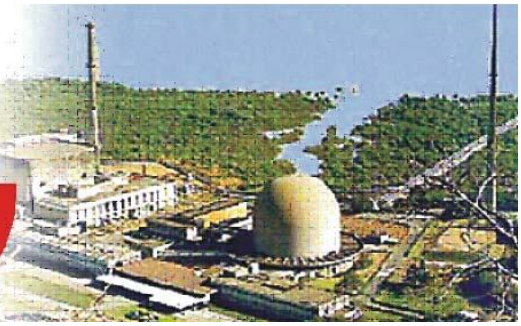
NUCLEAR SECURITY



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

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OPINION – Manpreet Sethi

The Bomb Banned: By and For the NNWS, For Now

As the Treaty on the Prohibition of Nuclear Weapons (TPNW), popularly referred to as the Ban Treaty, opens for signature on September 20, 2017 it is most likely that it will garner the 50 endorsements that are necessary for its entry into force. After all, it was adopted in the UNGA on July 07, 2017 by a vote of 122 in favour with one against (Netherlands) and one abstention (Singapore). But having entered into force, would the treaty, as Ambassador Gomez of Costa Rica, president of the Conference negotiating the instrument said, bring the world "one step closer to the total elimination of nuclear weapons"? Will the treaty facilitate universal nuclear disarmament?

The answer, at this juncture, is not a clear yes since all nuclear weapon possessors have shunned the treaty. The US, UK and France have even described themselves as "persistent objectors" to the treaty, expressing that they do not "intend to sign, ratify, or even become party to it". The three have accused the treaty of creating "even more divisions at a time when the world needs to remain united in the face of growing threats." China and Russia too have voiced similar objections and rue the absence of a feasible, comprehensive, verifiable and enforceable nuclear disarmament regime.

Will the treaty facilitate universal nuclear disarmament? The answer, at this juncture, is not a clear yes since all nuclear weapon possessors have shunned the treaty. The US, UK and France have even described themselves as "persistent objectors" to the treaty, expressing that they do not "intend to sign, ratify, or even become party to it.

Given this response of the NWS, the ability of the treaty to further the cause of universal elimination of nuclear weapons is doubtful. The treaty prohibits development, testing, production, manufacture, acquisition, transfer, possession, stockpiling of nuclear weapons as well as their use or threat of use. But only the non-possessors seem to be accepting its mandate. For the states possessing nuclear weapons, it is fairly certain that the dawn of September 21, 2017 will be no different from those before. These countries have made it clear that they cannot yet visualise a

CONTENTS

- OPINION
- STATEMENT
- NUCLEAR STRATEGY
- BALLISTIC MISSILE DEFENCE
- NUCLEAR ENERGY
- NUCLEAR COOPERATION
- URANIUM PRODUCTION
- NUCLEAR PROLIFERATION
- NUCLEAR NON- FROLIFERATION
- NUCLEAR SAFETY
- NUCLEAR DISARMAMENT
- NUCLEAR WASTE MANAGEMENT

world without nuclear deterrence. Rather, each one is engaged in updating, upgrading or modernising its nuclear arsenal in view of the growing rifts in their relationships – US-Russia; US-China; US-North Korea; Russia-France; China-India; India-Pakistan – none of the nuclear dyads is in a comfortably stable situation right now. The salience of nuclear weapons appears to be at an all-time high since the end of the Cold War. Who then amongst these is interested in the Ban Treaty?

The treaty lays down that a NWS could join it so long as it agrees to remove its nuclear weapons "from operational status immediately and to destroy them in accordance with a legally binding, time-bound plan…for the verified and irreversible elimination of that State Party's nuclear weapon-programme, including the elimination or irreversible conversion of all nuclear

Supporters of the treaty, however, emphasise that it would increase normative pressure on the NWS, especially in forums such as the NPT RevCon or at the UN High Level Conference on Nuclear Disarmament due in 2018. However, any such impact is yet to be seen. In fact, nearly all nuclear weapon possessors have pretty much bandied together in criticising the treaty for being low on details on how to bring about a real elimination of nuclear weapons. For instance, the treaty lays down that a NWS could join it so long as it agrees to remove its nuclear weapons "from operational status immediately and to destroy them in accordance with a legally binding, time-bound plan…for the verified and irreversible elimination of that State Party's nuclear weapon-programme, including the elimination or irreversible conversion of all nuclear weapons related facilitates." Legal eagles have already punched holes in these statements. How, they ask, does one define "operational status," "destruction of nuclear weapons," "legally binding, time bound plan of elimination," and who would determine and enforce it? For the NWS, these issues are of major concern. Given that these countries consider nuclear weapons as central to national security, it becomes difficult for them to envisage their elimination in the absence of definitely laid out processes and mechanisms that would enforce necessary verifications.

NNWS supporters of the treaty respond to this criticism by saying that the treaty has only created a framework and that it should now be the task of the NWS to flesh in the details. However, at this juncture, none of the NWS appears in a mood to do so. In the immediate future then, it appears that the entry into force of the Ban Treaty will be hailed and celebrated by the scores of NNWS who voted for it at the UNGA as also the non-governmental organisations and civil society movements that put their weight behind it. Meanwhile, states with nuclear weapons and those under the nuclear umbrella are likely to ignore the development and carry on their business as usual for now.

The next RevCon in 2020, however, might be the first major battleground where the relationship between the NWS and NNWS and the normative strength of the Ban Treaty will be tested. The interaction between both sides on the matter to stop their divide from deepening and threatening the NPT will be something to watch out for. For the sake of stability and survival of the NPT, it is necessary that both sides find a way to work together on furthering nuclear disarmament. The significance of the Ban Treaty, the first multilaterally negotiated legally binding instrument with the objective of eliminating nuclear weapons, cannot and should not be discounted. However, the treaty would be able to live up to its promise only with the cooperation of the nuclear weapon possessing states.

The significance of the Ban Treaty, the first multilaterally negotiated legally binding instrument with the objective of eliminating nuclear weapons, cannot and should not be discounted. However, the treaty would be able to live up to its promise only with the cooperation of the nuclear weapon possessing states.

Therefore, it is in the interest of the NNWS

supporting the treaty to find ways of engaging with the NWS to gradually bring them on board. Meanwhile, if non-proliferation has to be sustained in the coming decades, the NWS must heed the concerns of the NNWS and discover pathways to a nuclear weapons-free world. The future depends on the sagacious and patient interaction of these two sets of states. Are they up to the task? More importantly, do they understand how important it is for them to bridge the divide? Otherwise, the Ban Treaty will be successful enough to enter into force, but end up banning the bomb for only those who anyway do not have them.

Source: *http://www.ipcs.org, 18 September 2017.*

OPINION – Rabia Akhtar

Trump's N Korean Challenge: Can Pakistan be Next?

It appears that the Trump administration is not willing to learn any lessons from the vast riches of US diplomatic history. The one thing that stands out in the administration's dealing with North Korea's nuclear conundrum is its unwillingness to understand Pyongyang's security concerns, and in turn South Korea and Japan's security dilemma. There are two issues here. One, since North Korea has developed and successfully tested its ICBM, will the US still be ready to risk, e.g., San Francisco for Seoul? It appears as if the US extended deterrence theory has left the books and is now out to play. Second, can South Korea and Japan really afford to continue to bank on the US to provide them security from N Korea? They might not have time on their side to look into other options but there are no easy answers here.

Pakistan and North Korea are of course two completely different cases. In contrast to Pyongyang, Islamabad does not have ICBMs, thermonuclear weapons or whatsoever that can deter the US. Nevertheless, is it unthinkable that one day Pakistan could be on the list? No. Can Pakistan's nuclear weapons save it from a US conventional or nuclear attack? No. So should Pakistan be worried? Yes.

Trump has rebuked both South Korea and China for appeasement after the North Korean ICBM test. He has threatened China with sanctions for continuing trade with North Korea. Trump and his military advisers have threatened the use of massive military force like the world has never seen. This begs the question: will Trump break the nuclear taboo? Perhaps. But it does not matter whether North Korea or the US would be the first to attack. Once the nuclear taboo is broken, which has been in place for the last 72 years, it will legitimise the use of nuclear weapons for teaching an adversary a lesson or to ensure its compliance. Thus, it will make annihilation acceptable as a possible concept.

Looking at the Trumpian approach, one can posit a question — what will Trump consider as the next challenge. Can it be Pakistan? Perhaps if the US sees North Korea and Pakistan as China's proxies. Pakistan and North Korea are of course two completely different cases. In contrast to Pyongyang, Islamabad does not have ICBMs, thermonuclear weapons or whatsoever that can deter the US. Nevertheless, is it unthinkable that one day Pakistan could be on the list? No. Can Pakistan's nuclear weapons save it from a US conventional or nuclear attack? No. So should Pakistan be worried? Yes. For Trump and his national security community, nuclear war is both thinkable and winnable. Trigger-happy Trump might use post-North Korea scenario as a benchmark to signal the rest of the world that under his leadership, the US can go to any extent to ensure compliance and the presence of nuclear weapons in a country will not stop him. Dangerous? Certainly. Would it have consequences? Surely. Still thinkable? Possibly.

After President Trump unveiled his South Asia strategy, the US Ambassador to Pakistan, Hale met Pakistan's COAS, General Bajwa. During the meeting, Gen Bajwa stated that Pakistan did not need aid but an acknowledgement of its sacrifices and critical role in the war on terror. This is not the first time someone from Pakistan has told the US that they do not need its financial assistance. General Zia in 1980 while rejecting Carter's initial

$400m aid offer told the then assistant to President Carter for national security affairs, Zbigniew, and the deputy secretary of state, Christopher, that Pakistan did not need US military and economic assistance if the US could not provide security guarantees to it against these three contingencies:

- Soviet attack on Pakistan
- Soviet-Indian collusion in an attack on Pakistan and
- Situation in which the Soviets encouraged an Indian attack on Pakistan.

Zbigniew and Christopher were puzzled for they could not understand Pakistan's insecurity and obsession with India. They were surprised that Zia was willing to let go of military and economic assistance in lieu of a simpler security guarantee against India in addition to the Soviets. In the decades that it took Pakistan to develop nuclear weapons, several US administrations ridiculed the notion that India posed a threat to Pakistan (existential or otherwise) thereby undermining the rationale for Pakistan's need for nuclear weapons. But look what happened. Pakistan became a nuclear weapon state under a sanctions regime in the absence of security guarantees from the US.

