomb'?

A dirty bomb combines radioactive material with explosives. The aim is to cause harm by spreading radioactive material that can contaminate an area and poison the human body. This is different from a nuclear bomb that utilises radioactive materials to create an explosion.

What are the materials used for making a 'dirty bomb'?

Although dirty bombs haven't been used anywhere, people have reportedly experimented with making one using Cesium-137 and explosives like RDX. High-energy gamma emitters like Cobalt-60 may also be used. Caesium-137 is produced by nuclear fission processes and is essentially used to treat cancer in hospitals. Although it can be found in small quantities in the environment (from nuclear weapon tests in past), Caesium-137 otherwise is extremely rare. Cobalt-60 is made bombarding

Cobalt-59 with a neutron and is used for cancer treatment; it is also used in industries.

What prevents someone from assembling a dirty bomb?

Assembling a radioactive device involving long exposure to very high radiation can make one sick. Radiation exposure can cause burns and radiation sickness, with nausea and hair loss. Prolonged exposure can cause death. Even if someone succeeds in assembling the bomb it is very difficult to transport a radioactive device. The device will need heavy shielding by metals like lead, which would make it very heavy.

Is India equipped to detect a dirty bomb?

Bhabha Atomic Research Centre (BARC) has developed many systems such as the aerial gamma spectrometry system which can be used to detect even shielded and hidden devices. BARC has also developed technology to detect elements from solid and liquid industrial wastes, as most of these radioactive elements can dissolve in water.

Source: <http://www.thehindu.com> , 10 May, 2016.

OPINION- Trevor Findlay

Sustaining the Nuclear Watchdog with a Grand Budgetary Bargain

On March 11, 2011, a powerful earthquake struck the east coast of Japan. Fifty-six minutes later the seismic safety experts at the Vienna-based International Atomic Energy Agency (IAEA)

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Approximately 200 agency personnel were diverted from their normal activities to the Fukushima disaster response, keeping in touch with Japanese authorities, advising concerned member states and coordinating offers of assistance. Fukushima-related activities ended up consuming all unencumbered funding in the agency's safety and security budget for 2012 as well as requiring a one-off transfer of funds from other major programs. This incident illustrates graphically the hand-to-mouth existence of what is popularly known as the "nuclear watchdog."

concluded that the event, and its accompanying tsunami, could damage nuclear power plants in the region. The Agency's Incident and Emergency Centre was activated, declared to be in "full response mode" and staffed continuously 24 hours a day for the following 54 days.

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A more recent example: the July 2014 agreement to curb Iran's nuclear activities. To implement the vital monitoring and verification provisions with which it was entrusted, the

IAEA has been forced to go cap-in-hand to its wealthier member states to fund the effort, seeking additional funding that amounts to \$10 million per year. It is also reliant on member states providing the state-of-the-art verification equipment mentioned in the agreement. Similarly, the fourth and final Nuclear Security Summit, held in Washington DC in March, agreed on an action plan for the IAEA but pledged no additional funding so the agency could carry it out.

Despite facing a succession of nuclear crises over its almost 60-year existence (the Chernobyl and Fukushima disasters and the major non-compliance cases of Iran, Iraq, and North Korea), the IAEA has no emergency or contingency fund. Its nuclear laboratories outside Vienna—where, for instance, it assesses radioactive samples from Iran—were until recently

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rundown and non-compliant with the agency's own safety and security guidelines. Refurbishment efforts are still not fully funded. Modernization of vital safeguards equipment like 24-hour surveillance cameras at nuclear power plants is described as "unfunded" in successive agency budgets. Its regular funding has increasingly been supplemented by irregular voluntary contributions, even for core functions like nuclear safeguards.

The sledge-hammer approach to budgeting: zero real growth

Like other organizations in the UN system, the IAEA has been held to annual zero real growth—with few exceptions—for more than 30 years. The current budget is \$353 million. By comparison, the annual budget of the New York City Police Department is \$4.6 billion. Zero real growth has been imposed at the insistence of the Geneva Group, composed mostly of Western states, despite the agency being widely judged one of the most effective and efficient of international organizations. Its management and administration costs have declined as a percentage of its regular budget over several years, and its inspectorate has remained numerically static at around 250 for decades.

Such budgetary constraint has been imposed

regardless of the IAEA's demonstrable importance to international security. Note the IAEA's inspectors' discovery that North Korea was in violation of its safeguards agreement in 1992. Note also the agency's certification in 2003, which turned out to be accurate, that Iraq was free of nuclear weapon activities and materials prior to the US invasion. Recall, too, the

agency's pivotal role in strengthening nuclear safety after the Chernobyl disaster in 1986, as well as its contribution to strengthening nuclear security after the events of 9/11 stoked fears that nuclear weapons or material might be involved in future terrorist attacks. Meanwhile international demand for the more prosaic but important services provided by the agency has been steadily rising. Verifying compliance with nuclear safeguards agreements, which provide early warning that states are seeking nuclear weapons, now applies to almost all states in one form or another. Safeguards are also becoming more elaborate and intrusive. Technical assistance in the peaceful uses of nuclear energy (known as

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Technical Cooperation or TC) is provided to the majority of member states and is essentially demand-driven. States seeking nuclear energy for the first time are increasingly turning to the agency for advice. For nuclear safety and security, the agency provides a variety of "public goods": setting standards

or guidelines; organizing peer reviews; nourishing networks; convening conferences and workshops; and providing training and equipment. Although the popularity of such offerings is indicated by the agency's steadily increasing membership, the newer members are mostly poorer developing countries that are avid recipients of assistance rather than contributors to IAEA coffers.

What should be done?

To begin with, the Geneva Group should make an exception for the IAEA—on the grounds of its significance for international security—and release the agency from the clutches of zero real growth. This does not mean unlimited funds should be thrown at it. The director general and secretariat must do a better job of demonstrating and justifying their needs, as they did in the case of the agency's laboratory refurbishment program. Management reforms must continue apace, among other things bringing the agency's information technology systems into the 21st century and breaking down its infamous bureaucratic stovepipes (which separate safety, security, safeguards, and promotion of peaceful uses of nuclear energy).

Second, a grand budgetary bargain should be struck between politico-geographic factions of the agency's membership over issues that have bedevilled rational budgetary outcomes for years. An obvious compromise would be to bring into the agency's regular budget both Technical Cooperation, favored by the developing nations, and nuclear security, a prime concern of Western states. Nuclear security will require increased attention at the IAEA now that the nuclear security summits have ended; some of this attention will be achieved through the TC program. Both programs are now accepted parts of the IAEA mandate and deserve regular, secure funding through member states' assessed contributions. Uncertain voluntary funding, often subject to contributors' restrictions, should be confined to non-vital IAEA functions, to avoid distorting agreed budgetary priorities. Such a deal would not end the bargaining over agency priorities that naturally characterizes budgetary negotiations, as in all organizations. But it would have the merit of

putting all bids into the same negotiating pot and, if judiciously negotiated, would confound the decades-long linkage between increased funding for the IAEA's safeguards system, on the one hand, and TC on the other. Part of the bargain would be thorough reform of the Technical Cooperation program, long regarded as the underfunded Cinderella of the agency's efforts, relatively poorly managed, unintegrated with states' development goals, and inattentive to sustainability.

A third element would be to move the IAEA definitively from annual to biennial budgeting, bringing it into line with most other UN agencies, including those it collaborates with. To do so member states need to bring into force a statutory amendment that has been lingering unattended for 16 years. While this might seem a trivial matter, it would avoid the budgetary dust-up that tends to consume the IAEA General Conference every year, leaving space for more important issues. Fourth, key member states can make a huge difference to the IAEA's finances by

paying in full and on time. While the United States has been generous to a fault in providing voluntary funding, cost-free seconded staff, and cutting-edge technology, it is perennially late in providing its annual assessed contribution due to a budgetary quirk. During the Reagan administration, Congress approved a one-year delay in US payments to international organizations resulting in cash flow difficulties towards the end of their financial years, including at the IAEA. Whether the US can fix this problem in the near future is obviously dependent on the outcome of the next US general election. But other member states could also lift their financial game. China has for many years been a relative free-rider on the agency, getting a hefty discount on its contribution to safeguards funding through the

China has for many years been a relative free-rider on the agency, getting a hefty discount on its contribution to safeguards funding through the "shielding system" for poorer states and providing little in voluntary contributions. Given the substantial assistance that the IAEA has provided China over the years and its current headlong rush into nuclear energy, it should be prepared to pay more for the benefits of global nuclear governance. Other states with rapidly expanding nuclear sectors like India, Russia, Turkey, and the United Arab Emirates should do likewise.

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Finally, the IAEA needs to move quickly to develop its recently announced resource mobilization strategy to tap non-governmental sources of funding. This may be in the form of public-private partnerships with industry or philanthropic donations. The agency is one of the few UN bodies not to have such a strategy and dedicated personnel to carry it out. As a result, it has not fared well in its ad hoc attempts to attract outside funding, with the notable exception of its involvement in cancer research and treatment. Non-state funding sources could help sustain an IAEA endowment for longer-term needs, such as capital works and information technology (including cutting-edge cyber security to protect safeguards secrets). A Nuclear Emergency Fund to deal with future

Fukushimas and Irans could be inaugurated, using funds that the agency has traditionally refunded to member states if it fails to spend its annual budget on time. Despite being the paramount global nuclear governance organization, the IAEA’s culture fosters a steely focus on its member states’ needs and aspirations, to the detriment of cultivating close relationships with the industry it also purports to serve. Similarly, the IAEA’s relationships with non-governmental organizations tend to be arms-length and constrained by excessive secrecy and over-sensitivity to criticism. All this needs improvement if the agency is to successfully appeal for support beyond its wealthiest member states. Paradoxically, the agency has an excellent

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message to convey, not just about its invaluable contribution to international security, but about its growing role in ensuring the safe, secure and responsible use of nuclear energy for peaceful purposes.

