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OPINION – Manpreet Sethi

India Need Not Worry

New Delhi has reason neither to be particularly alarmed by the launch nor to gloat over the faking of the video of Babur. Last month, Pakistan’s ISPR announced the successful test of the country’s first SLCM, Babur-3. Tested from an underwater mobile platform, the reportedly nuclear-capable SLCM hit the target accurately.

With a claimed range of 450 km, this is the sea-based variant of Babur, the ground-launched cruise missile that Pakistan had first tested in 2005 and which is now believed to be in service. The ISPR claims Babur is equipped with an ‘advanced and modern navigation and guidance system which combines inertial navigation system, terrain contour matching, digital scene matching and area correlation and global positioning system satellite guidance’. Interestingly, similar capabilities have been attributed to Babur-3 too.

Just a day after the test, questions came to be raised on the launch and hit. Imagery analysts found plenty amiss with the video released by the ISPR. Be that as it may, India has reason neither to be particularly alarmed by the launch, nor to gloat over the faking of the video.

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There is little doubt that Pakistan is working towards this technology as part of its full spectrum deterrence. Sooner rather than later, and with Chinese blessings, the technology will be a part of Pakistan’s repertoire of strategic capabilities. Therefore, what should preoccupy India is the precise role that Pakistan envisages for the missile and how it is likely to use the capability.

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Therefore, what should preoccupy India is the precise role that Pakistan envisages for the missile and how it is likely to use the capability.

It may be recalled that it was in 2012 with the inauguration of its naval SFC that Pakistan had first indicated its desire to take its nuclear weapons out to sea. What is interesting in the Pakistani approach to

development of nuclear capabilities is its knack of finding ways of circumventing long and classical pathways to deterrence by taking short cuts or *jugaads* to meet the immediate purpose.

Babur-3 is a good example.

Instead of equipping itself with a survivable second strike capability through nuclear-powered submarines equipped with submarine-launched ballistic missiles, Pakistan has chosen to place whatever missiles it has on whichever surface/sub-surface vessels it has. So it was that ballistic missiles were reportedly placed on surface ships in 2013, even as the intent to place nuclear-capable missiles on Agosta submarines after necessary modifications to missile dimensions to fit it into its torpedo tubes was announced. Babur-3 seems to have achieved that objective.

For a country that refuses to give up terrorism as an instrument of state policy against India, finding multiple ways of deterring a conventionally superior military from retaliating to its provocations is a compulsion. On land, Pakistan believes it has found an answer to this in the idea of battlefield use of low-yield nuclear weapons.

Indeed, the 'tactical nuclear weapon' has been tom-tommed as the ideal platform to project a low threshold with high brinkmanship. At sea, nuclear tipped cruise missiles on submarines are now being suggested to further this strategy.

While Pakistan is projecting this as a second strike capability or a step towards its search for survivability, that should not be read as the primary purpose of this move. Its real intention is to raise risks and uncertainties to deter India by complicating naval strategy with the deployment of nuclear-tipped SLCMs alongside conventional variants on multipurpose naval platforms.

What if such a ship was to be hit by an Indian conventional missile without the knowledge that it was carrying nuclear tipped cruise missiles too? Would it be taken as an attack on nuclear capability

leading to a nuclear response?

Though such an action would result in an Indian nuclear response that could well prove suicidal for Pakistan, Rawalpindi is actually hoping to derive deterrence benefits from the prospect of such an escalation. It is the possibility of such a mix up that is supposed to deter India from offensive actions.

Unfortunately, Pakistan does not seem to have thought through some of these issues and their dangerous potential

repercussions. The risks that Pakistan hopes to create for India could well boomerang with severe repercussions for itself. Moreover, its own naval strategy will be challenged. If the platforms carrying nuclear missiles need to survive to enhance strategic reserve, then they should remain out of harm's way.

Land attacks-But if they are to simultaneously carry out conventional land attack missions, they must deploy to areas from where they can undertake these missions, even if they face the risk of taking a hit themselves. So, how would naval vessels, on which both conventional and nuclear missiles are deployed, behave?

In response to Pak moves, India does not need to make any material change in its arsenal. What the country needs to focus on is the credible communication of the assuredness or certainty of retaliation to cause unacceptable damage in case of any initiation of nuclear use. India must continue to emphasise the distinction it makes

between nuclear and conventional weapons and the fact that any nuclear use would invite a disproportionate response.

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Pakistan's efforts at finding short cuts to deterrent capability are good attempts at strategic jugaad.

Like the proverbial hare, it is eager to win a race it is running with its own paranoia. India can afford to be the tortoise with a clear focus on building only as much as is necessary.

Nuclear weapons, after all, are only good for deterrence. No nation, not Pakistan either, can hope to protect itself through their use. Raising the bogey of their use every now and then could either lead to the threat losing its edge, or to the threat actually leading to escalation. The choice is Pakistan's to make.

Source: <http://www.deccanherald.com/>, 06 February 2017.

OPINION – Bruce Blair

What Trump Doesn't Get About Nukes

Mikhail Gorbachev, the former Soviet premier, warned in an extraordinary article late last month that the "increasingly belligerent" tone of geopolitical debates looked to him "as if the world is preparing for war." He urged the UNSC to "adopt a resolution stating that nuclear war is unacceptable and must never be fought." To almost everyone, this call from a farsighted leader may seem self evident, but what about President Donald Trump?

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apparent offer to extend the New START agreement that otherwise expires in 2021. This extension was a key aim of President Barack Obama, whose administration negotiated the arms deal. It would enable the United States to continue to closely monitor Russia's strategic nuclear deployments and prevent Russia from uploading huge numbers

of warheads onto those forces. Without the extension, the US intelligence community would need to spend billions of additional dollars to monitor Russia. And the uncertainty and unpredictability of each side's deployments would likely spark a costly nuclear

arms race and increase the instability of a nuclear crisis and the likelihood of nuclear conflict.

After reportedly checking with his advisers to learn what treaty Putin was talking about (the White House says he was asking for an opinion), Trump apparently told the Russian leader the entire agreement was just another bad deal signed by his predecessor, even though its provisions impose identical obligations on both sides, and even though it was supported by the US Senate and all

Trump seems to believe he can bend opponents to his will. And, although he evidently knows little about nuclear weapons, he seems to embrace the Dr. Strangelove view that they are for war fighting and war winning. During the presidential campaign, for instance, he refused to rule out the use of nuclear weapons to fight the Islamic State.

the key national security players, including the US Strategic Command and the Joint Chiefs of Staff. Instead of seizing upon a good offer (as well as an offer to convene talks on a range of other nuclear issues, including strategic stability, according to a former US official familiar with the call) that would strengthen US national security, Trump

signaled a willingness to embark on an expensive, pointless new arms race that he boasts the United States would win.

This is a foolish, dangerous delusion. Trump seems to believe he can bend opponents to his will. And, although he evidently knows little about nuclear weapons, he seems to embrace the Dr. Strangelove

view that they are for war fighting and war winning. During the presidential campaign, for instance, he refused to rule out the use of nuclear weapons to fight the Islamic State, despite the absurdity of wielding them against a lightly armed terrorist group. Against a heavily armed nuclear state like Russia or China, the notion of nuclear war fighting is beyond absurd. Once nuclear weapons are unleashed, a conflict would almost certainly escalate to all-out proportions and kill hundreds of millions of people.

Will Trump come to understand his folly in time to avert an arms race, a nuclear crisis and a nuclear war? His mindset recalls President Ronald Reagan, who also entered the White House intent on launching a nuclear buildup and believing that a nuclear war could be fought and won. Soon after taking office, Reagan signed a presidential directive calling upon the nuclear establishment to plan and prepare for prevailing in a nuclear conflict lasting as long as half a year.

Reagan intended to convince the Soviets that they would lose a nuclear war and therefore they had better not start one, but his aggressive rhetoric and nuclear buildup had the unintended effect of provoking the Soviets. The president was startled to learn from top secret reports based on intelligence from a KGB spy working for the British that the Soviet leadership so feared a US nuclear first strike that it was seriously preparing to preemptively strike the United States. He also faced massive public pressure for a freeze on the arms race. Reagan quickly backpedaled. By the start of his second term, he sought arms control talks with the Soviets and agreed with Gorbachev on the goal of banning nuclear weapons.

By then, Reagan and Gorbachev understood that the notion that a nuclear war can be fought and won is the height of self-delusion. The whole point of nuclear weapons, rather, is to deter their use.

Believing a nuclear war can yield victory only creates incentives to strike first while inviting a breakdown of command and control and the abandonment of all restraint.

This still holds today. In the case of wars with Russia or China, escalation culminating in a civilization-ending nuclear exchange seems the most plausible outcome. Practically every US nuclear force exercise involving a Russia scenario ends exactly this way—in a full-scale nuclear exchange that kills tens of millions of civilians.

Nuclear crises involving coercion and threats meant to subdue an adversary are likewise fraught. Bullying the other side in a nuclear confrontation might succeed, but it just as easily could provoke escalation to the brink of war and possibly beyond. The definitive study of the effectiveness of nuclear blackmail during the Cold War finds it had mixed results, even when the

Trump needs a crash course on the probable consequences of a nuclear exchange with our nuclear rivals, especially Russia because of its vast arsenal. His education should include a thorough repudiation of the delusion of US nuclear primacy. No matter what armchair strategists may claim, US strategic nuclear forces and missile defenses are not capable of blocking Russian retaliation to a US first strike. Not by a long shot.

United States enjoyed overwhelming nuclear superiority. In some cases, the United States forced the Soviet Union or China to back down, but in others the threats were counterproductive. Hubris in this arena today, too, threatens to fuel escalation and yield a nuclear war instead of a diplomatic victory.

By the end of the Cold War, both the United States and Soviet Union had learned that arms races are expensive and dangerous. Far better to stave them off through mutual agreements based on equal security. Thousands of nuclear weapons on each side have been disarmed and dismantled since the Intermediate-Range Nuclear Forces Treaty 30 years ago.

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Even if the United States could surreptitiously raise its nuclear readiness to a war footing and launch a surprise, fullscale nuclear strike that caught Russia flatfooted, the US would suffer massive casualties. At least 145 Russian warheads could be delivered by surviving Russian mobile nuclear missiles alone, according to a new study by Global Zero. If those missiles were allocated one to every American city with a population above 172,000, nearly 150 cities would be utterly destroyed in retaliation. Twenty two million people would die.