If and when Indian boots hit the ground in Afghanistan, even if in token representation to join the coalition, Pakistan will have to be prepared for dual attack contingencies. We need to strategise against the possibilities of any misadventures in any territory in Pakistani control.

Today, one is reminded of Kissinger's dictum, "a nation's security is more important to that country than it is to the United States." But despite that Kissinger was approached during the run-up to Trump's presidency, it seems that now no one in the current US administration is listening. By inviting India to play a role in Afghanistan's development, the US has once again repeated the grave mistake of misunderstanding Pakistan's security concerns with regard to India. If and when Indian boots hit the ground in Afghanistan, even if in token representation to join the coalition, Pakistan will have to be prepared for dual attack contingencies. We need to strategise against the possibilities of any misadventures in any territory in Pakistani control. This, points at the need to retaliate and defend ourselves against any raid, cross-border sweeps or search-and-destroy missions by any adversary. The need to modernise Pakistan's conventional forces and strengthen non-nuclear deterrence is relevant more than ever before. We must also now think of ways to deter the Trump-led US. Tactful diplomacy should be an obvious start but we must think and prepare for the unthinkable.

Source: https://tribune.com.pk, 20 September 2017.

OPINION – Michael J Bramham

The Nuclear Paradox – Creating a World Both More and Less Peaceful

While the threat of mutually assured destruction has enabled a superficial peace, a nuclear world is not as peaceful as hoped. But is there an alternative? The shadow of the nuclear mushroom cloud has hung over the world for 72 years and shows no sign of lifting anytime soon. The advent of the bomb forever changed the international system and how foreign policy was conducted. It must be remembered, however, that nuclear weapons are a paradox – they have simultaneously made our world both more and less peaceful, and not necessarily in the ways you might expect.

72 Years of MAD Peace? Contrary to popular belief, MAD works, at least when it comes to superpowers. If you doubt that MAD works, then look at the past 72 years and ask: why wasn't there a World War III? For much of history, it was common for the leading powers of each era to frequently test one another's military strength to achieve dominance. One would naturally emerge victorious and thus a bipolar or multipolar world (a world with two or more superpowers) would become a unipolar world (a world with one superpower) and we would have peace until a new

power arose to challenge the old. This has been the normal cycle for centuries.

The Cold War is an unprecedented anomaly in history. For 46 years, the world was divided between two superpowers ideologically and geopolitically opposed to one another and each heavily militarised, yet there was no direct military confrontation between them. The US won the Cold War simply because it managed to out-live the unstable Soviet Union. Many expected World War III in the 1950s and yet nothing happened because of the complex effects of the MAD doctrine on geopolitical relations. Both sides understood as never before that there could be no victor from a direct military confrontation between them.

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Even at the height of the Cold War, when tensions were at their worst, did either side ever seriously consider a deliberate nuclear war between them? The simple fact is that humans generally *don't want to die*. There are exceptions to this, but world leaders – or rather politicians – bestowed with that honourable title, as we all know they have very well-developed senses of self-preservation. In short, if you have a territory to defend, you have nothing to gain from a nuclear war except annihilation.

That isn't to suggest that the post-WWII era has been an era of universal peace. With the superpowers unable to confront one another directly, they have fought out their rivalry through indirect means – economics, espionage and proxy wars. Having secured peace for their own citizens, superpowers have instead unleashed the horrors of war upon the citizens of non-nuclear states. That is, therefore the nuclear paradox. The nuclear weapon has ended war between superpowers, but not ended war itself.

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Nuclear War in a MAD World: Although there have been no direct wars between the nuclear armed superpowers in the post-WWII era, what we have seen instead is a proliferation of civil wars and regional conflicts. Since 1945 there have been hundreds of such conflicts (the number varies depending on how you count them). Whilst some of these can be attributed to decolonisation which created many new unstable states, many of these conflicts were prolonged, worsened or even triggered by the superpowers waging proxy wars to exert their influence or to effectuate their posturing.

A proxy war is a civil war or regional conflict where rival powers have become involved supporting opposing sides of the conflict, using it as a proxy for their own rivalry. Said 'powers' can be superpowers or regional powers and not necessarily nuclear powers. Infamous examples of this include the Greek Civil War, Korean War, the Vietnam War, the Soviet intervention in Afghanistan and more recently the Syrian Civil War.

Typically, the involvement of the superpowers in a war only serves to escalate and prolong it. If we look at major proxy wars like the Korean War or Vietnam War, we see that were it not for Soviet or American involvement said conflicts would have ended relatively quickly. Instead the Vietnam War dragged on for more than a decade until American withdrawal in 1973, with South Vietnam quickly being overwhelmed once the United States

withdrew. Meanwhile, the Korean War was almost entirely the result of the Soviet Union and then the United States intervening in Korean affairs and effectively carving the peninsula up between them.

More recently, we have the Syrian civil war which has now lasted nearly six and a half years. What started as an internal conflict between the Syrian government and liberal opposition fighters has ballooned into an enormous international crisis with different sides fighting each other and the involvement of multiple regional and international powers including the United States (and NATO allies), Russia, Iran, Saudi-Arabia, Lebanon, Israel and Turkey.

The situation in Syria is a complex conflict – in that it is in many ways a proxy for the wider conflicts in the Middle East. On the one hand, it has become a proxy conflict between Russia and the United States who each have sought to control the war's outcome in their own favour. On the other, it has also become a proxy for the regional rivalry between the Shia theocracy in Iran and the Sunni theocracy in Saudi-Arabia which is itself a manifestation of the sectarian strife between Sunni and Shia Muslims in the region triggered by the power vacuum in neighbouring Iraq. This does not even touch upon the mini-war between Turkey and the Kurdish fighters in the region, which has spilled over into Syria or the involvement of Israel and Lebanon in the crisis.

Proxy wars have become a major characteristic of the nuclear world, and have brought misery and the horrors of war to countless parts of the world as superpowers seek to project their power without actually warring with each other.

We can see that proxy wars have become a major characteristic of the nuclear world, and have brought misery and the horrors of war to countless parts of the world as superpowers seek to project their power without actually warring with each other. Even when superpowers don't resort to proxy wars, they still project their power into other countries either through economical means or through more covert manipulations. Sanctions, trade deals and covert actions are all weapons in the modern arsenal of the superpowers.

Unable to settle their rivalries through military confrontation, the superpowers have turned the whole world into a giant chess board for their confrontation to play out upon, each country a piece on the board. This was particularly true in the Cold War, but with the rise of China and the renewed conflict between the US and Russia, we face the prospect of such a complex and unproductive geopolitical scenario once again.

The Great Game: The only way for a state to escape this great game is either by allying yourself with one of the superpowers and using them as a guarantor against the others or developing your own independent nuclear capability. Allying with a superpower, though it will generally protect you from military involvement by the other, can be disadvantageous. Firstly, it makes your security entirely dependent on the continued existence of said superpower which, as the communist regimes of Eastern Europe and Cuba discovered, leaves you vulnerable if and when said superpower collapses. Secondly, it forces you to align your foreign policy with theirs and can risk you turning into a puppet state or vassal.

The most obvious examples of this are the Warsaw Pact nations who were so dependent on the Soviet Union, and in such a weak position, that they were unable to disobey them, thus turning them into puppets. That is not to say, however, countries allied to the United States are completely free of this problem. Since 1945, the nations of Western Europe have been dependent on the United States, via NATO, for their security and have thus aligned their foreign policy accordingly. They need the United States to check the imperial power of Russia and until Russia is truly spent this will continue. This is why despite the current US President Trump's veiled insults and slights against Germany and other NATO members, the leaders of Europe will largely ignore them. Breaking with the US is simply not an option.

Not wishing to limit their options like this some states have taken the second option and have tried to become nuclear powers in their own right. If successful the country becomes unassailable from

the outside as MAD comes into effect and thus they need only worry about decay from within. However, pursuing this path is dangerous. It is not in the interests of the superpowers for other countries to develop nuclear capabilities as it puts them out of their reach. As such, it has been the goal of the United States and other superpowers to prevent and contain the proliferation of nuclear weapons.

However megalomaniac and paranoid, dictators do not make good allies and North Korea's leadership have become dissatisfied with dependency on China for protection, not least due to China's changed priorities in the post-cold war era. As such, North Korea has sought to establish its own nuclear capability out of a paranoid fear of invasion from either the US or China.

Since the 1980s countries that have tried to develop their own nuclear weapons have been subject to international censure, harsh economic sanctions and sometimes even direct military intervention against them (e.g. Iraq). Iran and North Korea have discovered they can take advantage of this process, stopping and starting their nuclear programs in order to get diplomatic concessions out of the western powers.

North Korea is an interesting example of a state that has played both roles. The deeply isolationist and paranoid state has spent most of its history aligned with the Communist superpowers of the Soviet Union and China with their nuclear arsenals warding off the military might of the United States and her allies in South Korea. However megalomaniac and paranoid, dictators do not make good allies and North Korea's leadership have become dissatisfied with dependency on China for protection, not least due to China's changed priorities in the post-cold war era. As such, North Korea has sought to establish its own nuclear capability out of a paranoid fear of invasion from either the US or China.

A frozen conflict is a war where although a ceasefire has come into effect no peace treaty that satisfies all parties has been signed. Thus, both sides remain in a perpetual state of war without fighting but also without a peace. This has been the situation in Korea since 1953.

This has largely broken-down relations between North Korea and its traditional ally China – as China has no interest in a nuclear armed North Korea. Chinese foreign policy has always favoured the formation of satellite states that can act as buffers between it and the outside world. North Korea was intended to be one of those buffers – clearly, a buffer doesn't work if it has ambitions of its own. North Korea was always meant to be a hermit kingdom, a subservient puppet state; not a power in its own right. Whilst China is by no means ready to intervene in North Korea, the fact that it has come to support UN sanctions against the Kim regime shows that its patience with the antics of the Kim dynasty is wearing thin.

Frozen Conflicts: The Korean War and the situation on the Korean peninsula since 1953 is an example, perhaps the first, of a frozen conflict. A frozen conflict is a war where although a ceasefire has come into effect no peace treaty that satisfies all parties has been signed. Thus, both sides remain in a perpetual state of war without fighting but also without a peace. This has been the situation in Korea since 1953. A ceasefire was signed between the North and South and their respective allies but both sides have remained so irreconcilable that no peace treaty has ever been signed. Both sides remain *de facto* at war and periodic standoffs between them, such as the current one, have been common occurrences over the past 64 years.