Source: <http://thebulletin.org>, 11 May, 2016.

OPINION- Tyler Rogoway

North Korea’s Failed Ballistic Missile Launches are No Laughing Matter

It is hard not to laugh at North Korea’s seemingly bumbling military apparatus. Kim Jong Un’s Bond villain parallels and bad haircut only amplify the cartoon-like feel. But the Hermit Kingdom is no longer hiding behind theoretical capabilities. Instead, they have rapidly moved to testing their most terrifying weapons in order to make them actually operational. The recent launches of BM-25 Musadan IRBMs, long considered an unproven design more suitable as a parade prop than a plausibly effective weapon system, is proof of a concerning shift in North Korea’s weapons development strategy.

The Musadan missile system is likely a development of the ‘60s-era Russian R-27 Zyb liquid-fueled IRBM. Its first appearance—or at least an elaborate mockup of one—was in 2010, during the Korean Worker’s Party 65th anniversary parade. The BM-25 was shown riding on the back of a large off-road capable TELs, and it set off alarms among defense and arms-proliferation analysts. The BM-25 is believed to have a range of 1,500 to 2,500 miles and is capable of delivering a nuclear warhead. That is, if it could fly. In the half decade that has passed since that parade, North Korea’s Musadan missile capability was questioned by many analysts, who could find no evidence the missile had ever been flight tested. In essence, it was a phantom capability: maybe a propagandist tool, maybe a real weapon, or a mix of both. This uncertainty among the analysts changed suddenly just weeks ago. The North Koreans conducted no fewer than three consecutive BM-25 Musadan

missile tests—on April 15, 27, and 28—and each one failed, according to South Korean and US governments. Pyongyang, which for years seemed content in to use the missiles as saber rattling props, has suddenly moved to verify their combat capabilities in a startlingly aggressive manner.

Another intermediate range ballistic missile test,

this one a submarine launched weapon, occurred on April 23. By all accounts, it was successful at “cold launching” the missile from a vertical launch tube—to the point of ignition and fly-away. The

missile only traveled about 17 miles before exploding, according to South Korea officials, but the test represented a significant leap in North Korea’s ability to launch such a weapon successfully. Whether the launch originated from a submersible test barge or North Korea’s Sinpo Class submarine remains unclear. Analysts are uncertain if this new submarine-launched ballistic missile, dubbed the KN-11 by North Korea, uses solid or liquid propellant. The latter is used

in the Musadan missile, and is the mainstay of North Korea’s rocket capabilities—at least for now. This greatly limits its strategic effectiveness, especially when it comes to road-mobile liquid-fueled ballistic missiles, since they can’t be transported while fueled. To launch, they have

to stop, configure upright, and only then fuel up for ignition. This process can take hours and exposes the missiles and their support crews and vehicles to preemptive attack.

Since the SCUD hunts of Desert Storm, the US has become more adept at detecting and targeting ground-mobile ballistic missiles. This capability is only improving as advances in radar technology, aided by faster and faster computer processing power, evolves in exotic ways. Liquid-

fueled *submarine*-launched ballistic missiles, however, are a different story. Cruising beneath the surface, submarines can prepare for a launch virtually undetected, are not exposed to the same amount of jarring while submerged as road-mobile variants. Still, their propellants are highly volatile, a reality that led to the loss of the Russian submarine K-219 in 1986. Also, the fuel sloshes

around during the violent ejection from a submerged launch tube, putting extreme loads on the missile’s structure and propulsion components. Ballistic missiles that use a solid-fuel based propulsion concept can be stored for

long periods of time with little maintenance requirements and can take much more abuse while remaining mission capable. Most importantly, they can be launched much faster than their clumsy liquid-fueled counterparts. However, the propulsion technology behind solid-fueled missiles is much more challenging to master.

It is known that North Korea has been testing solid fuel rocket engines. If one of these

adolescent engines was fitted to the submarine-launched missile that was tested recently, it is possible it’s flight was short because the limitations of this early iteration of a solid fuel propellant and motor. If this is the case, it’s likely that the goal of the test was proving *launch*

capability, not downrange flight capability. The weak thrust of a new solid-fuel motor may have limited the amount of fuel that could be loaded onto the missile. By loading less fuel, the thrust-to-weight ratio required for the missile to fly off after being “cold launched” from its underwater missile tube could be achieved.

If the KN-11 submarine-launched ballistic missile fired late April had a new solid-fuel based propulsion system, we should be concerned. If North

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Korea has moved to this more promising but complex rocket technology, it will have repercussions across each of their ballistic missile and rocket programs. Once mature, this technology would signify a giant leap in reliability and quick-launch capability for Pyongyang, and it would align with its stated goal of creating a credible nuclear deterrent as quickly as possible. It could also mean that the deployment of nuclear armed ballistic missiles on future North Korean submarines is entirely plausible. Once again, the fact that most of these recent ballistic missile launches have failed is beside the point. The takeaway should be that North Korea is now moving away from the far easier and cheaper route of putting forward “supposed capabilities” to risking that psychological deterrent in order to make their ballistic missile dreams a verified reality. Through each consecutive launch, failed or otherwise, North Korean rocket development teams are learning and becoming one step closer to success.

At the very least, expect other countries in the region to invest in ballistic missile defense systems, which are hideously expensive and often unreliable. Also, count on the international community jacking up the pressure on China to curb the North Korea threat.

China and Pakistan are closely coordinating moves to block India's entry into the Nuclear Suppliers Group (NSG). Beijing is using Pakistan's Non Starter position with the NSG to block India's application in the name of parity, stating that it would either support NSG entry for both India and Pakistan, or none of them.

This is a dark development for the region. With North Korea's possible miniaturization of a nuclear warhead, it seems now to be rushing headlong towards a credible medium-range nuclear delivery system. Once it has tested a miniaturized warhead (which could be very soon) and have a credible rocket to fly it on—even eventually one that even uses solid fuel and can be launched quickly—the strategic equation in Asia and beyond will change significantly. At the very least, expect other countries in the region to invest in ballistic missile defense systems, which are hideously expensive and often unreliable. Also, count on the international community jacking up the pressure on China to curb the North Korea threat. China has already signed on to crushing sanctions against North Korea over its nuclear

arms development program and general misbehavior—a move that deviates from decades of Chinese support for the Kim regime and interfering with international efforts to punish it through harsh sanctions. Still, China has incredible leverage over North Korea: it is the impoverished nation's main trading partner and often exclusive supplier of everything from energy to iron ore.

Still, North Korea will have to prove that its budding ballistic missile nuclear delivery systems work and that a nuclear warhead can separate, reenter and fuse with some accuracy and reliability. These initiatives will likely come to pass in the next decade, at which time North Korea will pose a real-deal nuclear-ballistic missile threat to its neighbors, and in some circumstances, to America's interests in the West Pacific, Alaska and possibly even part of the west coast. The good news is that North Korea has played their hand publicly. Since the recent crescendo of test flights, we have a better picture of its weapons programs. The US and the global community—especially China—have some time to deal with the issue. But the clock is ticking louder and faster now than ever before.

Source: <https://www.yahoo.com>, 9 May 2016

NUCLEAR STRATEGY

PAKISTAN-CHINA

China Coordinates Moves with Pakistan to Block India's Entry into NSG

China and Pakistan are closely coordinating moves to block India's entry into the Nuclear Suppliers Group (NSG). Beijing is using Pakistan's Non Starter position with the NSG to block India's application in the name of parity, stating that it would either support NSG entry for both India and Pakistan, or none of them.

Talking about the China – Pakistan grand strategy to stall India's admission into the NSG, well placed U.S. sources who work with the NSG said from all counts it does appear that China and Pakistan are coordinating closely to stop the Indian entry. The sources pointed to the fact that when India sought an information session with the NSG Participating Governments (PGs) at the recent NSG Consultative Group meeting on April 25 and 26, where it would have made a formal presentation to the NSG Group in support of its membership, Pakistan requested for a similar discussion slot with the NSG PGs.

Sources said that even though Pakistan was fully aware that its request would be rejected, it made its application at the cue of China, in order for Beijing to look even-handed when it sought the rejection of both requests on grounds of parity. Providing an insight into the China-Pakistan plan to stall India, sources say that Pakistan is now going to write to all the NSG PGs about its wish to join the NSG. This is being done in anticipation of an application by India for NSG membership at the forthcoming plenary session of the NSG in June. The Pakistani application, added sources, is "just a decoy" for China to reject both applications on grounds of parity. China knows that Pakistan does not stand a chance at the NSG, and most of the NSG states will reject Islamabad's application.

By taking the lead in rejecting the Pakistani application along with that of India, China would like to project its position as "neutral" when in reality it is "working in tandem with Pakistan to stall India's application". U.S. sources are disappointed with the Chinese tactics of "using Pakistan's non credentials with the NSG to settle scores with India". Informed sources say that this

strategy is not a secret and during Pakistan President Mamnoon Hussain's visit to China in November 2015, China revealed its hand when it told President Hussain that if India is allowed to get NSG membership, China would ensure that Pakistan also joins the group. The Chinese government told President Hussain that "if India is allowed to join the NSG and Pakistan is deprived of NSG membership, Beijing will veto the move and block the Indian entry". Sources maintain that true to its word, China is following a

plan that will enable it to use Pakistan's non-acceptance at the NSG to block India's acceptance. "It is both or none" is the Chinese plan to derail the Indian application, say sources. Chinese officials at the NSG level have been using the Pakistan card to stop India's entry into the NSG while appearing to be even handed in China's relations with India.

