



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

**OPINION – Rafael Mariano Grossi**

Vol 16, No. 15, 01 JUNE. 2022

**Nuclear Energy can be the Turning Point in the Race to Decarbonize**

As a team of IAEA experts and I made our way to the UN's COP26 climate conference in Glasgow last November, the growing energy crisis was already apparent in queues at petrol stations and among concerned conversations about the 400% rise in natural gas prices. For the first time, nuclear energy was represented at the COP table and its increasing acceptance, especially among young people, was palpable. It had been a long time coming for nuclear, which produces more low-carbon energy than any other source except hydropower.

Today, just a few months after COP, we are seeing the consequences of military conflict in Ukraine begin to turn that interest into action. Governments from Belgium to Japan have announced their intention to extend the lives of nuclear power plants, citing concerns about geopolitical instability. Across the world, leaders are worried about shortages in the supply of oil and natural gas, and price spikes in electricity and petrol, undermining their nations' economies and political stability.

**For the first time, nuclear energy was represented at the COP table and its increasing acceptance, especially among young people, was palpable. It had been a long time coming for nuclear, which produces more low-carbon energy than any other source except hydropower.**

**CONTENTS**

- ☞ OPINION
- ☞ NUCLEAR STRATEGY
- ☞ BALLISTIC MISSILE DEFENCE
- ☞ EMERGING TECHNOLOGIES AND DETERRENCE
- ☞ NUCLEAR ENERGY
- ☞ URANIUM PRODUCTION
- ☞ NUCLEAR COOPERATION
- ☞ NUCLEAR PROLIFERATION
- ☞ NUCLEAR DISARMAMENT
- ☞ NUCLEAR SAFETY
- ☞ NUCLEAR WASTE MANAGEMENT

The head of the IEA calls this our first global energy crisis. There's little doubt this crisis will accelerate a shift in our energy infrastructure. Still to be decided is whether it will be coal and gas, or nuclear, that work together with hydro, wind, solar and other renewables to deliver uninterrupted electricity. If, despite the short-term pressures, governments prioritize moving to more predictable long-term prices, meeting their climate targets, and reducing the 8 million annual deaths caused by air pollution, nuclear capacity

will grow. Forecasters including those at the Intergovernmental Panel on Climate Change, the IEA, and the IAEA have looked at data that underpin where we are today and where nations say they want to be in the coming decades, and have concluded the journey will require a doubling of nuclear capacity.

I am confident it can be done. It has been done before. Forty per cent of today's operating nuclear power plants were built as a result of the last major energy crisis and now – after considerable upfront costs – supply some of the cheapest electricity in the world. Technically, nuclear has the advantage of the atom's high energy density, meaning it can supply uninterrupted energy at scale with a comparably minimal physical, as well as carbon, footprint; its fuel can be stored to avoid big price fluctuations or supply interruptions; and the physical size of its waste is small.

More than 440 nuclear reactors operating across the world produce one-quarter of its low-carbon electricity, and more than 50 reactors are currently under construction. About 30 countries are actively considering, planning, or preparing to build nuclear power plants, seeing their benefits as long-term reliable low-carbon energy sources and stimulators of economic activity and employment.

As a significant share of the current nuclear fleet of reactors comes to the end of their intended lifetimes, several countries are successfully extending their use, buying more time to bring new low-carbon sources online. We have come a long way since those reactors were built in the 1970s and 1980s. Importantly, a technical solution now

exists to the central question of what to do with nuclear waste. Finland's Onkalo spent fuel repository shows us a way forward, and several other countries are also working on such projects.

Meanwhile, innovations such as SMRs are being developed. As they come to market, they will offer options to countries and industries for which larger reactors may not be the right choice. SMRs will be quicker and more affordable to build, have a greater level of inherent safety due to their design, offer more flexibility for pairing with variable renewables such as solar and wind, and are being

developed by many countries around the world. However, there are important requirements to consider. For SMRs and any nuclear power plant to be built, regulatory and financing conditions need to be right. Here there is more work to do. Industry has much experience to build on and some countries, including for example the UK, are coming up with innovative answers in regulation and financing.

Finland's Onkalo may be a beacon, but more countries will have to continue to work on solutions to existing and future nuclear waste, both by recycling and reusing it and in building repositories. Across the fuel cycle, nuclear safety, security and safeguarding – areas integral to the IAEA's mandate – are key to nuclear's future. They lay its critical foundation of public confidence, which is built through honest and consistent public outreach and stakeholder engagement.

In these crucially important areas, I am confident that the international community will continue to work together, despite any wider geopolitical disagreements. My confidence rests not only on

**Forty per cent of today's operating nuclear power plants were built as a result of the last major energy crisis and now – after considerable upfront costs – supply some of the cheapest electricity in the world. Technically, nuclear has the advantage of the atom's high energy density, meaning it can supply uninterrupted energy at scale with a comparably minimal physical, as well as carbon, footprint.**

**More than 440 nuclear reactors operating across the world produce one-quarter of its low-carbon electricity, and more than 50 reactors are currently under construction. About 30 countries are actively considering, planning, or preparing to build nuclear power plants, seeing their benefits as long-term reliable low-carbon energy sources and stimulators of economic activity and employment.**

the fact that the IAEA will help make it happen but also because, even in the past few months, I have seen it occur.