Since both sides have nuclear weapons in their arsenals, neither can move against the other without annihilation. Both sides are so ideologically incompatible that neither can ever have true peace with the other. Thus, the situation persists indefinitely. The term frozen conflict has come to be popularised with the many such conflicts that litter the territories of the former Soviet Union. When the Soviet Union broke up in 1991, its various soviet republics became independent states. Unfortunately, however, in

some cases these states' borders did not match the ethnic composition of the regions they occupy. This was either due to the high ethnic diversity of regions like the Caucasus or due to the mass immigration of Russians into the non-Russian territories of the Soviet Union as part of the Soviet government's attempts at 'Russification' of conquered territories.

Examples of such frozen conflicts include the Nagorno-Karabakh Conflict in Azerbaijan, the Abkhazian and South Ossetian conflicts in Georgia, the Transnistria conflict in Moldova and more recently the conflicts in Crimea and Eastern Ukraine…. In most of these conflicts, an ethnic minority secessionist group has risen up against the central government either to seek independence (e.g. Abkhazia) or union with their ethnic motherland (e.g. Nagorno-Karabakh). Post-Cold War Russia has sought to intervene in these conflicts on the pretence of protecting ethnic minorities. In truth, its real goal is to divide and conquer its neighbours both to keep them weak but also to keep them out of the western sphere of influence. They have thus invaded all these countries and occupied the secessionist territories usually as 'peacekeepers'. Western powers, not wishing to see these countries fall under Russian domination again, have thus pledged tacit support to the central governments in these countries and warned Russia against further threats to their sovereignty.

The threat of nuclear war thus leads to a stalemate and to a frozen conflict. Russia cannot act to fully retake or incorporate these territories and the West cannot act to push Russia out without each risking nuclear war. The conflicts remain frozen like Korea and like Korea, what could have been sorted out diplomatically or by brief internal wars has become a prolonged state of war and ethnic tension with no end in sight.

The Phantom Mushroom Cloud: The rhetoric of MAD has ensured that the reality of nuclear war is an improbable one whatever the consequences to non-nuclear powers. Despite this, the phantom of the mushroom cloud continues to haunt our popular culture and media. This is understandable given the terrifying destructive power they can unleash not only on their targets but the whole world. However, in truth the real risk of nuclear annihilation comes from two less publicised scenarios rather than nuclear war.

The first scenario has already almost occurred several times over the past 72 years – it is the threat of an accidental launch or the 'nuclear close call'. This 'accidental' launch could be caused by one side misinterpreting the actions of the other as being a declaration of war either through direct misunderstanding or (more commonly) through computer error. This has already happened to both the Americans and the Soviets/Russians. The most popularised incident was in 1983 when a satellite error almost led the Soviet Union to launch its nuclear arsenal against the US and was halted only by a Soviet officer Lt. Colonel Petrov refusing to follow his orders as he correctly believed it was a false alarm.

To avoid such incidents both Russia and the United States have tried to cultivate open lines of communication between them so that any false alarms can be identified and diffused before the decision to retaliate is made. Whilst this has worked quite well over the decades, some concern has been raised in recent years that the White House and the Kremlin have largely severed such lines of communication as relations between them have deteriorated. If this is not rectified, then such incidents are likely to occur again and we can only hope that there are brave officers like Petrov who are willing to risk themselves in defence of our world should this happen.

The second scenario, and the one security analysts worry about the most, is the fear of a nuclear armed state disintegrating into civil war leaving their nuclear weapons unsecured and vulnerable to theft by non-state actors. Today, this fear is mostly focused on Pakistan which remains a volatile region with many non-state actors such as terrorist groups who, should the opportunity arise, would be more than happy to get their hands on a nuclear device. As non-state actors, thus not having any land to defend, they are the only ones free to actually use nuclear weapons without consequence to themselves.

Currently Pakistan remains stable enough to keep its arsenal under control, however, out of all the countries with fully deployed nuclear capabilities, Pakistan is probably the only one to be so close to the edge. If the worst did happen, then it would be imperative for the world to act to secure Pakistan's nuclear arsenal with or without Pakistani cooperation.

Currently Pakistan remains stable enough to keep its arsenal under control, however, out of all the countries with fully deployed nuclear capabilities, Pakistan is probably the only one to be so close to the edge. If the worst did happen, then it would be imperative for the world to act to secure Pakistan's nuclear arsenal with or without Pakistani cooperation.

The Destroyer of Worlds: In an interview first televised in 1965, Professor Oppenheimer, wartime scientific head of the Manhattan Project, said that upon witnessing the first successful tests of the atomic bomb he was reminded of a quote from the Hindu scripture the Bhagavad Gita "Now I am become death; the destroyer of worlds". Whilst Oppenheimer, who became a notable advocate against further development of nuclear weapons technology, was referring in his quote to the enormous destructive power of the bomb, his quote has a perhaps unintended meaning. The bomb may be able to destroy our world, but it has already destroyed the world that came before it.

No longer could the great powers act against each other freely. No longer could they afford war between them. That old world has gone. We can never go back to a pre-nuclear age – the genie cannot be put back into the bottle. Attempts to reduce the American and Russian nuclear stockpiles are folly when you consider that they need barely a hundred such devices to destroy us all (and both still have many times that number).

No state will ever agree to unilaterally eliminate its nuclear capability given that it would leave itself open to attack from other nuclear powers: it would have to be a unanimous decision on the part of all nuclear armed states. Given that the only thing stopping World War III between these powers is the threat of nuclear annihilation, do we really want them all to give up their nuclear weapons? By slaying the phantom of the mushroom cloud could we not be unleashing a monster even worse?

No state will ever agree to unilaterally eliminate its nuclear capability given that it would leave itself open to attack from other nuclear powers: it would have to be a unanimous decision on the part of all nuclear armed states. Given that the only thing stopping World War III between these powers is the threat of nuclear annihilation, do we really want them all to give up their nuclear weapons.

Nuclear weapons are here to stay. Fighting this is futile. What we must focus on is improving the condition of Humanity so that all war becomes unacceptable, not just nuclear war. It matters not what weapons we have, but the manner in how we choose to use them.

Source: *https://conatusnews.com/nuclear-paradox*, *16 September 2017.*

OPINION – Richard Heydarian

Asia could Find Itself Locked in a New Cold War if the North Korean Nuclear Crisis Escalates

Almost seven decades since the end of Korean war, the world is once again on the edge of an abyss. Recent months have witnessed a precarious uptick in geopolitical tensions in the Korean Peninsula, largely thanks to a festering brinkmanship between Washington and

Pyongyang. On multiple occasions, US President Trump has nonchalantly proposed a pre-emptive strike against North Korea, which has, in turn, responded by even more provocative missile and nuclear tests.

The emerging consensus among experts is that the reclusive regime is well on it way to placing continental America within its nuclear crosshairs. Perturbed by Pyongyang's increasing nuclear capability, the Shinzo Abe administration in Japan has also adopted an increasingly hawkish position. The crisis on the Korean peninsula has put China in a particularly difficult position. On one hand, the Asian powerhouse has repeatedly scolded North Korea for its provocative actions and has signed up to evermore punitive sanctions against it. Yet, Beijing also detests the possibility of violent and abrupt regime change in Pyongyang. The last thing China wants is a humanitarian crisis on its northeastern border and a unified Korea under America's influence. In turn, the Trump administration has accused China of abetting North Korea by providing an economic lifeline to the Kim Jong-un regime.

Military action on the Korean peninsula can only be decided by South Korea, and no one else can decide to take military action without the consent of South Korea". Thus, from Seoul's point of view, de-escalation and Chinese diplomatic support would be key to resolving the crisis. The ultimate goal is a nuclear weapons-free zone on the Korean peninsula by 2020.

In a disturbing echo of the cold war years, the world's superpowers, namely the United States and China, could once again find themselves on the opposite sides of the battlefield. Moreover, the crisis has also increasingly poisoned largely constructive ties between China and South Korea. Beijing has vigorously opposed the installation of American missile defence systems, particularly the THAAD, on the Korean peninsula. China opposes any US-led military build up that might imperil its deterrence against external aggression.

Seoul, however, insists on the necessity of bolstering its defence capability amid rising threats from across the 38th parallel. Meanwhile, Seoul has accused Beijing of squeezing South Korean companies' access to the Chinese supply chain and markets over the THAAD issue. They also accuse China of imposing a de facto travel ban by discouraging the eight million-strong Chinese tourists who visit South Korea every year.

This is a far cry from the early years of former president Park Geun-hye's administration. Park visited Beijing multiple times amid much fanfare and paid close attention to strengthening bilateral strategic ties to the dismay of Washington and Tokyo. Her overtures to China were reciprocated in President Xi Jinping's high-profile visit to Seoul in 2014, where he emphasised deep historical bonds between the two nations. The Moon Jae-in administration that came to power after Park was impeached in a corruption scandal initially provided some room for compromise. The liberal-leaning president favoured direct dialogue with North Korea and campaigned heavily against the deployment of the THAAD missile defence system during the presidential elections.

South Koreans are also worried about the lack of a coherent and measured policy on the part of the United States. In recent months, Trump has consistently contradicted senior officials, including Secretary of State Rex Tillerson, who has called for dialogue with North Korea, and Defence Secretary Mattis, who has cautioned against the unwanted consequences of pre-emptive strikes. From Moon's point of view, the Trump administration has been pouring fuel on the fire by further militarising an already combustible situation.

In mid-August 2017, amid rising diplomatic tensions between Washington and Pyongyang, the South Korean leader said: "Military action on the Korean peninsula can only be decided by South Korea, and no one else can decide to take military action without the consent of South Korea". Thus, from Seoul's point of view, de-escalation and Chinese diplomatic support would be key to resolving the crisis. The ultimate goal is a nuclear weapons-free zone on the Korean peninsula by 2020.

As one of Moon's key advisers told me during a recent visit to Seoul, South Korea is willing to provide necessary trade and investments incentives in exchange for the gradual transformation of Pyongyang into a less hostile and erratic neighbour. As historians such as Bruce Cumings have correctly observed, "the only method that has ever worked" on the Korean peninsula is "direct talks", since it led to the freezing of Pyongyang's nuclear programme for almost a decade (1994-2002). All other measures either failed or exacerbated the crisis.

The only method that has ever worked" on the Korean peninsula is "direct talks", since it led to the freezing of Pyongyang's nuclear programme for almost a decade (1994-2002). All other measures either failed or exacerbated the crisis.

