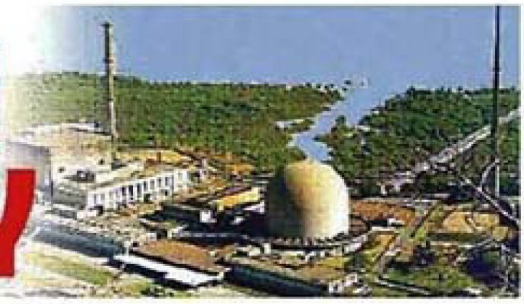
NUCLEAR SECURITY



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

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OPINION – Manpreet Sethi

Bringing Nuclear Risks Back into Popular Imagination

'Little Boy' was dropped on Hiroshima on August 6, 1945 at 0815 hours. This was followed three days later by the dropping of 'Fat Man' on Nagasaki, at 1101 hours. The two nuclear bombs vaporised around 150,000 people who were going about their morning business; 130,000 others succumbed to burns, radiation sickness, and other ailments that the collapsed health system could not treat. Few, then, understood why their skin erupted wounds that would not heal, hair fell off in clumps, and stomach churned with pain and nausea. Several hibakusha, or survivors of the atomic bombings, have recounted how an ordinary day turned into one where they wished they too had died in that instant flash.

Buried Under: The purpose of recalling these horrors from 75 years ago is to ensure that nuclear armed states do not forget the real nature of nuclear weapons. Human memory is short and often preoccupied with the immediate. Currently, the socio-economic-health emergency posed by COVID-19 and the growing geopolitical tensions between major powers owing to their abrasive behaviour seem to be consuming us all. But nuclear risks are lurking just below the surface, and they are growing.

Human memory is short and often preoccupied with the immediate. Currently, the socio-economic-health emergency posed by COVID-19 and the growing geopolitical tensions between major powers owing to their abrasive behaviour seem to be consuming us all. But nuclear risks are lurking just below the surface, and they are growing.

Dangers of Unintended Use: Among the risks of nuclear use, the highest likelihood is that of inadvertent escalation due to miscalculation or misperceptions. It is less likely that adversaries will launch pre-meditated, deliberate nuclear attacks because each understands that a splendid first strike is impossible and that nuclear retaliation cannot be escaped. Of course, the severity of the damage would depend on the number and yield of weapons used. But studies indicate that use of even a fraction of the weapons held in medium-sized arsenals would cause a massive human tragedy and have long-term repercussions for food and water availability, agricultural output, climate change, migration, etc.

Possibilities of unintended use are exacerbated by many factors: stressed inter-state relations, unchecked strategic modernisation as arms control arrangements wither and nations hedge against each other; adoption of nuclear postures that peddle the benefits of 'limited' nuclear war; and emergent technologies creating new anxieties. Advancing capabilities of cyberattacks on nuclear command and control, blurring lines between conventional and nuclear delivery, induction of hypersonic missiles capable of high speed and manoeuvrability, incorporation of artificial intelligence in nuclear decision making are new developments that threaten to create unknown risks. As capabilities grow and inter-state trust diminishes, chances of stumbling into nuclear war are not insignificant.

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The Cold War and After: However, these risks are not part of our collective popular imagination today. During the Cold War, citizens of affected nations were made to undergo regular nuclear drills. As sirens blared, everyone had to rush to bunkers created in homes, schools, hospitals, etc. There were guidelines on what to equip these nuclear shelters with so as to be able to sustain lives in case mushroom clouds went up. Several works such as novels, movies and TV documentaries depicted life "the day after". These graphic depictions kept nuclear weapons and their highly destructive nature alive in the consciousness of the people. Public pressure translated into civil society movements that demanded action from political leaders to engage with the subject of risk reduction through unilateral, bilateral or multilateral measures.

The end of the Cold War pretty much brought down the curtains on nuclear weapons for the common man. The perceived sense of danger of nuclear war receded and nuclear strategies went back to being dictated and driven primarily by security conclaves. Over the years, technological advancements and growing hyper-nationalist tendencies have shaped strategic discourse in a manner that is largely devoid of popular participation. But, this connect is important to temper national choices and create the much needed checks and balances.

General awareness of the horrors accompanying nuclear weapons, therefore, needs to be revived since a high level of public apathy and political complacency have brought us to the threshold where the risks remain high but the desire to address them is low. In fact, one does not see a shared desire for nuclear risk reduction among nuclear armed states. Drunk on their faith in deterrence, there is a tendency to use strategies of nuclear brinkmanship and ambiguity that actually add to the risks. There is also a display of confidence in being able to manage and control risks. However, umpteen war games have shown that it is impossible to calculatedly climb the escalation ladder. Any nuclear use between nuclear adversaries would cause a humanitarian disaster.

General awareness of the horrors accompanying nuclear weapons, therefore, needs to be revived since a high level of public apathy and political complacency have brought us to the threshold where the risks remain high but the desire to address them is low. In fact, one does not see a shared desire for nuclear risk reduction among nuclear armed states.

A Media Campaign: In order to get nations to understand this, it is necessary to expose leaders and societies to the full range of physical, economic, social, political, health, environmental, and psychological effects of nuclear weapons. This could be most effectively done through use of popular media. Just as the fight against COVID-19 is being won through global high intensity information dissemination about various facets of this highly contagious disease, a similar

information campaign about the destructive potential of nuclear weapons is needed. This will help on three counts: compel leaders to rationalise their weapon requirements; force nations to find ways of reducing nuclear risks; and gradually pave the path towards elimination of nuclear weapons.

Recalling the horrors of Hiroshima and Nagasaki through events all year round on its 75th anniversary is an opportunity to bring nuclear risks back into popular imagination and into the political agenda. Creative media can help by tapping available modern means of mass communication to create stories with identifiable characters and situations that tug at the heart and instil a larger respect for humanity.

Source: The Hindu, https://www.thehindu.com/opinion/lead/bringing-nuclear-risks-back-into-popular-imagination/article32311140.ece, 10 August 2020.

OPINION – George Perkovich

75 Years On, How will the Nuclear Age End?

Seventy-five years ago, US nuclear weapons devastated Hiroshima and Nagasaki. For individual human beings, 75 years signals nearness to the end of life. But for the nuclear age, does this anniversary mark the beginning, the middle, or the end?

There are two dramatic ways in which the nuclear age could end: annihilation or disarmament. If one ending is undesirable and the other unachievable, leaders should prolong life with nuclear weapons by making their use much less likely and reducing their destructiveness in case they are used. Clearer adherence to the law of armed conflict and greater understanding of the climatic effects of nuclear war would serve both purposes.

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Annihilation could come through war involving arsenals that devastated not only the societies of the belligerent countries, but also the agricultural productivity and economic markets on which many other nations depend. Some nations would survive, and some could retain nuclear weapons or ambitions to acquire them, but for the purposes of marking epochs, we could say that the first nuclear age would have ended.

Nuclear disarmament is a much happier prospect. This is one reason that many in Japan and other countries advocate it and support the 2017 Treaty on the Prohibition of Nuclear Weapons. However, the treaty does not detail how nuclear disarmament would be defined, achieved over time, verified, and enforced. Nor have the nine nuclear-armed states done so, even though the NPT obligates the United States, Russia, the United Kingdom, France, and China "to pursue negotiations in good faith on effective measures" to end the nuclear arms race and achieve nuclear disarmament.

The undesirability of nuclear war and the uncertainty about how to accomplish nuclear disarmament suggest that we are still in the middle of the nuclear age. This middle age is predicated on maintaining nuclear deterrence as a livable way to avoid annihilating wars while searching for a disarmament solution. If deterrence could endure without failure, the nuclear age could tolerably last forever.

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Yet, nuclear deterrence could fail. Indeed, the risk of failure — nuclear war — is what makes deterrence work. Everyone would be more secure if deterrence could be maintained with significantly less destructive arsenals. Nations that do not

possess these weapons (or participate in alliances that do) are especially keen to be spared from the consequences of other governments' nuclear wars.

Russian President Vladimir Putin's response to an interviewer's question two years ago epitomized the vulnerability felt by non-nuclear-weapon states. Putin said that if Russia's warning systems detected an enemy attack with nuclear-armed missiles, he would order "reciprocal" nuclear strikes. "If there is this decision to destroy Russia then we have a legal right to respond," Putin said. "Yes," he acknowledged, "this would be a global catastrophe for humanity but I, as a citizen of Russia and the head of the Russian state, would like to ask you this — what do we need a world for if there is no Russia in it?"

In their renewed arms race, Russia and the United States — and increasingly China, India, and Pakistan — let the theoretical logic of deterrence and the interests of military-industrial establishments rationalize how many nuclear weapons of what type and which targets they "need." This thinking is too narrow. It does not ask, in the words of Paul Ramsey's classic, *The Just War,* what is "the upper limit of sanity in the actual use of nuclear weapons"?

What number and type of nuclear weapons, detonated on which targets, would be likely to produce environmental and climatic effects that would threaten the viability not only of the "winning" combatant country but also of non-belligerent nations? And what scale of nuclear war would clearly transgress the law of armed conflict (also known as international humanitarian law).

Two considerations beyond deterrence might help answer this question: What number and type of nuclear weapons, detonated on which targets, would be likely to produce environmental and climatic effects that would threaten the viability not only of the "winning" combatant country but also of non-belligerent nations? And what scale of nuclear war would clearly transgress the law of armed conflict (also known as international humanitarian law)?

Data and models to assess the potential climatic effects of nuclear war have improved enormously since the prospect of "nuclear winter" first emerged in the 1980s. It is time for the United States, Russia, China, India, and Pakistan (at least) to conduct new studies examining the probable climatic effects of various scenarios that drive their planning for potential nuclear war. Declassified versions of such studies should be made available for international experts to analyze and debate.

If reputable scientific debate indicates little risk of agricultural catastrophe, then nuclear-armed states would have a stronger basis for retaining the weapons and policies that could produce those scenarios. (Other arguments for disarmament still could be validly made.) Conversely, if openly debated scientific studies identify scenarios that would be catastrophic not only to the belligerent nations but also to others, then it should be more difficult to justify retaining arsenals and war plans that are likely to produce such harm.