In March, as the conflict in Ukraine dominated minds and hearts, state parties gathered in Vienna and successfully reviewed the Convention on the Physical Protection of Nuclear Material, confirming the global commitment to nuclear security. And every day I see countries continue to work on implementation, sharing expertise and offering support in many areas of nuclear energy and science. Today's decisions by scientists, leaders and the public make me hopeful that the energy crisis we are experiencing will be a catalyst for a faster shift to a low-carbon energy future, where nuclear provides electricity and supports the shift to a hydrogen economy, while helping to decarbonize hard-to-reach industrial sectors and transport. It is up to all of us to ensure we don't let the opportunity go to waste.

Source: <https://www.weforum.org/agenda/2022/05/nuclear-energy-decarbonization/>, 22 May 2022.

**OPINION – Manpreet Sethi**

**The Need for Diversity of Gender Perspectives on Matters of Security and Peace**

In the early 1980s when a group of women from across Europe came together to protest arms and nuclear weapons and seek peace, they paved the way for May 24 to be recognised as International Women's Day for Peace and Disarmament. Forty years since then, while the day continues to be celebrated across the globe, the role of women in promoting peace and disarmament remains marginal while that of nuclear weapons has grown in significance. Expansion and modernisation of nuclear capabilities can be seen across all nuclear armed states. Ironically, at this moment, it is also in Europe that a bloody war has been raging for nearly three months with frequent references to weapons of mass destruction. As always in case

of war, women are bearing the brunt of unspeakable physical atrocities, as well as the loss of their families and lives.

Two decades ago, the/ UNSC/ adopted/ Resolution 1325 (2000) linking gender to international peace and security. The Resolution reaffirmed the role of women in the prevention and resolution of conflicts, peace negotiations, and peace building. Nine additional resolutions later, women, peace and security is now one of the main thematic pillars

of UNSC's work. Four years ago, on this day in 2018, UN Secretary-General Antonio Guterres launched the Disarmament Agenda as part of Securing our Common Future. He outlined the importance of disarmament for the achievement of sustainable development,

and the need for engaging all constituencies, especially women, in disarmament action. Despite these efforts, it is a global reality that issues related to national and international security, war and strategy remain male preserves. While women have breached glass ceilings across many domains, on security and strategic issues, their voices are few, often dismissed as lightweight, and not up to managing the rough and tumble of power play in inter-state relations.

The annual celebration of the historic day this year is taking place against the backdrop of the ongoing Russia-Ukraine conflict. Besides the usual disruption of lives and livelihoods that every war causes, this conflict has also drawn attention to nuclear weapons in a manner that had not been seen in the East-West context since the end of the Cold War. President Putin has resorted to unambiguous and explicit nuclear signalling. In fact, even before Russia started the military operation against Ukraine, Putin oversaw elaborate/ nuclear exercises/ on 19 February 2022. Then, on the fourth day of the invasion, he announced that he was raising nuclear alert levels by imposing a "special regime of combat duty." There have been reports of deployment of nuclear submarines from the Northern Fleet. Indeed, Russia

**I am confident that the international community will continue to work together, despite any wider geopolitical disagreements. My confidence rests not only on the fact that the IAEA will help make it happen but also because, even in the past few months, I have seen it occur.**

has repeatedly drawn attention to the nuclear capability and status of the country, and to the likelihood of “consequences you have never seen in history” in case of outside intervention. Irrespective of how this conflict gets resolved, it will have implications for the future of peace and disarmament. Perceptions on the value of nuclear weapons and on the acceptability threshold of nuclear risks are likely to change.

**There have been reports of deployment of nuclear submarines from the Northern Fleet. Indeed, Russia has repeatedly drawn attention to the nuclear capability and status of the country, and to the likelihood of “consequences you have never seen in history” in case of outside intervention.**

May 24 has a symbolic importance. This year, it offers a particularly unique opportunity to dwell on the twin subjects of the role of women in matters of national and international security, and why peace and disarmament remain elusive. In fact, is there a correlation between the two? Do peace and disarmament continue to remain distant goals because security issues have been deprived of women’s voices and perspectives? Could the international situation have been different if there was greater diversity in gender perspectives on security?

**As more women populate decision-making structures on national and international security, it would be enriched by different perspectives. Perhaps, disarmament has eluded us for so long because of the predominance of one particular kind of approach, mirror-imaged across nations. The focus has primarily been on building security through weapons and military capabilities rather than building security through peace.**

While it may be impossible to offer a definite yes as the answer to this question, and even naïve to generalise, there is little doubt that women as bearers and nurturers of the next generation do have a higher natural inclination towards peace and disarmament. Encouraging, mainstreaming, and popularising their voices could have an impact on how inter-state relations are managed and structured. This is a road that has not yet been taken and should be worth trying.

One way of doing this would be to facilitate an ecosystem that is encouraging of young women to enter the fold of security policy research. Mentors and ‘womentors’ will have to nurture their talents and provide them with opportunities to

make a difference. Recognition of their ideas and competence will be as important as recognition of their special responsibilities in nurturing their families to achieve work-life stability. In order to balance demanding careers with family requirements, women will realise that they need discipline and time management. But even more importantly, they need supportive family structures and enabling professional and social environments.

As more women populate decision-making structures on national and international security, it would be enriched by different perspectives. Perhaps, disarmament has eluded us for so long because of the predominance of one particular kind of approach, mirror-imaged across nations. The focus has primarily been on building security through weapons and military capabilities rather than building security through peace. However, the fact of the matter is that while an environment of peace would naturally provide security, mere security may or may not bring peace. This approach needs more consideration, especially in today’s environment when heightened threat perceptions from stressed major power relations are likely to lead to increased military capabilities and expenditures. It is even more worrying that this is happening despite all nations’ recent experience with the pandemic that has exposed the abysmally low priority granted to citizen’s health and human security.