In recent weeks, amid North Korea's back-to-back ballistic missile and nuclear tests, the Moon administration has come under increasing pressure to adopt a tougher line. Thus, it has now welcomed the additional deployment of the THAAD missile defence systems, focused on strengthening South Korea's country's ballistic missiles, expanding joint military drills with its allies, and even contemplating the return of US tactical nuclear weapons to its territory after they were withdrawn in the early nineties.

India has always given primacy to IAEA's role in the promotion of peaceful uses of atomic energy, both in the area of nuclear power and nuclear applications, while maintaining due support in IAEA's role in safeguards.

In a dramatic turnabout from his presidential campaign rhetoric, Moon has even considered potential pre-emptive strikes against North Korea's nuclear sites and facilitating regime change if necessary. The hope is that a combination of greater diplomatic pressure and enhanced military deterrence will force Pyongyang's hands. More likely, however, is greater geopolitical tensions among China, US, Japan and the two Koreas, giving birth to a new and even more dangerous cold war in Asia. The world's most dynamic region is now sleepwalking into conflict.

Source: *http://www.scmp.com, 17 September 2017.*

STATEMENT – Sekhar Basu, Chairman, AEC

Madam President, Excellencies, Ladies and Gentlemen, good morning to all of you. I would take this opportunity to convey on behalf of the people of India, and the Government of India the warmest greetings to the IAEA and the Member States on the occasion of 61st General Conference.

India has always given primacy to IAEA's role in the promotion of peaceful uses of atomic energy, both in the area of nuclear power and nuclear applications, while maintaining due support in IAEA's role in safeguards.

Madam President, I take this opportunity to congratulate you on your election as President of the 61st General Conference. I am sure that the current General Conference will accomplish successfully all the tasks laid before it under your leadership.

We welcome Granada as a new Member to IAEA.

I would like to compliment Dr. Yukiya Amano for his reappointment for the third consecutive term as the Director General of IAEA. Your Excellency, Mr. Amanov, through your tireless effort you have steward the work of the Agency so that it can be better prepared to face the contemporary challenges and also realize the immense opportunities that lie ahead.

India's Minister of State for External Affairs participated in the IAEA Ministerial Conference on Nuclear Security held in Vienna in December 2016. In the meet, India reiterated its commitment to global nuclear disarmament, non-proliferation and peaceful uses of nuclear energy.

I am happy to inform that we have signed Civil Nuclear Cooperation Agreement with Bangladesh in April this year along with two more complementary Agreements.

We are collaborating with our Russian and Bangladeshi partners on establishing Rooppur Nuclear Power Plant in Bangladesh.

India became Associate Member of European Organisation of Nuclear Research (CERN) in November 2016 with whom we have been working for the last five decades. We have also signed Civil Nuclear Cooperation agreement with Japan and Vietnam.

70th year of Indian independence has also been an year of exceptional achievements for us in the area of nuclear power, heavy water, nuclear fuel and associated material, uranium mining and milling, rare earth, radio isotopes and cancer care. All our research facilities, including synchrotron, cyclotron and reactors achieved their highest ever performance.

Let me tell you some of the recent developments in our country in the field of the Nuclear Energy and its applications: This year we have completed 7 decades of our independence. 70th year of Indian independence has also been an year of exceptional achievements for us in the area of nuclear power, heavy water, nuclear fuel and associated material, uranium mining and milling, rare earth, radio isotopes and cancer care. All our research facilities, including synchrotron, cyclotron and reactors achieved their highest ever performance.

We are making sustained efforts to achieve major growth in our programmes of nuclear energy and nuclear applications.

In the Cancer care sector, we have started major expansion by taking up construction/ upgradation of 6 additional facilities throughout our country. This will help us in doubling number of new patients treated from the present figure of 70,000 in the next 4-5 years. We have established a cancer grid connecting over 100 hospitals for diagnostic and therapeutic consultancy.

Recently, Indian Government has approved the construction of 10 Pressurized Heavy Water Reactors in serial mode and also the construction of 2 more reactors at Kudankulam. Apart from the objective of major growth in carbon free electricity production, this step will give major boost to the industries producing the reactor equipment in India.

With these reactors we will now have 21 reactors under construction and 22 reactors in operation. This will increase the capacity to over 22,000 MWe by the end of next decade. We shall continue to add more capacity in future.

To cater to the needs of expansion of nuclear power programme, we are also stepping up our exploration and mining operation for production of uranium. In the Prototype Fast Breeder Reactor front, after completion of construction, the commissioning activities are making steady progress while fulfilling all the safety requirements.

In the Cancer care sector, we have started major expansion by taking up construction/ upgradation of 6 additional facilities throughout our country. This will help us in doubling number of new patients treated from the present figure of 70,000 in the next 4-5 years. We have established a cancer grid connecting over 100 hospitals for diagnostic and therapeutic consultancy. We are also reorganizing ourselves to cater to further expansion in terms of research, education and patient care.

In the frontier science area, we are establishing a small underground research laboratory in one of our uranium mines for pursuing research on dark matter. This will enthuse scientists from all generations.

As part of our celebration of 70 years of independence of our country, we organized a side event at this venue on Global Centre for Nuclear Energy Partnership and I thank all of you who participated in the programme. This Centre will have 5 schools covering safety, security and societal activities. I invite Member States to make use of this facility under the aegis of IAEA. We thank the city of Vienna, and the people and the Government of Austria, for hosting the IAEA and this event. India looks forward to IAEA's continued leadership for

fostering safe, secure and sustainable use nuclear energy in the future. India will continue to support IAEA in all areas of its endeavor.

We wish the 61st General Conference a grand success.

Thank you.

Source: Statement made at the 61st IAEA General Conference at Vienna, Austria, https://www.iaea.org/sites/default/files/gc61-india-statement.pdf, 20 September 2017.

NUCLEAR STRATEGY

SOUTH KOREA

A South Korean Delegation Asks Washington for Nuclear Weapons

The heated debate in South Korea over redeploying US nuclear weapons on its territory has now reached Washington. A senior delegation of South Korean lawmakers is in town making the case to the Trump administration and Congress that such a move is needed to confront North Korea's growing nuclear capability and place more pressure on China.

Even before Kim Jong Un's latest nuclear test, South Korean polls showed that 68 percent support reintroducing nuclear weapons and that 60 percent support South Korea developing nuclear weapons of its own.

... Lee is heading a delegation of members of the Liberty Korea Party, the opposition to President Moon Jae-in's Democratic Party. ... Moon told CNN that he does not agree that tactical nuclear weapons should be reintroduced to South Korea or that Seoul should develop its own nuclear weapons. He warned it could "lead to a nuclear arms race in northeast Asia." But Lee's delegation believes that as the North Korea nuclear crisis worsens, a push by the Trump administration or Congress could help persuade Moon's government to change its position, as it has already done regarding the deployment of the THAAD missile defense system.

... The delegation will meet with the State Department's special representative for North Korea policy, Joe Yun, and senior Asia-focused lawmakers including Sens. Cory Gardner (R-Colo.) and Dan Sullivan (R-Alaska).

The delegation touts rising South Korean public support for their initiative. Even before Kim Jong Un's latest nuclear test, South Korean polls showed that 68 percent support reintroducing nuclear weapons and that 60 percent support South Korea developing nuclear weapons of its own.

The United States stationed nuclear weapons in South Korea for most of the Cold War, but they were removed by President George H.W. Bush in 1991. After South Korea's defense minister suggested this month it's worth reviewing the idea, Senate Armed Services Committee Chairman John McCain (R-Ariz.) said "it ought to be seriously considered." Trump administration officials have said they are not ruling out the possibility, should the South Korean government request it.

Adding nuclear weapons to the already volatile situation on the Korean peninsula seems to run counter to the stated US goal of completely denuclearizing the peninsula. But proponents of the idea lay out three key reasons it could be helpful.

First, North Korea is very close to achieving the capability to launch nuclear weapons via both intercontinental ballistic missiles and submarine-launched missiles. That changes the calculus of strategic deterrence. Putting nukes in South Korea would strengthen the ability of the United States and South Korea to retaliate, thereby bolstering that deterrence.

Separately, the Chinese government would surely oppose putting nuclear weapons back in South Korea. Beijing has been subjecting the South Korean economy to severe punishment in response to the THAAD deployment. But the threat of South Korea going nuclear could push Beijing into doing more to rein in Pyongyang.

Lastly, since North Korea is now a de-facto nuclear state, putting nukes back in South Korea could be a bargaining chip for future negotiations with Pyongyang. ...

So long as Moon is in power, prospects for putting nukes back in South Korea will remain slim. The Trump administration would be unwise to publicly break with Moon on such an important issue. Alliance unity is an important signal to Pyongyang and Beijing. But ignoring the fact that North Korea's nuclear advancement is changing the strategic situation is also deeply unwise. The only thing worse than failing to prevent a new nuclear arms race would be losing it.

Source: Josh Rogin, The Washington Post, 14 September 2017.

USA–NORTH KOREA

China Urges North Korea, US to Stop Escalating War of Words

Warning there would be "no winner" in the event of a conflict on the Korean Peninsula, China on Tuesday urged North Korea and the United States to stop their escalating war of words and sit down for talks on cooling the recent spike in tensions.

So long as Moon is in power, prospects for putting nukes back in South Korea will remain slim. The Trump administration would be unwise to publicly break with Moon on such an important issue. Alliance unity is an important signal to Pyongyang and Beijing.

The comments from foreign ministry spokesman Lu Kang reinforce China's position that all sides should avoid provoking each other following biting new United Nations economic sanctions on North Korea and a new exchange of threats between President Donald Trump and North Korean leader Kim Jong Un.

The launch of the INS *Aridhaman* follows India's first domestically built nuclear-powered ballistic missile submarine (SSBN), the IHS *Arihant*, being inducted into the Indian Navy in August of last year. That submarine made India only the sixth country after the United States, Russia, the United Kingdom, France and China to build a SSBN.

Mr. Lu's remarks came after North Korea's top diplomat on Monday characterised Mr. Trump's tweet that Mr. Kim "won't be around much longer" as a declaration of war against his country by the United States. ... Beijing has responded by voting in favor of increasingly harsh UN resolutions over North Korea's nuclear and missile development programs and announced on Saturday that it will limit energy supplies to North Korea and stop buying its textiles as dictated by the latest sanctions.

Source: The Hindu, 26 September 2017.