Trump's hometown would suffer the most. Nearly 2 million people would be killed by a single nuclear detonation above Times Square in New York City. His newly adopted home of Washington, D.C., would suffer more than half a million fatalities. After Trump received the nuclear codes, he described the experience as "very sobering" and "a very, very scary thing." He could offer proof by announcing, together with Putin, that "nuclear war is unacceptable and must never be fought."

Source: <http://www.politico.com>, 11 February 2017.

OPINION – Hina Pandey

Pakistan's Ababeel: An Inevitable Development

Two days before India's show of military strength on its 68th Republic Day, Pakistan successfully tested its first surface-to-surface nuclear-capable ballistic missile. According to a press release by the ISPR, the ballistic missile Ababeel has a maximum range of 2,200 km and the capability of delivering multiple warheads. This development is aimed at strengthening nuclear deterrence by adding an element of survivability to the nuclear arsenal.

The success of MIRV technology in Pakistan is significant for two reasons. First, it confirms the credibility of the various designs and technical parameters of Pakistan's ballistic missile program. The country is already on the path towards qualitatively improving various aspects of its missile program such as warhead delivery and maneuverability. Thus, the development of MIRV technology is bound to instill confidence in Pakistani nuclear thinking. Second, the landmark development is a matter of pride for Pakistan. Only a few countries, such as the United States, China, and Russia, have been able to master this technology.

It is interesting to note the timing of the Ababeel test. Just two weeks ago, Pakistan conducted a successful test of the submarine-launched cruise missile Babur-3, which is meant to complete its nuclear triad. The test is the first step towards achieving this goal; the fully operational nuclear triad is only expected around 2030.

Theoretically, Pakistan's recent missile endeavors have been aimed at achieving two objectives: achieving a credible sea-based second strike capability, and strengthening its first strike credibility by increasing the likelihood of use.

In recent years, some Indian scholars have opined that the likelihood of a nuclear exchange between India and Pakistan is "infinitesimal and too remote to merit seriousness...near zero." Indian scholars have often doubted Pakistan's capability of miniaturizing warheads and its intent to use TNW if this capability is achieved. In this context, recent developments can be viewed as Pakistan projecting its determination to develop its TNWs. However, the credibility of this signaling can only be assessed by the way in which it has been received by India. The Indian science community has already noted this development with a grain of salt. The head of India's ballistic missile systems raised questions over the Ababeel test, claiming that it is challenging to use these

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technologies in a short range missile.

There are three possible ways in which the Ababeel test may pan out in the foreseeable future. First, Indian nuclear scholarship is likely to view this as an anticipated development in accordance with Pakistan's efforts to counterbalance India's conventional superiority. In this case, the development might be interpreted as providing "self-assurance." Second, on the other end of the spectrum, this development may incentivize New Delhi to strengthen and assertively pursue its own MIRV option. Third, in light of the recent test, pertinent questions about the way in which the nuclear balance and perceived instability in the South Asian region have been altered are likely to take shape.

Source: www.southasianvoices.org/, 27 January 2017.

OPINION – David Reid

China's Nuclear Missile Policy Put Under Strain by US Plan

A decision by the United States to pursue a new breed of nuclear weapons could push China to reconsider its decades-long atomic policy, according to experts. The US Defense Department recently received a recommendation that the government develop tactical nuclear weapons with "low yield" results that can be deployed within smaller battlefield areas.

Tong Zhao, an associate in the Carnegie Endowment's Nuclear Policy Program based in Beijing, told CNBC that this more flexible form of weapon would lower the threshold of nuclear use. "This will be seen by China as evidence of US

contemplating first use of nuclear weapons in a future crisis and will encourage China to consider pursuing similar capabilities that may undermine the no-first-use policy," he said in an email.

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China's "no-first-use policy" means Beijing only demands the capability to ensure the launch of a nuclear missile, after being hit first by an enemy nuclear strike. US President Donald Trump signed an executive order on January 27, requiring Defense

Secretary James Mattis to review America's nuclear prowess.

Zhao said US plans to pursue a global missile network, initiated by the Obama administration, may be viewed by China as a threat to its own small deterrent and could mean a switch to a "launch-on-warning" policy, whereby China would retaliate before enemy missiles hit land.

"The new US administration seems very much devoted to developing and deploying a massive global and layered missile defense network that protects not only US homeland, US allies, and friends, but also US bases and troops wherever they are located or deployed. "To make sure that

To make sure that there would be enough Chinese nuclear weapons to survive a US first strike and not be neutralized by US missile defense, China may have an increasing incentive to adopt the launch-on-warning posture.

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at present there is no sign that the very top Chinese leaders are changing their attitude toward nuclear capabilities, but he does detect a growing voice among low-level analysts, military scholars and media commentators calling on China to expand its arsenal.

M. Taylor Fravel, Associate Professor of Political Science in the Security Studies Program at the MIT,

agreed that China is extremely sensitive to US capabilities and will be watching the Trump administration's next moves closely. "During the transition, he [Trump] suggested that the US should expand its nuclear forces. "If so, China may conclude that it needs to accelerate the pace of its nuclear force modernization to ensure that it can deter a first strike by a much larger US force," he said by email. And Taylor Fravel said China may also update its weaponry to ensure it can get past any US missile defense system.

But the co-author of a report on US-China Strategic Stability said there is little sign of a shift in attitude from Beijing just yet. "China's leaders have historically viewed the role of nuclear weapons as limited to deterring a nuclear attack only. "The main concern driving China regarding its nuclear capabilities is ensuring the robustness second-strike capability, defined as being able to launch a nuclear attack after being attacked first with nuclear weapons," he said. Taylor Fravel also said China has long been in a technological position to upgrade its weapons. "But technology is not destiny, especially with nuclear weapons. "That China has chosen not to build a large nuclear force despite being able to do so is more revealing about China's intentions than its possession of the capability to upgrade its nuclear weapons," he said.

Source: <http://www.cnbc.com>, 09 February 2017.

OPINION – Steve Kidd

Achieving Progress in Nuclear – Throw out the Establishment?

There is now such extensive coverage of nuclear-related stories in the media that it is inevitable there will be a mixture of positive and negative. A conclusion many people make is that "the

industry stands at a crossroads". It faces some new negative issues, such as the economic threat to today's operating plants from cheap natural gas and the rising renewables penetration of power markets. Yet there remain some hopes that many countries will eventually introduce new nuclear programmes as an antidote to climate change.

It has been consistently argued in these columns, however, that the industry is failing to address the key negative issue which dominates it, namely the fact that most people are fearful of nuclear technology. Unless the "paradigm of fear" is overcome, the industry essentially has no future,

despite the space in the world energy market which is very much open to it, combined with the technical developments underway in the sector today.

The Asia Pacific region is usually used as an example where positive news for nuclear is more prevalent, but three recent news stories – from Taiwan, Vietnam and Australia – yet again demonstrate the extent of the underlying problem.

It now seems almost certain that Taiwan will no longer have any nuclear stations in operation post-2025. This nuclear phase out stands in sharp contrast to the position in mainland China, where reactor construction dominates the world's new build programme. The public acceptance issues which have bedevilled the Taiwanese industry for years have now come to a head and, to some extent at least, will almost inevitably resonate on the mainland.

The six operating units on Taiwan face specific issues such as shortage of storage for used fuel, but the underlying problem is lack of governmental support for continued operation, rooted in deep public fear. The Fukushima accident occurring in a nearby country with similar climatic and seismic

challenges can be seen as the final nail in the coffin for nuclear in Taiwan. The new twin ABWRs at Lungmen, which are almost ready to operate, have been mothballed, joining the list of completed nuclear plants which have never operated, such as Shoreham in the US and Zwentendorf in Austria. That key components from Lungmen could conceivably find their way to the prospective ABWR units at Wylfa in the UK is more of a comment on the true position of the industry than any consolation.

In Vietnam, the Government has suddenly and unexpectedly announced the cancellation of the planned nuclear power programme. In the list of likely new nuclear countries, Vietnam has long been in the top five, so the decision is a bitter blow to the industry, particularly to the Russians and Japanese who were taking the lead with the two reactor sites. The reasons cited include slowing power demand growth and the belief that a combination of fossil fuels and renewables will offer cheaper power generation. The real reason, however, is the continuation of the paradigm of fear and particularly its adverse impact on nuclear economics.

With the way the mass media works today, even a one-party state such as Vietnam cannot be immune to public opinion and (as is now the case in China) opposition voices were getting a hearing. The cost of building reactors today means new build projects are unlikely to go ahead without some guarantees on generous power prices, and this is difficult in developing countries where access to affordable power is crucial.

The prospect of Australia having a deeper involvement in nuclear beyond its strong historic role in uranium mining has often seemed

somewhat remote, but to South Australia's credit, it established a Royal Commission to subject the question to rational analysis. Its report, and particularly the accompanying excellent background papers, certainly fulfilled this mandate and concluded that the best chance was setting up an international used fuel repository in the State. The Commission's findings were recently put to a citizen's jury which rejected the idea. This essentially got spiked by the anti-nukes to the extent that months of detailed and rational analysis of the case risks getting thrown out of the window.

The debate should certainly be continued, particularly in light of recent power outages in South Australia, which suggest that it hasn't got things quite right in power generation. More public consultation will be very welcome, possibly followed by a referendum, but this episode demonstrates once again the lingering hold of the fear paradigm. A major focus of the attack was on the prospective economics of the repository project, but the antis essentially appeal directly to the many people who are fearful of all things nuclear. This appears strong enough to survive a seemingly strange alliance of the right-of-centre Liberals with the far-left Green Party in South Australia.

What comes out, loud and clear, from these three examples is that the industry's attempts to rebrand nuclear in over five years since the Fukushima accident have got essentially nowhere. Indeed, one may (politely) accuse it of engaging in a range of displacement activities (definition: an unnecessary activity that you undertake because you are trying to delay doing a more difficult or unpleasant activity).