There is undoubtedly a need to promote different perspectives to augment discussions on national and international security. Women are needed as part of the agenda on building security through peace, not just because they are victims of war,

but because they have the potential to bring their unique perspectives as equal stakeholders in the international system.

May 24 might be international women's day for peace and disarmament, but the fact is that every human being has a stake in celebrating it in such a way that both women and peace and disarmament receive a fair chance to live up to their potential.

Source: <https://www.apln.network/analysis/commentaries/the-need-for-diversity-of-gender-perspectives-on-matters-of-security-and-peace>, 24 May 2022.

**OPINION – David Gormezano**

**Should the War in Ukraine Spur a Nuclear Security Rethink?**

With Russia's invasion of Ukraine, nuclear facilities have been caught up in the midst of conventional warfare for the first time in history. That nightmare scenario is one that few of the industry's players had anticipated. In Chernobyl and Zaporizhzhia, Russian forces represent a lingering threat to the most basic rules of nuclear security. On the way to Chernobyl along the Dnipro River, a two-hour drive from Kyiv, the imprint left by Russia's occupation remains, two months after an ordeal that lasted from the February 24 invasion until March 31. Most bridges have been destroyed and our driver warns us to stay on the pavement as landmines lurk beyond.

After the invasion, the exclusion zone around Chernobyl – a 30-kilometre radius around the notorious nuclear plant near Ukraine's border with Belarus – made global headlines once again. For some 35 days, Chernobyl personnel had to abide the Russian soldiers who seemed oblivious to the

dangers inherent in a nuclear site. "They had a very low level of knowledge. They didn't understand that the soil here is contaminated, that one mustn't touch it, and certainly not dig trenches in it," recounted Ruslan, a technician at the plant, waiting for his bus into work. "And yet that's what they did and it spurred an increased level of radioactivity at the site. Happily, management handled the situation well."

**With Russia's invasion of Ukraine, nuclear facilities have been caught up in the midst of conventional warfare for the first time in history. That nightmare scenario is one that few of the industry's players had anticipated. In Chernobyl and Zaporizhzhia, Russian forces represent a lingering threat to the most basic rules of nuclear security.**

Chernobyl shift chief Valentin Geiko became a national hero after he was able to tell various media how he resisted the orders of Russian officers with no scientific knowledge and with ambiguous intentions. Geiko's sense of humour and his determination helped the plant's personnel cope while they were held hostage for 20 days, until Russian soldiers finally allowed their colleagues in to relieve them of their duties. With Russia's invasion, Chernobyl had the world's nuclear experts in a cold sweat all over again. Deactivated sensors, troop movements on contaminated soil, and a plant disconnected from the electrical network from March 9 to 14 had specialists fearing the worst.

**Indeed, the Chernobyl nuclear site remains active 36 years after the worst nuclear accident in history. The dismantling of the site's four reactors is still in progress and, most importantly, some 22,000 highly radioactive spent fuel assemblies are being kept in storage pools that require constant cooling.**

Sergei, another plant employee, can still hardly believe it, after seeing "the barbarians" turn up inside the exclusion zone that has been insulating the damaged reactor since 1986. "They pillaged everything, broke technical material, equipment. But happily, they didn't damage the cooling system, which could have provoked a catastrophe." Ruslan and Sergei, two employees of the Chernobyl nuclear plant, begin a 15-day rotation to ensure the maintenance of the site. Indeed, the Chernobyl nuclear site remains active 36 years after the worst nuclear accident in history. The dismantling of the site's four reactors is still in progress and, most importantly, some

22,000 highly radioactive spent fuel assemblies are being kept in storage pools that require constant cooling. Another major activity at the site is the surveillance of the 100-plus metre sarcophagus completed in 2019, which isolates the reactor that “melted” during the 1986 disaster.

While Russian soldiers have now left the Chernobyl site, allowing the plant to return to a level of risk deemed acceptable by international standards, the Zaporizhzhia plant’s occupation, ongoing since March 4, has made for some surreal and worrisome scenes on the other side of the country. The images of artillery fire targeting buildings inside the plant’s enclosure spurred major concern, although no nuclear incident came of it. Ukrainian authorities said 500 soldiers settled in at the site, with 50-odd military vehicles, including tanks, weapons and explosives of all sorts; an arsenal entirely incompatible with the most basic security rules inside the walls of a nuclear facility. “Nobody had ever imagined that one could open fire on a nuclear power plant, the way the Russians did in Zaporizhzhia,” said Petro Kotin, president of Energoatom, the public company in charge of nuclear energy in Ukraine. .

Petro Kotin, president of Energoatom, the public company in charge of Ukraine’s nuclear energy, in his office in Kyiv. Indeed, neither the Russian soldiers nor the 10 to 15 technicians from Rosatom, the powerful Russian civil nuclear energy firm, on site at Zaporizhzhia tried to get their hands on nuclear fuel. Moreover, the plant’s two functioning reactors (out of six in total) are still supplying electricity to the Ukrainian network and powering the cooling systems of the largest nuclear plant in Europe. Could Russia’s objective be to use the site as a spoil of war to supply electricity to Crimea or other territories?

Russia’s deputy prime minister appeared to indicate as much during a visit to Zaporizhzhia

last week. “If Ukraine is ready to pay, then (the plant) can operate for Ukraine. If not, then it will operate for Russia,” said Marat Khusnullin, as cited by Russian press agencies. “For the moment, it is impossible to connect Zaporizhzhia to the Russian electrical network,” Kotin retorted. “For that, one would need to build 200 to 400 kilometres of lines, which would cost more than €500 million and could take two years. But with time and money, the Russians can do it, of course. Look at the means they deployed to build a bridge between Crimea and the Russian Federation” between 2014 and 2018, he added.