BALLISTIC MISSILE DEFENCE

INDIA

India's Navy Just Built a Second Nuclear Missile Submarine

The Indian Navy will launch its second homegrown nuclear-powered submarine in October 2017, according to local media outlets. India's *Economic Times* reported, citing government sources, that the second indigenous nuclear submarine will be transferred to water sometime in later September or early October 2017. At that time, the INS *Aridhaman* will undergo extensive sea tests over the next two years before being inducted into the Indian Navy at some point in 2019.

The launch of the INS *Aridhaman* follows India's first domestically built nuclear-powered ballistic missile submarine (SSBN), the IHS *Arihant*, being inducted into the Indian Navy in August of last year. That submarine made India only the sixth country after the United States, Russia, the United Kingdom, France and China to build a SSBN. The first Indian SSBN is believed to carry twelve Sagarika (K-15) SLBMs that have ranges of 700 km. However, India's DRDO is also developing a longer-range SLBM, the K-4, which its SSBNs will also carry. The IHS *Arihant* is only equipped to handle four of the larger K-4s (the submarine has four launch tubes but three K-15s can fit in each launch tube). The submarine can also carry torpedoes and SLCMs, including possibly a sea-launched version of the BrahMos.

The IHS *Arihant* was built primarily to serve as a trainer. That is, to train sailors to operate the new Arihant-class submarines, of which Delhi plans to build four boats. Thus, the new INS *Aridhaman* will pack a lot more firepower than its sister ship. According to the *Economic Times*, the second SSBN has eight vertical launch tubes, allowing it to carry twenty-four K-15 missiles or eight K-4 missiles. In addition, the new boat will have a reactor more powerful than the INS *Arihant's* 83 MW pressurised light-water reactor. That reactor uses uranium as fuel and light water as a coolant and moderator, which allow it to operate quietly and stay submerged for about two months at a time. The new SSBN will be able to travel at speeds of 24 knots when submerged.

While technically an indigenous boat, the Arihant-class submarines are based on the designs of the Russian Project 971 Akula I-class nuclear-powered attack submarines. India has leased the Akula I-class SSN from Russia in the past. Still, the launching of the first nontrainer SSBN is a significant milestone for India's Navy. As I've noted before, India's quest to build a nuclear-powered ballistic missile submarine reportedly began in 1970 under Prime Minister Indira Gandhi. Code-named the Advanced Technology Vehicle (ATV) program, its existence was kept under wraps for more than three decades ago before the former chairman of India's AEC, PK Iyengar, revealed it at a public forum back in 2007.

The SSBNs will give India a complete nuclear triad, which consists of land, air, and sea-based nuclear delivery systems. In one sense, this could be seen as a good development for strategic stability in the region as submarines out at sea are far less vulnerable to surprise attacks compared with airplanes and land-based missiles.

The SSBNs will give India a complete nuclear triad, which consists of land, air, and sea-based nuclear delivery systems. In one sense, this could be seen as a good development for strategic stability in the region as submarines out at sea are far less vulnerable to surprise attacks compared with airplanes and land-based missiles. This is especially critical for a country like India which maintains a modest-sized nuclear arsenal.

At the same time, the new leg of the triad could produce a sea change in India's nuclear operating procedures. As a country with a no-first use declaratory policy, India's current nuclear warheads and missiles are kept demated and likely in separate locations. This is fine for the air and land-based legs of the triad because they can be brought together if needed. This is not possible for SSBNs. To provide any deterrent benefit, the missiles and warheads will need to be kept together on the submarines, eliminating any actual demonstration of its no first use policy beyond words. This is a challenge that is also being confronted by China, another country with a no-first use policy that also recently began deterrent patrols.

Questions will inevitably be raised about the security of hosting nuclear weapons on Indian ships as the country's navy, and submarine fleet, has suffered from a number of mishaps in recent years. Most notably, an explosion on the Russian-built INS *Sindhurakshak* submarine sunk the ship and killed eighteen sailors in 2013. In 2014 there was a fire on another submarine, the INS *Sindhuratna*, which killed two people. A report by the Comptroller and Auditor General's latter blamed crew fatigue and outdated ammunition as the causes of these incidents.

The emergence of India's SSBNs is another example of a growing technological arms race among the so-called nuclear triangle of China, India and Pakistan. In 2012, India first tested its Agni-V intermediate ballistic missile, which can reach all parts of China. As alluded to above, China also recently acquired its first operational SSBNs, which began conducting deterrent patrols sometime in 2016. China also recently began deploying MIRVs on its ballistic missiles, a step India is also likely to take if it already hasn't. Both India and China have also been improving their targeting capabilities through improved ISR capabilities. On the other hand, Pakistan has been focusing on building up a large tactical nuclear weapon arsenal to repeal any Indian conventional attacks.

Source: *http://nationalinterest.org, 16 September 2017.*

NUCLEAR ENERGY

AUSTRALIA

Australia Joins International Nuclear Power Research Group

Australia has officially joined an international group focused on developing future nuclear energy systems. The Australian Nuclear Science and Technology Organisation has been welcomed into the Generation IV International Forum Framework agreement, which aims to develop next-generation nuclear power systems, and which ANSTO calls "a potential game-changer in global energy creation".

GIF is a cooperative of 14 nations led by France, a country where nuclear power accounts for nearly 75 per cent of energy generation. This reliance on nuclear energy has played a role in helping the nation slash its CO2 emissions, with OECD data outlining France averaging 4.32 tonnes per capita compared to Australia's average of 15.8 tonnes per capita.

Although Australia signed the GIF charter last year, the event marked the country's official accession to the nuclear framework agreement, which is focused on six different nuclear reactor designs that provide power and "stringent standards in relation to safety and non-proliferation". However, ANSTO stated this was not about advancing the cause of nuclear energy in Australia's current energy mix; instead, it was about utilising Australian skills in research and development.

... "ANSTO will leverage our world-class capabilities, particularly in relation to the development of advanced materials with applications in extreme industrial environments, and of nuclear safety cases. "This agreement will enable Australia to contribute to an international group focused on peaceful use of nuclear technology, and the international energy systems of the future". An ANSTO spokesman said Australia was a world leader in terms of nuclear safety, "due to the high levels of oversight and paperwork required" to operate.

GIF is a cooperative of 14 nations led by France, a country where nuclear power accounts for nearly 75 per cent of energy generation. This reliance on nuclear energy has played a role in helping the nation slash its CO2 emissions, with OECD data outlining France averaging 4.32 tonnes per capita compared to Australia's average of 15.8 tonnes per capita. However, the nation is considering greater diversification into renewables, reducing its nuclear energy generation levels to account for half of all generation.

Source: *http://www.smh.com.au, 18 September 2017.*

CHINA

Nuclear Experts Head to China to Test Experimental Reactors

China is becoming the testing ground for a new breed of nuclear power stations designed to be safer and cheaper, as scientists from the US and other Western nations find it difficult to raise enough money to build experimental plants at home. China National Nuclear Power Co. (CNNPC) in September 2017 announced a joint venture to build and operate a "traveling wave reactor" in Hebei province, designed by Bellevue, Washington-based TerraPower LLC…. "China is where the demand exists and where willing partners exist for this kind of plant," said TerraPower President Levesque, whose company has been working on the traveling-wave technology for a decade. "It is really encouraging when your partners are announcing a site."

China's soaring energy demand means it's spending billions on new power plants across the energy spectrum, from coal and natural gas, to renewables and nuclear. China has the world's most aggressive reactor construction plan, with the goal of boosting its nuclear power capacity by about 70 percent to 58 gigawatts by 2020.

While most advanced economies are slowly pivoting to energy sources like solar and wind, China's soaring energy demand means it's spending billions on new power plants across the

energy spectrum, from coal and natural gas, to renewables and nuclear. China has the world's most aggressive reactor construction plan, with the goal of boosting its nuclear power capacity by about 70 percent to 58 gigawatts by 2020. ...

The systems proposed belong to the so-called fourth generation of reactors. The current generation under construction include enhanced safety features following the Fukushima disaster in Japan in 2011, but still typically use traditional fuel rods, cooled by water under pressure. Both Areva SA and Westinghouse Electric Co. are slated to turn on their current-generation nuclear reactors in the next year in China – well ahead of any other nation, despite delays.

Recycled Fuel: Some Generation IV designs aim to cut construction costs by using coolants that work at atmospheric pressure – reducing the need for massive containment structures. Many recycle their fuel, reducing the need for uranium, and in some cases are fail-safe without intervention if something goes wrong. In a pebble-bed reactor, for example, thousands of tiny fuel seeds encased in tennis-ball sized graphite "pebbles" can withstand much higher heat. In the event of an accident or loss of coolant, the rising temperature automatically shuts down the nuclear reaction.

Beijing's Tsinghua University has been running a small experimental pebble-bed reactor on campus since 2003 and has worked on the technology in cooperation with researchers at MIT in the US China Nuclear Engineering Construction Corp. is now building the world's first commercial plants using the technology, including one in Shandong province, south of Beijing, that is due to connect to China's grid in 2018.

Some of the new designs, including TerraPower's traveling wave unit, are breeder reactors that produce more atomic fuel than they consume, reducing the need to add costly processed nuclear elements. Some are designed to burn spent fuel from conventional reactors, or fissile material from decommissioned nuclear warheads. Coolants include liquid sodium, gases and molten metal. Some use thorium instead of uranium to power the reaction.

Still, the theories behind many of the proposed systems aren't new and often date back to the 1950s and '60s. Some experimental plants have been built, such as the fast breeder reactors in the UK and US Most suffered from crippling cost or design problems or were abandoned after nuclear accidents. "Most if not all of these so-called advanced reactor designs have been around for decades," said Ramana at the Liu Institute. "Different designs have different problems. I don't think anyone can be or should be confident that these problems can be resolved merely by throwing money and hiring engineers and scientists."

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Computer Models: TerraPower's traveling-wave design is based on research by Feinberg, a physicist who first proposed it in the 1950s. Levesque says that advancements in computing in the last decade have revolutionized the ability to develop these technologies. "You couldn't get it near the concept without the computer modeling," he said. Yet computers alone won't prove the technology without a working plant. "What they really need is to construct research reactors," said Macfarlane, former head of the US Nuclear Regulatory Commission. "And that is really expensive."

Under the Trump administration, the amount of support may not be sufficient for an advanced reactor program that could deliver an operating unit within 10 years, said Gadomski, an analyst at Bloomberg Intelligence. He estimates it would cost between $1.5 billion to $3.5 billion to commercialize a fourth-generation reactor. "In the US, where there is plenty of cheap natural gas and a preference for renewables, raising this type of cash is a challenge," Gadomski said by email.