Similarly, it is time to clarify whether and how the use of nuclear weapons can comport with the law of armed conflict. For decades, officials in the United States have declared that these weapons are not aimed "at population per se," or that operations would spare cities "to the degree practicable." The fuzzy language about targeting represents an important and admirable fealty to the law of armed conflict. Nevertheless, U.S. and other states' war plans have called for detonating hundreds of weapons on targets in cities, which would stretch any definition of legality.

The Trump administration's 2018 *Nuclear Posture Review* (like the Obama administration's before it) affirms America's commitment "to adhere to the law of armed conflict [in any] initiation and conduct of nuclear operations." However, it does not explain how this would be done. The United Kingdom's position is similar, while the other seven nuclear-armed states are even less forthcoming.

Because nuclear-armed states insist that they are responsible stewards and retain these weapons only for legitimate defensive purposes, they

should be willing to explain whether *and how* they plan to adhere to the law of armed conflict in the potential conduct of nuclear operations. They should describe how variations in explosive yields and numbers of weapons and their targets could increase or decrease the probability that use of nuclear weapons would comport with the law of armed conflict.

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Arsenals and policies that comport with the law of armed conflict would provide more credible and therefore more effective deterrence. A state that has worked through and publicly articulated why and how its policies would be legal would presumably be less self-deterred. This added credibility could inform adversaries' deliberations in deciding whether to undertake escalatory actions up to and during nuclear exchanges.

Now the skies are darkening. In 2019, the INF Treaty between the United States and Russia collapsed, ushering in a new arms race for weapons with a range of 500–5,500 km. China's rise as a superpower is bolstered by a rapidly modernizing arsenal. India and Pakistan are engaging in the worst border scuffles for decades.

The government of Japan and the governments that defend or potentially threaten it are not prepared to live without nuclear deterrence. By adding environmental and legal considerations to the logic of deterrence, they could greatly reduce the horrific consequences of its failure. Nuclear war with current arsenals would make the suffering of Hiroshima and Nagasaki seem minor by comparison.

Source: War on the Rocks, https://warontherocks.com/2020/08/75-years-on-how-will-the-nuclear-age-end/, 06 August 2020.

OPINION – Nobumasa Akiyama

Nuclear Weapons: Arms-control Efforts Need China

It is 75 years since the United States dropped atomic bombs on the Japanese cities of Hiroshima and Nagasaki on 6 and 9 August 1945, killing around 200,000 people. Since then, humanity has had to coexist with the massive destructive power of nuclear weapons.

Although such weapons have not been used in wars since, they define the international order. Nuclear deterrence and pacts to restrict arms between the United States and Russia have assured decades of precarious peace. Meanwhile, the United Nations' adoption of the first-ever Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2017 buoyed hopes of a world free of these catastrophic arms.

Now the skies are darkening. In 2019, the INF Treaty between the United States and Russia collapsed, ushering in a new arms race for weapons with a range of 500–5,500 km. China's rise as a superpower is bolstered by a rapidly modernizing arsenal. India and Pakistan are engaging in the worst border scuffles for decades. Iran is re-stoking its nuclear programme, after the United States unravelled the Joint Comprehensive Plan of Action restricting it. North Korea continues to expand its arsenal.

This environment had made the old rules of strategic stability obsolete even before the COVID-19 pandemic fuelled nationalism and tensions. New ways of thinking about nuclear security and arms control are needed urgently, and for more than two players.

First, researchers and security experts need to find deterrence strategies that are acceptable to three nations. China should join arms-control talks with the United States and Russia, even if these are open-ended. Second, international security discussions need to encompass emerging technologies and conventional weapons, as well as nuclear ones. Third, non-nuclear states, including Japan — my nation — need to be at the table.

In the 75 years since the nuclear cataclysm at the end of the Second World War, scientists have been central to deterrence, detection and verification, capitalizing on global collaborations to build trust, technology and treaties. Researchers' skills and commitment are needed now more than ever.

Nuclear-arms control is at a crucial juncture. On a positive note, world leaders are increasingly vocal about abolishing these abhorrent weapons. Sadly, current geopolitics means that situation is a long way off. Former US president Barack Obama called for a world without nuclear weapons on a visit to Prague in 2009, and became the first sitting US president to visit Hiroshima, in 2016. UN secretary-general António Guterres argued that their abolition is crucial "to save humanity" in his 2018 disarmament agenda. When Pope Francis visited Nagasaki and Hiroshima in November 2019, he criticized the concept of nuclear deterrence as offering a "false sense of security" sustained by "fear and mistrust". Peace should be assured instead, he said, through "the arduous yet constant effort to build mutual trust".

Notable absentees from the treaty include all nuclear-armed countries. They did not vote for the TPNW; they jointly expressed their unwillingness to join. Nor did 'nuclear umbrella states' in Europe and Asia, such as the members of the NATO, Japan and South Korea, whose security from nuclear attack relies on the United States.

Similar sentiments among non-nuclear states delivered the TPNW. It was adopted by 122 of the 193 members of the UN, and will enter into force once 50 states ratify it. But, as of this month (August 2020), only 40 have done so. Signatories agree not to develop, test, produce, acquire, possess, stockpile, use or threaten to use nuclear weapons.

Eradication is unlikely, however. Notable absentees from the treaty include all nuclear-armed countries. They did not vote for the TPNW; they jointly expressed their unwillingness to join. Nor did 'nuclear umbrella states' in Europe and Asia, such as the members of the NATO, Japan and South Korea, whose security from nuclear attack relies on the United States. A global regime of arms control is still crucial to manage nuclear risks.

Fracturing Framework: The United States and Russia together possess 90% of the world's 14,000 nuclear weapons. Their holdings have been shaped through four bilateral treaties at three levels: strategic nuclear arms, missile defence and sub-strategic nuclear and conventional arms. Negotiations began in 1969 under the SALT.

The SALT I agreement, signed in 1972, restricted systems that were capable of directly delivering nuclear weapons to either country. That agreement was replaced by the 1991 START 1, which capped the numbers of nuclear warheads as well as delivery systems that each nation could hold. President Obama and then Russian president Dmitry Medvedev signed a replacement 'New START' treaty in April 2010.

The ABM Treaty, signed in 1972, limited competition concerning these offensive weapons that had shaped confrontation between the two countries in a framework of mutual assured destruction. In 1987, the United States and the Soviet Union agreed to eliminate ground-launched, medium-range missiles under the INF treaty, and signed the Treaty on Conventional Armed Forces in Europe, which set ceilings on key conventional forces in Europe. Russia announced its withdrawal from the treaty in 2015.

Each nation agreed to abide by these rules because they recognized the existential risks: either could wipe out the other. The rules were formalized and verified. Predictability and transparency increase trust. Scientific teams from both countries conducted on-site inspections of warheads and exchanged data. The number of nuclear weapons held in each country has now fallen to around 6,000, or one-fifth of their peak during the cold war.

But tensions are rising again between the United States and Russia. The United States backed out of the ABM treaty in 2002. And in February 2019,

it announced it would withdraw from the INF treaty, citing Russia's testing of prohibited missiles. After Russia made counter accusations, both sides abandoned the treaty in August 2019.

Enter China: Negotiations have also stalled over a replacement for New START, which expires in February 2021. If the treaty is not renewed or extended, the nuclear arms race will go unchecked. The United States wants to bring in China and expand the scope of weapons covered. Russia wants to stick to the original remit.

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China's rise has transformed the geopolitical landscape. The United States cited that country's unrestricted build-up of nuclear forces as one reason for its withdrawal from the INF treaty. China has around 320 nuclear warheads, and more than 250 missile launchers capable of carrying them. The majority of its nuclear arsenal is in land-based, medium-range missiles.

For example, the Chinese ballistic missile Dongfeng 26 can travel 4,000 km, roughly the distance from eastern China to Guam, a US territory in Micronesia in the western Pacific Ocean. Dongfeng 21 can reach a target 2,000 km away, enough to hit US aircraft carriers deployed around the South China Sea if launched from central western China. Dongfeng 17 is a manoeuvrable missile that can deliver both nuclear and conventional warheads at a similar range. It could function as boosters for a hypersonic glide vehicle flying at low altitude, which radars would have little time to detect.

These types of missile are the very assets that the United States and Russia could not possess under the INF treaty. For China, they are key to being able to compete with the United States in the western Pacific Ocean. It is because of these that the United States, keen to protect its superiority in the region, wishes to bring China into the arms-control fold.

So, in June this year, the United States invited China to attend its discussions with Russia in Vienna about what will replace New START. China declined. Not keen for the United States to dampen its nuclear ambitions, it would rather wait and see what happens in November's US presidential election. But there are good reasons for China to engage. Not least, it could influence the agenda — to raise issues that concern it, such as the missile defence systems of the United States and its allies, which include Japan.

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Three Challenges: Finding a trilateral arms-control strategy will be difficult for three reasons: First is a problem of game theory. It makes more sense for three players in a non-cooperative dilemma game to defect rather than cooperate. Conventionally, rational players would rather engage in an arms race than agree not to. That view changes when they look ahead. Players place more emphasis on the value they will gain in future — they would rather be guaranteed a smaller payback than risk gaining nothing or losing. Cooperation then becomes possible. That's why the United States and Russia agreed to act in the past. The game repeats endlessly, and the devastating power of nuclear weapons makes the cost of defection high — a nuclear-first strike from the other.

In a three-way game, the outcome might be different. It is harder to find a stable equilibrium in the first place. And it's better for two to form a coalition against the other, even in the long run.

Thus, every player fears others teaming up against them. When trust is missing, players prefer to stay in competition rather than reach agreement.

The key to trilateral arms control is to ensure that the isolated party benefits from signing up. It's unclear whether the confidence-building and verification measures associated with existing arms-control treaties are sufficient to do that, and whether the level of transparency that could be required is acceptable for all three.

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Second, power balances, strategic goals and arsenals that were evolving fast are now profoundly in flux. The economic power shifts brought about by technology alliances and globalization have been accelerated and amplified by the COVID-19 pandemic. At potentially one of the most profound inflection points for centuries, it is hard to define a stable state of relations among countries that have different (and unpredictable) goals and assets.