Continuing to believe the public acceptance problem will be solved by more facts and figures

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from improved websites and news services is just burying one's head in the sand. And, as has frequently been pointed out in these columns, relying on the climate change argument to advance nuclear's prospects will almost certainly get nowhere. Industry bodies such as the WNA can point out that some of the countries with the best records on carbon emissions use a combination of nuclear and renewables (but mainly hydro, not wind or solar), while claiming that nuclear plants have avoided so many million tons of carbon since commissioning. But this is, at best and in my view, disingenuous. None of the 400 or so nuclear reactors around the world were built to abate carbon. They were built for other reasons, such as energy security and economics. Admittedly, it was believed that their environmental impact would mainly be benign, but investments are essentially made for what a technology does, rather than what it doesn't.

Overcoming the paradigm of fear is certainly a lot more challenging than the industry's obvious displacement activities and has a longer time horizon. Nuclear power will be badly needed in the future and it's essential that the industry is ready. When it's called upon, it has no chance of success if people are fearful of it, as there are always alternatives in power generation.

A new campaign needs to focus more on images and feelings, rather than facts, and must be particularly addressed at the understanding of the nature of radiation, its sources and proven impacts. At the same time, the international radiological protection (RP) regime must be reformed, as its basis in the Linear No Threshold (LNT) theory effectively gives regulatory backing to public fears and has caused most of the problems stemming from Fukushima. All of this may take 20-30 years, but a proper start needs making today, rather than the continued recourse to easier options.

Another recent news item is, of course, the election

of Donald Trump as the next President of the US. On the face of it, this isn't particularly good news for nuclear as he is on record as being supportive of fossil fuels and sceptical (at best) about actions on climate change and the environment. On the other hand, he is supportive of American industrial prowess and is unlikely therefore to be happy about US nuclear plant closures on his watch. These may rely more on actions at the State level, but the President sets an important tone and may turn out to be good for the industry rather than bad.

A more important reflection on the US elections is that facts (and hard-nosed analysis of these) seemed to count for very little and it was people's feelings and the way these are coloured by sharp

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images that held more sway. Rather like the Brexit vote in the UK, it was a vote against the establishment and its panoply of experts, who are alleged to have forgotten the wishes and needs of the ordinary person in the street. President Trump aims to "drain the swamp" in Washington DC and make his country "great again". But could it be that there is

an "establishment" in the nuclear industry which is resistant to deep change and is preventing a renaissance? And because of this, could it be that the industry is just not "fit for purpose" to meet the needs of the modern energy world?

Far be it for me to assert that all my friends in the industry are a swamp that needs draining, there is more than a germ of truth in the above thoughts. In some areas, one can detect a definite nuclear establishment, resistant to change. If one asserts that radiation is not as worrying as everybody seems to think it is, one is essentially saying that all the people working in RP are not so very important and that their past actions have been misguided. Within international bodies such as the IAEA and the OECD, there is arguably a mass of establishment thinking about nuclear which

doesn't help it at all. People claim to be supportive but come up with ideas like nuclear roadmaps and fantasy energy scenarios which are actually harmful. Within the industry itself, there are too many people who have worked only in nuclear and are seemingly not very upset with the way things are today. They appreciate that things are far from ideal but are not sufficiently motivated to do anything to change this. Or have simply given up, as a shift away from the paradigm of fear appears too challenging.

Rather like the establishment in Washington DC, the nuclear equivalent believes that the future can be measured and controlled, provided that people see sense and do what is right. So we get programmes like the WNA's Harmony, where nuclear and renewables happily co-exist and bring salvation to the world. In the real business world, however, uncertainty is accepted as a fact of life and change tends to be unpredictable and also disruptive. All that the people in one of today's industries can do to help its future is to identify one or two key issues and put maximum weight behind getting them right. With nuclear, it's widely accepted that its biggest problem today is that people are afraid of it, so why not concentrate on addressing this to counter its obvious consequences?

Another recent news item was that UNSCEAR (the United Nations Scientific Committee on the Effects of Atomic Radiation) came out with the finding that not only are exposures of radiation from coal-fired power generation much higher than from nuclear, but also those from solar power are higher too. This is because solar panels require rare earth metals, where the mining of low-grade ore exposes workers to natural radionuclides during mining. This may appear to be rather favourable

news for the nuclear sector, but the opposite is actually the case.

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there are conceivable accidents where it would multiply many times over. Hence such studies maybe inadvertently bring further adverse attention to what is so special about nuclear, namely the possible consequences of enhanced radiation exposure.

The way it has reacted to India's recent back-to-back successful testing of Agni-IV and V, it is clear that China is rattled and upset with India's growing missile capabilities. Though India had been testing these missiles for the last five to six years, China had by and large refrained from commenting over India's missile programme.

UNSCEAR accepts that the exposure levels of all generation technologies are not harmful to human health, so why are they carrying out this comparative analysis in the first place? Of course, these exposure levels are only of plants in normal operation, and for nuclear

For those interested in a successful nuclear industry, the question has to be: "Is what we're currently doing going to work?" My conclusion, based on the majority of what we're seeing in the news today is: "No it won't." It is therefore necessary to try much harder, think a little outside

the box, then come up with something new that will.

Source: www.neimagazine.com, 29 January 2017.

OPINION – Ajey Lele

Agni-V and Strategic Signalling

Is China feeling threatened by India's ICBM capabilities? The way it has reacted to India's recent back-to-back successful testing of Agni-IV and V, it is clear that China is rattled and upset with India's growing missile capabilities. Though India had been testing these missiles for the last five to six years, China had by and large refrained from commenting over India's missile programme.

The last time China had reacted was in April 2012, when Agni-V was first test-fired successfully.

China did not react when Agni-V was test-fired for the second time in September 2013 and for the third time in January 2015. India's SFC is expected to conduct two more tests before inducting Agni-V missile into its weapons arsenal. Similarly, there was no reaction from China when Agni-IV was first test-fired earlier in November 2011, and thereafter in September 2012 and January 2014, before being inducted into the armed forces in December 2014, though user trials are still on.

However, after India conducted the fourth test of Agni-V on December 26, 2016, Chinese foreign ministry spokesperson stated the very next day that "The UN Security Council has explicit regulations on whether India can develop ballistic missiles capable of carrying nuclear weapons." The spokesperson added, "China always maintains that preserving the strategic balance and stability in South Asia is conducive to peace and prosperity of regional countries and beyond." Interestingly, similar to the statement issued by China in April 2012, after Agni-V was first tested, the latest statement too reiterated that India and China "are not rivals for competition but partners for cooperation."

The Chinese spokesperson was probably referring to the UNSC Resolution 1172 of June 1998, which was passed in the aftermath of the nuclear tests conducted by both India and Pakistan in May 1998. The resolution had urged India and Pakistan not to develop nuclear weapons delivery platforms like ballistic missiles and also to cap their nuclear weapons programmes and cease all fissile materials production. This resolution was approved under Chapter VI of the UN Charter and is non-binding. There are no constraints therefore on India pertaining to its weapons and missile programmes.

In response to the Chinese reaction, the spokesperson of the Indian Ministry of External Affairs immediately affirmed that "India's strategic capabilities are not targeted against any particular country and India abides by all the applicable international obligations. India's strategic autonomy and growing engagement contributes to strategic stability." The Indian print

and electronic media, however, stated the obvious; claiming that, now with 5000 km-plus range, Indian missiles could reach any part of China. The way media went about commenting on India's growing missile capabilities, which received wide international coverage as well, could have to an extent spurred China to react.

The Chinese spokesperson in her statement had alluded to speculations in the media reports about India developing Agni-V to counter China. This came out in a more upfront manner in an editorial published in the *Global Times*, country's leading English-daily affiliated to the Communist Party of China, two days after India successfully conducted the user trial of Agni-IV on January 02, 2017. The editorial accused India of breaking "the UN's limits on its development of nuclear weapons and long-range ballistic missile" as "New Delhi is no longer satisfied with its nuclear capability and is seeking intercontinental ballistic missiles that can target anywhere in the world." The editorial warned that China "will not sit still if India goes too far... If the UN Security Council has no objection over this, let it be. The range of Pakistan's nuclear missiles will also see an increase."

Interestingly, three weeks later, *Global Times* carried an editorial emphasising the strategic significance of Dongfeng-41, China's own ICBM, and how it could bring more respect to China. The editorial argued that, "It is logical that Beijing attaches particular importance to the Dongfeng-41 as a strategic deterrence tool. With China's rise, China's strategic risks are growing. China bears the heavy task of safeguarding national security. Nuclear deterrence is the foundation of China's national security, which must be consolidated with the rising strategic risks." Taking the argument further, the editorial stated that, "China must procure a level of strategic military strength that will force the US to respect it."

However, media coverage of the successful test-firing of the two long-range missiles by India cannot be considered as the only reason why China reacted so brashly. Some of the recent developments too could have added to China's growing discomfort over India gaining prominence

in the strategic arena. Beijing is probably finding it difficult to accept the fact that India, despite not being a signatory to the NPT, is getting preferential treatment from the rest of the world (read the US, Russia and the European Union). India had recently joined the MTCR, whereas China's credentials to be in the grouping were found lacking. Meanwhile, China has been trying to ensure that India does not gain entry into the NSG. Instead, it wants Pakistan to gain entry into the NSG, fully aware of its highly questionable non-proliferation record.

Beijing is probably finding it difficult to accept the fact that India, despite not being a signatory to the NPT, is getting preferential treatment from the rest of the world (read the US, Russia and the European Union).

While China appears concerned about India's growing ballistic missile capabilities, it fully understands that the concept of so-called strategic stability in South Asia is actually a misnomer. The PLA had established a special missile arm in their defence establishment, called Rocket Force, on December 31, 2015. Further, China itself had tested various missiles during 2016. These tests included IRBMs like DF-21, ICBMs like DF-41 (a multiple warhead missile), a hypersonic missile test-fired from Chinese J-16 strike fighter, anti-ship missiles like YJ-12 and YJ-18, and missile defence interceptor test for missile DN-3, which is also known to have the capability to destroy satellites in the low earth orbit. In fact, very recently, there were reports about PLA's Rocket Force conducting an exercise with DF-16 medium range ballistic missile, which, with a range of 1,000 km, can easily target several countries in China's neighbourhood including the US military assets in Japan.