The US budget funding agreement reached for fiscal year 2017 provides the DOE with more than $1 billion for nuclear energy programs and research, including nearly $500 million for R&D, an increase of $30 million, according to the

Nuclear Energy Institute. Among the recipients of DOE funding is Greenbelt, Maryland-based X Energy LLC, which is developing a pebble-bed reactor concept. X-Energy believes US policymakers could accelerate the deployment of advanced units by pursuing public-private partnerships similar to ventures NASA has established with SpaceX and Boeing Co., spokeswoman Melanie White Lyons said by email. X-Energy isn't currently partnered with a Chinese company, but has a long-term goal of pursuing opportunities in countries with growth potential, including China, she said....

Part of the reluctance to invest in new reactors in the US and Europe is related to the public's skepticism about nuclear power. The Three Mile Island accident in the US in 1979, Chernobyl in Ukraine in 1986 and Fukushima in Japan in 2011 all contributed to a decline in reactor-building in advanced economies.

Fukushima Disaster: Part of the reluctance to invest in new reactors in the US and Europe is related to the public's skepticism about nuclear power. The Three Mile Island accident in the US in 1979, Chernobyl in Ukraine in 1986 and Fukushima in Japan in 2011 all contributed to a decline in reactor-building in advanced economies.

The US, the world's largest generator of nuclear power, began operation last year of its first new commercial reactor in decades. Delays building reactors were part of the reason Westinghouse filed for bankruptcy protection earlier this year. ...Developers say the industry is over-regulated. Keller, president of Hybrid Power Technologies LLC said the NRC is a "bureaucratic straight jacket" that creates a massive financial burden on the deployment of advanced reactors. ...

The DOE said in a email that it is promoting development of a framework that will increase regulatory certainty for advanced reactors in coordination with the NRC and industry. With fewer constraints and a burning need for more energy, China is pushing ahead with new power stations, not only in nuclear, but any technology that could help it meet demand. "China by a very large margin is the largest market in the world for new power plants of any type," said Forsberg, a professor at MIT. "If we do not get our act together, the low-carbon energy business will be owned by the Chinese."

Source: *https://www.bloomberg.com, 22 September 2017.*

INDIA

India Third in Nuclear Power Installations: Study

India is third in the world in the number of nuclear reactors being installed, at six, while China is leading at 20, the World Nuclear Industry Status Report 2017, released this month (September), shows. The number of nuclear reactor units under construction is, however, declining globally for the fourth year in a row, from 68 reactors at the end of 2013 to 53 by mid-2017, the report says.

Most nuclear reactor constructions are behind schedule, with delays resulting in increase in project costs and delay in power generation. There are 37 reactor constructions behind schedule, of which 19 reported further delays over the past year. In India itself, five out of the six reactors under construction are behind schedule.

The latest report further reveals that most nuclear reactor constructions are behind schedule, with delays resulting in increase in project costs and delay in power generation. There are 37 reactor constructions behind schedule, of which 19 reported further delays over the past year. In India itself, five out of the six reactors under construction are behind schedule. Eight nuclear power projects have been under construction globally for a decade or more, of which three have been so for over 30 years.

In the foreword, Freeman, an American energy policy expert who led the Tennessee Valley Authority under US President Carter, writes that

the debate regarding the value of nuclear energy "is over". "The most decisive part of this report is the final section — Nuclear Power vs Renewable Energy Development. It reveals that since 1997, worldwide, renewable energy has produced four times as many new kilowatt-hours of electricity than nuclear power," he writes, concluding, "The world no longer needs to build nuclear power plants to avoid climate change and certainly not to save money."

Global nuclear power generation increased by 1.4% in 2016 due to a 23% increase in China, though the share of nuclear energy in electricity generation stagnated at 10.5%. By comparison, globally, wind power output grew by 16% and solar power by 30%. Wind power increased generation by 132 TWh or 3.8 times, and solar power by 77 TWh or 2.2 times more than nuclear power's 35 TWh respectively.

Data gathered by the authors shows that global nuclear power generation increased by 1.4% in 2016 due to a 23% increase in China, though the share of nuclear energy in electricity generation stagnated at 10.5%. By comparison, globally, wind power output grew by 16% and solar power by 30%. Wind power increased generation by 132 TWh or 3.8 times, and solar power by 77 TWh or 2.2 times more than nuclear power's 35 TWh respectively. Renewables represented 62% of global power generating capacity additions. Russia and the US shut down reactors in 2016, while Sweden and South Korea both closed their oldest units in the first half of 2017, the report *notes.*

Financial Crisis: The report also documents the financial crisis plaguing the industry. After the discovery of massive losses over its nuclear construction projects, Toshiba filed for bankruptcy of its US subsidiary Westinghouse, the largest nuclear power builder in history. AREVA has accumulated $12.3 billion in losses over the past six years.

French Bailout: The French government has provided a $5.3 billion bailout and continues its break-up strategy, the report notes. In the chapter on the status of the Fukushima nuclear power project in Japan, six years after the disaster began, the report notes how the total official cost estimate for the catastrophe doubled to $200 billion. The lead authors of the report are Paris-based energy consultant Mycle Schneider, who advised the European Parliament on energy matters for over 20 years, and Froggart, energy policy consultant and senior researcher at Chatham House, a London-based non-profit organisation working on international affairs.

Source: *http://www.thehindu.com, 23 September 2017.*

NUCLEAR COOPERATION

CHINA–CAMBODIA

China, Cambodia Agree to Nuclear Energy Cooperation

Cambodia has signed a memorandum of understanding with China National Nuclear Corporation (CNNC) on cooperation in the peaceful use of nuclear energy. The agreement calls for cooperation on human resources development. The agreement was signed on September 12, 2017 by CNNC chief accountant Jize and Tekreth Samrach, Cambodia's secretary of state of the Office of the Council of Ministers and vice chairman of the Cambodian Commission on Sustainable Development. It was signed during the 14th China-ASEAN Expo and China-ASEAN Business and Investment Summit, being held in Nanning, the capital of China's Guangxi province....

Cambodia has signed a memorandum of understanding with China National Nuclear Corporation (CNNC) on cooperation in the peaceful use of nuclear energy. The agreement calls for cooperation on human resources development.

"This is another important initiative of China National Nuclear Corporation in implementing the 'One Belt, One Road' strategy and strengthening

cooperation with ASEAN countries in international production capacity, laying a solid foundation for follow-up cooperation between the two countries," CNNC said. One Belt, One Road is China's project to link trade in about 60 Asian and European countries along a new Silk Road.

Cambodia's current power supply cannot meet its basic electricity needs, while sectors including medicine, agriculture and industry require a "comprehensive upgrade". It said Cambodia has great market potential for nuclear power and nuclear technology applications.

CNNC noted that Cambodia's current power supply cannot meet its basic electricity needs, while sectors including medicine, agriculture and industry require a "comprehensive upgrade". It said Cambodia has great market potential for nuclear power and nuclear technology applications....In late August 2017, CNNC president Zhimin visited Cambodia and met Chhum, president of the Senate of Cambodia. Qian noted that CNNC will support Cambodia in applying nuclear technologies in industry, agriculture and medical science, thus developing its economy and improving the welfare of the population. Cambodia can start training workers, promoting new energy exploitation and infrastructure construction, and increasing its capabilities in scientific research and industrial manufacturing, he said. This will help the country achieve its long-term goal of the peaceful use of nuclear energy, he added.

Source: *http://www.world-nuclear-news.org, 13 September 2017.*

INDIA – RUSSIA – BANGLADESH

India Collaborating with Russia for Nuclear Power Plant in Bangladesh

India said on September 20, 2017 it is collaborating with Russia to build the Roppur nuclear power plant in Bangladesh, the first initiative under a Indo-Russia deal to undertake atomic energy projects in third countries. This will also be India's first atomic energy venture abroad. "We are collaborating with our Russian and Bangladeshi partners on establishing Rooppur Nuclear Power Plant in Bangladesh," AEC chairman Basu said at the 61st general conference of the global nuclear watchdog IAEA. Basu's remarks are significant given that the Indian nuclear establishment for years has not been able to grow, internationally, due to sanctions imposed on New Delhi post the 1974 Pokhran tests.

It was, however, not clear what kind of "collaboration" India was doing since it is not a member of the NSG – a 48 member grouping that controls the export of materials, equipment and technology that can be used to manufacture nukes. According to the December 2014 'Strategic Vision for Strengthening Cooperation in Peaceful Uses of Atomic Energy' between India and Russia, the "two sides will explore opportunities for sourcing materials, equipment and services from Indian industry for the construction of the Russian- designed nuclear power plants in third countries".

India signed a civil nuclear cooperation deal, along with two more agreements, with Bangladesh in April 2017 under which the two sides can supply and manufacture equipment, material for the atomic power plant. The Roppur project, which is being built by the Russians near Dhaka, will be Bangladesh's first atomic energy project. After commissioning of two units, each with a capacity of 1200 MWs, Bangladesh will be the third South Asian country after India and Pakistan to harness energy from atomic fission.

India signed a civil nuclear cooperation deal, along with two more agreements, with Bangladesh in April 2017 under which the two sides can supply and manufacture equipment, material for the atomic power plant.

Source: *http://economictimes.indiatimes.com, 20 September 2017.*

INDIA–UZBEKISTAN

India is engaging with various countries, including Uzbekistan, to procure nuclear fuel as part of its plan to create a strategic uranium reserve to ensure long-term security. The plan is to have a

stockpile of nuclear fuel for its strategic uranium reserve that can sustain the country's reactors for the next five years so that they do not stop functioning because of the lack of uranium.

In the past, the Indian power reactors were underperforming due to shortage of uranium, owing to the sanctions imposed by the West post 1974 Pokhran nuclear tests.

Australian uranium is "impure" in nature. "We have got nearly a kilogramme of uranium from Australia. This is being tested by the Nuclear Fuel Complex, Hyderabad to determine the price of the uranium. We are hopeful that the uranium import starts by next year.

Talks are currently being held with Uzbekistan, a senior government official said, and a delegation from the Central Asian country had visited India last month to discuss the issue in detail. The delegation came just two months after Prime Minister Narendra Modi held bilateral talks with Uzbek president Shavkat Mirziyoyev on the sidelines of the Shanghai Cooperation Organisation Summit in Astana in June this year, said a senior MEA official, on condition of anonymity. "We have been looking to import uranium from Uzbekistan in the past. Back then, they had refused to transport uranium to an Indian port. But now they have agreed to do so and negotiations are on", said a senior government official requesting anonymity.