From a global perspective (even as the pandemic continues), the United States is still a political and economic heavyweight, as well as a military one. It has been pursuing cooperation with allies in the Indo-Pacific, Europe and the Middle East. Russia's power is declining: its core interests are in Europe and central Asia, and it is seeking to keep its superpower status, even if only nominally. China's global status is rising: it has been extending its influence worldwide by economic and diplomatic means, such as the BRI, and its military focus has enabled it to gain dominance in the western Pacific. These three rival powers, with their varying future trajectories, face a major challenge in finding a sustainable way to accommodate all of their strategic interests.

First, agree the definition and scope of the weapons systems covered by an arms-control treaty. Second, reach a mutual understanding regarding the definition of a strategic equilibrium that serves the security of each country.

Third, boundaries are blurring between different types of weapon. Emerging technologies such as hypersonic gliders, precision-guided strike systems, robots and AI make conventional weapons as effective strategically as nuclear ones. Cyberattacks could cheat nuclear command-and-control systems and confuse decision-making, leading to risky situations. Satellite-imaging technologies enhanced using AI make it easier to identify and target strategic assets such as missile-launch sites and commands. All of these factors complicate deterrence calculations. Discussion on regulating them has not produced any tangible results, and it will remain difficult.

Steps Forward: The United States, China and Russia should immediately begin talks that explore how stable strategic relationships can be built. That would reassure other countries and pave the way for more substantive security agreements. Meanwhile, the United States and Russia need to extend New START to avoid a gap in arms control**.**

The three powers should discuss ways to identify and reduce the risks associated with nuclear weapons, as well as how to implement transparency measures. Then they should take the following steps. First, agree the definition and scope of the weapons systems covered by an arms-control treaty. Second, reach a mutual understanding regarding the definition of a strategic equilibrium that serves the security of each country. This will involve balancing qualitative values with a quantitative formula. Third, formulate mechanisms for verification and confidence-building that prevent defection without compromising sensitive security information.

Researchers and specialists in security need to explore new models of deterrence and arms control. Win-win-wins need to be found for a three-player

game. And a formula is needed to convert the balance of strategic interests into measurable levels of force, given different goals and military assets. Deterrence strategies that cover nuclear, conventional and cyber capabilities also need to be designed.

Non-nuclear states must participate in arms-control discussions. East Asia could be one focal point for testing new strategies, for three reasons. First, it is caught in the middle of a competition between the United States and China. Second, four nuclear powers, including North Korea and Russia, are involved in the region's instability. And third, non-nuclear allies of the United States — Japan and South Korea — are major strategic and scientific players in the high-tech environment that today shapes the power of states.

This places my country in a difficult but important position. Japan should take the lead in envisaging new forms of arms control, because it would be a way for the nation to commit to its promise: that what happened to the people of Hiroshima and Nagasaki must never happen again.

Source: https://www.nature.com/articles/d41586-020-02282-9, 04 August 2020.

OPINION – Jacques Hymans

Beyond the Ruins of Hiroshima

Seventy-five years ago, on 6 August 1945, an American warplane destroyed the city of Hiroshima with a single atomic bomb. Over the following five months, 140,000 people died. The surviving 210,000 came to be known in Japanese as *hibakusha*, 'bombed people'. A second atomic bomb destroyed the city of Nagasaki on 9 August, leaving 73,000 dead and 200,000 hibakusha.

In 1967, the psychiatrist Robert Jay Lifton published a major study of the hibakusha entitled *Death in Life*. Lifton argued that the hibakusha felt such severe survivor guilt that they wished they had died, too, and even thought of themselves as being already dead.

In her 1999 book *Hiroshima Traces*, the anthropologist Lisa Yoneyama describes the hibakusha's intense relationship with the dead differently from Lifton's 'death in life'. Yoneyama sees the hibakusha as giving the bomb's victims life after death. She writes that the hibakusha have developed 'testimonial practices' that can be compared to 'a shamanistic ritual that summons dead souls', to 'resurrect the deceased and endow them with voices'.

Beyond the Mushroom Cloud, a 2012 study by the ethicist Yuki Miyamoto, supports Yoneyama's interpretation. The testimony of the hibakusha, Miyamoto writes, 'draws strength from the dead to resist and unsettle the conditions of this world, replacing them with an evolving vision of a different world – a world bound not by the image of the mushroom cloud, but by a sympathy for others that knows no earthly bounds.' The Hiroshima Peace Memorial Ceremony is being held before a much smaller crowd this year because of Covid-19, but millions will still see it on television or online. The hibakusha have achieved a remarkable feat of political jiujitsu. They have turned their bombed cities and bombed selves into powerful agents of peace.

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The ICAN won the Nobel Peace Prize for its work on the UN Treaty on the Prohibition of Nuclear Weapons in 2017. The Nobel Lecture was given by the hibakusha and ICAN campaigner Setsuko Thurlow. 'To all in this hall and all listening around the world,' she said, 'I repeat those words that I heard called to me in the ruins of Hiroshima: "Don't give up! Keep pushing! See the light? Crawl towards it."' Since then, the treaty has been ratified by 40 nations; ten more, and it will enter into force.

Source: London Review of Books, https://www.lrb.co.uk/blog/2020/august/beyond-the-ruins-of-hiroshima, 06 August 2020.

OPINION – Simon Henderson

Is China Helping Saudi Arabia to Build a Nuclear Bomb?

Tuesday's (4 August) horrific blast in Beirut was too small to be an atomic bomb, but the prospect of a Middle East devastated by a nuclear exchange still should go up several notches because of news in the Wall Street Journal that Saudi Arabia, with Chinese help, has built a plant to process uranium ore. Although the story made the front page, the Journal may have underplayed its significance.

The plant, near the remote town of AlUla, is in the northwest of the kingdom, about midway between the holy city of Medina and Tabuk, the side furthest from Iran. Apparently U.S. officials have known of the plant's existence for months, perhaps years, and appear to have leaked or briefed their concerns to the Journal's reporters. The role of the plant is to produce "yellowcake," a semi-processed form of uranium, itself the crucial ingredient for both nuclear power reactors and atomic bombs.

China wasn't a comforting choice as a partner in this respect, either. Beijing can provide the necessary expertise, but its previous experience with such facilities has included Iran and Pakistan.

The name comes from its color when it was first made decades ago. These days, yellowcake still may have the consistency of cake but is black or brown. It is an oxide of uranium — U3O8 — but its significance is that it is a necessary intermediate step to making uranium hexafluoride, the gas that can feed an enrichment plant. Depending on the layout of the centrifuges and the time spun, the resulting enriched uranium is either good for a power plant or a nuclear weapon.

Until Journal reporters asked the Saudis for comment, Riyadh had not acknowledged the existence of the plant. In terms of international protocols, that's sort of OK — but it suggests a lack of openness inconsistent with peaceful intent. China wasn't a comforting choice as a partner in this respect, either. Beijing can provide the necessary expertise, but its previous experience with such facilities has included Iran and Pakistan.

More to the point, processing uranium is linear. It goes from mining to processing (yellowcake), to conversion into dioxide and metal, to gasification (hexafluoride), to enrichment. Saudi Arabia has now ticked the first two boxes. Worse, from a proliferation perspective, it is not a step process in which one skill is mastered before starting on the next. The chances are that — in other remote parts of the kingdom, or hidden in plain sight — there are, in various states of completion, a conversion plant, a gasification plant, and an enrichment plant or two.

The kingdom has not been good at putting Washington at ease. In 2018, while visiting the U.S., Crown Prince Mohammad bin Salman, or MbS, told 60 Minutes: "Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt, if Iran developed a nuclear bomb, we will follow suit as soon as possible." Especially after the recent hospitalization of his father, King Salman, the 34-year-old MbS is the *de facto* leader of his country. American officials, particularly those wanting to back the prospective sale of U.S. civil nuclear technology for proposed Saudi power plants, previously have tried to minimize MbS's words as not being a definitive statement of policy. Unfortunately, they do appear to be a valid statement of intent.

Justifying Saudi behavior in terms of Iran's assumed continuing determination to have the capability to make nuclear weapons is an explanation, but it does not help US policy. For example, a different path appears to have been taken by Riyadh's close ally, the UAE, which has forsworn enrichment and is just starting up the first of four South Korean nuclear power reactors.

An additional concern is that Saudi Arabia continues to have an arsenal of Chinese long-range missiles. They reportedly have been

updated since the 1980s when, to the consternation of the U.S. and Israel, the type supplied was capable of carrying a nuclear warhead. Anxieties were further tweaked last year, when China was discovered to be building a nuclear missile factory in the Saudi desert. The layout of that plant was virtually identical to one constructed in Pakistan in the 1990s.

An additional concern is that Saudi Arabia continues to have an arsenal of Chinese long-range missiles. They reportedly have been updated since the 1980s when, to the consternation of the U.S. and Israel, the type supplied was capable of carrying a nuclear warhead.

The ultimate historical twist is that when Pakistan was racing toward a nuclear weapon capability in the early 1980s, its uranium conversion plant wasn't working properly. The bottleneck was temporarily overcome in May 1981 by China gifting enough highly-enriched uranium to make two atomic bombs (as well as the designs to construct the device). It was months before Western intelligence realized what had happened. Once again, now in Saudi Arabia, it would appear that time is of the essence.

Source: https://thehill.com/opinion/international/510649-is-china-helping-saudi-arabia-to-build-a-nuclear-bomb, 05 August 2020.

OPINION – Raphael Ahren

If the Enemy of My Enemy Gets the Bomb: Saudi Nuclear Plan Gives Israel Headache

It's obvious why Jerusalem has vowed to do everything in its power to prevent Iran, which continues to threaten the Jewish state with annihilation, from obtaining nuclear weapons. But what if Saudi Arabia — the archenemy of Israel's archenemy — were also interested in developing a nuclear weapons program?

Israel no longer considers Saudi Arabia an enemy, but rather a partner in the fight against Shiite Iran and its proxies in Yemen, Lebanon, Syria and Gaza. A nuclear-armed Sunni-Arab power could go a significant way toward deterring Iran from further regional aggression.