***The Challenge of Nuclear Security in Wartime:***

Those in the civil nuclear industry believe it is vital to deliberate on the issue of nuclear security in wartime. Terrorist attack scenarios had been considered in the past. But in light of the Russian invasion, the matter of adopting international rules is now on the table. Over the past three months, Ukrainian authorities have been calling – so far without success – for the IAEA to commit its members to respecting a five-kilometre perimeter around nuclear facilities inside of which no military forces can be permitted to penetrate.

**Terrorist attack scenarios had been considered in the past. But in light of the Russian invasion, the matter of adopting international rules is now on the table. Over the past three months, Ukrainian authorities have been calling – so far without success – for the IAEA to commit its members to respecting a five-kilometre perimeter around nuclear facilities inside of which no military forces can be permitted to penetrate.**

For now, the Ukrainian government has reinforced the defence of its nuclear sites. “We now have soldiers equipped with Javelin and NLAW anti-tank missiles to protect the nuclear plants. In Zaporizhzhia, we were taken by surprise; there was not yet a single weapon on site. I don’t know specifically what military means were deployed. That is confidential information that I don’t have access to,” said Kotin. The head of Ukraine’s nuclear power plants has meanwhile forbidden the transport of nuclear material anywhere on Ukrainian territory for security reason. Moving the fuel needed for the reactors to operate will just have to wait until the end of the war. The measure shouldn’t hamper the functioning of Ukraine’s

nuclear infrastructure because the country's authorities followed the advice of American experts dispatched after war began in the Donbas in 2014.

In Ukraine, the prospect of peace seems a distant one. But the long run is just the sort of timeline that the civil nuclear industry needs to guarantee optimal nuclear security. In the short term, the threat of a battle between Ukrainian and Russian forces for control of the Zaporizhzhia plant cannot be dismissed, with Ukraine displaying its willingness to reclaim all of its occupied territory in the months to come. The prospect of high-intensity combat for control of a nuclear facility? A nightmare, for Europe as a whole.

Source: <https://www.france24.com/en/europe/20220526-should-the-war-in-ukraine-spur-a-nuclear-security-rethink>, 26 May 2022.

**OPINION – C Uday Bhaskar**

**May and its Multiple Nuclear Resonances in Southern Asia**

May is a month associated with some significant punctuations in the nuclear domain as related to Southern Asia and provides the trigger pulse to recall and review a critical, albeit opaque strategic determinant – namely WMD stability. It is important to review this determinant in the context of the global and Asian strategic template, and how individual nations abide by their commitments to deterrence and disarmament.

The better recalled phrase is 'nuclear South Asia'

with its attendant narrative and this has reference to the nuclear weapon tests of India and Pakistan in 1998 on 11 and 13 May, and 28 May respectively. In May 1990, (as per reports that appeared only in 1993) there was a major crisis on the Indian sub-continent that was ostensibly diffused by unobtrusive US intervention.

**In the short term, the threat of a battle between Ukrainian and Russian forces for control of the Zaporizhzhia plant cannot be dismissed, with Ukraine displaying its willingness to reclaim all of its occupied territory in the months to come. The prospect of high-intensity combat for control of a nuclear facility? A nightmare, for Europe as a whole.**

According to some experts that crisis had a nuclear element to it, even though Indian officials have denied knowledge of it. While India and Pakistan are part of what is often referred to as 'South Asia' and the perception is one of a binary adversarial relationship that is intractable, however,

there is an embedded extended Asian template that is strategically more valid, which brings China into the tent. Disclosures by a former US nuclear weaponeer confirmed that, on 26 May 1990, China enabled a covert nuclear test of a Pakistani nuclear weapon design in the Lop Nor desert in the Xinjiang province, thereby adding to the resonance of May.

This shrouded narrative about matters nuclear in relation to China's role is one of the more tenacious challenges to objectively comprehending the Asian nuclear template and recent reports in the public domain offer some assessments that merit review.

**The better recalled phrase is 'nuclear South Asia' with its attendant narrative and this has reference to the nuclear weapon tests of India and Pakistan in 1998 on 11 and 13 May, and 28 May respectively. In May 1990, (as per reports that appeared only in 1993) there was a major crisis on the Indian sub-continent that was ostensibly diffused by unobtrusive US intervention.**

China-Pakistan cooperation in the WMD domain goes back to the mid-1970s and Beijing as a non-signatory to the NPT had entered into a covert nuclear weapon and missile technology strategic cooperation program with many nations involved in the transfer of such know-how. The role of Pakistani scientist Dr AQ Khan and the

'nuclear walmart' network that he ran for decades is part of the opaque nuclear narrative that rippled across the extended Asian region from Pakistan-Iran-Iraq to North Korea.

The current global estimate about Pakistan's WMD arsenal is that it has 165 nuclear warheads (as of March 2022) and that it is "expanding its nuclear arsenal faster than any other country."

Two characteristics are distinctive, in relation to Pakistan's nuclear weapon capability. First, that it is pursuing both, uranium and plutonium routes to enhance its arsenal; and second, it is the only nation among the eight nuclear weapon possessors, wherein the military has a dominant role in the command and control of the arsenal.