Well informed sources also point to comments made by Pakistan's former Permanent Representative to the United Nations Zamir Akram

who virtually admitted the grand China – Pakistan plan to stall India's entry into the NSG when, he said, that India will not make it to the NSG despite U.S. support since China was committed to both India and Pakistan joining the NSG at the same time, and would block any move for a unilateral

admission of India. He added that chances of India gaining entry into the NSG are virtually nil. The former senior Pakistani official also made it known that Islamabad has "friends at the NSG" who won't let India enter the group. U.S. sources have seen through China's game of "either both or none" in the NSG. They say that India's non-proliferation credentials can never be compared with Pakistan's, as Pakistan has a history of "selling nuclear technology to rogue states like Libya". They point to the father of Pakistan's nuclear

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Added to this history, is the fear in the West that Pakistan's nuclear weapons, especially the tactical version that it is now in the process of developing, can easily find their way into the hands of terrorists, as Pakistan's nuclear command is extremely vulnerable to penetration by Islamic hardliners. Well-placed sources say that China is aware of this situation, and is mindful of the fact that Pakistan can never be considered for membership in any global nuclear club, but that won't stop China from using Pakistan as a "parity token to stop India which is fast emerging as China's competitor at a global level". By rejecting the applications of both Pakistan and India, China is telling New Delhi and the NSG governments that it is "neutral", when in fact it is working with Pakistan to reject India's application in the hope that there won't be an Indian reaction. U.S. sources say China's grand plan is to "eat its cake and have it too", that is reject the Indian application to the NSG on the pretext of "neutrality" between India and Pakistan and then hope that the "neutrality" card will stop any Indian commercial blowback on China.

Giving further insight into the plan, U.S. sources say that China "would be naive to expect that there won't be an Indian reaction, and especially a commercial one, as China is mindful that India is fully qualified to join the NSG, and by playing the 'Pakistan parity card', China is only hurting its own interests with an upcoming economic power, India."

Source: www.siasat.com , 12 May, 2016.

CHINA

Chinese Ballistic Missiles Dubbed 'Guam Killer' Pose Increasing Threat to US Island, Report Says
While China has long had the ability to strike Guam

with long-range nuclear missiles, the Chinese military is expending an increasing amount of resources to hit the key U.S. Island with more conventional weapons in the event of a conflict, according to a government report. The report, first reported on by the Washington Free Beacon and published by the U.S.-China Economic and Security

Review Commission, focuses on the threat posed by the recent introduction of new Chinese ballistic and cruise missiles and China's ongoing efforts to refine technology that would allow their weapons to

accurately hit U.S. assets on Guam and other surrounding islands. Of particular concern, according to the report, is the DF-26 intermediate-range ballistic missile. With a supposed range of 2,500 miles, the missile has been dubbed the "Guam Killer" or "Guam Express," because of its ability to hit the U.S. Island after being launched from mainland China.

"Combined with improved air- and sea-launched cruise missiles and modernizing support systems, the DF-26 would allow China to bring a greater diversity and quality of assets to bear against Guam in a contingency than ever before," the report says.

The DF-26 is China's first conventional ballistic missile capable of reaching Guam, and its modular design allows it to hold various types of warheads,

including nuclear payloads. After its debut in a military parade in September, the missile "has likely been deployed as an operational weapon," though in small numbers, according to the report. Guam currently hosts upwards of 5,000 U.S. personnel, multiple military facilities, and four nuclear-powered submarines. Additionally, there is a contingent of rotating multi-role jet fighters and bombers, as well as the presence of a, or THAAD, missile battery that can detect and intercept ballistic missiles such as the DF-26.

While the report assesses an attack on Guam as

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low, the continued introduction and deployment of new weapons that can threaten U.S. interests in the region is part of a broader Chinese strategy designed to resist U.S. responses to its territorial claims. Nowhere is this resistance more apparent than in the South China Sea, where China has continually funneled military resources, including surface to air and anti-ship missiles, onto a slew of man-made islands in an effort to secure its self-proclaimed territorial waters. Numerous islands in the area have been claimed by multiple countries, including China, Taiwan, Vietnam and the Philippines.

The US, in support of its regional allies, has contested Chinese claims by playing a game of brinkmanship in the form of what the Pentagon calls "Freedom of Navigation Operations." On 10 May, the USS William P. Lawrence, an Arleigh Burke-class guided-missile destroyer, sailed within 12 miles of a Chinese claimed island, prompting an immediate Chinese response in the form of three warships and a detachment of fighter aircraft that responded to the area. It was the third such operation since October.

According to the Chinese Foreign Ministry, the U.S. destroyer entered the area without China's permission and "threatened China's sovereignty." U.S. officials said the operation was well within the bounds of international law and demonstrated that the US will not be deterred by China's claims.

Source: <https://www.washingtonpost.com>, 11 May 2016.

USA-INDIA

Significant Progress Made in Civil Nuclear Deal, Says Top US Official

Observing that India has made significant

progress in implementing the civil nuclear deal in the last 18 months, the Obama administration told lawmakers that it is now up to individual companies to take decisions in terms of risks and opportunities. "One of the areas we have been able to have significant breakthroughs is the civil nuclear cooperation. We have seen in the past year-and-a-half significant progress with respect to India establishing its liabilities law which are compliant with international convention on supplementary compensation," Assistant

Secretary of State for South and Central Asia Nisha Desai Biswal told lawmakers during a Congressional hearing on South Asia.

India, she said, has now ratified it and is now a member of the international Convention on Supplementary Compensation for Nuclear Damage. "India has established an insurance pool," she said in response to a question from Congressman Brad Sherman who wanted to have an update on the civil nuclear deal. "I think, each individual

company at this point has to make its own commercial decisions in terms of risks and in terms of opportunity. I think we are starting to see companies making those decisions," Biswal said. "It is at this point largely a commercial decision. We stand ready through the US Government, through our financing bodies to support," the senior State Department official said. It is believed that Westinghouse Electric and Nuclear Power Co-operation India Ltd are in advance stage of talks for building six nuclear reactors in Gujarat. The long awaited commercial deal could be inked during next month's expected visit of Prime Minister Narendra Modi to Washington. There has been no official confirmation of Modi's travel to the US yet.

Source: <http://www.business-standard.com>, 12 May, 2016.

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BALLISTIC MISSILE DEFENSE

IRAN

Iran Ballistic Missile Test Controversy Leaves Washington Puzzled & Concerned

The Iranian Defense Minister has denied carrying out a new medium-range ballistic missile test after a senior official boasted about its pinpoint accuracy, leaving the US State Department “concerned” and White House officials scratching their heads over “what exactly transpired.” “We haven’t recently tested any missile with the range of 2,000km and with an eight meter margin of error,” Iranian Defense Minister Brigadier General Hossein Dehqan said 10 May, reported Iran’s semi-official Fars News Agency. Dehqan added that the development of Iran’s missile program will not stop as the country continues to increase its defensive capabilities.

Earlier, Brigadier General Ali Abdollahi was quoted by Tasnim news agency as saying that two weeks ago Iran had successfully tested a precision-guided missile with a range of 2,000 kilometers (1,240 miles). The White House said it is looking into the conflicting reports about Tehran’s alleged missile test. “We’re still trying to get to the bottom of what exactly transpired,” White House spokesman Josh Earnest told a briefing. “We are aware of Iranian claims of an additional ballistic missile launch ...we’re also aware of statements from the defense minister indicating that such a launch did not take place.” In the meantime the US State Department rushed to express concern over Iran’s “provocative and destabilizing” behavior in a potential breach of a UN Security Council resolution.

“We are aware of Iranian comments on an additional ballistic missile launched,” State Department spokeswoman Elizabeth Trudeau said. “We remained concerned about Iran’s ballistic missile test launch which are provocative

and destabilizing.” Tehran has carried out a series of ballistic missile tests recently. In March, the Revolutionary Guard tested short- and medium-range ballistic missiles, which are not capable of carrying a nuclear warhead. Last October, Iran tested a new guided long-range ballistic missile. The March test caused international outcry, focusing on the missile’s potential ability to strike Israel, although no country could provide any evidence that the missile had been designed to carry nuclear warheads which would be in breach of a UN resolution. Russia defended Iran’s missile tests back in March, confirming that tests of non-nuclear capable ballistic missiles did not violate the resolution that came into effect on January 16.

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weapons in its possession.

Source: <https://www.rt.com>, 10 May 2016

RUSSIA

Problems with New Russian Ballistic Missile

Testing of the new RS-28 Sarmat, a futuristic Russian liquid-fueled, MIRV, super-heavy thermonuclear armed intercontinental ballistic missile has been suspended until at least the second half of 2016, TASS reported. The Sarmat is intended to replace the SS-18 Satan (who says Russians aren’t great at naming things?). Even though the folks at the he Plesetsk space center have fixed the problems with the launcher and it is ready to handle the Sarmat prototype, there are problems with the missile, a source in the Russian defense industry complex told TASS.

“The missile’s pop-up tests have been postponed until the second half of the year,” the source said, explaining that “the tests were previously

postponed because the silo was not ready, and now the missile is not ready." According to the source, the retooling of the silo for the Sarmat was completed in April. A different source in the defense industry told TASS earlier that the pop-up tests of Sarmat were first set for March, then pushed to the second quarter of 2016, and now it looks like they need more time. Sarmat has

Sarmat has a large payload, allowing for up to 10 heavy warheads or 15 lighter ones, or a combination of warheads and massive amounts of substances intended to fool anti-missile systems. It is the Russian military's answer to the US PGS, a system that will be able to deliver a precision-guided conventional weapon airstrike anywhere in the world within one hour, just like a nuclear ICBM.

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Source: <http://www.jewishpress.com>, 11 May 2016

BALLISTIC MISSILE DEFENCE

UNITED STATES

U.S. TO ACTIVATE \$800 MILLION MISSILE DEFENSE SITE IN ROMANIA

The US will switch on a \$800 million missile shield in Romania, part of an umbrella from Greenland to the Azores against Iranian rockets that Russia aims to knock out its nuclear weapons. At the remote Deveselu air base in Romania, senior U.S. and NATO officials will declare operational the ballistic missile defense site capable of shooting down rockets from so-called rogue states that Washington says could one day reach major European cities. "Iran continues to develop, test and deploy a full range of ballistic missile capabilities and those capabilities are increasing in range and accuracy," said Frank Rose, deputy U.S. assistant secretary of state for arms control. "Iran's systems can reach into parts of Europe,

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including Romania," Rose said, before heading to the site to join U.S. Deputy Defence Secretary Robert Work and NATO Secretary-General Jens Stoltenberg for a ribbon-cutting ceremony at 0900 GMT. On 7th May, the US will break ground on a final site in northern Poland that should be ready by the end of 2018, completing the shield first proposed almost a decade ago and that also includes ships and radars across Europe. It will be handed over to NATO control in July.