This is not an entirely hypothetical question. Riyadh is reportedly taking steps to advance its nuclear program in ways experts worry could indicate the future pursuit of uranium enrichment capability — in other words, the kingdom may be inching toward an atomic bomb.

As the saying goes, the enemy of my enemy is my friend. But in the Middle East's complicated system of strategic alliances, Riyadh's possible quest for a military nuclear program poses a formidable dilemma for Jerusalem.

On the one hand, Israel no longer considers Saudi Arabia an enemy, but rather a partner in the fight against Shiite Iran and its proxies in Yemen, Lebanon, Syria and Gaza. A nuclear-armed Sunni-Arab power could go a significant way toward deterring Iran from further regional aggression. Moreover, Jerusalem seeks to establish diplomatic ties with Riyadh, which it hopes could convince the Palestinians to make the necessary concessions to reach a peace agreement.

On the other hand, Israel, which is believed to have a nuclear arsenal, has always actively opposed effort by other states in the region to acquire non-conventional weaponry. The Middle East is a volatile place, and the last thing Jerusalem wants is a nuclear arms race that could dramatically tip the balance of power and jeopardize its current military advantage over its neighbors.

"The Israeli policy is clear and consistent: No country in the Middle East should have military nuclear capability," former Israeli national security adviser Yaakov Amidror told *The Times of Israel*. "However, as we anticipated, when the bad agreement was signed with Iran, it pushed other countries in the region to acquire these capabilities, and the Middle East is becoming a more dangerous area," said Amidror, now a Fellow at the Jewish Institute for National

Security of America's Center for Defense and Strategy.

At this particular juncture, it can be safely assumed that a Saudi bomb would not be directed at Israel, but rather serve as a deterrent against Iran. But in the ever-turbulent Middle East, Israel had better be prepared for any eventuality, suggested Dore Gold, a former director-general of Israel's Foreign Ministry. "Nuclear weapons capability is also a function of intentions," he said. "Right now we have a Saudi leadership that probably shares certain strategic observations about the region with us. Is it always going to be like that? I don't know. But it's something we have to watch and think about."

All indications are that Saudi Arabia, which has been working on a civilian nuclear program for many years, has not yet decided if it wants to strike a path towards nuclear weapons capability. And even if it did, it would take several years before it would be able to produce an atomic bomb.

Alarming Ambitions? All indications are that Saudi Arabia, which has been working on a civilian nuclear program for many years, has not yet decided if it wants to strike a path towards nuclear weapons capability. And even if it did, it would take several years before it would be able to produce an atomic bomb.

But both the Wall Street Journal and the *New York Times* cited US intelligence officials worried about Riyadh possibly heading in that direction. Aided by China, the reports said, the kingdom constructed a facility to extract uranium yellowcake from uranium ore, which can be enriched into fuel for a nuclear weapon.

Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt if Iran developed a nuclear bomb, we will follow suit as soon as possible," Saudi Crown Prince Mohammed bin Salman.

The Saudis began working on various nuclear energy projects more than a decade ago; one of them aims to construct 16 nuclear reactors by 2040, another trains technicians for uranium mining and extractions. Saudi Arabia has acknowledged having extracted small amounts of uranium from ores, with the assistance of China and Jordan, which has led international researchers and intelligence officers to look for possible facilities suitable for processing uranium ores and the production of uranium ore concentrate, yellowcake.

"Saudi Arabia has an ambitious nuclear program, which includes building an independent front-end nuclear fuel cycle, including possibly uranium enrichment capability," said Olli Heinonen, an expert on nuclear weapons programs at the Washington, DC-based Stimson Center.

"Uranium enrichment capability will make Saudi Arabia, like Iran, a nuclear weapon threshold state, which can — if it so decides — break out from its nuclear nonproliferation commitments and build nuclear weapons in a short period of time, perhaps in a few months." Thus, statements made by Saudi leaders to the effect that they want whatever Iran has are "alarming," he added.

Riyadh has not hidden its intention to become a nuclear power if Iran sets the precedent. "Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt if Iran developed a nuclear bomb, we will follow suit as soon as possible," Saudi Crown Prince Mohammed bin Salman, the country's de-facto leader, said in a March 2018 interview.

Heinonen, who worked for nearly 30 years at the International Atomic Energy Agency, including as head of its Department of Safeguards, has long warned about Iran's nuclear ambitions and is critical of Tehran's failure to come clean about its covert military program.

Countries cooperating with Saudi Arabia's nuclear project — mainly China but also Russia, South Korea, Argentina and the US — should promise the kingdom that it will be provided with fuel for civilian reactors that is produced elsewhere and

urge it to forgo uranium enrichment on its own territory, Heinonen suggested.

What's Israel's Role in All of This? A Saudi Arabia armed with non-conventional weapons has been a "low-level concern of Israel for 30 years, if not longer," said Joshua Krasna, an expert on the Arab world at the Jerusalem Institute for Strategy and Security. Fears of an "Islamic bomb" predate even Pakistan's nuclear weapons program, which was heavily funded by Riyadh, he said.

Jerusalem views the kingdom as a strategic partner, not only in combating mutual foe Iran and its proxies, but and in other areas as well. Furthermore, Saudi Arabia has become an ever-closer partner of Israel's closest ally — the United States.

In past decades, Jerusalem was never shy about voicing its opposition to its Arab neighbors' nuclear ambitions. But the situation with Saudi Arabia today is different and very tricky for Israel, Krasna went on. Jerusalem views the kingdom as a strategic partner, not only in combating mutual foe Iran and its proxies, but and in other areas as well. Furthermore, Saudi Arabia has become an ever-closer partner of Israel's closest ally — the United States.

"When a country is perceived as friendly by Israel's current government, there is very little you can do," he said. "I am sure we would be happy if the Saudis didn't work toward nuclear weapons. But that is not the same as saying we have a significant impetus to do something about it." "Working against the nukes of ostensible friends is a hard sell. You don't want to annoy your friends," he said.

Embarking on a loud diplomatic campaign against the Saudi plan would risk the still-covert rapprochement between Riyadh and Jerusalem, and also wouldn't be very effective, Krasna posited. "In the past, Israel protested big US arm sales to the Saudis, to Egypt and to the UAE," he recalled. "That has disappeared. Israel no longer lobbies against arms sales to Arab countries friendly to the US because it realized that it's the kind of fight that you waste a lot of resources on but that ultimately isn't successful."

Officials in Jerusalem have been instructed not to talk to the press about the Saudis' nuclear plans, but are obviously following the developments in Saudi Arabia very closely and with some degree of concern.

People with knowledge of the matter estimate that Riyadh has recently intensified nuclear cooperation with Beijing because China has lower nonproliferation standards than the US or other Western countries, but that the Saudis ultimately prefer to work together with Washington on this matter. After all, Saudi Arabia is aware that China and Russia are closely aligned with Iran, which could become a problem if Riyadh ever decided to militarize its nuclear program.

Even though Israel has stayed mum so far, it remains opposed to Arab countries enriching uranium on their territory This policy makes it more difficult for the US to reach a nuclear agreement with the Saudis that would rule out a future military program.

Is Israel Blocking a US-Saudi Nuclear Agreement? Even though Israel has stayed mum so far, it remains opposed to Arab countries enriching uranium on their territory, according to Ilan Goldenberg, the director of the Middle East Security Program at the Center for a New American Security. This policy makes it more difficult for the US to reach a nuclear agreement with the Saudis that would rule out a future military program, he argued.

"The best way to prevent Saudi Arabia from getting nuclear weapons is through the best civil nuclear program agreement possible that puts meaningful restrictions on the nuclear activities that could be leveraged for a weapons program," Goldenberg said. "But thus far Israel has strongly opposed any 123 agreement between the US and Saudi that does not entail forgoing all domestic enrichment."

So-called "123 agreements," named after section 123 of the Atomic Energy Act passed by Congress in 1954, require nuclear cooperation agreements

with foreign governments to meet several nonproliferation criteria.

In the current political climate, asking Saudi Arabia to agree that it will not be allowed to enrich uranium — something that Iran was allowed to do even under the now largely defunct 2015 nuclear deal — is "unrealistic," according to Goldenberg."And the end result of taking such a hard line is that the Saudis will just cut deals with the Chinese that are much less restrictive," he predicted. "So what Israel should do is have deep discussions with the US about a 123 agreement for the Saudis, but ultimately support something realistic that is achievable and ensures Saudi Arabia's program remains civilian in nature."

With an active arsenal of about 3,800 warheads, America's nuclear stockpile is still almost 12 times larger than China's, according to open-source research. But Beijing's nuclear modernization efforts have raised the stakes. While it once was the smallest nuclear power among the five nuclear-weapon states under the NPT, it is now the third largest — behind only the United States and Russia.

Source: https://www.timesofisrael. com/if-the-enemy-of-my-enemy-gets-the-bomb-saudi-nuclear-plan-gives-israel-headache/, 13 August 2020.

OPINION – Tong Zhao

Managing the Sino-American Dispute Over Missile Defense

Despite the opacity and secrecy over China's nuclear weapons, a public debate has broken out in China about the country's nuclear arsenal. Hu Xijin, the chief editor of Global Times — reportedly China's highest-circulation newspaper — made repeated calls for China to quickly and massively build up its nuclear forces. Supporters of nuclear expansion believe that a larger Chinese nuclear arsenal is the key to prevent a war with Washington and "nothing else could work." The overt nature of the debate is unprecedented and shifts public opinion toward greater enthusiasm for a more robust nuclear posture.

Hawkish, nationalistic opinion leaders add fuel to an already intensifying military competition between the United States and China that now risks spilling over into the nuclear domain. With an active arsenal of about 3,800 warheads, America's nuclear stockpile is still almost 12 times larger than China's, according to open-source research. But Beijing's nuclear modernization efforts have raised the stakes. While it once was the smallest nuclear power among the five nuclear-weapon states under the NPT, it is now the third largest — behind only the United States and Russia. Worried that its arsenal will at least double before 2029, Washington has threatened to spend Beijing "into oblivion" unless it joins arms control talks. Senior U.S. officials even considered resuming nuclear testing to force China to the negotiation table.