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China fully understands that having arsenal in thousands is of little consequence. What counts is the potency and accuracy of the weapons/missiles and the nature of military tactics employed. It is but obvious that China must be

keenly monitoring India's progress in the SLBM arena. India has already successfully tested the K-4 SLBM and its efforts to marry this missile with the submarine are progressing well. China probably worries that India's growing military profile is no longer South Asia-specific.

Apart from raising objections to India's missile testing and stalling India's entry into the NSG, China has also been acting against Indian interests on the issue of terrorism emanating from the Pakistani soil. India, however, does not appear to be giving a strong response to such Chinese actions. India could have launched a 'different form of surgical strike' by exhibiting its missile potential during the Republic Day parade in January this year. For all these years, the parade has been used by India to display its achievements and progress in social, scientific and military sectors.

Globally, it has been observed that countries use such ceremonial parades to display their military capabilities to the world. On September 03, 2015, China had held a grand military parade to mark the 70th anniversary of the victory of 'Chinese People's War of Resistance against Japanese Aggression and the World Anti-Fascist War'. The occasion was used by China to display a host of new armaments, ranging from ICBMs to medium-long range bomber aircraft, highlighting the nation's inherent military strategy of "active defense."⁵ Russia is also known to use the occasion of Victory Day parade held every year on May 09 (to commemorate the victory of the Soviet Union over Nazi Germany) to demonstrate their military capabilities. States like North Korea, South Korea, Iran, etc. are also known to use such ceremonial parades to demonstrate their military strength including missiles.

During the 2013 Republic Day parade, India had displayed Agni-V and at that point of time too Chinese media had taken note of it. During the subsequent years, 2014 and 2015, Japanese PM Shinzo Abe and the US President Barack Obama were the chief guests for this parade. It appears that India avoided displaying its nuclear might after 2013 for obvious geopolitical reasons. But, January 2017 parade was different. During the last one year, China has repeatedly rubbed India the wrong way and for no reason. Hence, it was important to fully display India's strategic capabilities.

A display of ICBM in a ceremonial parade may have a very limited strategic relevance but, what was important is the timing. In view of China's adverse reaction to India's missile testing, this year's Republic Day parade could have been used for strategic signalling.

Nuclear deterrence is also about demonstration and display of capabilities. If you have it, then flaunt it! Such strategic signalling is often necessary to send a strong message to arrogant entities questioning India's 'strategic autonomy'.

Source: <http://www.idsa.in/>, 09 February 2017.

NUCLEAR STRATEGY

EUROPE

Europe's Nuclear Masterplan: Angela Merkel Told of Strategy for Joint Nuke Defence

Angela Merkel was expected to be presented with plans of a European nuclear defence programme on 7 February 2017. Later on in the day, the German leader met with President Andrzej Duda and Jarosław Kaczyński, leader of the conservative Law and Justice Party.

It is during the latter meeting, that Mr Kaczyński was to reportedly propose defence investments for "a European version of DARPA". The project would include a joint-investment in future defence

measures, including a "nuclear umbrella" based on French nuclear armaments.

Prior to the meeting, the right-wing politician told German press he hoped for a single nuclear unit, capable of matching Russia. He underlined Europe must be prepared for greater spending, suggesting nations put forward 10 per cent of their budgets towards this goal. Angela Merkel's foreign affairs spokesperson, Roderich Kiesewetter, mirrored these sentiments in regards to US involvement in European defence measures.

He issued a warning: "Europe needs to plan its own safety, in the event the Americans raise the costs of defending the continent, or decide to leave it completely". The Law and Justice leader also touched upon EU reform, which will lead towards more integrated defence co-operation. He was expected

to tell Mrs Merkel Europe is in crisis due to two fundamental mistakes, namely the Lisbon Treaty and the handling of the migrant crisis.

In his words, accepting high numbers of migrants into Europe would lead to "the erasing of a civilisation which arose out of Christianity." He added, aid would be more effective if spent in the countries where the refugees are coming from. The meeting was held at 6pm Polish time, with the Chancellor also paying visit to other political parties and German minority groups. ...

Source: <http://www.express.co.uk>, 7 February 2017.

Poland Wants Nuclear Weapons for Europe

In a newspaper interview, Jarosław Kaczyński, chairman of Poland's ruling Law and Justice Party (PiS), has called for a European nuclear superpower. Is this a debate we really need to have? The strongman of Poland's ruling national-conservative party has stoked a debate that was previously held in only a very limited capacity. In an interview with the daily "Frankfurter

Allgemeine Zeitung," Jaroslaw Kaczynski said Europe should be a super power with a nuclear arsenal to rival that of Russia. He conceded that such a program would, however, be very costly and that he did not anticipate such investment.

That aside, Kaczynski has broached a taboo subject typically only embraced by individual voices. One example is German parliamentarian Roderich Kiesewetter, of the conservative Christian Democrats, who recently told Reuters news agency that "Europe needs nuclear protection as a deterrent" if the United States were no longer to extend its protection. But how realistic are such ideas?

Franco-British Nuclear Capability?: "It's not surprising that we're seeing this kind of debate now," said Nick Witney, former head of the European Defense Agency and now a senior fellow at the European Council on Foreign Relations. In principle, it's about the question of whether US President Donald Trump is prepared to sacrifice Chicago to save Warsaw. And what would his answer to that be? The political situation has changed so quickly, and with it the current state of defense policy.

But how credible would a European nuclear deterrent be? Thirty years ago, London and Paris would have been flattered to be chosen as the defenders of the European continent. But what EU state would be prepared to accept such a nuclear defense force now? Never mind what Britain's decision to leave the EU has done to whatever credibility that idea still had.

For his part, Witney says he doesn't believe in a common European nuclear power. "You would need institutions for that which the EU doesn't have," he said. That leaves just France with its nuclear weapons which, in an emergency, could

perhaps still just about "rip the arm off of a Russian bear." Witney's conclusion: "The discussion is very much one that is on the fringe, if not completely out of the realm of the possible."

EU Nuclear Weapons would be a Mistake: "There

is no concrete threat," said Ulrich Kühn of the Carnegie Endowment for International Peace. The arguments for such a discussion are all there now in the Trump era, but at the same time, he says, this is "not helpful." NATO still exists, and under

US leadership, conventional weapons are being stationed in Poland and the Baltics. As long as NATO exists, Europeans should stay away from a nuclear race, he said.

Moreover, Kühn added, the suggestions are not practical. "Russia has between 2,000 and 3,000 tactical nuclear weapons," meaning that Europe would face enormous expenses if it were to acquire an adequate arsenal to serve as a deterrent. And the main question is who would control the red button? Aside from these issues, there's also the fact that a majority of European citizens, including

those in Poland, are against engaging in a nuclear arms race.

Kühn also believes it is dangerous that the non-proliferation treaty would effectively be voided if the Europeans were to withdraw from it. "That

would have global consequences," he said. "You could suddenly see the creation of 55 to 60 nuclear countries - a horrific scenario."

Instead, he said, the Europeans should finally do what they have long talked about doing: Take concrete steps towards realizing defense cooperation, sign agreements and work together on weapons systems in order to be more effective and credible in conventional defense measures.

No to a Nuclear Arms Race: Michael Gahler of the defense committee in European Parliament is

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also in favor of greater EU-wide cooperation. "We should finally do what the Lisbon Treaty allows us to do, which is to implement structural cooperation," he said. Of the 203 billion euros (\$217 billion) spent on defense in the EU, 26 billion could be saved or otherwise allocated if the member states would only work together, according to a parliamentary paper on common defense policy.

"Common acquisition, common exercises and common structures" are the next steps, according to Gahler. But he also said that a nuclear arms race would be a mistake. Although he perceives Russian tactical nuclear weapons as a real threat, he believes that overall, there is a balance when it comes to nuclear deterrents. "We don't want to revive the old arms debates of the 1980s," Gahler said. While he admitted that Russia and the United States of today were not foreseeable at the turn of the century, Gahler remains firm in his belief that "this is a debate that should not be started."

Source: <http://www.dw.com/en/poland-wants-nuclear-weapons-for-europe/a-37449773>

CHINA

China's Nuclear Weapons Policy could be about to Radically Change

There has long been a gap between China's nuclear weapons capabilities and the aspirations of its defence strategists, some of whom are keen to align Beijing's nuclear posture with the offensive, dominant stance of its conventional military forces. They may be getting their way: there are signs that China could start to move towards a "war-fighting" nuclear stance and dramatically change

There has long been a gap between China's nuclear weapons capabilities and the aspirations of its defence strategists, some of whom are keen to align Beijing's nuclear posture with the offensive, dominant stance of its conventional military forces. They may be getting their way: there are signs that China could start to move towards a "war-fighting" nuclear stance and dramatically change the way it uses its nuclear weapons for strategic purposes.

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This would be a huge change....But things have moved on; Chinese nuclear thinking is not static, passive or isolated, and the different elements of its nuclear position are flexible and well-integrated. This means Beijing could radically change its nuclear weapons strategy with relative ease. And that in turn could spell serious trouble for the geopolitical and nuclear balance of the whole Asia-Pacific region....The Pentagon

mostly assesses the Chinese nuclear arsenal by measuring its size, meaning it struggles to factor in other changes. Among these upgraded and more flexible equipment: China now possesses road-mobile nuclear weapons equipped with multiple warheads and a new generation of nuclear-powered submarines. It's also deployed long-range bombers on deterrence missions....

Only a few Chinese strategists have publicly advocated a shift from minimal nuclear deterrence to something like a war-fighting stance. But even if their views are in the minority, they nonetheless indicate that some in the defence establishment intend to assimilate Western nuclear strategies into traditional Chinese ones.

There are plenty of ways China could modify its existing forces to do this. It could deploy "tactical" nuclear weapons in large numbers, bolster its missile defence capabilities, or adopt a launch-on-warning posture, meaning that its weapons would be launched automatically or by default if an enemy attack were detected.

There are plenty of ways China could modify its existing forces to do this. It could deploy "tactical" nuclear weapons in large numbers, bolster its missile defence capabilities, or adopt a launch-on-warning posture, meaning that its

weapons would be launched automatically or by default if an enemy attack were detected....