The US assessment of China is even more bleak and confirms many anxieties in a formal manner. In its annual assessment, the apex US intelligence institution notes: "Beijing will continue the most rapid expansion and platform diversification of its nuclear arsenal in its history, intending to at least double the size of its nuclear stockpile during the next decade and to field a nuclear triad. Beijing is not interested in arms control agreements that restrict its modernization plans and will not agree to substantive negotiations that lock in US or Russian nuclear advantages." Pakistan has used its nuclear capability to pursue two objectives that have muddled the concept

of deterrence, and the principle that a nuclear weapon has only one role – to 'deter' the threat or use of a similar capability by an adversary.

The first objective has been to carry out its

Islamist terrorism option against India, enabled by its nuclear weapons capability. This was demonstrated by the Pakistani military using its nascent and covert nuclear capability acquired in

May 1990 and use it as a shield in the Kashmir Spring crisis of 1990. The second objective has been to force a territorial grab against India along the disputed LoC – this was displayed during the Kargil war of 1999 when Pakistan engaged in nuclear sabre-rattling. The Pakistan Army's feckless adventurism was successfully thwarted by India and the global

community censured Islamabad for such transgression. India remained committed in word and deed to nuclear restraint and rectitude and in doing so also helped to strengthen the nuclear non-use norm. India was accorded an exceptional status

in 2008 by the international community as part of a US-India civilian nuclear agreement, wherein it remained a non-signatory to the NPT but retained its strategic capability with certain self-imposed caveats apropos nuclear testing and separation of reactors.

Pakistan's abiding objective post May 1998 has been to project an image of dyadic instability in relation to India, and Islamabad periodically makes reference to its tactical nuclear weapons as a military option to blunt what it perceives as India's conventional superiority and

circles back to the unresolved 'Kashmir issue' as a trigger for disequilibrium. This undesirable and uneasy status quo brings together nuclear weapons-terrorism and territorial revisionism, which has been at the core of global concern for the last two

**The US assessment of China is even more bleak and confirms many anxieties in a formal manner. In its annual assessment, the apex US intelligence institution notes: "Beijing will continue the most rapid expansion and platform diversification of its nuclear arsenal in its history, intending to at least double the size of its nuclear stockpile during the next decade and to field a nuclear triad."**

**Pakistan's abiding objective post May 1998 has been to project an image of dyadic instability in relation to India, and Islamabad periodically makes reference to its tactical nuclear weapons as a military option to blunt what it perceives as India's conventional superiority and circles back to the unresolved 'Kashmir issue' as a trigger for disequilibrium. This undesirable and uneasy status quo brings together nuclear weapons-terrorism and territorial revisionism, which has been at the core of global concern for the last two decades since the ill-advised US attack on Iraq for perceived WMD transgression and Baghdad's support to terrorism.**



decades since the ill-advised US attack on Iraq for perceived WMD transgression and Baghdad's support to terrorism.

Here the paradox is that while Pakistan is culpable of such transgressions, its 'dog in the manger' attitude at the Conference on Disarmament is preventing any meaningful deliberations on larger global policy matters related to fissile material ceilings, disarmament, and deterrence.

The Russian attack on Ukraine has rendered the global high table ineffective for urging and ensuring nuclear restraint. With the Iran nuclear imbroglio yet to reach satisfactory closure, North Korea flexing its WMD muscles periodically and Moscow attempting to play out its 'escalate-to-de-escalate' formulation by invoking its nuclear weapon capability in the Ukraine war – the extended Asian template and the global strategic framework are in varying degrees of tension and discord. If US-Russia relations are at a low point with little light at the end of the tunnel, the US-China bilateral relationship is equally discordant and the latest assertion by US President Joe Biden in relation to Taiwan has only exacerbated the animus.

In summary, the global and Asian strategic template is not in a satisfactory state and the need to review the commitment to both deterrence and disarmament by concerned interlocutors is even more urgent now than it has been in the past. We do not need a nuclear strand to add to the many challenges that the global community is trying to deal with already – the Covid-19 pandemic, climate change and the war in Ukraine – alas, ineffectually.

Source: [https:// www.apln. network/analysis/ commentaries/may-and-its-multiple-nuclear- resonances-in-southern-asia](https://www.aplnetwork.com/analysis/commentaries/may-and-its-multiple-nuclear-resonances-in-southern-asia), 27 May 2022.

OPINION – Seiyeon Ji, Victor Cha

**Making Sense of North Korea's Recent ICBM and (Possible) Nuclear Tests**

In a reversal from its earlier position, North Korea test-launched a suspected ICBM and two shorter-range weapons—only hours after US president Joe Biden concluded his trip to Asia. In April 2018, North Korea's leader, Kim Jong-un, had declared a self-imposed moratorium on nuclear weapons and long-range missile tests after three successful ICBM launches in 2017 demonstrated their potential range to reach the United States. In contrast, in the first half of 2022 alone, North Korea has conducted more than 18 weapons

**In the first half of 2022 alone, North Korea has conducted more than 18 weapons tests—an alarming development given their frequency and variety. During this period, North Korea not only tested long-range missiles capable of reaching the continental United States, it also launched short-range and intermediate-range missiles, and tactical missiles—as well as submarine-launched, train-launched, hypersonic, and cruise missiles.**

tests—an alarming development given their frequency and variety. During this period, North Korea not only tested long-range missiles capable of reaching the continental United States, it also launched short-range and intermediate-range missiles, and tactical missiles—as well as submarine-launched, train-launched, hypersonic, and cruise missiles.