According to the World Nuclear Association, an international organisation that represents the global nuclear industry, the landlocked Central Asian country is the seventh largest exporter of uranium in the world.

Global nuclear capacity will grow between 35% to 70%. Even if growth comes in at the lower end of the range, it will be the highest growth in nuclear power seen over the past 20 years with China dominating, increasing capacity from 37 GWe to 141 GWe.

Attempts are also being made to procure uranium from Australia. A nuclear cooperation pact between the two nations was signed in 2014 and came into force in 2015. Uranium mining in Australia is mostly done by private players. However, a senior government official pointed out that Australian uranium is "impure" in nature. "We have got nearly a kilogramme of uranium from Australia. This is being tested by the Nuclear Fuel Complex, Hyderabad to determine the price of the uranium. We are hopeful that the uranium import starts by next year," the official added.

... Apart from domestic production, India currently imports uranium from Kazakhstan and Canada. This is primarily used to fuel its indigenously built PHWRs. It procures enriched uranium from Russia for its two Boiling Water Reactors at Tarapur in Maharashtra. As part of its contract, Russia also supplies uranium to fuel the two reactors at Kudankulam in Tamil Nadu. Apart from it, it has agreements in place to import uranium from Namibia and Mongolia. ...

Source: http://economictimes.indiatimes.com, 24 September 2017.

URANIUM PRODUCTION

GENERAL

Uranium Prices: Uranium Demand Growth will be Slow

In the World Nuclear Association's latest (biennial) report, World nuclear capacity will grow dramatically in the coming years, but stockpiled uranium will mean it will take some time for new uranium to be required. This is disappointing news for those who are expecting that increases in nuclear capacity will result in a very near-term boost in uranium demand.

According to the report, global nuclear capacity will grow between 35% to 70%. Even if growth comes in at the lower end of the range, it will be the highest growth in nuclear power seen over the past 20 years with China dominating, increasing capacity from 37 GWe to 141 GWe.

While installed capacity will grow, the estimates are lower compared to the last report (from 2015) due to economic closures, less new construction than previously expected in the US, delays in China, changes to South Korea's plans and slower restarts in Japan.

World reactor requirements for uranium, estimated at about 65,000 tU in 2017 will rise to 2025 and 94,000 tU in 2035 in the reference scenario. In the Upper Scenario, uranium requirements are expected to be 84,000 tU in 2025, and 122,000 tU in 2035. These figures are down from the 2015 report.

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World uranium production rose to 62,221 tU in 2016, and according to the report, known global resources of uranium are more than adequate to satisfy reactor requirements to well beyond 2035. Currently, depressed uranium prices have curtailed exploration activities and the opening of new mines, and the number and size of new mines that are under development have fallen significantly compared with the 2015 report.

Though there have been consistent reports of the Chinese sharing nuclear technology with Pakistan, this cable is perhaps the first from non-Western sources that points to the intensive contacts between the two countries in this sensitive field.

Source: *http://www.economiccalendar.com, 15 September 2017.*

NUCLEAR PROLIFERATION

PAKISTAN

Zia-ul-Haq Pressed China for Joint N-Test

Pakistan under Zia-ul-Haq pressed **China** in 1980 for a "joint [nuclear] explosion" to be carried out at a Chinese site, given the "new technical problems" Rawalpindi was facing in going for its own nuclear test. This was the assessment of ambassadors of the socialist countries based in Islamabad ahead of Gen Zia's visit to China and North Korea in May 1980. The analysis is contained in a ciphered telegram sent by the Hungarian Embassy to its headquarters on April 30, 1980, now available at the Wilson Centre digital archive in Washington.

Non-Western Sources: Though there have been consistent reports of the Chinese sharing nuclear technology with **Pakistan,** this cable is perhaps the first from non-Western sources that points to the intensive contacts between the two countries in this sensitive field. In May 1979, the Soviet ambassador Azimov informed his socialist colleagues in Islamabad that Pakistan possessed both the "material and intellectual capabilities" to carry out a nuclear explosion.

"The execution of the programme is being accelerated by the recent discovery of uranium of a favourable composition near Dera Ghazi Khan. They began to set up the already available enrichment facility in the vicinity of the quarry," the Hungarian Embassy quoted the Soviet envoy as saying in his May 17, 1979, cable to headquarters.

***West Asian Help*:** The Soviet ambassador also stated that the Pakistani nuclear programme, proceeding at an accelerated pace, was "actively supported" by both Saudi Arabia and Libya. Twenty-five years later, the fact of Pakistani-Libyan nuclear cooperation was made public by the United States, but even then, Washington put the blame on Pakistani scientist AQ Khan, absolving the Pakistani State of any role in the international smuggling operation.

***Israelis Knew*:** Interestingly, on the same day as the Hungarian cable was sent in 1979, Israeli Prime Minister Menachem Begin wrote to his British counterpart Margaret Thatcher informing her of

Libya's close partnership with Pakistan in the nuclear field. The British, too, shared the Israeli (and Soviet) view of close Pakistani-Libyan collaboration in the nuclear field. "Our evidence appears not dissimilar to theirs," a British assessment prepared for Mrs. Thatcher said. The Soviets were seriously worried about the prospect of the Arabs getting their hands on a nuclear weapon and were contemplating various means to prevent this from happening, according to the May 1979 Hungarian cable.

"For this reason, it is becoming less and less interesting whether we might be able to slow down the execution of the [Pakistani nuclear] programme. Instead, we should rather look for means to prevent its successful completion," Ambassador Azimov told his socialist counterparts. "At the same time, however, one should be extremely cautious in this question because of the 'Indian factor'," Dr. Azimov was quoted as saying.

Source: http://www.thehindu.com, 24 September 2017.

NUCLEAR NON-PROLIFERATION

IRAN–USA

Will September be Decisive for the Nuclear Agreement?

Two frustrating years out of ten have passed since the nuclear agreement was signed. The world is stepping into the third year of an agreement described by President Trump as the worst in ages. It is obvious that September 2017 will be decisive for the nuclear agreement as the US administration is considering a comprehensive strategy for all noxious Iranian acts – a strategy that calls for more strictness against Iranian forces and its agents of extremist Shi'ite groups in Iraq and Syria. Through its new strategy, Washington aims to increase pressure on Tehran to curb its ballistic missiles program and its support to extremists. It also targets cyber-spying and possibly, nuclear proliferation.

Once agreement is reached on this comprehensive strategy, then we will face a new phase of a serious attempt to downsize Iranian expansion after it lasted eight years (during the term of Obama) and, ironically, reached its zenith after signing the nuclear agreement. Most importantly, the strategy will be the first practical step by Trump's administration towards a stricter supervision of the nuclear agreement without letting it be an advantageous award to Tehran's arms and militias in the region.

The real catastrophe is that Iran has already received all it had to gain from the nuclear deal, which serves its interest and doesn't terminate uranium enrichment. Nikki Haley, US ambassador to the United Nations, said it is likely that Iran has already accumulated enough reactors to produce a nuclear bomb. The problem with the agreement was and still is that it does not stand against Iran's aspirations to expand aggressively in the region. Furthermore, it does not effectively tackle Iran's previous efforts for nuclear armament at a time when it still continued to the violate the agreement.

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The truth is, no one opposes a nuclear agreement that falls in the interest of the world. No one wishes to besiege Iran as long as it doesn't violate international laws. It is in no one's interest to call for abolishing the agreement, but the concerns that appeared when announcing the agreement in July 2015 seemed obvious after the deal was signed. In short, Iran had violated the agreement in the first month and it continued to manipulate it under the pretext of "the spirit of the agreement".

But in fact, it has been violating central details without being held accountable. For example, the agreement stipulates that Iran be notified if it violates any of the articles, and in case it abides by it again later on then this wouldn't be considered a breach. In this way, Iran continues

to violate the agreement, and then it stops when being notified. I think that this is the best agreement Iran has ever signed because it is benefiting from it in any way it wants, while the region is jeopardized by Iran's use of its terrorist networks under the umbrella of the international agreement.

We can say that this is the first article that should be revised strictly so that Iran becomes aware of the consequences of its violations. Who would believe that the US navy can't strongly respond when IRGC-affiliated armed ships provoke it (a thing that occurred several times in the past two years)? The desire not to give Iran an excuse to disrupt the nuclear agreement is the only thing stopping them. What better gift could be given to Iran? In his famous interview with Atlantic magazine in 2015, Obama said that the long negotiations with the Iranians that led to the agreement would help restore respect to Iran and calm in the region. He pointed out that he has no excessive concerns over Iran's corruption and that supporting the US allies against Tehran would trigger conflicts.

Two years of the agreement have proven that everything Obama said and believed in, and everyone who supported the agreement, was wrong. The region didn't calm down, but the opposite. The agreement didn't help Tehran respect its neighbors. The only thing that happened is that ignoring Tehran's attitude led to an escalating threat to the world, not only the region. Maybe it is time to call Iran to account for violating the nuclear agreement, even after two years of signing it.

Source: https://english.aawsat.com, 17 September 2017.

USA–RUSSIA

New US Policy Violates US-Russia Nonproliferation Nuclear Forces Treaty

An obscure $65 million program tucked inside the National Defense Authorization Act (NDAA) funds a cruise missile program "with a range prohibited by the 1987 Intermediate-Range Nuclear Forces Treaty," writes Politico's Greg Hellman, former Government Accountability Office analyst. Hellman argues that "Russia has violated the treaty," which is why some people want in Washington want to move forward with the program. "But opponents, which include former State and Defense Department officials who helped negotiate the treaty, say it would doom the treaty altogether," he says.

The analyst suggests the Senate freeze money directed toward the ground-based missile program "until the Defense secretary submits a report about the weapon." If the measure goes forward it will constitute "one more coal on the fire of US-Russian relations," John Kiriakou, CIA officer-turned-whistleblower, told Sputnik News.

The Arms Control Association reports that "as the possessors of over 90 percent of the world's roughly 15,000 nuclear weapons, the United States and Russia have a special responsibility to avoid direct conflict and reduce nuclear risks.

The Arms Control Association reports that "as the possessors of over 90 percent of the world's roughly 15,000 nuclear weapons, the United States and Russia have a special responsibility to avoid direct conflict and reduce nuclear risks." Passing the provision into law "would deal a major, if not mortal, blow to longstanding, bipartisan arms control efforts," the Arms Control Association wrote in a July issue brief, adding that the FY2018 NDAA fails to "provide effective oversight of the rising costs of the government's more than $1 trillion-plan to sustain and upgrade US nuclear forces." If these points weren't enough to make policymakers reconsider the measure, the new NDAA proposes further funding for an "expanding US missile defenses that make neither strategic, technical, or fiscal sense," the nonpartisan group said.