This is all complicated by China's propensity for strategic ambiguity and opacity, which will surely reinforce the Pentagon's reliance on capacity-based assessments – the worst-case scenarios that it uses to infer Chinese intentions. If China formally adopts a war-fighting nuclear posture, it could create a self-fulfilling prophecy in which the US responds by taking a more assertive stance of its own. This in turn could send already fragile US-China relations into an intense and intractable security dilemma.

And so China presents the West's nuclear policy wonks with a set of fiendish puzzles. Why might Beijing be fundamentally rethinking things, and if so, when and why did it start? Who might be leading the rethink? Many of China's "new" nuclear capabilities in fact date back two decades or so, and it's hard to distinguish which are newly developed and which are simply being deployed in new ways. And above all, it's still unclear how having these "new" capabilities might affect Beijing's thinking about how to use its nuclear options in some future conflict... Many states will continue to accumulate progressively advanced war-fighting tools at a relatively low cost; interstate security dilemmas are set to become more frequent, more intense, more intractable and more destabilising. For China to take on a more aggressive nuclear posture in a world like this would be an alarming step indeed.

Source: <http://theconversation.com>, 08 February 2017.

USA

Pentagon Panel Urges Trump Team to Expand Nuclear Options

A blue-ribbon Pentagon panel has urged the Trump administration to make the US arsenal more capable of "limited" atomic war. The Defense Science Board, in an unpublished December

report obtained by CQ Roll Call, urges the president to consider altering existing and planned US armaments to achieve a greater number of lower-yield weapons that could provide a "tailored nuclear option for limited use." The recommendation is more evolutionary than revolutionary, but it foreshadows a raging debate just over the horizon.

Fully one-third of the nuclear arsenal is already considered low-yield, defense analysts say, and almost all the newest warheads are being built with less destructive options. But experts on the Pentagon panel and elsewhere say the board's goal is to further increase the number of smaller-scale nuclear weapons — and the ways they can be delivered — in order to deter adversaries, primarily Russia, from using nuclear weapons first....The issue will gain greater prominence in the next several years as an up-to-\$1 trillion update of the US

It has been the policy of Republican and Democratic presidents since the end of the Cold War to retain a range of nuclear capabilities, both in terms of explosive yield and method of delivery. Such a range of capabilities strengthens deterrence by signaling to potential adversaries that we can respond to a wide range of scenarios.

nuclear arsenal becomes the biggest Pentagon budget issue. That update, as now planned, mostly involves building new versions of the same submarines, bombers, missiles, bombs and warheads. Support for the modernization effort is bipartisan....

Dustin Walker, a spokesman for Arizona Republican Sen. John McCain, chairman of Senate Armed Services, said, "It has been the policy of Republican and Democratic presidents since the end of the Cold War to retain a range of nuclear capabilities, both in terms of explosive yield and method of delivery. Such a range of capabilities strengthens deterrence by signaling to potential adversaries that we can respond to a wide range of scenarios."

Worries about Trump: The Defense Science Board's nuclear recommendation is buried inside a report titled "Seven Defense Priorities for the New Administration," which also addresses homeland security, protecting information systems

and more. The board has made similar nuclear recommendations before, but the new report adds volume to a growing chorus of hawkish experts calling for a nuclear arsenal they say is more “discriminate.”

The board’s latest statement comes at a pivotal time because Trump rattled many Americans with comments during the campaign about nuclear weapons. He suggested that atomic arms might be an appropriate response to an

Islamic State attack and that it’s good for a president to be “unpredictable” about nuclear weapons. He also said, referring to nuclear weapons in general, that “the power, the destruction is very important to me.”... Lawmakers from both parties said that the debate over more lower-yield warheads should be part of the upcoming review.

New Forms of Deterrence: The Defense Science Board’s position is that Russia, under Vladimir Putin, has threatened to use TNWs first in a war in order to deter the United States from further escalating the conflict — a posture Moscow calls “escalate to de-escalate.” China, North Korea, Iran and other potential foes may take a similar tack, this group of experts fears....The concern is that enemies may not perceive America’s massive nuclear arsenal as a credible threat, because neither foes nor friends believe the US would use it. Moreover, the group says, if countries such as South Korea and Japan don’t believe America’s nuclear umbrella will protect them, they may consider building their own atomic arsenals.

All current and future low-yield US weapons would be delivered by aircraft. But more options are needed, the nuclear advocates say. America’s ballistic missiles — both ground-based and submarine-launched — are not equipped to carry lower-yield nuclear warheads, nor are drones, experts say. Missiles might be able

to reach targets faster and without getting anywhere near an enemy’s territory. And drones would not risk pilots’ lives and can fly for long periods of time...

Fears of Expanded Arms Race:

Those who oppose development or production of more small-scale nuclear weapons argue that US conventional capabilities are unmatched. They also say there’s no reason to believe that Russia, for all its bluster, would go nuclear in a conflict, because it would never assume the United States wouldn’t respond either with overwhelming conventional force or nuclear weapons.

a conflict, because it would never assume the United States wouldn’t respond either with overwhelming conventional force or nuclear weapons.... Moreover, they say, the United States has or will have plenty of lower-yield nuclear bombs to drop if necessary. And, they add, there are few scenarios in which missiles would be needed to deliver such warheads, because aircraft will suffice, particularly if they can launch atomic-tipped cruise missiles from long distances.

Source: <http://www.rollcall.com/>, 02 February 2017.

PAKISTAN

Pakistan Threatens Nuclear War to Stop India’s Cold Start

Pakistan and India are on the brink of nuclear war following India’s plans to deploy 460 high-tech battle tanks along its border with Pakistan. The deployment of the tanks is said to mark the start of implementation of India’s long-hyped Cold Start military strategy. “If ever our national security is threatened by advancing foreign forces, Pakistan will use all of its weapons — and I mean all of our weapons — to defend our country.”

Will the Cold Start Strategy Trigger a Nuclear War? With Islamabad being prepared to take up its own nuclear weapons as revenge on India for the potential consequences of its Cold Start military

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With Islamabad being prepared to take up its own nuclear weapons as revenge on India for the potential consequences of its Cold Start military strategy, tensions between them have reached a new high. The strategy will enable New Delhi to perform a military operation with conventional weapons on Pakistan soil at any given time.

strategy, tensions between them have reached a new high. The strategy will enable New Delhi to perform a military operation with conventional weapons on Pakistan soil at any given time. In other words, India will be able to immediately retaliate for a terror attack or the killing of its soldiers along its border with Pakistan....

How serious are Pakistan's nuclear threats? It's not the first time Pakistan has threatened to use nuclear weapons against India. However, whenever Islamabad reiterates its first-use nuclear doctrine, it almost always results in an escalation of tensions with India....

However, this time, Pakistan's nuclear threats serve as a dangerous wake-up call. The Pakistani official's comments quoted by the Financial Times came in the context of India's Cold Start military strategy. Earlier this month, India's new chief of army staff finally publicly acknowledged the existence of the strategy.... To fully implement the Cold Start military strategy, India requires high-tech advanced military hardware, including tanks and attack helicopters. It also requires the Indian army to have advanced intelligence, surveillance and reconnaissance capabilities that it just doesn't have.

Pakistan vows to "destroy" India with nuclear weapons-Even though India already has an impressive tank force deployed along its border with Pakistan, almost all of them are equipped with obsolete, decades-old technology. That's why India has been so eager to purchase hundreds of advanced tanks from Russia....

Nuclear war political experts in both India and Pakistan are worried the Cold Start strategy could have the unintended consequence of triggering a nuclear war. In fact, the new Indian military strategy does make a nuclear war more likely. Many experts are worried that in a conflict as tense and heated as that between India and Pakistan, there is no real definition of a conventional conflict. Nuclear weapons are still weapons, and both Islamabad and New Delhi are willing to do anything – even risk massive retaliation involving nukes – to destroy their traditional enemy.

Islamabad and New Delhi are willing to do anything – even risk massive retaliation involving nukes – to destroy their traditional enemy.

Critics of the Cold Start strategy say it is based on a very questionable assumption that rapid attacks against Pakistan would deter the latter from carrying out nuclear attacks in retaliation. The objective of India's new military doctrine is to be able to launch a rapid military action against Pakistan without risking a nuclear war. Many question the rationality of this strategy.

Source: <http://www.valuewalk.com>, 24 January 2017.

BALLISTIC MISSILE DEFENCE

USA

US Should Expand Missile Defense Due to North Korea, Iran

The United States should invest more in missile defense given missile testing by North Korea and Iran, the chairman of the House of Representatives Armed Services Committee said. The comments by Republican Representative Mac Thornberry

followed new US sanctions against Iran after Tehran's recent ballistic missile tests. Washington is also concerned North Korea may be preparing to test a new ballistic missile. Thornberry's position was a sign of support in Congress for military spending to counter North Korea after President Trump during the 2016 election campaign raised doubts about future US funding to defend allies like South Korea and Japan.

"If you look at what's happening around the world, I would mention Iran and North Korea, the importance of missile defense is increasing," Thornberry said at a roundtable discussion with reporters. He said there was a need both to provide more systems and to improve missile defense technology. "Actors around the world are building missiles that are harder to stop," he added.

Jim Mattis, Trump's defense secretary, told South Korea that Washington and Seoul would stand "shoulder-to-shoulder" to face the threat from North Korea. Both South Korea and the United States have recommitted to plans to deploy an \$800 million advanced missile defense system in South Korea later this year. More broadly, Thornberry also said he expected an end to strict limits on defense spending now that Republicans control both Congress and the White House.... The Trump administration is expected within weeks to send Congress a request for a supplemental bill to increase defense spending this year.

Source: <http://www.reuters.com>, 06 February 2017.

CHINA

China Steps Up Opposition to US Missile Defense System

China is stepping up its efforts to stop South Korea from deploying a US missile defense system on

its soil, turning up the pressure on the economic front, while warning of the impact on diplomatic relations if the system is put in place this year.

China is stepping up its efforts to stop South Korea from deploying a US missile defense system on its soil, turning up the pressure on the economic front, while warning of the impact on diplomatic relations if the system is put in place this year.

Chinese political scientist Tang Jianqun said there are two things about the system that worry Beijing: its impact on major nuclear powers such as China and Russia and how it can also

function as a strategic deterrent to the People's Liberation Army.... The THAAD missile system comes equipped with a powerful radar system that China has long argued would allow the United States to see far beyond North Korea into Chinese and Russian territory....