Each new North Korean missile test—regardless of its success or failure—brings Pyongyang closer to its goal of developing a credible, survivable nuclear weapons delivery system that can target the US homeland. Recent missile developments. During its military parade in October 2020, North Korea also revealed the development of a larger Hwasong-17—the world's largest liquid-propellant missile ever built, and deployed on a road-mobile launcher to date. A missile of this size suggests North Korea's intends to arm the weapon with multiple warheads to overwhelm US national missile defense systems. The military parade also showed that North Korea appears to be indigenously designing launch vehicles for large missiles, including the Hwasong-17. This is significant because the survivability of North Korea's ICBM force will heavily depend on the

number of launchers they are about to build.

These developments point to North Korea achieving major technical benchmarks to

quantitatively and qualitatively expand its nuclear-capable delivery force. But North Korea's advances are not just in building better, more capable, and more precise missiles. Its credible missile capability is now being accompanied also by a credible strategy. At the 8th Workers' Party Congress in

January 2021, Kim Jong-un laid out—in unusually specific details—his goals for North Korea's weapons development. During his remarks, Kim outlined three major objectives for North Korea's ICBM program likely to be the focus of future missile tests: MIRVs capable of hosting several warheads on a single missile, longer-range ICBMs with a 15,000-kilometer capability (about 9,321 miles), and solid-propellant ICBMs. Such new solid-fuel ICBMs take much less time to prepare for launch, making them quicker to turn around in a crisis—which consequently shortens the time the United States and South Korea might have to preempt these systems before they are launched.

The development of MIRVs by North Korea would be particularly negative for US

security interests. With a limited number of missile defense interceptors designed to cope with North Korean ICBMs, a multiple warhead delivery system would significantly increase the threat to the US homeland. North Korea currently houses at least 10 ICBM launchers, including six launchers that were converted from Chinese Wanshan logging trucks and four 11-axle Hwasong-17 launchers. The United States currently has 44 ground-based interceptors that can handle limited ICBM threats from North Korea.

**These developments point to North Korea achieving major technical benchmarks to quantitatively and qualitatively expand its nuclear-capable delivery force. But North Korea's advances are not just in building better, more capable, and more precise missiles. Its credible missile capability is now being accompanied also by a credible strategy.**

**North Korea currently houses at least 10 ICBM launchers, including six launchers that were converted from Chinese Wanshan logging trucks and four 11-axle Hwasong-17 launchers. The United States currently has 44 ground-based interceptors that can handle limited ICBM threats from North Korea.**

As international security analyst Ankit Panda noted, "if you assume a worst-case scenario where [the U.S.] end[s] up using four interceptors per incoming reentry vehicle and you see single

reentry vehicles, basically the North Koreans need to build one more launcher to saturate the existing capability."

**New Nuclear Activities:** In addition to accelerating the development of survivable nuclear weapons delivery systems, there are now signs that North Korea may

resume testing of its atomic bombs. US and South Korean intelligence agencies are on alert for a possible nuclear test by North Korea. On May 25, South Korea's deputy national security advisor Kim Tae-hyo commented in a press briefing that North Korea has been testing a nuclear-triggering device in preparation for what would be the country's seventh nuclear test. If conducted, this test would mean that Pyongyang is also breaking its self-imposed moratorium on nuclear weapons testing.

The strategic analysis program "Beyond Parallel" by the Korea Chair at the CSIS has used high off-nadir satellite imagery to monitor activity in the village of Punggye-ri where all of North Korea's previous six nuclear tests have been conducted. Most recent imageries collected

on May 17, 2022, indicated that there was continued expansion of the support infrastructure for the Punggye-ri nuclear testing facility—including changes in lumber piles, renovation of existing buildings, and construction of new buildings in the main administration and support area. Satellite images also revealed progress over the past three months in the refurbishing work and preparations at Tunnel Number 3. Such activity, if completed, will signal that North Korea has prepared for a possible nuclear test.

The war in Ukraine may also have affected the doctrine that informs North Korea's pursuit of nuclear weapons and delivery capabilities. At one level, Russia's military attack on Ukraine provides a confirmation to Kim Jong-un that his nuclear pursuits are the best way to deter any external threats. At another—more worrying—level, however, is the possibility of Kim seeing benefits in adopting a nuclear first-use strategy. Putin's threats of nuclear weapons use—or, at least, his unwillingness to rule out their use—in response to any NATO intervention in Ukraine may influence the way Kim thinks about his ability to deter the United States from intervening on the Korean peninsula. In recent statements, Kim already referred to the possession of nuclear weapons as a deterrent and a secondary use as an "unexpected second mission" if outside forces violate its "fundamental interests."

Deterring North Korea. Additional testing—particularly of MIRV capabilities—will be one of the greatest security challenges to the United States and South Korea. While there are no easy options to prevent further advances in North Korea's weapons program, several steps could help altering Kim Jong-un's cost-benefit calculations for his missile development efforts.

First, the United States and South Korea should upgrade their defense and deterrence capabilities on the Korean Peninsula. In addition to reactivating the suspended Extended Deterrence Strategy and Consultation Group—as promised in last week's Biden-Yoon summit—the allies should consider other measures to integrate early warning systems, strike capabilities, and the rotation of dual-

capable assets to the peninsula. Second, the two allies, along with Japan, should pursue a broad counter-missile strategy that involves detecting and defending against North Korean missiles and launchers, disrupting North Korea's network of capabilities that allow them to fire missiles repeatedly, and destroying the launchers and missiles themselves. This would require the United States and South Korea to invest in capabilities like sensors, advanced command and control systems, and intelligence, surveillance and reconnaissance technology. Third, the United States can

encourage Seoul to continue developing its indigenous capabilities to help protect South Korean critical infrastructure from North Korean missile barrages. South Korea's version of the "Iron Dome"—an artillery interception system deployed by Israel—is an example of the types of capabilities it can develop.