Russia is incensed at such of show of force by its Cold War rival in formerly communist-ruled Eastern Europe. Moscow says the U.S.-led alliance is trying to encircle it close to the strategically important Black Sea, home to a Russian naval fleet and where NATO is also considering increasing patrols. The readying of the shield also comes as NATO prepares a new deterrent in Poland and the Baltics, following Russia's 2014 annexation of Crimea. In response, Russia is reinforcing its western and southern flanks with three new divisions. The Kremlin says the shield's aim is to neutralize Moscow's nuclear arsenal long enough for the US to strike Russia in the event of war. Washington denies that. "We are not meddling in anything that could be perceived as potentially destabilizing," said Douglas Lute, the US' envoy to NATO. However, Lute said NATO would press ahead with NATO's biggest modernization since the Cold War. "We are deploying at sea, on the ground and in the air across the eastern flanks

of the alliance ... to deter any aggressor," he said.

Russian Warheads

At a cost of billions of dollars, the missile defense umbrella relies on radars to detect a

ballistic missile launch into space. Sensors then measure the rocket's trajectory and destroy it in space before it re-enters the earth's atmosphere. The interceptors can be fired from ships or ground sites. While U.S. and NATO officials are adamant that the shield is designed to counter threats from the Middle East and not Russia, they remained vague on whether the radars and interceptors could be reconfigured to defend against Russia in a conflict.

The US says Russia has ballistic missiles, in breach of a treaty that agreed the two powers must not develop and deploy missiles with a range of 500 km (310.69 miles) to 5,500 km. The US declared Russia in non-compliance of the treaty in July 2014. The issue remains highly sensitive because the US does not want to give any impression it would be able to shoot down Russian ballistic missiles that were carrying nuclear warheads, which is what Russia fears.

Source: <http://uk.reuters.com>, 12 May 2016.

NUCLEAR ENERGY

AFRICA

Several African Countries Consider Nuclear Energy Programme

Eleven African nations are considering the construction of nuclear energy plants over the next 14 years to overcome the extreme lack of electricity today in the continent, affirmed an expert. Out of South Africa, all the generation capacity installed in Africa south of the Sahara is only 28

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gigawatts (28 thousand MW or 28 million W), equivalent to that of Argentina, warned Anton Khlopkov, director of the Center of Studies of Energy and Security in Moscow.

The academic talked at the ISS in Pretoria, during a seminar on the perspectives of nuclear cooperation Russia-Africa. He said that only 24 % of the population in Africa South of the Sahara has presently access to electricity and with unreliable connections.

Khlopkov recalled that before the nuclear disaster of Fukushima in Japan, over 60 countries in the world were studying the construction of nuclear energy plants.

At present no less than 45 nations evaluate the possibility of developing nuclear energy programs, of which several belong to this continent: Algeria, Egypt, Ghana, Kenya, Morocco, Namibia, Nigeria, Senegal, Tanzania, Tunis and Uganda. But until now, only South Africa produces this type of energy with two reactors in Koeberg (Capetown) which contribute five % of the energy matrix of the country. Russia -stressed the expert- is one of the largest exporters of nuclear technology in the world.

Source: <http://www.plenglish.com>, 7 may 2016.

INDIA

Nuclear Energy Can Meet the Gap in Power Sector, Says Scientist

Harnessing nuclear energy will help India meet its growing energy requirement which is expected to touch 3128 Terawatt hours per year

Eleven African nations are considering the construction of nuclear energy plants over the next 14 years to overcome the extreme lack of electricity today in the continent, affirmed an expert. Out of South Africa, all the generation capacity installed in Africa south of the Sahara is only 28 gigawatts (28 thousand MW or 28 million W), equivalent to that of Argentina.

with a minimum per capita requirement of 1840 Kwh a year and it is a huge task compared to the present generation of 1031 TWA, distinguished scientist of BARC B.R. Jagtap has said. Addressing scientists of NSTL here on the occasion of National Technology Day, he said 70 per cent of the power produced came from carbon resources. As of now, the country was importing 70 per cent of its crude and 40 % of gas requirement and it is projected that it would be the world's largest oil importer by 2020. With the total demand projected to go up to 8000 to 9000 TWh per year, the gap had to be filled by nuclear energy and other renewable energy sources without increasing the carbon footprint, Dr. Jagatap said. With uranium in fast reactors and utilising thorium of which India has large reserves, the country can tap energy sources to meet its demand with its three-stage nuclear programme with closed fuel cycle, he said.

Indigenous Reactors

In Stage I, the country has 18 power stations with world class performance with a total operating capacity 5780 MWe and for another 4300 MWe construction is under construction, he said. "The commissioning of prototype fast breeder reactor of 500 MWe marks our entry into Stage II. After that we are planning to have five more such indigenous reactors," Dr. Jagtap said. The advanced heavy water reactor of 300 Mwe capacity will have all passive features and designed for 100 years. Being designed post-Fukushima, unlike other reactors it has no exclusion zone and can be placed even in the heart of the city. The plans with various reactors including light water reactors envisaged taking the nuclear power generation to 60000 MWe by 2032, he said.

The inland reactors would be stationed at Banswara, Bargi and Bhimpur and in Haryana and the larger reactors in the coastal areas of Jaitapur,

Haripur, Miti Viridi and Kovvada. Answering questions from scientists, Dr. Jagtap said post-Fukushima, hydrogen mitigation systems and core catchers were being introduced to make reactors 100 per cent safe.

Guided Torpedo Varunastra

Scientist G and officiating director of NSTL A.V.V.S. Murthy said guided torpedo Varunastra would be handed over to the Navy this May enabling it prove its underwater capability. Recalling the contribution, Organising Committee Chairman A. Srinivas Kumar said DRDO team had participated in the fabrication of the implosion of system.

Source: <http://www.thehindu.com>, 12 May 2016

SOUTH AFRICA

Nuclear energy Could Play a Positive Role: Energy Minister

Energy Minister, Tina Joemat-Petterson, has again tried to persuade sceptical legislators to accept the positive role nuclear energy can play in the energy mix, amid calls from opposition benches to scrap the project altogether. Joemat-Petterson says nuclear energy will provide more jobs, and reassure investors of a reliable and sustainable energy supply.

Joemat-Petterson says, "We will not move at the pace which will disregard your opinions and those of Honourable members. We will rather take a step back and reconsider your advice. We're not prepared to steamroll decisions."

The minister has reassured lawmakers that the nuclear procurement deal will be transparent. But opposition parties believe it will result in a corruption scandal bigger than the arms deal. "The role of SA will be the hub for the training of nuclear scientists in Africa and the rest of the world. We will have the placement of people from the rest

With the total demand projected to go up to 8000 to 9000 TWh per year, the gap had to be filled by nuclear energy and other renewable energy sources without increasing the carbon footprint. With uranium in fast reactors and utilising thorium of which India has large reserves, the country can tap energy sources to meet its demand with its three-stage nuclear programme with closed fuel cycle.

of the ... despite the oppositions calls for corruption," adds the minister. Opposition parties are not convinced. They all believe there will be no immediate benefit from the project and that it is likely to benefit the African National Congress (ANC) members and their friends more than the people of South Africa. According to the minister, the procurement process has already begun and public acceptance will be sought before any deal-making can begin.

Source: <http://www.sabc.co.za> , 11 May, 2016.

NUCLEAR COOPERATION

IRAN-POLAND

Warsaw Seeking Nuclear Coop with Iran

Behrouz Kamalvandi, Spokesperson of the AEOI, met with Poland's visiting Deputy Energy Minister Michal Kurtyka in Tehran. During the meeting, the Polish side presented the invitation of Prime Minister Beata Szydlo to AEOI Head Ali Akbar Salehi to visit Poland and expressed his country's readiness to develop cooperation with the Islamic Republic of Iran's Atomic Energy Organization in scientific-research fields, nuclear safety, medical applications of nuclear energy, radiopharmaceuticals, as well as cooperation in the field of accelerator.

Kamalvandi also noted the proximity of the two countries' historical positions, their capacities and opportunities for cooperation, and welcomed the signing of MoUs between the two countries to expand cooperation. The Polish Ambassador to Tehran Julius Jacek Gojlo accompanied Kurtyka at the meeting with Iranian official.

Source: <http://en.mehrnews.com> , 08 may 2016

UNITED STATES

The United States' Newest Nuclear Power Plant Has Taken 43 Years to Build

This summer, if all goes according to plan, the second reactor at Watts Bar Nuclear Power Plant

will begin supplying power to the US electrical grid. Construction on the reactor in Spring City, Tennessee, has proceeded in fits and starts since the project began in 1973. It will be the first new nuclear reactor to come online in the US since the first Watts Bar reactor was completed 20 years ago. This summer, if all goes according to plan, the second reactor at Watts Bar Nuclear Power Plant will begin supplying power to the US electrical grid. Construction on the reactor in Spring City, Tennessee, has proceeded in fits and starts since the project began in 1973. It will be the first new nuclear reactor to come online in the US since the first Watts Bar reactor was completed 20 years ago.