Tang said it is not just radar systems in South Korea, but those in Japan, Alaska and even in Taiwan that form part of a larger global system that concern China.

North Korean threat-Still, while Beijing and Washington are rivals and competitors, the relationship between the world's top two economies is nothing like

the Soviet Union and the United States during the Cold War. China and the US are not in a nuclear arms race and while there are concerns that disagreements, over the South China Sea for example, could escalate, the two do not threaten each other with direct military action.

North Korea on the other hand is likely to be the biggest security challenge for the United States over the next two years, defense analysts say, with some predicting that Pyongyang could have the capability to carry out a nuclear strike on the American continent in that time....

An upcoming election could lead to the cancellation or delay of the system. But even so, Beijing is concerned, said Bong Young-shik, a political analyst with the Yonsei University Institute for North Korean Studies."There have been persistent attempts by the Xi Jinping

government to keep South Korea closer to China and away from the trilateral security cooperation with the US and Japan," Bong said. "South Korea has been perceived by Beijing as the weakest link of the trilateral China encirclement."

Jagannath Panda, an analyst at the Institute of Defense Studies and Analysis in New Delhi, said there is not a debate going on in China now about how to counter THAAD, but how to counter the American presence permanently. Chinese countermeasures-Panda said recent revelations in the media about China's deployment of DF-41 intercontinental ballistic missiles in the country's northeast, near its border with the Korean peninsula, were in part a response to the possible deployment of THAAD.... China has already begun tightening the screws on Seoul and that is likely to continue if it fails to reverse its course, Panda added.

Since THAAD was deployed fewer Chinese tourists have been going to "South Korea for vacation, and that has actually in a big way already affected the South Korean economy already," Panda said. And that is just one of the ways Beijing is taking initiatives to pressure South Korea over its deployment... A golf course owned by the Lotte Group in South Korea's southern Seongju County is the announced site where the THAAD system will eventually be located. It is expected to be deployed in May. Although there are concerns increased public opposition could delay it.

Source: <http://www.voanews.com>, 01 February 2017.

PAKISTAN

Pakistan Raises Objections to India's Missile Programme

A week after India conducted an Agni-IV test, Pakistan conveyed its "concern" about New Delhi's missiles programme to the MTCR, saying that it posed "a danger to regional peace and

stability," *The Express Tribune* reported.

... Pakistan conveyed its "concerns" to an MTCR delegation which is in Pakistan to meet with foreign affairs ministry officials. Pakistan reportedly said India's introduction of "destabilising systems such as missile defence programmes and inter-continental ballistic missiles was posing a danger to regional peace and stability", *The Express Tribune* wrote.

These Pakistan statements come after India conducted its final test of the Agni-IV ICBM. That test came close on the heels of the successful test-firing of Agni-V. Agni-IV can travel 4,000 kilometres and Agni-V has a range of more than 5,000 kilometres and can reach Europe and the northernmost parts of China.

In a clear reference to India, a Pakistani foreign ministry official "highlighted the risks posed to regional peace

and stability due to the introduction of destabilizing systems such as missile defence programmes and inter-continental ballistic missiles." Pakistan said its proposal on establishing a Strategic Restraint Regime in South Asia, which covers nuclear and missile restraint remains, on the table. "Pakistan believes that progress on this proposal through meaningful dialogue can promote peace and stability in the region," the foreign ministry official said.

A statement issued by Pakistan's foreign office said the agenda for talks with the MTCR delegation included the latest political and technical developments in the grouping. "Pakistan's export control regime is at par with the best international standards and its national control lists encompass the items and technologies controlled by the MTCR," a foreign ministry official told the delegation.

Source: <http://timesofindia.indiatimes.com>, 12 January 2017.

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RUSSIA

Russia's Anti-ballistic Missile Defense System to be Upgraded by Late 2017

Russia's anti-ballistic missile system will be upgraded until the end of 2017, Chief of Staff of a Missile Defense Formation Colonel Alexei Chumakov said in an interview with Krasnaya Zvezda newspaper. "Work is in full swing today to create a unified national ABM-air defense system of the 21st century to comprise S-500 air defense missile complexes and advanced mobile radar stations. As a whole, the entire ABM system will be upgraded until the end of 2017. Importantly, the system is being modernized without the withdrawal of capabilities from the organic mode of operation, i.e. without interruptions in operational readiness," he said.

At present, the radar Don-2N is also undergoing profound upgrade to increase the range of detecting both ballistic targets and small space objects and make its transmitters and receivers more powerful," Krasnaya Zvezda said in its material.

The Don-2N is a stationary multi-purpose all-round surveillance centimeter-range radar station created to perform missions for Moscow's missile defense. The radar is capable of detecting an ICBM warhead at a distance of 3,700 km and at an altitude of 40,000 km. The Don-2N is the central and the most complex element of Moscow's anti-ballistic missile defense system. It is assigned the tasks of detecting and tracking ballistic missiles, measuring coordinates and aiming anti-missiles at incoming targets. The radar is integrated into the unified system of additional data support for missile early warning and outer space control systems.

Source: <http://tass.com>, 23 January 2017.

NUCLEAR ENERGY

CHINA

Full Steam Ahead: China Plans Floating Nuclear Power Plants by 2020

China's next generation nuclear vision includes rolling out a series of floating marine power plants to light up offshore initiatives by 2020, a government spokesperson for science and technology has confirmed.

A five-year-plan published in March 2016 detailed China's desire to boost its nuclear generating capacity. The development plan also pledged to "strengthen" sea oil and gas exploration, a goal that would be buoyed by offshore nuclear sites.

According to Wang Yiren, a director at China's State Administration of Science, Technology and Industry for National Defense, floating nuclear stations will help provide the extra juice necessary for powering China. Yiren told China's Science and Technology

Daily that offshore energy supplies such as diesel generators are inefficient for offshore initiatives such as oil drilling. He confirmed floating power platforms are a major component of China's latest five-year plan, while the Atomic Energy Agency has conducted research into key technology for the development.

... Although China's latest social and economic strategy does not mention floating power plants specifically, an objective to "accelerate the development of new generation nuclear power equipment" is included. The document also centers on building a modern energy system, a focus which could see China's coastal power belt overhauled and the "construction of independent nuclear power projects". ...

Source: <https://www.rt.com/business/377324-china-floating-nuclear-reactor/>, 14 February 2017.

The Don-2N is a stationary multi-purpose all-round surveillance centimeter-range radar station created to perform missions for Moscow's missile defense. The radar is capable of detecting an ICBM warhead at a distance of 3,700 km and at an altitude of 40,000 km. The Don-2N is the central and the most complex element of Moscow's anti-ballistic missile defense system. It is assigned the tasks of detecting and tracking ballistic missiles, measuring coordinates and aiming anti-missiles at incoming targets.

INDIA

Westinghouse Mum Over Threat to Andhra N-Unit

India is not unduly worried over a recent decision by Japan's Toshiba Corporation to quit nuclear power stations construction business in the wake of the massive write-down at its US nuclear unit, Westinghouse Electric Company, which was allotted a site in Andhra Pradesh to set up a nuclear power plant following the India-US civil nuclear deal. Officials said India will wait for communication from its American partner on the future of the project.

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The NPCIL and Westinghouse are scheduled to conclude the commercial contract this year, after which the US nuclear firm is to set up six reactors (AP1000 type) in three pairs for the proposed plant in Andhra Pradesh.

However, Toshiba's decision to withdraw from its lead role in Westinghouse-led nuclear plants has reportedly raised doubts over its various projects worldwide. Persons familiar with the developments, however, said India has not received any communication from Westinghouse about any challenges for the project. Westinghouse is the principal interlocutor for India for the proposed plant.

The US nuclear firm has not apprised India about Toshiba's decision, which is essentially a matter between the Japanese corporation and Westinghouse, said a person familiar with the development. NPCIL will await communication from Westinghouse, he said... Meanwhile, with threats emerging from tactical nuclear weapons from state and non-state actors in India's neighbourhood, the external affairs ministry is hosting the Implementation and Assessment

Group Meeting of the GICNT in Delhi on February 8-10. The event highlights India's commitment to global nuclear non-proliferation and peaceful uses of nuclear energy, officials said.

The ministry said in a statement, "The possible use of weapons of mass destruction and related material by terrorists is no longer a theoretical concern. A breach of nuclear security may lead to unimaginable consequences. Such an event would have a global impact. It is imperative to strengthen international efforts to combat such threats. This meeting is therefore timely and important and would further enhance our vigil."

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GICNT was launched in 2006 jointly by Russia and the USA. In the past ten years, it has grown to include 86 partner nations and five official observer organisations, and has held several multilateral activities in support of its statement of principles. GICNT comprises four working groups – Implementation and Assessment Group, Nuclear Detection Working Group, Nuclear Forensics Working Group, and Response and Mitigation Working Group. India has been an active participant at the GICNT events.

Source: <http://economictimes.indiatimes.com>, 09 February 2017.

GENERAL

IAEA Spearheading Training Programmes on Small Modular Reactors

With increased global demand for alternative energy sources, many developing countries are considering the introduction of nuclear power programmes to meet growing energy needs. This, in turn, has necessitated the exigency for nuclear science/technology education programmes,

helping nuclear professionals maintain and expand their nuclear expertise.

As the global hub for exchange in peaceful nuclear technologies, the IAEA is spearheading training programmes with the development and distribution of simulation software and training courses. With the recent addition of a Small and Medium Sized or Modular Reactor (SMR) simulator, the IAEA bolstered its collection of educational nuclear power plant simulators.

The brand new simulator of an integral pressurized water reactor (iPWR) type is the first and only freely available simulator to understand the physics and technology of SMRs for educational purposes. Responding to growing interests and activities in SMR technology, the simulator is available for free to all IAEA Member States. It comes with proper manuals in order to understand the intricacies of this technology, along with ways to perform various exercises.

Similarly, throughout 2016, the IAEA has conducted several activities, including training courses and demonstrations, in Asia, North Africa, and Latin America in order to support education and training on nuclear reactor systems....

In a conscious effort to expand the use of this training course to help countries in their national education and training programmes, the simulators were also demonstrated at the biennial Austrian "Long Night of Research" event, the IAEA's 60th General Conference and the 3rd Nuclear Knowledge Management Conference.