However, America's coercive strategy has not worked and will not work. Instead, it will reinforce a view in China that arms control is a trap laid by White House officials to contain China and undermine its security. But Washington can convince Beijing otherwise if it includes missile defense in the discussion agenda. It is time for the two countries to launch a dedicated effort on this issue because missile defense generates more Chinese suspicion about the U.S. military's strategic intentions toward China than anything else. Previous bilateral dialogues have been too generic and superficial to tackle the sources of disagreements. But if China and the United States are willing to examine how ambiguities in both countries' capabilities and policies have caused unnecessary mutual suspicions, they could find a new path to manage this dispute and advance mutual security.

Arms Control and Sino-American Relations: Arms control can be a useful tool for China and the United States to manage their military competition by making it less dangerous and costly. That said, the United States needs to be clear-eyed about the limits of its coercive leverage to force China into arms control. Beijing, for its part, is confident in its ability to outcompete Washington for regional

military superiority and its will is hardened by the perceived U.S. arrogance to threaten an all-out arms race. In its budget for next year, China's defense spending will grow by 6.6 percent, even though the central government's overall budget will contract and other spending such as in education and diplomacy will see unprecedented cuts by 7.5 percent and 11.8 percent, respectively. China's population, which is suffering economically from the pandemic and recession, might normally oppose this reallocation. But many Chinese are mobilized by perceived American hostility and support greater government investment into comprehensive military modernization.

U.S. threats also make it difficult for officials and scholars who support arms control, like me, and worry about being seen as unpatriotic for promoting cooperation with the United States. As free and open internal discussions about the benefits of arms control become increasingly difficult, China's defense industry faces even fewer checks and the hawkish voices prevail.

When it comes to U.S. strategic military capabilities, missile defense is China's top concern. Beijing worries that, in a conflict, the United States might attack China's nuclear forces and then use its defenses to block China's few surviving weapons.

China is right to be suspicious of U.S. intentions when it comes to arms control. The Trump administration has withdrawn from existing arms control and nonproliferation agreements, as did the administration of President George W. Bush. While countries engage in foreign policy to pursue their own interests, historically, the United States has often used arms control to maximize its own military advantage as opposed to promoting cooperative security. For the United States to change China's mindset it should help Beijing reach the conclusion that arms control could be mutually beneficial and that Washington is serious in pursuing forms of cooperation that would accommodate both countries' interests. Washington should, therefore, abandon its current approach and put forward realistic proposals. There is no more important step for Washington to take than to signal to Beijing that China's concerns over U.S. missile defense would be part of any future arms control discussion.

China's Top Concern: When it comes to U.S. strategic military capabilities, missile defense is China's top concern. Beijing worries that, in a conflict, the United States might attack China's nuclear forces and then use its defenses to block China's few surviving weapons. By undermining China's nuclear retaliation capability in this way, missile defenses could neutralize China's ability to deter a nuclear attack and thus leave it vulnerable to U.S. nuclear coercion. This fear may appear exaggerated to the United States but it is genuine and widely held by Chinese strategists. In fact, it is the single most important external driver of China's ongoing and comprehensive nuclear modernization efforts. China's long-range missiles with multiple warheads, air-launched ballistic missiles, strategic nuclear submarines, and, in the future, intercontinental hypersonic glide missiles, among other new nuclear systems, in various ways all contribute to China's systematic efforts to build countervailing capabilities against U.S. missile defense.

The good news is the missile defense dispute is not a result of an unresolvable conflict of interests. Washington has a longstanding official policy, which the Trump administration has rearticulated, of not aiming to undermine China's nuclear deterrent with missile defenses. Ambiguities around U.S. policy and capabilities, however, have led to serious Chinese suspicions about whether America's actual capabilities and plans are consistent with its stated policy. Chinese officials believe America's true objective is more ambitious and hostile, and Beijing has invested in advanced nuclear capabilities to counter the perceived threat. The U.S. government, on the other hand, sought to reassure Beijing that its homeland missile defense is aimed only at so-called rogue states. Thus, Washington was willing to tolerate some slight growth of China's nuclear capability in response to the American missile defense deployment. However, Beijing's strategy to

strengthen its nuclear forces lacks clarity and appears so excessive it has led the United States to suspect that China's nuclear buildup foreshadows a shift toward a more aggressive nuclear posture.

One Chinese suspicion is whether Washington is using the North Korean nuclear threat as an excuse to build a missile defense system that is actually designed to protect the United States from China's long-range missiles. This concern is at the core of a serious U.S.-Chinese dispute since 2016 over the purpose behind the U.S. deployment of a THAAD missile defense system to South Korea. Washington argued that the deployment is useful only for defending against short-range North Korean missiles. Beijing, however, believes it could enhance — and is intended to enhance — the capability of U.S. homeland defenses. This prompted China to impose severe economic sanctions and political pressure on South Korea to stop the deployment. Those punishments did not work but significantly damaged the bilateral relationship.

One Chinese suspicion is whether Washington is using the North Korean nuclear threat as an excuse to build a missile defense system that is actually designed to protect the United States from China's long-range missiles. This concern is at the core of a serious U.S.-Chinese dispute since 2016 over the purpose behind the U.S. deployment of a THAAD missile defense system to South Korea.

The disagreement over the missile defense battery in South Korea hinged largely on technical questions about the capabilities of a single truck-mounted radar system. Using publicly available information, nongovernmental experts were able to make insightful estimates about the technical capability of the AN/TPY-2 radar and its potential impact on China. Therefore, with a joint study based on open-source data, the two countries could have clarified some of the technical ambiguities over that radar's capability. But the failure of the two sides to recognize the existence of a genuine technical disagreement led to a missed opportunity for substantive engagement on this specific but critically important issue, which then caused mutual misinterpretations of each other's strategic intentions.

What should Beijing and Washington Do?: The existing distrust between China and the United States on missile defense has its roots in the accumulation of mismatched understandings on various concrete issues, such as if certain radar systems can track Chinese warheads, whether some missile defense systems are overkill against North Korean technologies, and why Washington is contemplating space-based interceptors. Exchanging complaints at the political level won't help. Instead, efforts to tackle disagreements over narrowly defined but concrete issues have the best chance to clarify unintended ambiguities.

As a first step toward mitigating distrust, Washington and Beijing should conduct a joint expert study about the technical feasibility of building a missile defense system that could deal with North Korean missiles without significantly affecting China. This study should take place at the unclassified level and use only open-source data. Previous open-source research indicates that this approach can be technically feasible and help minimize political complications. Of course, this could backfire. Experts could conclude from this study that it is impossible to design such a missile defense system due to various technical and geographical constraints. Yet recognizing that there are practical challenges for the United States to counter the North Korean threat without affecting China could, in itself, help mitigate worst-case thinking in Beijing.

As a first step toward mitigating distrust, Washington and Beijing should conduct a joint expert study about the technical feasibility of building a missile defense system that could deal with North Korean missiles without significantly affecting China.

In addition, Washington should demonstrate to Beijing that it is serious about exploring options that may make its missile defense less threatening to China's nuclear deterrent in the future. When the United States contemplates new missile defense plans, it should analyze what technological choices and deployment strategies can best minimize their potential impact on China's long-range nuclear missiles. American officials should release declassified excerpts of the technical studies to the public so that Chinese experts can analyze U.S. thinking on the matter. This can be a confidence-building measure for those U.S. missile defense plans that concern China most, including those of building layered homeland defense and of building boost-phase missile defense systems in Northeast Asia that can intercept missiles before their engines burn out.

With Moscow on its side, Beijing may feel more comfortable with starting an arms control discussion with Washington. That said, whether a bilateral or trilateral discussion, U.S. willingness to engage on the issue of missile defense could pave the way for Chinese restraint in its nuclear modernization.

Another step to demonstrate U.S. sincerity would be to indicate its willingness to have an expert-level discussion with China to explore the possibility of incorporating missile defense into an inclusive arms control framework. Under such an arrangement, the United States could continue expanding its missile defense against so-called rogue states, if Washington also cuts certain nuclear attack capabilities simultaneously. A trading mechanism between strategic offensive and defensive weapons could provide a flexible framework for Washington and Beijing to achieve two goals simultaneously: enhance bilateral strategic stability and protect unique security interests.

Joint technical studies, transparent decision-making, and expert-level discussions on missile defense can also be the subject of U.S.-Chinese-Russian trilateral arms control talks. Russia shares the same concern with China about U.S. missile defense and has more experience than China in negotiating with the United States. With Moscow on its side, Beijing may feel more comfortable with starting an arms control discussion with Washington. That said, whether a bilateral or trilateral discussion, U.S. willingness to engage on the issue of missile defense could pave the way for Chinese restraint in its nuclear modernization. By broadening the discussion beyond a narrow focus on offensive nuclear capabilities, this would help address a major obstacle to Sino-American arms control cooperation — the considerable asymmetry in their nuclear stockpiles. In Washington, there is concern about whether China's growing interest in a rapid nuclear response capability, coupled with the advancement of its early warning system and theater-range nuclear forces, indicates a shift toward a more aggressive nuclear employment posture aimed at limited nuclear use. Greater Chinese transparency on these issues could serve as a goodwill response to reciprocate the U.S. openness to discussing missile defense.

Washington offered little hint of the intended scale and scope of that framework and it is not clear what it wants Beijing to sign up to. To China, which has much less experience in arms control negotiations, the whole undefined concept may appear too intimidating to commit to.

Looking Ahead: The rapid deterioration of the U.S.-Chinese relationship highlights the urgency — and reveals a potential opportunity — for substantive engagement on longstanding security disputes. Worried about a race to the bottom, senior Chinese officials repeatedly declared that China is willing to talk about all issues of mutual concern with Washington through a series of dialogues. American officials have also called on China to join an arms control framework with the United States and Russia. But Washington offered little hint of the intended scale and scope of that

framework and it is not clear what it wants Beijing to sign up to. To China, which has much less experience in arms control negotiations, the whole undefined concept may appear too intimidating to commit to. A more promising approach is for Washington to engage Beijing in quiet and substantive exchanges on a range of more specific security concerns, including on the issue of missile defense. Radical arms control measures like numerical reductions in nuclear capabilities are unrealistic for the near term, but initial talks can start with less controversial measures identified above.