Source: <http://qz.com> , 11 May 2016

URANIUM PRODUCTION

GENERAL

Energy Fuels Repeats Uranium Production Guidance as It Continues To Aim to Lower Costs

Uranium miner Energy Fuels Inc. repeated production guidance of 950,000 pounds of uranium for 2016 as it posted increased revenues in its first quarter and says it aims to continue to try and lower costs. Revenue for the three months to end March was \$18.0mIn compared to \$7.6mIn in the same period of 2016. The net loss increased to \$8.8mIn versus a loss of \$1.2mIn a year ago. This was mainly due to the \$7.4 million in investments the firm is making for future production that it must expense, including shaft-sinking at its high-grade Canyon mine, construction of wellfields and an elution circuit at Nichols Ranch, and construction of leach tanks at its White Mesa Mill. In the quarter, 350,000 pounds of uranium were sold at \$51.36 per pound, the group said.

Energy Fuels president and chief executive Stephen Anthony told investors: "While the price of uranium has disappointed so far in 2016,

It will be the first new nuclear reactor to come online in the US since the first Watts Bar reactor was completed 20 years ago. This summer, if all goes according to plan, the second reactor at Watts Bar Nuclear Power Plant will begin supplying power to the US electrical grid.

Energy Fuels continues to pursue efforts aimed at lowering operating and other costs, while also advancing our long-term ability to ramp-up mineral extraction activities in the future. "We continue to adjust our business plan to appropriately respond to uranium prices that are near multi-year lows, but expected to rise significantly over the long-term. "As such, we have made the decision to save significant cash in 2016 by planning to delay previously announced capital expenditures, including well field expansion at Nichols Ranch."While this decision is expected to lower production at Nichols Ranch by 50,000 pounds 2016, White Mesa Mill uranium recoveries are now expected to be higher than originally forecast. Therefore, we are maintaining our previous guidance of 950,000 total pounds of uranium recovery in 2016." The company boss added that it continued to pursue shaft-sinking and resource evaluation activities at its Canyon Project in Arizona, and later in the year, hopes to announce positive results at this low-cost project. "Finally, we expect to lower our portfolio-wide cost of production upon the closing of our pending acquisition of Mestena Uranium, and its ISR production in South Texas.

"While long-term uranium market pricing is currently lower than the pricing contained in our four existing contracts, upon only a modest uplift in current long-term prices, Mestena will provide Energy Fuels with the potential to sign uranium sales contracts which meet targeted operating margins for the Company. As a result, Mestena is a key acquisition for Energy Fuels as we navigate today's challenging uranium markets." As at March 31, the firm had \$37.5 million of working capital, including cash of \$16.5 million (not including an \$8.3 million receivable that was paid in cash in April) and around 225,000 pounds of uranium concentrate inventory.

Source: <http://www.proactiveinvestors.com> , 06 May 2016

NUCLEAR COOPERATION

AUSTRALIA

Australia Joins Fourth Generation Reactor Forum

Australia is to become the 14th member of the GIF. In addition to accepting Australia's entry, last week the forum's policy group also elected a new chairman. GIF was initiated in 2000 and formally chartered in mid-2001. It is an international

collective representing government of 13 countries where nuclear energy is significant now and also seen as vital for the future. Most are committed to joint development of the next generation of nuclear technology. In its latest monthly news bulletin, the OECD NEA said GIF's policy group met in Paris on 27-28

The forum recognises six advanced nuclear power systems as most likely to be deployed first. These are the sodium-cooled fast reactor, the lead-cooled fast reactor, the very-high temperature reactor, the molten salt reactor and the gas-cooled fast reactor. GIF expects that some of these reactor designs could be demonstrated and commercially launched in around 2030-2040.

May and unanimously voted to accept Australia's bid to join.

The other members of the forum are Argentina, Brazil, Canada, China, France, Japan, Korea, Russia, South Africa, Switzerland, the UK and the USA, along with the European Union (through Euratom). Most of these are party to the 2005 Framework Agreement, which formally commits them to participate in the development of one or more Generation IV systems selected by GIF for further R&D. The NEA describes the Framework Agreement as the world's first such accord aimed at the international development of advanced nuclear energy systems. In February 2015, the agreement was extended for another ten years, thereby paving the way for continued collaboration among participating countries. The forum recognises six advanced nuclear power systems as most likely to be deployed first. These are the sodium-cooled fast reactor, the lead-cooled fast reactor, the very-high temperature

reactor, the molten salt reactor and the gas-cooled fast reactor. GIF expects that some of these reactor designs could be demonstrated and commercially launched in around 2030-2040. Christopher Pyne, Australia's minister for industry, innovation and science, said: "Australia's invitation to join this important global project marks an exciting opportunity to be at the forefront of global innovation in the nuclear industry." He added, "Inclusion in the GIF further strengthens Australia's position as a nation that has the research muscle to deliver innovations on the global stage. It reinforces the governments AUD1.1 billion National Innovation and Science Agenda, encouraging our best and brightest researchers to collaborate with international experts."

Minister for foreign affairs Julie Bishop commented, "Australia has firm non-proliferation goals and nuclear safety objectives, and contributing to the global conversation on this level is an opportunity to assist in the research that is making nuclear technologies safer around the world in the long term." Australia produces about 80% of electricity from coal-fired plants, 12% from gas and 7% from hydro. This gives it a high output of carbon dioxide, which is the main reason for consideration of possible nuclear generation in the future. Low-cost power has been a competitive advantage of the country, and nearly 10% of its electricity is embedded in aluminium exports. In September 2007, Australia joined the GNEP. This partnership aimed to accelerate the development and deployment of advanced nuclear fuel cycle technologies while providing greater disincentives to the proliferation of nuclear weapons. GNEP was succeeded by the International Framework for Nuclear Energy Cooperation in 2010. This is a partnership of countries aiming to ensure that new nuclear

energy initiatives meet the highest standards of safety, security and non-proliferation. Also at its recent meeting in Paris, GIF's policy group elected François Gauché - director of the nuclear energy division of the French Alternative Energies and AEC - as its chairman for the 2016-2018 period. Gauché will be supported by three vice-chairmen: John Kelly, Hideki Kamide and Hark Rho Kim. The policy group is responsible for the overall steering of GIF co-operative efforts, establishing policies governing GIF activities, and interacting with third parties.

Source: <http://www.world-nuclear-news.org>, 03 May 2016.

RUSSIA-TURKEY

Russia's Partner for Nuke Plant Construction in Turkey to Be Named Before End 2016

It was earlier reported that Russia was looking for a partner in Turkey for the construction of Akkuyu nuclear power plant. The Turkish construction company Cengiz Insaat Sanayi ve Ticaret A.S. showed its interest in the construction of the nuclear power plant. If the Turkish company decides to build the nuclear power plant together with Russia, the share of its participation in the project will amount to 49 %.

A partner of Russia for the construction of the Akkuyu nuclear power plant in Turkey will be named before late 2016, said Mehmet Cengiz, head of the Turkish construction company Cengiz Insaat, the Aksam newspaper reported May 11. Cengiz said it is unknown whether the Cengiz Insaat will become a partner of Russia in the construction of the

Akkuyu nuclear power plant, since the Russian side will make a final decision on this issue. It was earlier reported that Russia was looking for a partner in Turkey for the construction of Akkuyu nuclear power plant. The Turkish construction company Cengiz Insaat Sanayi ve Ticaret A.S. showed its interest in the construction of the nuclear power plant.

If the Turkish company decides to build the nuclear power plant together with Russia, the share of its participation in the project will amount to 49 %. Turkish Ministry of Energy and Natural Resources told Trend earlier that construction of Akkuyu nuclear power plant in Turkey will start in 2016

and the country hadn't abandoned its construction. The plant's construction is expected to be completed in 2020, the ministry said. The project's cost nears \$20 billion. The Akkuyu plant is projected to generate about 35 billion kilowatt hours of electricity per year. The intergovernmental agreement between Russia and Turkey on cooperation in the fields of construction and operation of the country's first nuclear power plant Akkuyu near the city of Mersin in southern Turkey was signed in 2010. After the deterioration of relations between the two countries due to the SU-24 incident, Russia's Prime Minister Dmitry Medvedev signed a government decree on economic measures against Turkey. However such large projects as Turkish Stream and Akkuyu nuclear power plant were not reflected in the list of these measures.

Source: <http://en.trend.az>, 11 May 2016.

NUCLEAR PROLIFERATION

ARMENIA

Former Armenian PM Says His Country Has Nuclear Weapons

Hrant Bagratyan, a former prime minister of Armenia, has claimed that his country has nuclear weaponry. The statement raises concern, as Armenia is technically at war with Azerbaijan, over the territory of Nagorno-Karabakh. "Nuclear weapons are already created in Armenia," Bagratyan said at a press conference on 29 April at the Armenian Media Center, an NGO, adding that Armenia has such potential. "I say it as a note to Azerbaijan," Bagratyan said.

The Media Center tried to clarify if we have that weapon, or Armenia has that potential, Bagratyan said. "I said what I said," he added. The ex-premier claimed that the war in Nagorno-Karabakh would continue, as Azerbaijan has substantial resources, and can sustain its efforts well into the future.

Bagratyan also spoke also about Armenia recognising the independence of Nagorno-Karabakh. A bill is reported to be in preparation in Yerevan, although it is clear that such a move would change nothing, and possibly make the situation worse. Azerbaijan rejects the vote, accusing Armenia of trying to derail international peace talks.

Azerbaijan and Armenia fought a 4-day war in early April, which has been dubbed the April Fool's War. The conflict was stopped mainly by Russian diplomacy, but skirmishes have persisted since. Bagratyan said he believes that it is illogical to think that Azerbaijan will launch a large-scale war after the recognition of Nagorno-Karabakh. "Armenia has no

The Media Center tried to clarify if we have that weapon, or Armenia has that potential, Bagratyan said. "I said what I said," he added. The ex-premier claimed that the war in Nagorno-Karabakh would continue, as Azerbaijan has substantial resources, and can sustain its efforts well into the future.

other option than to participate in this war and to win," he said. Bagratyan was the prime minister of Armenia from 2 February 1993 until 4 November 1996. He was a member of the Pan-Armenian National Movement party (of liberal and anti-communist tendency). He has doctorate in economics, and is the author of seven books. As Prime Minister, Bagratyan had a key role in the organization of his country's military operations in Nagorno Karabakh, in the 1993-1994 war with Azerbaijan. The ceasefire, on 12 May 1994, was secured during his tenure. Maayan Jaffe-Hoffman, director of international communications at Israel Democracy Institute, a leading Israeli think tank, wrote in the The Jerusalem Post on 8th May that Bagrathyan's statements should not be taken lightly.