The United States, Japan, and South Korea should also increase trilateral coordination on missile defense. This would require South Korea to rethink its long-held position that it would not cooperate with Japan and the United States trilaterally on detection, warning, tracking, and interception of ballistic missiles. For its part, the United States should consider shifting the focus

of its diplomacy from completely shutting down North Korea's nuclear program to slowing down or halting its missile testing. As North Korea comes closer to its capacity to overwhelm US national missile defenses, such policy reorientation is becoming more urgent. For as long as North Korea refuses to return to the negotiating table, the United States could consider integrating

**Deterring North Korea. Additional testing—particularly of MIRV capabilities—will be one of the greatest security challenges to the United States and South Korea. While there are no easy options to prevent further advances in North Korea's weapons program, several steps could help altering Kim Jong-un's cost-benefit calculations for his missile development efforts.**

**For its part, the United States should consider shifting the focus of its diplomacy from completely shutting down North Korea's nuclear program to slowing down or halting its missile testing. As North Korea comes closer to its capacity to overwhelm US national missile defenses, such policy reorientation is becoming more urgent.**

ideas for possible “carrots” and “sticks” in the missile realm into existing potential roadmaps for nuclear diplomacy.

Source: <https://thebulletin.org/2022/05/making-sense-of-north-koreas-recent-icbm-and-possible-nuclear-tests/>, 27 May 2022.

**NUCLEAR STRATEGY**

**CHINA**

**Satellite Photo Shows Possible New Chinese Nuclear Submarine able to Launch Cruise Missiles**

A submarine seen in a satellite photo of a Chinese shipyard shows what could be a new class or subtype of a nuclear-powered attack sub with a new stealthy propulsion system and launch tubes for cruise missiles. The satellite photo of the shipyard at Huludao in Liaoning province, northern China, which was provided to Defense News by Planet Labs, was taken May 3 and shows a submarine on a drydock.

The unidentified boat’s presence at the yard was first noted in an April 29 satellite image by geospatial intelligence outfit AllSource Analysis. The organization said the submarine is possibly a new class undergoing construction by China. The submarine has two distinct patches of green coloring on its hull immediately behind its conning tower, while a cruciform rudder arrangement and a possible shrouded propulsion system are seen. A naval expert told Defense News he has “moderately high confidence” the submarine includes a row of vertical launch system cells for submarine-launched missiles and a shroud for pump-jet propulsion.

...Having submarines capable of launching cruise missiles for land-attack and anti-ship missions fits

into China’s pursuit of long-range offensive strike capabilities, he said, adding that these include the capability to target U.S. Navy assets and distant land targets, such as those in Guam, where American forces are based. If the rectangular section on the submarine, as seen in the satellite photo, is indeed a set of VLS cells, it would be in line with a 2021 Pentagon report on China’s military power that the country was likely building “the Type 093B guided-missile nuclear attack submarine.” The sighting of the new submarine

comes after a model of a nuclear-powered attack submarine bearing the nameplate of China State Shipbuilding Corporation Limited and fitted with VLS technology as well as pump-jet propulsion appeared online. (China’s two largest shipbuilding conglomerates, China

Shipbuilding Industry Corporation and China State Shipbuilding Corporation, merged in November 2019 to create the business.)

The model, which features 18 VLS cells in three rows of six missile tubes behind the boat’s conning tower, was posted on Chinese social media without the shipyard’s plaque in early May. Some speculated this was a development of the Type 093 class tentatively named Type 093B. The submarine seen in the latest satellite image of Huludao appears to measure up closely to the Type 0932 s 110-meter length, indicating it is likely a development of the Type 093 rather than an altogether new class.

The Type 093 is also known as the Shang class; the Pentagon’s report noted the “new Shang class variant will enhance the PLAN’s anti-surface warfare capability and could provide a clandestine land-attack option if equipped with LACMs.” The Type 093 and the follow-on Type 093A Shang-II-

**The submarine is possibly a new class undergoing construction by China. The submarine has two distinct patches of green coloring on its hull immediately behind its conning tower, while a cruciform rudder arrangement and a possible shrouded propulsion system are seen.**

**Some speculated this was a development of the Type 093 class tentatively named Type 093B. The submarine seen in the latest satellite image of Huludao appears to measure up closely to the Type 0932 s 110-meter length, indicating it is likely a development of the Type 093 rather than an altogether new class.**

class boats displace about 6,100 tons each when submerged. China has six Type 093s, including the "A" variant. Their commissioning began in 2006, with each successive boat featuring slight differences in sail design and a hump behind the conning tower, whose purpose has yet to be disclosed nor been fully understood.

Source: <https://www.defensenews.com/naval/2022/05/16/satellite-photos-show-possible-new-chinese-nuclear-submarine-able-to-launch-cruise-missiles/>, 16 May 2022.

**Besides the French deployment to Romania, Germany and the Netherlands have deployed PATRIOT batteries to Slovakia and the United States sent two PATRIOT batteries to Poland in April 2022. These deployments are critical augmentations enhancing the Alliance's IAMD posture in a changed geopolitical environment.**

changed geopolitical environment. "Besides the French deployment to Romania, Germany and the Netherlands have deployed PATRIOT batteries to Slovakia and the United States sent two PATRIOT batteries to Poland in April 2022. These deployments are critical augmentations enhancing the Alliance's IAMD posture in a changed geopolitical environment," said Brigadier General Christoph Pliet, Deputy Chief of Staff Operations at Allied Air Command that oversees NATO's air operations.