In a new research report for the Carnegie Endowment for International Peace, I outline additional steps Washington and Beijing can take, both individually and cooperatively, to prevent their missile defense dispute from further exacerbating mutual hostility and fueling a burgeoning arms race. Crude coercive threats will not get Beijing to the negotiation table. At the same time, the opacity surrounding China's nuclear program is unhelpful in generating trust with the United States. But cool-headed efforts to address the missile defense dispute can help open the door to serious and broad-ranging arms control cooperation in the future. The two countries should turn their previously superficial and sporadic dialogues into substantive efforts to address the underlying sources of disagreements and clarify ambiguities. There are mutually beneficial options to prevent a costly and dangerous arms race but the window to engage may close soon.

Source: War on the Rocks, https://www.nature.com/articles/d41586-020-02282-9, 11 August 2020.

NUCLEAR STRATEGY

CHINA

It is not Right Timing for China to Join U.S.-Russia Arms Control Talks: Chinese Ambassador

China's nuclear power is not at the same level as that of the United States and Russia, and it is not yet the right timing for China to join their nuclear disarmament talks, Chinese Ambassador to the United States Cui Tiankai has said.

"All over the world, the United States and Russia have the largest nuclear arsenal ... this is international consensus. So they should take the lead in international nuclear disarmament," said Cui in an online interview with Nicholas Burns, executive director of the Aspen Strategy Group, and Andrea Mitchell, chief foreign affairs correspondent of NBC News, while attending the 2020 Aspen Security Forum on Aug. 4.

"China has a very small amount of nuclear weapons. It's not at the same level. We are far behind the U.S. and Russia," Cui said. Only when the United States is ready to reduce its arsenal to the size of China's can both sides begin real negotiation, he said, adding, "I hope we could be given a very convincing answer."

All over the world, the United States and Russia have the largest nuclear arsenal ... this is international consensus. So they should take the lead in international nuclear disarmament," said Cui.

Noting that the United States and Russia are having "very important negotiations" on some existing nuke control treaties, such as the New Strategic Arms Reduction Treaty, Cui said the treaties are "extremely important for international strategic stability."

"We hope these treaties could continue," he said.

Source: Xinhua, http://www. xinhuanet.com/english/2020-08/11/c_139282059.htm, 11 August 2020.

RUSSIA

Russia Warns it will See any Incoming Missile as Nuclear

Russia will perceive any ballistic missile launched at its territory as a nuclear attack that warrants a nuclear retaliation, the military warned in an article. The harsh warning in the official military newspaper *Krasnaya Zvezda* (Red Star) is directed at the United States, which has worked to develop long-range non-nuclear weapons.

The article follows the publication in June of Russia's nuclear deterrent policy that envisages

the use of atomic weapons in response to what could be a conventional strike targeting the nation's critical government and military infrastructure.

In the *Krasnaya Zvezda* article, senior officers of the Russian military's General Staff, Maj.-Gen. Andrei Sterlin and Col. Alexander Khryapin, noted that there will be no way to determine if an incoming ballistic missile is fitted with a nuclear or a conventional warhead, and so the military will see it as a nuclear attack.

In line with Russian military doctrine, the new nuclear deterrent policy reaffirmed that the country could use nuclear weapons in response to a nuclear attack or an aggression involving conventional weapons that "threatens the very existence of the state.

"Any attacking missile will be perceived as carrying a nuclear warhead," the article said. "The information about the missile launch will be automatically relayed to the Russian military-political leadership, which will determine the scope of retaliatory action by nuclear forces depending on the evolving situation."

Russia has designated the 'red lines' that we don't advise anyone to cross...If a potential adversary dares to do that, the answer will undoubtedly be devastating. The specifics of retaliatory action, such as where, when and how much will be determined by Russia's military-political leadership depending on the situation.

The argument reflects Russia's longtime concerns about the development of weapons that could give Washington the capability to knock out key military assets and government facilities without resorting to atomic weapons. In line with Russian military doctrine, the new nuclear deterrent policy reaffirmed that the country could use nuclear weapons in response to a nuclear attack or an aggression involving conventional weapons that "threatens the very existence of the state."

The policy document offered a detailed description of situations that could trigger the use of nuclear weapons, including the use of nuclear weapons or other weapons of mass destruction against Russia or its allies.

In addition to that, the document states for the first time that Russia could use its nuclear arsenal if it receives "reliable information" about the launch of ballistic missiles targeting its territory or its allies and also in the case of "enemy impact on critically important government or military facilities of the Russian Federation, the incapacitation of which could result in the failure of retaliatory action of nuclear forces." U.S.-Russia relations are at post-Cold War lows over the Ukrainian crisis, the accusations of Russian meddling in the U.S. 2016 presidential election and other differences.

Russian officials have cast the U.S.-led missile defense program and its plans to put weapons in orbit as a top threat, arguing that the new capability could tempt Washington to strike Russia with impunity in the hope of fending off a retaliatory strike. The *Krasnaya Zvezda* article emphasized that the publication of the new nuclear deterrent policy was intended to unambiguously explain what Russia sees as aggression.

"Russia has designated the 'red lines' that we don't advise anyone to cross...If a potential adversary dares to do that, the answer will undoubtedly be devastating. The specifics of retaliatory action, such as where, when and how much will be determined by Russia's military-political leadership depending on the situation."

Source: Vladimir Isachenkov, https://apnews.com/888e0816c6fa7f58b9ad4f1e97993643, 07 August 2020.

BALLISTIC MISSILE DEFENCE

ISRAEL

Israel Successfully Carries out Arrow-2 Interception Test

A test of the Arrow 2 interceptor system, part of the Arrow Weapon System, was successfully carried out Wednesday (12 August) night along

with the US MDA, the Defense Ministry said. The advanced system is designed to intercept long-range missiles. It successfully intercepted a Sparrow simulated long-range, surface-to-surface missile, which could one day be fired at Israel by Iran, such as the Shahab 3 MRBM with an explosive warhead.

... The test was conducted at 11:45 p.m. at a test site in central Israel. It was led by Israel Aerospace Industries (IAI), IMDO, the US MDA and the IAF. The interception was conducted by IAF service members together with engineers from the institutions involved in the system's development. The various layers of Israel's air-defense mechanism were employed in this test to ensure their readiness and efficacy in operational scenarios.

The integration of both systems in Israel's air-defense mechanism significantly expands and enhances the state's capability to defend against current and future threats." The Arrow 2 forms a key layer of Israel's multilayered defense system along with the Arrow 3, David's Sling and Iron Dome.

"The test was just perfect; all the systems worked as anticipated," Boaz Levi, IAI's executive vice president and general manager of Systems, Missiles and Space Group, told reporters. The radar locked in on the target, which had been launched from the West, and followed it the entire time before it was intercepted and completely destroyed – exactly when it had been planned.

According to Levy, the test simulated an incoming missile that represented a threat between the capabilities of Arrow 2 and Arrow 3 systems. While he did not specify the altitude at which the target was intercepted, he said it came in at the upper reaches of the Earth's atmosphere. During the test, the updated capabilities of the Arrow system were validated, the Defense Ministry said.

...

... During the test, the target was fired toward Israel "from a significant distance" and intercepted successfully, Patel told reporters. While the main country from which such long-range threats might originate is Iran, they can also come from Iraq and Syria. The system can also contend with threats from there.

...The successful interception test comes after a series of additional tests, including the Arrow 3 test conducted by the IMDO and the US MDA last year in Alaska. "Both systems demonstrated advanced operational capabilities," the Defense Ministry said. "The integration of both systems in Israel's air-defense mechanism significantly expands and enhances the state's capability to defend against current and future threats." The Arrow 2 forms a key layer of Israel's multilayered defense system along with the Arrow 3, David's Sling and Iron Dome. The systems provide Israel with a protective umbrella able to counter threats posed by both short- and mid-range missiles used by terrorist groups in Gaza and Hezbollah, as well as the threat posed by long-range Iranian ballistic missiles.

Source: Anna Ahronheim, https://www.jpost.com/israel-news/israel-us-test-ballistic-missile-defense-system-638406, 13 August 202.

USA

COVID-19 Affecting Ballistic Missile Defense Near Russia, China, North Korea

The debut of a BMD system being installed at Clear Air Force Station in central Alaska has reportedly been delayed for at least a year due to the COVID-19 pandemic. Work on the system, known as the Long Range Discrimination Radar (LRDR), was halted in March due to the pandemic, according to a July report from the U.S. Government Accountability Office (GAO). An "initial fielding" of the LRDR had been planned for the 2021 fiscal year, while transfer to the Air Force had been expected the following year.

"All LRDR construction and integration activities ceased in March 2020 due to Coronavirus Disease 2019 (COVID-19)," the report states. "As a result, initial fielding is delayed and transfer to the Air Force is now expected in late fiscal year 2023."

After completion of construction, which began last year and is largely contracted to Lockheed Martin,

the LRDR is expected to be able to "track incoming missiles and discriminate the warhead-carrying vehicle from decoys and other non-lethal objects" for the Ground-Based Midcourse Defense System, a MDA program designed to detect potential threats from places like North Korea, Iran, China and Russia.

The report states that a developmental step in the LRDR program that had been expected for fiscal year 2018 was previously delayed, while the program also had a $25 million budget overrun. Delivery of the LRDR to government custody was further delayed in January due to "radar component construction issues." The latest construction delay occurred over fears of transmitting the virus, since workers are required to be in close contact.

The Defense Department has been jointly developing the body that will serve as the base of its offensive hypersonic missile. The test marks a significant step forward in accomplishing that mission amid mounting criticism that the United States is behind China and Russia in hypersonic weapons development.

... The GAO report notes that the current testing plan for the LRDR includes two ground tests followed by only one flight test, scheduled for the third quarter of the 2021 fiscal year, which would be between April and June of the 2021 calendar year. It warns that "key aspects" of data required to evaluate the program are gathered from flight tests, expressing concern that only one flight test is planned. "By having two ground tests before the only flight test, it increases the likelihood that the models will not be accredited when testing is complete," the report states.