Smuggling of Nuclear Material

Hoffman contends that on 18 April, just days before Bagratyan's statements, the Georgian State Security Service arrested three Armenian nationals and three citizens of Georgia for attempting to illegally sell roughly \$200 million of weapons-grade uranium 238. "This recent arrest was not the first. Arrests of Armenians who have crossed into neighbouring Georgia have increased in the

past two years, according to an article published last April by The World Post (a partner publication of The Huffington Post), causing alarm among nuclear non-proliferation experts in the US and elsewhere. Landlocked Armenians use Georgia for access to the Black Sea ports, which could be used to traffic nuclear material to the Middle East or anywhere else," Hoffman writes. She cites reports of Armenians arrested for attempting to smuggle and sell nuclear materials in Georgia.

"What's more is that we don't know from exactly where these Armenians are getting the nuclear materials. Until now, it was assumed that Armenia possesses no nuclear weapons", she wrote. Hofmann says that it is a known fact that Armenia has a nuclear power plant at Metsamor, which was built in 1970, ceased operations in 1988 and then resumed work in 1995. She further quotes Mehmet Fatih Oztarsu, vice president of the Turkish Analytical Center for Strategic Outlook, who said that according to ecologists, seismic activity in this area makes operations at Metsamor nuclear power plant extremely dangerous. But Hoffmann adds that there is no evidence the material came from there. According to Hoffman, multiple reports, although unconfirmed, indicate that it might have come from Novosibirsk, in Siberia.

"Armenia's claim of a nuclear weapon – if one can constitute Bagratyan's statements as such – will create legal and political problems for the country. Azerbaijan and Turkey will both need to deal with the legal and security ramifications of this statement immediately," Hoffman argues. Alexander Murinson, a senior fellow at the Begin-Sadat Center and Bar Ilan University, wrote in The Washington Times several days ago that Georgian authorities reported the arrest of an elderly Georgian man and several Armenian nationals — alarmingly suspected of being current or former

members of the Armenian Security Service — who were attempting to smuggle and illegally sell some \$200 million worth of nuclear-grade materials.

"The highly radioactive U-238 can be used to produce a myriad of deadly and destructive apparatuses, not the least of which is a dreaded "dirty bomb," Mirinson writes. "Some of this material entered Georgia through the Russia-annexed enclave of South Ossetia and was traced back to Russian facilities. This adds much

credence to complaints by Georgia and Azerbaijan that their territories under separatist control, such as Abkhazia, Nagorno-Karabakh and South Ossetia, are being used for all manner of illegal smuggling from nuclear material to arms to narcotics," Murinson wrote. "Armenia is not a threat for the region of the world, instead, Azerbaijan and Turkey are threats of

the region", the Vice president of the Parliament of Armenia Eduard Sharmazanov stated on 10 May. He said that statement by opposition MP Bagratyan had caused "much turbulence in Azerbaijan". "What Mr. Bagratyan said is his personal viewpoint, while the position of the Armenian authorities and the political elite is clear: we use the nuclear station for peaceful purposes for producing electricity", Sharmazanov said. A spokeswoman for the European Commission said she was not aware of the statements and repeated that the EU's position is against nuclear proliferation.

Source: <http://www.euractiv.com> , 10 May 2016

EU Reminds Armenia on Treaty on Non-Proliferation of Nuclear Weapons

Maja Kocijancic, spokesperson for foreign affairs and security policy of the European External Action Service (EEAS), the EU department, reminded Armenia of the obligations undertaken

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by the country after it signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Armenia is party to the NPT, Kocijancic told Trend May 12, commenting on the recent statement by Armenian former prime minister, MP Hrant Bagratyan.

Bagratyan said on April 29 that Armenia has a atomic weapon. When asked by journalists to clarify, Bagratyan replied that Armenia has an opportunity to build atomic weapon. "Article II of the NPT states that each non-nuclear weapon State Party undertakes not to receive, from any source, nuclear weapons, or other nuclear explosive devices; not to manufacture or acquire such weapons or devices; and not to receive any assistance in their manufacture," Kocijancic said. "Armenia has joined the NPT as a non-nuclear weapon State Party and we have no information that it would have withdrawn from the Treaty." Armenia has been a party to the NPT since 1993, and in 1997 signed the Additional Protocol on its safeguards agreement with the International Atomic Energy Agency (IAEA), which means the activities in its nuclear facilities have been regularly verified by the IAEA, she said.

"Further, Armenia has signed and ratified the Comprehensive Nuclear-Test-Ban Treaty, which prohibits nuclear testing, i.e. putting serious limitations on the development of nuclear weapon capabilities," Kocijancic said.

Source: <http://en.trend.az>, 12 May, 2016.

NUCLEAR DISARMAMENT

UNITED NATIONS

Ban hopes Obama's Hiroshima visit gets wheels rolling on nuclear disarmament

The United Nations hopes that U.S. President Barack Obama's visit to Hiroshima will highlight

U.N. Secretary-General Ban Ki-moon "very much welcomes" Obama's decision to visit the atomic bomb-struck Japanese city on May 27, Stéphane Dujarric said. "For the secretary-general, one of the enduring lessons of Hiroshima is the need to abolish nuclear weapons once and for all," he added.

the need to abolish all nuclear weapons, a spokesman said 10 May, 2016. U.N. Secretary-General Ban Ki-moon "very much welcomes" Obama's decision to visit the atomic bomb-struck Japanese city on May 27, Stéphane Dujarric said. "For the Secretary-General, one of the enduring lessons of

Hiroshima is the need to abolish nuclear weapons once and for all," he added. "We would hope that the visit is again a global message on the need for nuclear disarmament, which is something that the secretary-general is calling for." Obama will be the first sitting American president to visit Hiroshima, 71 years after the U.S. dropped an atomic bomb on the city, ultimately killing around 140,000 people.

The White House described the trip as an effort to highlight the U.S. "commitment to pursuing the peace and security of a world without nuclear weapons." At a major conference held at the United Nations last year,

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member states failed to agree on the next steps needed to implement the Nuclear Nonproliferation Treaty. The United States, backed by Britain and Canada, blocked a document on the way forward over provisions that called for Israel to agree to a nuclear-free zone in the Middle East.

Source: <http://www.japantimes.co.jp>, 11 May, 2016.

SOUTH KOREA

South Korea Asks Iran to Help with Nuclear Disarmament of North Korea

South Korea's President Park Geun-hye has asked for Iran to help with implementation of UNSC resolutions against North Korea. President Park arrived in Tehran with a 236-member high-level delegation for wide-ranging discussions with Iranian President Hassan Rouhani.

Park asked for Iran to help with implementation of UNSC resolutions calling for the nuclear disarmament of the reclusive North Korea. Tehran and Pyongyang are allies and it is suspected they have worked together to develop weapons technology. "Iran seeks peace and stability in the Korean Peninsula and is against the production of any types of weapons of mass destruction. We want a world free from weapons of mass destruction, especially in the Korean peninsula and the Middle East," Rouhani said at a press conference in Tehran held jointly with Park.

South Korean press reported that aides to Park expressed hope that Tehran will be able to exert pressure on North Korea, noting that Tehran has a lengthy, close relationship with that nation's regime. The war in Yemen, the future of Syria, and Iraq's fight against terrorism were addressed also by the two leaders, Rouhani confirmed, saying they had discussed ways to establish peace and security in the region. Delegates also discussed strengthening economic and cultural cooperation between the two countries and signed numerous MoU on 2nd May, covering many areas, including oil, natural gas, energy, education, tourism, and health. The agreements are valued at \$18 to \$45 billion. Iran is being welcomed back onto the world stage following a deal with the US and other nations that includes Tehran repurposing its nuclear programs for energy only in exchange for lifting of sanctions. Prior to sanctions being imposed, South Korea was one of Iran's main customers for oil. South Korean press states that Seoul wants to have strong connections with Iran as they hope for a Middle East economic boom. The meeting of Rouhani and Park is the first time leaders of the two nations have met since establishing diplomatic relations in 1962.

Source: <http://rudaw.net>, 2 May 2016.

NUCLEAR TERRORISM

INDIA

Top Indian Nuke Scientist Busts Myths Surrounding 'Dirty Bomb'

More than a Hiroshima or Nagasaki- type atom bomb today, security agencies worry about the use of a 'dirty bomb', especially by terrorists. So how dangerous is a 'dirty bomb' or an explosive-laced with radioactive material? On the eve of the anniversary of the Pokhran explosions, K S Pradeepkumar, head of emergency preparedness for India's main nuclear laboratory Bhabha Atomic Research Center here, busts some of the commonly held myths about dirty bombs and says India is well prepared to detect such devices thanks to a countrywide network.

Excerpts From An Interview

Q1: These days there is a lot of fear of something called a 'dirty-bomb'. What is a dirty bomb?

A1: Dirty means it is dirty, that is it will not really harm you but it makes you uncomfortable. See it is like getting dirt on your dress that does not mean you are

going to die or that your health is in trouble but definitely, you have to go and change your dress.

Same way, a dirty bomb, which normally like any other explosive has some effect, but since it is integrated with radioactive material and after an explosion that radioactivity could spread out. Therefore, there is a chance of contamination on your body, even contamination on your dress, so definitely it calls for a decontamination of the people who are nearby. It also calls for a decontamination of the area. Therefore, it is not in terms of a casualty or a serious injury we are worried about a dirty bomb, or what is called a radiological dispersal device. The concern is about the fear it may inject into the people

A dirty bomb, which normally like any other explosive has some effect, but since it is integrated with radioactive material and after an explosion that radioactivity could spread out. Therefore, there is a chance of contamination on your body, even contamination on your dress, so definitely it calls for a decontamination of the people who are nearby. It also calls for a decontamination of the area.

because very large number of people will believe that they are all affected because they are all contaminated. It causes disruption.