The US Congress passed a sanction bill against Russia that was signed into law by President Trump on August 02, 2017 — though the president described it as "seriously flawed." "This bill makes it harder for the United State to strike good deals for the American people, and

will drive China, Russia, and North Korea much closer together," Trump said in a statement following passage of the law. One day after signing the sanctions bill Trump declared via Twitter that Washington's "relationship with Russia is at an all-time & very dangerous low. You can thank Congress, the same people that can't even give us Hcare," referring to Republicans' 7 year mantra of "repeal and replace" that they party cannot pass through Congress despite holding majorities in both chambers.

On September 07, 2017, the White House made its position clear. "The Administration objects to section 1635, which would establish a program of record to develop a road-mobile, ground-launched missile system and would prohibit any authorization of funds for research and development until a detailed analysis of systems is delivered to defense committees," according to a White House policy document on the NDAA.

Source: *https://sputniknews.com, 15 September 2017.*

NUCLEAR SAFETY

UK

No Nuclear Weapon is Safe from Cyber Attacks

In late 2010, 50 nuclear missiles went missing from under the noses of officers at the Francis E. Warren Air Force Base in Wyoming, US. For the best part of an hour the Minuteman III missiles, each with a range in excess of 12,800km, could not be reliably monitored or communicated with. If they had needed to, the staff at the control centre would have had no way to launch those missiles. They also had no way of knowing whether the missiles were being tampered with remotely by some unknown enemy.

This terrifying episode, it turns out, was all down to a single hardware failure in the communication system at the base. But senior officials were so rattled by the incident that President Obama ordered investigators to search for more vulnerabilities in the US's nuclear weapons silos.

... The risk isn't limited to the possibility of hackers launching a missile remotely, she says. Cyber attackers could tamper with a system so it *thinks* it's being attacked, or gives humans misleading information about the status of its nuclear weapons, reducing their ability to use those weapons effectively if they needed to.

... "The question is whether the system will continue to function as it is designed to or not, when unusual things happen." Cyberattacks have always posed some risk to nuclear weapons systems, but since the peak of the Cold War, international efforts to limit the development and use of nuclear weapons have largely kept the prospect of nuclear war at a distance.

Cyberattacks have always posed some risk to nuclear weapons systems, but since the peak of the Cold War, international efforts to limit the development and use of nuclear weapons have largely kept the prospect of nuclear war at a distance.

Now that picture is changing. With President Trump and North Korea's leader Kim Jong-un rattling their sabres at each other from across the Pacific, it's hard to predict what shape nuclear diplomacy will take over the coming months. "Today the role of nuclear weapons is set between the major players, but we don't know how North Korea would act," Unal says.

The increasing sophistication of cyberattacks also makes it harder to reach for diplomacy as a way of stopping nuclear attacks. ...For years nuclear diplomacy relied on the mutual acknowledgement of the strength of different nations' nuclear forces, but now it's much more difficult to really know your enemy.

Despite the vulnerabilities that military networks may possess, state-level hackers seem to be keeping their hands off of nuclear weapons so far, says Andrew Futter at the University of Leicester. ...

But that doesn't mean that attacking nuclear facilities is impossible. America *may* have used cyberattacks to disrupt North Korean missile launches during the Obama era, although it's not fully clear whether the failed missile launches were due to US interference or errors on the North Korean side. The 2010 Stuxnet attack, which brought Iranian nuclear enrichment facilities grinding to a halt, showed for the first time that cyberattacks could hit nuclear infrastructure hard, even though it seems they haven't yet been used against nuclear weapons facilities themselves.

Although nuclear weapons systems are deliberately designed to be minimally exposed to the outside world, Futter says that no system can be completely isolated from attacks. Nuclear submarines are completely disconnected when they're deep under the water, but even they become vulnerable when they have their hardware and software updated.

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The manufacturing process is another risk, says Unal, as hackers could introduce malicious code into a weapon while it's still being built. It's not just the sites where nuclear weapons are kept that need to be protected against attack, she says, but every single company that's involved in the manufacturing process too.

The Treaty on the Prohibition of Nuclear Weapons would stop countries from "undertaking to develop, test, produce, manufacture, acquire, possess or stockpile nuclear weapons or other nuclear explosive devices, as well as the use or threat of use of these weapons.

... Working out who is actually committing a cyberattack presents a further set of problems, says Joe Burton at the University of Waikato in New Zealand. The 2017 cyberattacks perpetrated against Ukraine, for example, are most likely to have been carried out by Russia, but no one has admitted to that....

The world is slowly starting to catch up with applying international law to cyberattacks, says Unal. Between 2009 and 2013, 17 nations collaborated to create the Tallinn Manual, a non-binding document that analyses how state-level cyberattacks are governed by conflict law. ...

Source: *http://www.wired.co.uk, 18 September 2017.*

NUCLEAR DISARMAMENT

GENERAL

Treaty on the Prohibition of Nuclear Weapons Opens for Signature

A new treaty that opened for signature Sept. 20 at the United Nations and that could be the first step toward worldwide nuclear disarmament has been signed by the Vatican and endorsed by leading Catholic ethicists.

The Treaty on the Prohibition of Nuclear Weapons would stop countries from "undertaking to develop, test, produce, manufacture, acquire, possess or stockpile nuclear weapons or other nuclear explosive devices, as well as the use or threat of use of these weapons," according to a U.N. press release. If it gains the signature and ratification of 50 states, it would become the first legally binding treaty prohibiting nuclear weapons.

In July, after four months of negotiations, the final draft of the treaty was approved, with 122 countries voting in favor, one against and one abstention. None of the world's nine nuclear powers — China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom and the United States — participated in the negotiations. Only one NATO state, the Netherlands, participated, and provided the sole vote against the final draft.

The treaty opens for signature at a time when conflict between the United States and North

Korea has raised the fears of nuclear war to heights not seen since the Cold War, and the U.S. Senate is debating a Pentagon funding bill that would allocate money for a new nuclear weapons program.

When the final draft was announced, France, the United Kingdom and the United States said in a press release that they "do not intend to sign, ratify or ever become party to [the treaty]. Therefore, there will be no change in the legal obligations on our countries with respect to nuclear weapons. ... This initiative clearly disregards the realities of the international security environment. Accession to the ban treaty is incompatible with the policy of nuclear deterrence, which has been essential to keeping the peace in Europe and North Asia for over 70 years." ...

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Source: https://www.ncronline.org/news/world/treaty-prohibition-nuclear-weapons-opens-signature, 26 September 2017.

NUCLEAR WASTE MANAGEMENT

NORTH KOREA

Nuclear Waste Disposal Contract with North Korea Invalid: Taipower

A contract signed between state-run Taiwan Power Co. (Taipower) and North Korea in 1997 on the disposal of nuclear waste has never been valid, leaving the company with no obligation to pay any compensation to North Korea, an official said.

The contract had allowed Taipower to ship 60,000 barrels of low-radioactive nuclear waste to North Korea for ultimate disposal but never came into force because North Korea did not provide Taipower the data necessary to obtain an export permit for the shipment, according to Taipower spokesman Lin Te-fu.

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Although North Korea reportedly planned to seek NT$300 million in compensation from Taipower for breach of contract, the company has never received any formal request from North Korea for compensation or made any such payment, he said.

The matter has drawn renewed attention after Taiwan's government announced a ban on trade with North Korea as a sanction against continued missile tests by Pyongyang. Lin said Taipower will comply with the government's ban and stop all bilateral trade with North Korea. Taipower had imported coal from North Korea at one point but is no longer doing so, he said.

Source: http://focustaiwan. tw/news /aeco / 201709250035. aspx , 25 September 2017.

USA

Cameco to Resume Radioactive Waste Shipments

The Nuclear Regulatory Commission has concluded that Wyoming-based Cameco-Power Resources has fixed its shipping problems that led to radioactive spills south of Blanding, Utah, and can resume shipments of barium sulfate to waste storage facilities.

However, the White Mesa Mill, which formerly accepted the waste then reported to regulators they were leaking en route, said it is not accepting barium sulfate shipments from Cameco at this time, according to a company spokesman.

Twice in eight months — on Aug. 19, 2015, and March 28-29, 2016 — a Cameco container truck shipping barium sulfate from the Smith Ranch, Wyoming, uranium mine to the White Mesa Mill waste-storage facility leaked toxic contents en route. The March incident was the most severe, spilling a

trail of the milky radioactive waste onto US Highway 191 south of Blanding.

In August 2016, Cameco was ordered by the Nuclear Regulatory Commission to suspend shipments pending an investigation and approved corrective action plan. The investigation concluded Cameco failed to effectively package the waste and did not accurately describe the contents and quantity of loads in shipping papers.

In its corrective action plan, Cameco said it will begin using new containers designed for sludge and pond sediments and will place the waste in industrial bags before it goes into containers. Cameco also said it would add dunnage to fill voids in the load to keep it from shifting and would add improved absorbent polymer to keep free water from sloshing around.

At the time of the accidents, the company was misclassifying radioactive waste at a lower level than the actual shipment, the NRC found. Cameco said it has adjusted its testing methodology in order to classify radioactive waste accurately and would sample and test each waste shipment before transport rather than take limited samples. Officials also said the company has improved hazardous materials training.

After several reviews and inspections of corrective action plans, the company was given the green light to resume shipments last month. Cameco's "recent changes to its transportation program associated with the package selection process, waste classification and its pre-transportation packaging process have been reviewed and determined to be adequate," Scott Morris, deputy regional administrator for the Nuclear Regulatory Agency, stated in an Aug. 25 letter to the company.

The letter further stated that the NRC has determined that Cameco's "corrective action plan and changes made to prevent recurrence were adequate to ensure the safe transport of barium sulfate sludge and pond sediment to disposal facilities."

The spills alarmed nearby residents of the Ute Mountain Ute tribe, who often walk the highway where the spill occurred north of their reservation. Cameco spokesman Gord Struthers said that there was "definitely a problem" with its shipping practices, but they have taken extensive steps to correct them. The company plans to resume shipments of barium sulfate to waste facilities in October and hopes that includes the White Mesa Mill. Gord said that its improved shipping procedures will prevent leaks and spills. ...

Source: Jim Mimiaga, https://the-journal.com/articles/67325-cameco-to-resume-radioactive-waste-shipments, 25 September 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).

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