Source: Aila Slisco, https://www.newsweek.com/covid-19-affecting-ballistic-missile-defense-near-russia-china-north-korea-1524167, 11 August 2020.

How the DoD Plans to Meet its Ambitious Hypersonic Missile Test Schedule

The Army — in conjunction with the Navy — is planning to conduct three flight tests of its hypersonic glide body in 2021, an ambitious schedule to initially field the weapon in fiscal 2023, according to Lt. Gen. Neil Thurgood, who oversees the Army's rapid development of hypersonics, directed energy and space capabilities.

In March, the Army and Navy had a successful first flight test of its Common-Hypersonic Glide Body, which was launched and flew at hypersonic speed to a designated impact point. Hypersonic weapons are capable of flying faster than the speed of sound — Mach 5 — and can maneuver between varying altitudes and azimuths, making it harder to detect.

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The C-HGB will be made up of the weapon's warhead, guidance system, cabling and thermal protection shield. Each service will use the body as the base while developing individual weapon systems such as launchers capable of firing the weapons from land or sea.

... As the Army gets closer to its fielding goal for the Block I version in fiscal year 2023, every flight test needs to meet defined objectives. ...And moving forward, the services will have to "dramatically" accelerate the pace of the program, he said. That means conducting a flight test in the middle of 2021 and another two later in the year.

...In order to carry out three tests next year, the Army's Space and Missile Defense Technical Center is planning to beef up its personnel involved, and is partnering with other organizations such as the Missile Defense Agency within the DoD to bring in the necessary expertise, Thomas Webber said in another interview with Defense News during its SMD Debrief. The

technical center's flight test director at the Ronald Reagan Test Site in the Marshall Islands oversaw the hypersonic test in March. The center manages the site and has direct links to conducting the test and collecting the data to determine successful flight test performance.

... The Army is in charge of the building the non-existent hypersonic industrial base and has now trained Leidos' Dynetics — through know-how at Sandia National Laboratories — to build glide bodies so the company can now design manufacturing plans around that expertise. ... And the service also has designed dedicated teams to handle each flight test. One team will conduct one flight test, another team will handle the next one, and the first team will rotate back and conduct the third test, he said. "We will keep that cycle going to maintain that [operational tempo].

Source: Jen Judson, Defence News, https://www.defensenews.com/digital-show-dailies/smd/2020/08/05/heres-how-the-dod-plans-to-meet-its-ambitious-hypersonic-missile-test-schedule/, 06 August 2020.

NUCLEAR ENERGY

SOUTH KOREA

South Korea Weighs in on Micro Reactor Project

Soon after negotiating a joint venture with Ontario Power Generation to build a prototype in Canada, Ultra Safe Nuclear Corporation of the USA has signed a five-year agreement with South Korea's Hyundai Engineering and the Korea Atomic Energy Research Institute. It outlines goals for development of technologies that enhance the ability of USNC's Micro Modular Reactor to produce and deliver clean power and process heat. The MMR is an advanced design for a versatile 15 MW thermal/ 5 MWe high temperature gas-cooled reactor based on operational experience in several countries. The three companies will make equal contributions to the project.

Source: World Nuclear News, https://mailchi.mp/world-nuclear-news/weekly-digest-7-august-2020?e=66ff4977f4, 05 August 2020.

UAE

New Reactor Starts Up in UAE

Barakah-1, the UAE's first nuclear power reactor, has started up. The 1,345 MWe (net) South Korean APR1400 unit is the first of four reactors built at Barakah as part of the UAE's efforts to diversify energy supplies away from gas. It was built by a consortium led by KEPCO and is located between Abu Dhabi city and Qatar. Barakah 1 was originally scheduled for operation by 2018, but was delayed after an operational readiness review by plant operator Nawah Energy Company found that additional staff training and procedural development was required, including the need to develop competence in English as a bridging language between Arabic and Korean. Nawah is the nuclear operations and maintenance subsidiary of Emirates Nuclear Energy Corporation (ENEC), set up in joint venture with KEPCO in 2016.

Barakah 2 is complete and awaiting an operating licence, units 3 & 4 are 92% and 85% complete respectively. Construction began in 2012. The UAE is the first country in the Arab world, and the 33rd nation globally, to develop a civil nuclear power program. It will supply about one quarter of the country's electricity.

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ENEC was set up in 2009 and has drawn heavily on international expertise in mounting the project. It has worked closely with the IAEA and has joined the WANO to benefit from its peer review processes. Nawah has ongoing agreements with France's EdF for fuel cycle management, operational safety and radiation protection, and with KEPCO for maintenance. The UAE is widely

seen to have benchmarked the process for establishing nuclear power in a new country, starting from scratch in 2008.

A nuclear professional who moved to the project from a senior role in GE, Robert Bergqvist, said: "When I worked at ENEC ..... I was so impressed by the high standards set for 'doing this the right way' as the UAE was embarking on building not just four power plants, but a nuclear ecosystem supporting the Arab World. I'm convinced that a hundred years from now this project will have been absolutely critical for peace and prosperity in the region.

The mechanical engineering division of Rosatom began shipping crucial components for the main coolant pipeline for the fourth unit at Kudankulam. This equipment, weighing almost 350 tonnes, will be transported from Petrozavodsk to St Petersburg port, from where it will be carried by a ship about 10,000 km to Kudankulam.

Source: World Nuclear News, https://mailchi.mp/world-nuclear-news/weekly-digest-7-august-2020?e=66ff4977f4, 03 August 2020.

NUCLEAR COOPERATION

INDIA–RUSSIA

Russia Continues Work on Kudankulam Nuclear Plant

Russia has continued work on key bilateral projects with India amid disruptions caused by the Covid-19 crisis, delivering important components for the Kudankulam nuclear power plant and training Indian pilots for the Gaganyaan manned space mission. Atommash, part of the mechanical engineering division of the Rosatom State Atomic Energy Corporation, announced it had begun manufacturing a set of steam generators for the fifth power unit of the Kudankulam plant.

So far, Atommash has manufactured and shipped two sets of steam generators for the third and fourth units of the Kudankulam plant. Each reactor requires four generators, which are built to high safety standards and have a heat exchange surface with 11,000 stainless pipes. ... Rosatom said Indian contractor L&T, with the technical support of Russian experts, had completed installing the dry shielding for the reactor pressure vessel of the third unit according to schedule. This shielding prevents overheating of the reinforced concrete reactor pit structure, it added.

Earlier this month (August), the mechanical engineering division of Rosatom began shipping crucial components for the main coolant pipeline for the fourth unit at Kudankulam. This equipment, weighing almost 350 tonnes, will be transported from Petrozavodsk to St Petersburg port, from where it will be carried by a ship about 10,000 km to Kudankulam. ...

Source: Rezaul H Laskar, https://www.hindustantimes.com/india-news/russia-continues-work-on-kudankulam-nuclear-plant-training-indian-pilots-for-manned-spaceflight/story-6I457MHHSYKIwsUn6qpwwK.html, 11 August 2020.

NUCLEAR DISARMAMENT

GENERAL

43 Countries and Regions Ratify UN Nuclear Ban Treaty

Three countries completed ratification procedures for a UN-adopted nuclear ban treaty Thursday (6 August), bringing the number of such countries and regions to 43 with a total of 50 required for the pact to enter into force, a UN source said. Ireland, Nigeria and Niue became the latest signatories of the Treaty on the Prohibition of Nuclear Weapons, adopted in 2017, on the 75th anniversary of the US atomic bombing of Hiroshima on August 6, 1945.

While the addition of signatories is likely to raise hopes for an early enforcement of the nuclear ban treaty, its potential effectiveness remains uncertain as all five permanent members of the UNSC, all of which possess nuclear weapons, have declined to ratify the pact.

Japan, the only country in the world to have experienced nuclear bombings, has not ratified the treaty either, apparently in light of the security alliance with the United States providing nuclear deterrence against potential adversaries. UN Secretary General Antonio Guterres said in a video message delivered in Hiroshima, "The risk of nuclear weapons being used, intentionally, by accident or through miscalculation, is too high for such trends to continue." He also stressed the importance of the enforcement of the nuclear ban treaty, saying "the only way to totally eliminate nuclear risk is to totally eliminate nuclear weapons." According to the United Nations, 82 countries and regions signed the nuclear ban treaty. The pact will enter into force 90 days after it has been ratified by at least 50 countries and regions. ...

UN Secretary General Antonio Guterres said in a video message delivered in Hiroshima, "The risk of nuclear weapons being used, intentionally, by accident or through miscalculation, is too high for such trends to continue.

Source: Kyodo News, https: //english.kyodonews. net/news /2020/08/4e659c 32b2a3-43-countries - ratify-un- nuclear -ban- treaty. html? phrase = Hideaki % 20 Kumazawa & words =, 07 August 2020.

NUCLEAR PROLIFERATION

IRAN

Iran Nuclear Deal at Risk as UN Council Prepares to Vote on Arms Embargo

The UNSC is preparing to vote on a U.S. proposal to extend an arms embargo on Iran, a move that some diplomats say is bound to fail and put the fate of a nuclear deal between Tehran and world powers further at risk. A last-minute attempt by Britain, France and Germany to broker a compromise with Russia and China on an arms embargo extension appeared unsuccessful so far, diplomats said. Russia and China, allies of Iran, have long-signaled opposition to the U.S. measure.

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A Chinese diplomat at the United Nations, speaking on condition of anonymity, said that "extending the arms embargo on Iran in whatever form lacks legal basis and will undermine efforts to preserve" the nuclear deal, adding that there is "no chance" the U.S. text will be adopted.

U.S. Ambassador to the United Nations Kelly Craft said Russia and China wanted to benefit from the end of the arms embargo. "Russia and China are waiting to be able to sell arms to Iran," Craft told Fox News. The embargo is due to expire in October under a 2015 deal among Iran, Russia, China, Germany, Britain, France and the United States that prevents Tehran from developing nuclear weapons in return for sanctions relief.