Q2: But what are the materials, which can be used to make a dirty bomb?

A2: First of all a dirty bomb has never been used anywhere in the world. Nevertheless, it is mentioned that there were attempts made where people have tried to make one using radioactive Cesium-137 and explosives like RDX. It has never been used in India. What is feared is that since the use of radioactive sources and radioisotopes is increasing in a very significant way world over. Moreover, in some places the security of sources is not fully ensured. Hence, there are cases of lost sources, misplaced sources etc. These orphan sources can get into the hands of the bad-boys. It is believed that they can integrate these with explosives, and they can use it. However, it has never been used.

Q3: But is it not dangerous to handle radioactive sources?

A3: It is indeed so it is also a big challenge for those bad people who could try to assemble such devices, that is one of the reasons why assembling them has not been successful. Compared to the conventional explosives, whoever tries to integrate radioactive sources like Cesium-137 or Cobalt-60, they are all high-energy gamma emitters.

Therefore, during the assembly itself, even if one spends more than few minutes, the bad boys will get very high radiation exposure and will fall sick.

Q4: So you are saying that if a terrorist has to use it, then the likelihood of the terrorist himself being exposed to such serious doses of radiation is high. Is that what you are saying?

A4: Yes, unless, until they manage it with many

remote controlled mechanisms, and if it is not shielded, they themselves would be subjected to high radiation field. Not only will they get affected, the pain will be extremely severe, so keeping it a secret will be very difficult from the neighbors. Unlike conventional explosives transporting dirty bombs is very difficult. Escaping detection is almost impossible since transport of radioactive material is very difficult. Either it requires extremely large quantity of shielding like say by using hundreds of kilograms of lead.

In that case, the person will be moving about in a suspicious way, since it is hard to carry so much

weight, or it will be a group of people. If enough shielding is not there, even the vehicle he is using, co-passengers, driver, they will all start getting a radiation exposure syndrome or acute radiation syndrome. Therefore, world over it is considered very difficult to assemble it, as the terrorists are likely to be

harmed more. However, much more challenges are on people like security agencies who would have to respond and take care of the public.

Q5: In India, do we have the capability to detect hidden dirty bombs?

A5: BARC has developed many systems. We have developed many systems like aerial gamma spectrometry systems, which can be used for searching such types of sources. It can be detected easily by BARC's equipment, even if it is shielded or kept hidden inside some building.

Q6: There are some stories going around which say that if an explosive device like a dirty bomb is exploded let's say, in the heart of Delhi then all of Connaught Place will be obliterated and radiation will spread up to the Parliament Building, and all around several kilometers would get affected. In your assessment in the worst-case scenario what would be the situation?

A6: Let me explain, the word 'affected' has to be

Compared to the conventional explosives, whoever tries to integrate radioactive sources like Cesium-137 or Cobalt-60, they are all high-energy gamma emitters Therefore, during the assembly itself, even if one spends more than few minutes, the bad boys will get very high radiation exposure and will fall sick.

used very carefully. See, we have highly sensitive radiation monitors. With this, even extremely small quantity of radioactivity can be detected. See for example, let me take the Fukushima accident, people detected extremely small doses of radioactivity as far away as in Europe and USA, and people started predicting everybody will be affected and there will be cancer. It was wrong, okay, so what I want to tell is the radioactivity in the environment was extremely small, nevertheless, the scientists could detect it. Same way, if there is an explosion of a dirty bomb, what you have called it; there can be presence of radioactivity slightly above the natural background, even in 3-4 kilometers because it can be transported by the wind. Nevertheless, if you ask me the question, even that radiation level will not be even one thousandth of the radiation level of what you are having in the high background dose area of Kerala where people are living for many-many generations.

So I will not like to use the word, people will be 'affected', but definitely nearby area may be around 30-50 meters from where a dirty bomb is exploded it can have high level of contamination, beyond that there can be a cigar shaped area where spread of contamination will take place. That also may be 80 meters or slightly more than that, but it all depends upon what is the source you are using. I can tell you, more than 1.5 kilometer one need not bother at all. Again, I am telling, it may be possible to detect even up to 3 kilometer etc but that is not a concern.

Q7: So, in case of a dirty bomb, what I understand is that the possibility of people dying is because of the thermal part of the bomb, and not because of the radiation. Is that what you are suggesting?

A7: Yes, I think I have to make it very specific,

when you talk of a 'dirty bomb'; we are talking about an explosive mixed with a radioactive material. When we use the word radiological dispersal device, it is of two types. One is a dirty bomb, where there is an explosive involved. Another is just a dispersal of the radioactive powder in the public domain. However, in any case, if we are talking about a dirty bomb, it will have the same effect like any other explosive, blast effect, thermal effect, etc and added to it there will be a radioactive fallout. What I want to tell is, any death or serious injury to the people will be limited due to the blast and thermal effect because of the explosive power. Radioactive fallout and radiation exposure is not going to cause serious health effects.

Q8: So the people dying of radiation exposure are unlikely.

A8: It is unlikely. Today, there are many myths around a dirty bomb. Not only about dirty bomb, you talk about radiation, there are myths. 30-40 years back, even to take an X-ray people were scared, but today the awareness has

come to the level that people are asking for an X-ray. Incidentally, in India no one has ever died due to a high radiation dose at any of the facilities run by the Department of Atomic Energy.

Q9: Do you suspect that a dirty bomb would ever be used in India; people have an anxiety about it?

A9: The threat does exist since radioactive sources do get lost and misplaced but assembling a pile with a gigantic radiation dose is very difficult. Moreover, at the same time, I would like to underline the fact that making a dirty bomb and using it is a big challenge. Since first, it will harm those who try to assemble such a device.

Source: <http://economictimes.indiatimes.com>, 10 May 2016

NUCLEAR SAFETY

INDIA

Gujarat Nuclear Reactor Shut After Leakage. Rest safe? Top Scientist Explains

Nearly two months after the nuclear reactor at Gujarat's Kakrapar developed a leak in its cooling system and was shut down, nuclear engineers are yet to find how it was caused. And although there was no leakage of radioactivity, the matter has triggered concerns about the safety of the country's 18 other nuclear reactors. To address the concerns, it has been decided to keep the reactor shut till the investigation is complete. But India's top nuclear scientist K N Vyas, Director of the BARC, said he believes the problem may not be generic. "I feel an isolated incident like this should not be the cause for worry," he said. "These types of incidents have taken place in Canadian reactors also more than once." In some cases, the severity of the incident was worse, he added. The Rs. 1,400 crore atomic plants had been refurbished recently, and the reason of the leak remains a mystery. Explaining the procedure of the investigation, Dr Vyas said an inspection has been carried out through a probe tube, which has failed. "The crack has been identified (But) till the tube is cut and brought here, it'll be very difficult to say there is a generic problem," he said.

Such tubes, he said, have been manufactured in nuclear fuel complex for so many years but so far, no such problem has been observed. "I personally feel that, had it been a generic problem, this particular issue would have come up earlier also," he said. Dr Vyas, however, added that without a proper inspection and confirmation from the regulatory authority, "it will be incorrect for me to give any specific conclusion." The leakage at Kakrapar was detected exactly four years after the disaster at Japan's Fukushima nuclear reactor,

I feel an isolated incident like this should not be the cause for worry," he said. "These types of incidents have taken place in Canadian reactors also more than once." In some cases, the severity of the incident was worse, he added.

which had been caused by a tsunami.

After the leakage of heavy water was discovered in the morning, the plant was immediately shut down and emergency cooling systems took over.

Source: <http://www.ndtv.com>, 10 May 2016.

UAE

Staff at Barakah Nuclear Power Plant Being Trained to Tackle Disasters

Staff at the Barakah nuclear power plant are being trained and the building upgraded to deal with earthquakes, floods or any other type of disaster. The reactor is being fitted with doors and gates to stop water entering, the main control room strengthened against seismic activity, battery life extended in case of power cuts and fire protection measures are being improved.

Officials from the Federal Authority for Nuclear Regulation, or Fanr, and the Emirates Nuclear Energy Corporation this week reviewed the upgrades in light of the International Atomic Energy Agency's report on the 2011 Fukushima nuclear accident. "Within a few months after the accident, we asked Enec to

submit a safety assessment report describing the response of the Barakah facility to a severe external event and to describe what design improvements would be reasonable and practical," said Ian Grant, Fanr's deputy director general for operations. "By the end of 2011 we had a report of hundreds of pages detailing the safety assessment. "It addressed the adequacy of the design in extreme events like earthquakes and tsunamis, the loss of internal safety functions, heat removal and core cooling." Enec called for 17 design and safety upgrades, all of which were approved by Fanr. "They're in various stages of construction as the plant is being completed. They're being implemented in the construction," Mr Grant said on 10 May. "We would expect them to be completed before the plant goes into

operation next year."

A priority is to strengthen and secure the plant's emergency electrical supplies. "It's very important

that power comes in too, to be able to run machinery like pumps and valves to maintain the safety functions," Mr Grant said.

"Increasing the fuel supplies for the emergency generator, making batteries bigger so they can last longer in the event of a complete loss of power, and installing additional diesel generators to supply power to the plant in the event of a shutdown are other upgrades." So far, Enec has

managed to reduce the risk of damage to the plant's core by 67 per cent with the new features.

"Our generators are higher than sea level. They reach six metres so water won't enter the plant," said Mohammed Sabaan, Enec head of risk assessment. "After Fukushima, people's views of

nuclear power plants, and how they react and think about operation and management changed around the world," Mr Sabaan said. "We are going through an accident management programme to ensure the safety of the

community and the environment. We doubled the plant's battery size and improved its seismic factors." Enec staff are also being sent to Korea, the US and the IAEA in Vienna to learn from experts. Fanr also plans to update its regulations and bring in a more rigorous safety review process. "A nuclear accident can never be acceptable," said Christer Viktorsson, director general of Fanr. "We have to make every effort to ensure we can prevent that from happening because nuclear power should serve us in a good way to produce environmentally friendly electricity."