With the distribution of more than 200 simulator software to 36 Member States and 75 organisations, the interest in member states to use this training methodology is increasing. The simulators can be easily operated from personal computers, do not require high end computing

capabilities, have intuitive graphic user interfaces, and are particularly useful for newcomer nations and universities interested in developing or adapting nuclear engineering courses.

Source: <https://www.iaea.org>, 6 February 2017.

RUSSIA

Russia Tests Advanced Nuclear Fuel Equipment

The AA Bochvar Research Institute of Inorganic Materials (VNIINM) has announced further progress in Russia's endeavour to close the nuclear fuel cycle. A subsidiary of nuclear fuel manufacturer TVEL, VNIINM said it had completed

three state-sponsored contracts for the 'Proryv', or Breakthrough, project.

These are: processing irradiated uranium-plutonium mixed nitride fuel; treatment of subsequent radioactive waste; and mathematical modelling of technological processes for the fabrication of nuclear fuel, its reprocessing and the management of radioactive waste for advanced fast

reactors.

Siberian Chemical Combine (SCC), another TVEL subsidiary, last year designed a stand for the development of technology to refine the manufacture nuclear fuel. A fabrication and recycling facility is planned for the pilot demonstration power complex (ODEK), which is to be built at SCC as part of the Breakthrough project. The stand was first tested with plutonium and neptunium.

The stand includes an extraction-crystallization separation module for processing used nuclear fuel to examine technologies VNIINM and the VG Khlopin Radium Institute have developed. Experiments using the stand will help inform the design of ODEK. The stand, which is now operational, also includes automatic control and

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management of process equipment with remote monitoring.

VNIINM said its experiments had confirmed for the first time that the technology used for the reprocessing of used uranium-plutonium mixed nitride fuel enables the reuse of more than 99.9% of the actinides. Vladimir Kashcheev, VNIINM director, said the stand had enabled experiments originally on "model-based solutions" to be carried out using full-scale equipment, as well as identified further research to be conducted this year and next....

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Mashinostroitelny Zavod (MSZ), another unit of TVEL, said last August it had completed acceptance tests of components for its ETVS-14 and ETVS-15 experimental fuel assemblies with mixed nitride fuel for the BREST and BN fast neutron reactors - also part of the Breakthrough project. MSZ also announced the start of research and development work on the technical design of the "absorbent element" of the core of the BREST-OD-300 lead-cooled fast reactor. ETVS-16 to 21 are scheduled for 2017 production by SCC for VNIINM.

Source: <http://www.world-nuclear-news.org>, 09 February 2017.

UK

UK Energy Plans Hit after Toshiba Balks at Nuclear Plant Risk

A key part of the UK's energy strategy has been thrown into doubt after Toshiba, the struggling Japanese conglomerate, said it would not take on any construction risk for a nuclear power station in Cumbria. The move by Toshiba is the latest setback to the UK's plans to invest in new nuclear

generating capacity, an important component of the country's strategy to reduce carbon emissions and keep the lights on.

The setback follows delays on the other two advanced projects in the British nuclear revival. A planned plant at Hinkley Point in Somerset, led by the French utility EDF, was approved last year. But two other projects in France and Finland based on the same reactor design are years behind schedule. There are

also question marks over the third UK project at Wylfa in Anglesey, which is being led by Hitachi of Japan.

The Toshiba-led project at Moorside in Cumbria is expected to meet about 8 per cent of the UK's electricity needs and is an important part of the UK's plans to build six nuclear power stations as it due to phase out dirty coal-fired plants completely by 2025 and decommission the

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One energy consultant warned that any further delays to the nuclear build programme would make it difficult for the government to hit its emission reduction targets. "The simple maths make it very, very

challenging to hit the 2030 target for [the UK's] greenhouse gas reduction unless you have a substantial nuclear fleet at that time," said Peter Atherton at Cornwall Energy.

Industry and trade union leaders called on the British government to save the Moorside project after the Japanese conglomerate announced it would scale back its overseas nuclear ambitions by reducing its role in constructing new power plants. Instead Toshiba said it would focus on lower-risk areas such as reactor designs.

Toshiba, which owns 60 per cent of the NuGen consortium responsible for Moorside, said it would still “consider participating [in the project] without taking on any risk from carrying out actual construction work”. The Japanese company confirmed it planned to sell its stake in NuGen if a buyer could be found after it announced a \$6.3bn write down at its crisis-hit US Westinghouse subsidiary that designs nuclear reactors.

It means that Moorside is only likely to go ahead if new investors can be found to build the plant that will house three AP1000 reactors supplied by Westinghouse. As well as an important pillar of UK energy policy, Moorside is also a political flashpoint in the campaign for parliamentary by-election in the west Cumbrian seat of Copeland. Opposition political parties and union leaders seized on Toshiba’s announcement to step up pressure on the government to commit finance to Moorside. ...

Source: Excerpted from article by Andrew Ward and Nathalie Thomas, <https://www.ft.com>, 14 February 2017.

URANIUM PRODUCTION

INDIA

India Plans Nuclear Energy Evolution with Discovery of Uranium Reserves, More Atomic Power Plants and Tie-up with French Company

India is looking to take the next step in its evolution as a world power on nuclear energy, with the establishment of more atomic power plants, a tie-up with French public utility EDF and the discovery of uranium reserves in Meghalaya, which means India may not have to look at foreign source for fissile materials in nuclear power plants any more....

According to a statement from the DAE, he added: “The nuclear power project at Gorakhpur in Haryana is being set up by the NPCIL, a public sector enterprise under the DAE.”

Uranium in Meghalaya-In a written reply to another question in the Lok Sabha, Singh said: “Uranium mineralisation in Meghalaya has been found over a large area around Domiasiat, Wahkyn, Lostoin etc. The UCIL under the DAE has already made a plan to develop the mineral

resources at Domiasiat under the name of “Kylleng Phendengsohiong Mawthabah (KPM) Uranium Mining Project”. The project has the potential to generate substantial nuclear fuel for the atomic power plants of the country. According to a DAE statement, he added: “The Detailed Project Report of the KPM Uranium Mining

Project has been approved by Atomic Energy Commission. Environmental clearance for this project has been obtained from Ministry of Environment Forest and Climate Change in December 2007....

Tie-up with French utility company-Singh also said that India has entered into a tie-up with a French utility company to further its nuclear industry. In a written reply to a third question in the Lok Sabha, he said: “The French Government in January 2016 had communicated that French public utility Electricite de France (EDF) was designated to take control of AREVA NP and would be the single entry point for Indian side on all matters related to nuclear power projects to be set up at Jaitapur, Maharashtra.” According to a DAE statement, he added: “The NPCIL has entered into an MoU with EDF for implementation of six EPR units at Jaitapur in Maharashtra together with associated fuel, fuel services and other services.”

Source: <http://www.ibtimes.co.in/>, 9 February 2017.

NUCLEAR PROLIFERATION

NORTH KOREA

North Korea Nuclear Weapons Advances Stir Concerns

New warnings about North Korean advances on its nuclear weapons program demonstrate the need for President Trump to enforce sanctions rather than encourage an arms race with the reclusive nation and its unpredictable leader, Kim Jong-un, Nevada Rep. Dina Titus said.

"Rather than saber rattling, the Trump administration should focus on fully implementing and enforcing these sanctions. We should also not encourage an arms race in Asia as Trump suggested during the campaign," said Titus, D-Nev., and a member of the House Foreign Affairs Committee.

Titus' comments came in response to a Review-Journal query after the committee heard experts testify that North Korea has been skirting sanctions with help from China and is close to developing a nuclear warhead for delivery by an intercontinental ballistic missile or one launched by a submarine.

"I understand how important it is that the United States work with our allies in the Pacific region to counter any attempts by the regime in North Korea to further its nuclear programs," Titus said in an email provided by her spokesman, adding that she supported additional sanctions against North Korea last year... One expert who testified, Victor Cha, senior adviser and Korea chairman of the Center for Strategic and International Studies, said it's "highly likely that the North will carry out another ICBM test or nuclear test early in the Trump administration." "The purpose would be to demonstrate advances in the technology and assert a position of strength that would put the president back on his heels," Cha said.

In his first overseas trip as defense secretary, Jim Mattis, with South Korean Defense Minister Han Min Koo by his side, warned North Korea, saying, "Any attack on the United States, or our allies,

will be defeated, and any use of nuclear weapons would be met with a response that would be effective and overwhelming."

Source: <http://www.reviewjournal.com>, 03 February 2017.

North Korea Accuses US, South Korea of Plotting Nuclear Attack

The commitment of the US and South Korea to a new missile defense system is pushing the Korean peninsula to the "brink of a nuclear war," North Korea warned. Pyongyang said the missile system, also opposed by China, was part of a joint plot between Seoul and Washington to mount a "preemptive attack on the North", according to a statement on the official KCNA news agency attributed to the National Peace Committee of Korea. The statement coincided with a visit by new US Defense Secretary James Mattis to Seoul, where he pledged to deploy THAAD – the Terminal High Altitude Area Defense system – to protect US and South Korean troops.

Mattis promised an "overwhelming" response to any attack mounted by North Korea. "North Korea continues to launch missiles, develop its nuclear weapons program and engage in threatening

rhetoric and behavior," Mattis said at a press conference in Seoul. Speaking alongside South Korean Defense Minister Han Min-koo, he added: "Any attack on the United States or on our allies will be defeated and any use of nuclear weapons will be met with a response that will be effective and overwhelming."

China again called for the THAAD missile defense system to be halted. In his regular press conference, Chinese Foreign Ministry spokesman Lu Kang said Beijing "firmly opposed" the new system.... North Korea nevertheless continues to make bellicose statements, including one from leader Kim Jong Un on New Year's Day in which he said his military is on the brink of testing its first intercontinental ballistic missile – a rocket that could be equipped with nuclear weapons and is powerful enough to reach any part of the United

New warnings about North Korean advances on its nuclear weapons program demonstrate the need for President Trump to enforce sanctions rather than encourage an arms race with the reclusive nation and its unpredictable leader, Kim Jong-un.

States. Analysts point out, however, that Kim's bluster is often more for internal consumption than an actual threat to South Korea and the US, which has 28,000 troops in South Korea.