Even though U.S. President Donald Trump's administration quit the accord in 2018 - with Trump dubbing it "the worst deal ever" - Washington has threatened to use a provision in the agreement to trigger a return of all U.N. sanctions on Iran if the Security Council does not extend the arms embargo indefinitely.

Renewed sanctions — a move known as snapback — would likely kill the nuclear deal because Iran would lose a major incentive for limiting its nuclear activities. Iran has already breached parts of the nuclear deal in response to the U.S. withdrawal from the pact and Washington's imposing strong unilateral sanctions.

... A snapback of U.N. sanctions would require Iran to suspend all enrichment-related and

reprocessing activities, including research and development, and ban imports of anything that could contribute to those activities or to the development of nuclear weapon delivery systems.

It would reimpose the arms embargo, ban Iran from developing ballistic missiles capable of delivering nuclear weapons and reimpose targeted sanctions on dozens of individuals and entities. States would also be urged to inspect shipments to and from Iran and authorized to seize any banned cargo.

'Zero Chance': Richard Gowan, U.N. director for conflict prevention advocacy body the International Crisis Group, said there was "zero chance" the U.S. attempt to extend the arms embargo would be adopted and that it was "a ploy to get to snapback."

The council is operating virtually so once a vote is called the 15 members would have 24 hours to submit their decision and the result would be announced at a public meeting, but diplomats say there is little support for the current U.S. text.

Washington argues it can trigger the sanctions because a Security Council resolution enshrining the nuclear deal names it as a participant. But the remaining parties to the agreement are opposed to such a move, and diplomats say the United States would face a tough, messy battle.

The draft resolution needs at least nine votes in favor to force Russia and China to use their vetoes, but some diplomats question whether Washington can even secure those nine votes. "Everyone at the U.N. understands that this resolution is just the curtain-raiser for a much bigger fight over the Iranian nuclear deal," said Gowan.

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"It's highly likely ... a number of countries will be saying they have no intention of implementing further sanctions, until the U.N. Security Council decides whether or not snapback has been carried out legally," said a senior council diplomat, speaking on condition of anonymity. "I don't see how the council can decide that given the divisions that will be within it," the diplomat said. "I don't see any rush to re-establish sanctions regimes therefore around the world."

Source: Michelle Nichols, Reuters, https://www.reuters.com/article/us-usa-iran-un/iran-nuclear-deal-at-risk-as-u-n-council-prepares-to-vote-on-arms-embargo-idUSKCN2562LN, 11 August 2020.

NUCLEAR SAFETY

NORTH KOREA

North Korea Nuclear Reactor Site Threatened by Recent Flooding, US Think-tank Says

Satellite imagery suggests recent flooding in North Korea may have damaged pump houses connected to the country's main nuclear facility, a US-based think-tank said. Analysts at 38 North, a website that monitors North Korea, said commercial satellite imagery from August 6-11 showed how vulnerable the Yongbyon Nuclear Scientific Research Center's nuclear reactor cooling systems are to extreme weather events.

The Korean peninsula has been hammered by one of the longest rainy spells in recent history, with floods and landslides causing damage and deaths in both North and South Korea. Located on the bank of the Kuryong River about 100 km (60 miles) north of North Korea's capital, Pyongyang, Yongbyon is home to nuclear reactors, fuel re-processing plants and uranium enrichment facilities that are thought to be used in the country's nuclear weapons programme.

The five-megawatt reactor – believed to be used to produce weapons-grade plutonium – does not appear to have been operating for some time, and

an Experimental Light Water Reactor (ELWR) has not yet come online, but such flooding in the future would likely force a shutdown, the 38 North report said.

"Damage to the pumps and piping within the pump houses presents the biggest vulnerability to the reactors," the report said. "If the reactors were operating, for instance, the inability to cool them would require them to be shut down."

While there was further flooding downstream, it did not appear to reach the Yongbyon facility's Uranium Enrichment Plant and by August 11 the waters appear to have somewhat receded, *38 North* said. South Korea's Ministry of Defence declined to comment on the report, but said it is always monitoring developments related to North Korea's nuclear and missile programmes and maintaining close cooperation with the US government. ...

Source: https://www.news18.com/news/world/north-korea-nuclear-reactor-site-threatened-by-recent-flooding-u-s-think-tank-says-2782309.html, 13 August 2020.

NUCLEAR WASTE MANAGEMENT

JAPAN

No Japan Prefectures Positive about Hosting Nuclear Waste Site

Nearly half of Japan's 47 prefectures said they are opposed to or held negative views about hosting a deep-underground disposal site for high-level radioactive nuclear waste, a Kyodo News survey showed. None expressed a favorable stance. The result signals further woes for the central government in its attempt to find a permanent geological disposal repository.

Little progress has been made since the process to find local governments willing to host one started in 2002, due mainly to opposition from local residents. The survey was sent to all prefectures in July, with additional interviews conducted depending on their answers. While 16 prefectures such as Fukushima, Kanagawa and Okinawa clearly opposed hosting a site, seven others including Hokkaido, Kyoto and Nagasaki also expressed negative views.

The western prefecture expressed opposition to hosting a disposal site, saying it faces the need to take measures against a possible major earthquake in the region. For permanent disposal, high-level radioactive waste, produced as a result of the process of extracting uranium and plutonium from spent fuel, must be stored more than 300 meters underground.

Most of the others did not make their positions clear. Of the total 23 prefectures that opposed or showed negative views, seven host nuclear power plants. ... Meanwhile, Hokkaido mentioned its existing ordinance to prevent nuclear waste from being brought into the northernmost main island, a view that contradicts the relatively positive stance held by one of its municipalities. The town of Suttsu said it is considering signing up for preliminary research into its land to gauge its suitability for hosting a disposal site.

On 14 August, however, its mayor, Haruo Kataoka, said the town has been asked by the prefecture not to apply for the preliminary study. Before Suttsu, the town of Toyo in Kochi Prefecture applied for the study in 2007, but it later withdrew the application following strong protests by local residents.

In the Kyodo News poll, the western prefecture expressed opposition to hosting a disposal site, saying it faces the need to take measures against a possible major earthquake in the region. For permanent disposal, high-level radioactive waste, produced as a result of the process of extracting uranium and plutonium from spent fuel, must be stored more than 300 meters underground so that it cannot impact human lives or the environment. Elsewhere in the world, Finland and Sweden are the only countries to have decided on final disposal sites.

Source: https://www.japantimes.co.jp/news/2020/08/14/national/prefectures-nuclear-waste-site/#.XzbdsOgzZPY, 14 August 2020.

USA

The Successful Cleanup of Nuclear Waste Sites: Past, Present and Future

In 1989 the Department of Energy set out on a most ambitious but necessary endeavor: the cleanup of 107 sites that bore the environmental legacy of the United States' work of developing nuclear programs that helped end World War II and the Cold War.

Over the next 30 years, the DOE's Office of Environmental Management developed and oversaw this undertaking, by tackling a collective area nearly the size of Rhode Island and Delaware combined. In that time, EM's projects and efforts have successfully shrunk the original footprint of 107 sites comprising 3,100 square miles by 90% down to 16 sites with an active footprint today of less than 300 square miles. The cleanup involved contaminated soils, groundwater and streams, and demolishing massive enrichment buildings and former research facilities.

DOE continues to prepare for the startup of the Integrated Waste Treatment Unit, a long-planned facility that will turn about 900,000 gallons of liquid radioactive waste into a solid product for disposal. We are targeting completion of this waste treatment by 2028.

Among the achievements at the Idaho National Laboratory Site, the Idaho Cleanup Project has shipped over 60,000 cubic meters of transuranic and mixed low-level waste out of the state for disposal. This volume of waste amounts to 92% of the total inventory of such waste in Idaho. ICP successfully decontaminated, decommissioned and demolished 225 nuclear, radiological, and industrial facilities, as well as removed buried waste from the Subsurface Disposal Area, a 97-acre landfill. ICP also completed the processing of debris waste containing transuranic elements at the Advanced Mixed Waste Treatment Plant, a one-of-a-kind facility. These activities all support the vital goal of protecting the Snake River Plain Aquifer, the primary drinking and agriculture water source for the region.

Make no mistake, our job is not yet done, and tough challenges remain. Contending with unforeseen situations like the COVID-19 pandemic adds to those challenges, impacting every aspect of life including operations at EM sites. The workforce at the INL Site and other EM locations has demonstrated remarkable resilience during this unprecedented time, adjusting to changing conditions and safely performing activities needed to protect the health and safety of the environment while addressing national security needs.

As the INL site progresses through a phased and deliberate approach towards full activities, the Department's top priority is the health and safety of its workforce. Enhanced safety protocols that have been instituted during the pandemic will continue as more operations are reinstated, in order to provide adequate protection of the workforce.

I can say with confidence our successes over the last three decades have set the stage for significant progress at each of the 16 DOE sites where work continues — including completing work at several of them. EM remains on the precipice of what will serve as an inflection point across the program.

Earlier this year, DOE released EM Vision 2020 — 2030, A Time of Transition and Transformation, a report that provides a snapshot of major achievements possible by the end of the decade, including those at the INL site.

Most notably, DOE is primed for dramatic progress in facing its largest remaining environmental risk — millions of gallons of radioactive reprocessing waste stored in tanks. Idaho will be at the forefront of this progress. DOE continues to prepare for the startup of the Integrated Waste Treatment Unit, a long-planned facility that will turn about 900,000 gallons of liquid radioactive waste into a solid product for disposal. We are targeting completion of this waste treatment by 2028.

Within the next several years, DOE plans to

complete buried waste exhumation at the subsurface disposal area. By the end of the decade, we expect to be finishing shipments of legacy transuranic waste out of state. These are just several of the achievements we are planning. Of course, none of this will be possible without the hard work of our federal and contractor team members, nor without the support of communities surrounding INL, state leaders, Native American tribes and Congress. ...

Source: Paul Dabbar, https://www. postregister. com/opinion/guest_column/the-successful-cleanup-of-nuclear-waste-sites-past-present-and-future/article_1bc78fa2-598a-5912-8c88-d68a27019d47.html, 11 August 2020.

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 K.K Nohwar, PVSM VM (Retd).

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