A priority is to strengthen and secure the plant's emergency electrical supplies. "It's very important that power comes in too, to be able to run machinery like pumps and valves to maintain the safety functions," Mr Grant said. "Increasing the fuel supplies for the emergency generator, making batteries bigger so they can last longer in the event of a complete loss of power, and installing additional diesel generators to supply power to the plant in the event of a shutdown are other upgrades.

By 2020, the UAE's four nuclear energy units will provide up to a quarter of the country's electricity and save up to 12 million tonnes of carbon emissions ever year. The project is 62 per cent complete.

The IAEA report presented more than 100 lessons learnt from Fukushima, when a tsunami flooded more than 500 square kilometres, killed 15,000

people and injured another 6,000. They included a lack of regulatory competency and inspections as two of the main contributors. "The effectiveness of the regulator was poor and the inspection programme was very weak," said Gustavo Caruso, the agency's director of safety and security coordination. "We found that 11 years before the accident, there was a break in the pipe inside the plant and it flooded part of the generators, which are

in a vulnerable area. "But there were no compensatory measures taken." Mr Viktorsson said: "Although Barakah has a very low seismic history, nuclear safety benefits from a strong safety culture. "It's about how we fight complacency and strive to improve continuously."

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Source: <http://www.thenational.ae>, 11 May, 2016.

NUCLEAR WASTE MANAGEMENT

UNITED STATES

Spike in Radiation Levels after Toxic Waste Leak at Washington Nuclear Site

Radiation levels at the Hanford, Washington nuclear waste site have spiked to "elevated risk" after thousands of gallons of toxic waste leaked in April. The site occasionally "burps" radiation, which now reached levels requiring evacuation,

RT has learned. The recent readings from the EPA obtained by RT have revealed that a sharp spike in the radiation level had been registered in Richland on the morning of May 5. The readings show the random jump when the toxic fume rates briefly reached around 410 CPM [counts per minute], nearly the highest possible level. It equals to around 4 microsieverts (uSv) per hour, a common measurement of radioactivity. To put this into perspective, the single lifetime human dose should be between 0.71 uSv/hour and a maximum of 5.7 uSv/hour, according to Radiation Survival.

Speaking of public health, levels between 2 uSv/hour and 5 uSv/hour are considered "elevated risk" which requires taking "safety precautions" and relocating "as soon as possible." Long-term exposure to radiation is required to really cause serious harm, as it happened in the infamous cases of Chernobyl or Fukushima. As of 7th May afternoon, there have been no media reports suggesting that an evacuation or other measures and guidance have been ordered for Richland. RT's Alexey Yaroshevsky has spoken to area residents, who told him that the Hanford Nuclear Reservation "burps radiation" and that this registered spike might have been one of them. It is unclear though, how often these "burps" strike, or for how long they have been happening already. The most recent radiation spike comes less than a month after a massive leak was first detected at the nuclear facility's AY-102 double-shell tank, on April 17. The Washington state Department of Ecology said then that there was "no indication of waste leaking into the environment or risk to the public at this time." It added that the leak was an "anticipated" outcome of an ongoing effort to

empty the tank.

In general, the department considers Hanford "safe", saying that the waste there is contained.

"It isn't accessible to the public, and employees who perform cleanup work receive specialized training and wear protective gear," the DoE said. The tank originally held some 800,000 gallons of waste, and has been known to experience minor leakage since 2011. At the time, this fact did not merit much attention from the local authorities. The government contractor managing the

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tanks, Washington River Protection Solutions, did not acknowledge the problem until 2012.

"It makes me sad that they didn't believe me that there was a problem in 2011," Mike Geffre, who detected the leak in 2011, told KING-TV. *"I wish they would have listened to me and reacted faster. Maybe none of this would be happening now. It's an example of a culture at Hanford of 'We don't*

The tank originally held some 800,000 gallons of waste, and has been known to experience minor leakage since 2011. At the time, this fact did not merit much attention from the local authorities. The government contractor managing the tanks, Washington River Protection Solutions, did not acknowledge the problem until 2012.

have problems here. We're doing just fine.' Which is a total lie."

Hanford is located on the Columbia River in eastern Washington, near the border with Oregon. Built during World War Two as part of the Manhattan Project to develop the nuclear bomb, it still

contains roughly 53 million gallons – over 2,600 rail cars – worth of high-level nuclear waste, left from the production of plutonium for the US nuclear weapons program. Since 1989, the only work at the Hanford Site has been related to cleaning up the waste left behind. In 2015, Hanford started moving radioactive waste from single-shelled tanks into double-shelled ones, which are supposedly safer. However, this turned out to be not as safe for the workers.

"When they move that waste, they have a lot more vapors coming out from the stacks. The wind was blowing toward me from that stack. That changed my life and hurt my lungs," Seth Ellingsworth, who became seriously ill from the fumes, told RT. *"It kept getting worse and worse."* According to officials at Hanford, 42 workers were evaluated for vapor exposure after the leakage. In total, 31 people have reported symptoms, while 11 requested evaluations as a precaution. They have all been cleared to return to work, despite obvious health risks.

Source: <https://www.rt.com>, 7 May 2016

USA

California Looks to Texas to Solve Nuclear Waste Problem

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California lawmakers are rallying around a plan to relocate radioactive waste from the state's shuttered nuclear power plants to a storage site in West Texas after failing to secure enough political support to move that waste to a repository in Nevada.

move that waste to a repository in Nevada. The Texas site is owned by Dallas-based Waste Control Specialists, which submitted a nuclear waste storage proposal to the NRC in April. Republican Rep. Darrell Issa, who represents parts of Orange and San Diego counties, said the proposed Texas site is California's next best hope for moving high-level radioactive waste from areas vulnerable to earthquakes and other natural disasters. The waste originally was to be sent to Yucca Mountain in Nevada, Issa said, but Senate Minority Leader Harry Reid, D-Nevada, successfully maneuvered to kill that plan.

Now, lawmakers say they are eager to see their second-best option gain government approval and bypass political obstacles. "With the proposed West Texas site and other options in development, we have viable alternatives for safe, consolidated, interim storage where the community actually wants it," Issa said. "Normally, you see a lot of not-in-my-backyard opposition,

but here the plan has the support of the local community and lawmakers – so you would expect development to move forward more quickly." The plan also has support from California Democrats. "While there are many different long- and short-term options to consider, I'm hopeful that we can come together around a common-sense path forward that meets the pressing needs of our local communities and utilities," said Rep. Doris Matsui, D-Sacramento. "A pilot consolidated interim storage facility would be a safe and cost-effective first step forward for California and the rest of the country."

Opposition to the plan from Texas environmental activists is beginning to take root, but Texas politicians have showed only limited concerns

about the site, which is to be built in Andrews County, northwest of Midland, Texas, on the border with New Mexico. About 17,000 people live in the county, nearly half of whom are Hispanic. Rep. Mike Conaway, R-Texas, represents Andrews

County. He crafted legislation in 2015 that paved the way for Waste Control Specialists to create the dump site. Conaway did not respond to questions about his support for the site. "Seems like we're on track to make West Texas the nation's default nuclear waste dump after the one in Nevada fell through," said Andrew Wheat, the research director for Texans for Public Justice, an advocacy group that targets what it labels the corrupt influence of corporate money in politics.

Even if legislators and government officials do decide to move forward with building a nuclear waste facility in West Texas, it would still be years before Californians would see a reduction in the size of the toxic inventory at the San Onofre Nuclear Generating Station in San Diego County, which was decommissioned in 2013, and the Rancho Seco Nuclear Generating Station in Herald, which was mothballed in 2009. Waste Control Specialists did not respond to questions about how long it would be before the company

would be able to relocate nuclear waste from California to Texas, but The Texas Tribune has reported that waste relocation efforts would not begin until 2021.

That's a long time for California lawmakers who say they're fed up with waiting for the Department of Energy to come up with a viable nuclear waste disposal plan. "The problem won't go away, and sooner or later the federal government will not just have to pay damages for the delay but will have to provide a site," Issa said. "We can't have (nuclear) materials sitting on the edge of the ocean for 10,000 years." Several months ago, Issa, Republican Duncan Hunter and Democrats Susan Davis, Scott Peters, and Juan Vargas sent a letter to Secretary of Energy Ernest Moniz reminding him that the public has poured \$30 billion into the Nuclear Waste Fund over the past two decades and that the Department of Energy has yet to do anything with that money. The department was supposed to use those funds to find a nuclear waste storage solution, they said. "We ask how DOE is using these funds to pursue a feasible

storage facility for the more than 70,000 metric tons of radioactive waste stored at reactors across the country," the letter states. "San Diego and the nation are ready for action on safely storing the country's nuclear waste." In a response, Moniz said that the Department of Energy would hold a series of public meetings in 2016 aimed at resolving the waste storage problem. Four of those meetings have already taken place in Sacramento, California; Denver, Colorado; Atlanta, Georgia; Chicago, Illinois and Washington D.C. Four more public meetings are scheduled in Tempe, Arizona; Boise, Idaho; Boston, Massachusetts; Minneapolis, Minnesota; and a department official is expected to attend a San Onofre Community Engagement Panel in June. Moniz pointed out in his letter that Congress also played a role in creating the problem. "The Department has not used money from the NWF for the planning activities described above because Congress has not appropriated funds from the NWF for these activities," he said in the letter.

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Arjan Path, Subroto Park,
New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: capsnetdroff@gmail.com

Website: www.capsindia.org

Edited by: Director General, CAPS

Editorial Team: Hina Pandey, Arjun Subramanian P, Chandra Rekha, Manisha Chaurasiya, Deep Jyoti Barman

Composed by: CAPS

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