Source: <http://edition.cnn.com/>, 3 February 2017.

NUCLEAR NON-PROLIFERATION

USA-RUSSIA

Trump Told Putin he didn't Like US-Russian Nuclear Treaty

President Trump told Russian leader Vladimir Putin that he didn't like a US-Russian nuclear non-proliferation treaty — after asking what the treaty was — according to Reuters.

When Putin asked about extending the New START treaty during a late January call, Trump paused to ask his aides what the treaty was, two US officials and a third former US official with knowledge of the call told Reuters. Trump then ripped the treaty, telling Putin that it was one of several bad deals negotiated by former President Barack Obama, before bragging about his own popularity....

According to the sources, two of whom were read detailed notes of the call, Trump didn't get the standard in-depth briefing from National Security Council staff that usually presages calls with international leaders. The White House initially wouldn't comment on the report. But Press Secretary Sean Spicer fired back at how Reuters had characterized the conversation — without disputing any of the facts...

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The report triggered alarm bells on both sides of the aisle. Former Sen. Dick Lugar (R-Ind.), a nuclear non-proliferation expert who played a key role in passing the New START treaty, said he was "worried" about Trump's lack of knowledge on the topic and encouraged him to study up.

"I wish he was better informed," Lugar said. "I have a general suspicion that he was not familiar

with that treaty or really for that matter with other arms control treaties that preceded it or really the whole sequence of events from 1991 through 2012," after the Soviet Union fell.

Democrats who focus on national security weren't as subtle. "It's impossible to overstate the negligence of the President of the United States not knowing basic facts about nuclear policy and arms control," Sen. Jeanne Shaheen (D-N.H.) said in a statement. "If this report is true, President Trump should immediately review the provisions of the New START Treaty with his advisors and Cabinet. ... The administration desperately needs to develop a consistent position on nuclear policy, especially before engaging in further conversations with world leaders."

Source: <http://www.nydailynews.com/>, 09 February 2017.

NUCLEAR SAFETY

FRANCE

French Nuclear Power Plant Explosion: Blast at Flamanville Station 'Does Not Cause Radioactive Leak'

Several people are being treated for smoke inhalation after an explosion and fire at a nuclear power plant in France. Authorities said there was "no nuclear risk" following the blast in Flamanville shortly before 10 am local time on 9 February. "It is a significant technical issue but does not constitute a nuclear accident," Olivier Marmion, director of the prefect's office, told AFP, adding that the explosion occurred outside the nuclear zone. Officials said the blast took place in the turbine hall and confirmed there was no radioactive leak.

Five people were treated by paramedics for smoke inhalation, with no serious injuries reported. The Flamanville nuclear power plant is run by EDF Energy, which is the main contractor on the new £18bn Hinkley Point C station in Somerset. It said

there were no casualties in the incident or “consequences for safety at the plant or for environmental safety”. “A fire resulting in a minor explosion broke out in the turbine hall on the non-nuclear part of unit one at the Flamanville nuclear power plant,” a spokesperson said.

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“The fire was immediately brought under control by the plant’s response team. As per normal procedure, the fire brigade went to the affected location and confirmed that the fire had been extinguished.” No information was given by EDF on the cause of the fire, which caused the number one reactor to be disconnected from the power grid....

The fire was the latest concerning incident for the trouble-beset Flamanville station, once described as a “nuclear catastrophe” in the French press. The plant, located on English Channel coastline in La Manche, houses two pressurised water reactors built in the 1980s. A radioactive leak occurred in 2012 from reactor one, which was at a standstill at that time.

Source: [http:// www.independent.co.uk](http://www.independent.co.uk), 09 February 2017.

JAPAN

Are Elevated Fukushima Radiation Levels Cause for Alarm?

The utility company that operated the Fukushima Daiichi nuclear plant in Japan – the one that went into triple meltdown after the enormous 2011 earthquake and tsunami – has released some jaw-dropping figures.

The radiation level in the containment vessel of reactor two has reached as high as 530 sieverts per hour, Tokyo Electric Power Co, or Tepco as it’s known, said. This far exceeds the previous high of 73 sieverts per hour recorded at the reactor following the March 2011 disaster. That was the world’s worst nuclear disaster since the one at Chernobyl, in Ukraine, in 1986. Almost 16,000 people were killed along Japan’s northeastern

coast in the tsunami, and 160,000 more lost their homes and livelihoods. The cleanup is taking much longer than expected. At this level of radioactivity, a person could die from the briefest of exposures.

Tepco recorded the radiation near the reactor core, suggesting that some melted fuel had escaped,

using a long, remote-controlled camera and radiation measurement device. It was the first time this kind of device has been able to get into this part of the reactor. There, it found a three-foot-wide hole in a metal grate in the reactor’s primary containment vessel.

So, how dangerous is this?-At this level of radiation, a robot would be able to operate for less than two hours before it was destroyed, Tepco said. And Japan’s National Institute of Radiological Sciences said medical professionals had never even thought about encountering this level of radiation in their work.

According to Kyodo News Agency, the institute estimates that exposure to one sievert of radiation could lead to infertility, loss of hair and cataracts, while four sieverts would kill half of the people exposed to it. This measuring device

hasn’t even gone into reactors one and three yet – that’s still in the works. So should the people who live in Japan, who live on the Pacific basin be freaking out?-Not yet, some analysts say.

Although the radiation level is “astoundingly high,” says Azby Brown of Safecast, a citizen science organization that monitors radiation levels, it doesn’t necessarily signify any alarming change in radiation levels at Fukushima. It’s simply the first time they’ve been measured that far inside the reactor.

... Could the radiation level be even higher? Possibly. The 530 sievert reading was recorded some distance from the melted fuel, so in reality it could be 10 times higher than recorded, said

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Hideyuki Ban, co-director of Citizens' Nuclear Information Center. He agreed with Tanabe, saying that the findings underscore how difficult the decommissioning process will be....

So what does this news portend? The level of the reading should give proponents of nuclear power in Japan – including PM Shinzo Abe, who's been pushing to restart reactors shut down after the 2011 disaster – pause, Tanabe said.... "The PM said everything was under control and has been pushing to restart nuclear plants, but no one knew the actual state of the plant and more serious facts could come out in the future," she said. "It's important to keep an eye on radiation-monitoring data and how Tepco's investigations go."

Source: <http://www.denverpost.com>, 08 February 2017.

NUCLEAR TERRORISM

GENERAL

Nuclear Terrorism an International Threat, Need for Global Response: Jaishankar

Asserting that nuclear security remains a continuing concern, India today said terrorism, especially nuclear terrorism is an international threat that should not serve national strategy and pitched for a global response in this regard.

Foreign Secretary S Jaishankar, who was speaking at the Implementation and Assessment Group Meeting of Global Initiative to Combat Nuclear Terrorism, also hoped that the horrors of atomic power destruction would never be repeated as the negative consequences of atomic power cannot be overlooked. "Events that have unfolded around us, more so in the past couple of decades, have highlighted that terrorism remains the most pervasive and serious challenge to international security. If access to nuclear technology changes State behaviour, it is only to be expected that it would also impact on non-state calculations.

"Nuclear security, therefore, will be a continuing concern, especially as terrorist groups and non-

state actors strike deeper roots and explore different avenues to spread terror. Developing a comprehensive global response is the highest priority," he said. Maintaining that nuclear energy will continue to play an important role in tackling challenges of inclusive growth and climate change, he said, "On the other hand, the negative consequences of atomic power also cannot be ignored. The world has witnessed the immense destructive power of the atom.

"We hope that such horrors will never be repeated and cannot overstate the importance of countries with nuclear weapons to be responsible." Jaishankar also warned of the dangers

of discriminating among terrorists – good or bad or even yours and mine – are increasingly recognised. "Terrorism is an international threat that should not serve national strategy. Nuclear terrorism even more so," he said.

During his address at the meeting, which is being attended by delegates from over 100 countries including the US, the UK, France and Pakistan, he also referred to the strong credentials of India, which is looking for a membership in NSG, in promoting the peaceful use of nuclear energy.

Source: <http://economictimes.indiatimes.com/>, 08 February 2017.

NUCLEAR WASTE MANAGEMENT

UK

Innovating a Solution to the UK's Nuclear Waste Legacy

There was a point during BBC 4's Britain's Nuclear Secrets: Inside Sellafield when the scale and complexity of dealing with certain types of nuclear waste was made clear. One of the site's ponds was home to spent nuclear fuel, isotope cartridges and reactor components that had been in situ for 50 years. The plan was to remove it, encapsulate it in concrete and then put it into steel containers.

But moving waste of a certain vintage is fraught with hazards and during the broadcast workers at the plant demonstrated to the show's presenter

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Prof. Jim Al-Khalili how ROVs and robotic arms were being employed to investigate the pond's contents and how they might best be removed.

Nuclear waste management and decommissioning is high on the agenda at Civil Nuclear Showcase 2017, which takes place in London between February 28 and March 1. It is also at the forefront of a funding round from the Nuclear Decommissioning Authority and Innovate UK, who are making £3m available to businesses that can develop technologies that will help dismantle facilities at the Sellafield nuclear site, which shifts into full-scale decommissioning and waste management by 2020.

Such businesses have until April 26, 2017 to submit their ideas to the Integrated Innovation for Nuclear Decommissioning competition, which is looking for equipment that can reduce the risks for workers, reduce timescales, costs, and identify how to deal with the radioactive waste. Ideas that can be adapted from other industrial sectors are

said to be particularly welcome, as are collaborations between smaller businesses.

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According to a joint statement, "robotics, virtual imaging, autonomous systems, sensors and detectors are all likely to be required as highly radioactive facilities are cleaned up and taken apart by a workforce that has to operate from a safe distance." Ideas generated and taken forward may have utility beyond Sellafield at other NDA/nuclear sites and in industries that present their

own unique safety challenges such as oil and gas or defence.

The organisers add that the competition is split into stages with initial funding available to develop a business case, followed by the second stage leading to demonstrations in a non-radioactive environment. "If this demonstration is successful, there is the potential for progress to deployment and demonstration in a radioactive facility at Sellafield," they said.

Source: <https://www.theengineer.co.uk/>, 06 February 2017.



Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal Vinod Patney, SYSM PVSM AVSM VrC (Retd).

Centre for Air Power Studies

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