**BALLISTIC MISSILE DEFENCE**

**FRANCE**

**France Deploys MAMBA Missile Defence System to Bolster NATO Defensive Posture on Eastern Flank**

The deployment of the French state-of-the-art MAMBA weapons system and an air defence command post to Romania augments NATO's Integrated Air and Missile Defence (IAMD) since May 16, 2022. In a collective effort, several Allies are providing both fighter aircraft and missile systems for an increased defensive posture on the eastern flank following Russia's unprovoked invasion of Ukraine. With the deployment of a surface-to-air missile defence system to Romania, France has further increased its forward footprint in support of NATO's enhanced vigilance towards potential threat from the East.

These deployments are critical augmentations enhancing the Alliance's IAMD posture in a

"The French MAMBA deployment shows France's capacity and will to protect her own interests as well as those of her Allies," said Colonel Pascal Ianni, French Chief of Defence Staff spokesperson. "It permits to reinforce the strategic partnership that has united France and Romania since 2007, especially in the field of air defence. The MAMBA deployment is firmly embedded in the multinational Forward Presence Battle Group which France, supported by the Netherlands and Belgium, established in Romania under NATO's aegis.

**MAMBA can operate in an electronic warfare environment and is interoperable with other NATO air defence systems. NATO has further increased its readiness and vigilance in response to Russia's aggressive military incursion into Ukraine. Allies have adopted a robust and capable military posture to deter - and if required defend against - any threat to Alliance territory and populations.**

The MAMBA surface based air and missile defence system is operated by the French Air and Space Force as a theatre antimissile system to protect tactical sites against airborne threats, including cruise missiles, tactical ballistic missiles, manned and unmanned aircraft. The system's main components are the Aster 30 interceptor

missile and the Arabel multi-function radar. MAMBA can operate in an electronic warfare environment and is interoperable with other NATO air defence systems. NATO has further increased its readiness and vigilance in response to Russia's aggressive military incursion into Ukraine. Allies have adopted a robust and capable military

posture to deter - and if required defend against – any threat to Alliance territory and populations. NATO IAMD is an essential, continuous mission in peacetime, crisis and conflict, safeguarding and protecting the Allies in this context, contributing to the Alliance's indivisible security and freedom of action.

Source: <https://ac.nato.int/archive/2022/france-deploys-mamba-missile-defence-system>, 23 May 2022.

## UK

### **Type 45 Ballistic Missile Defence Upgrade to Support More than 100 UK Jobs**

The UK is set to become the first European nation to operate a Maritime Ballistic Missile Defence capability that can detect and destroy Anti-Ship Ballistic Missiles as it commits to a significant upgrade of Britain's fleet of Type 45 destroyers. The upgraded defence system, using the ASTER 30 Block 1 missile previously used only in French and Italian land systems, will help UK forces combat the increasing threats posed by anti-ship ballistic missiles at sea by developing the missile into a maritime variant. The Ministry of Defence has placed an initial contract for this work with MBDA which, when delivered, will be worth more than £300 million and support more than 100 jobs across the UK - including highly skilled technology roles in areas such as system design and software engineering in Stevenage, Cowes, Bristol and Bolton.

Defence Procurement Minister, Jeremy Quin said, as we face global uncertainty, alliances and greater defensive capability are more important than ever. Joining our French and Italian counterparts will see us collectively improve the cutting-edge technology our armed forces possess. It is another example of us delivering on the commitments from the

Defence Command Paper, helping protect our service personnel when faced with the most severe threats.

Upgrading the defensive capability of the Type 45 fleet was committed to in the Defence Command Paper, as part of the Integrated Review last year. Being able to defend against anti-ship ballistic missiles will add to the current capability of the Destroyers to defeat threats from the air. The signing of the tri-national agreement is the first formal step in

the upgrade of the six vessels, which will include converting existing missiles to the ASTER 30 Block 1 standard, as well as updates to the SAMPSON multi-function radar (MFR) and Sea Viper command and control missile system, under the full Sea Viper Evolution programme.

Sea Viper's upgrade will boost the lethality of the Type 45 vessels, helping to ensure the Royal Navy remains poised to defend the surface fleet and the Maritime Strike Group against complex air threats both now and into the future.

DE&S CEO Sir Simon Bollom, said, this demonstrates the UK commitment to delivering a cutting-edge maritime Air Defence Capability. Sea Viper Evolution will deliver a significant uplift in capability and brings to a close many years of detailed planning and activity by the Maritime Air and Weapons team in DE&S. The Sea Viper Evolution programme follows the recent contract awards to introduce the Common Anti

Air Modular Missile (CAMM) into the Type 45, which will see the missile outload of the platform increased from 48 to 72 missiles. The Royal Navy's Type 45 destroyers are among the most advanced in the fleet and carry out a range of activity, including defence from air attack, counter-piracy

**The UK is set to become the first European nation to operate a Maritime Ballistic Missile Defence capability that can detect and destroy Anti-Ship Ballistic Missiles as it commits to a significant upgrade of Britain's fleet of Type 45 destroyers.**

**Sea Viper Evolution will deliver a significant uplift in capability and brings to a close many years of detailed planning and activity by the Maritime Air and Weapons team in DE&S. The Sea Viper Evolution programme follows the recent contract awards to introduce the Common Anti Air Modular Missile (CAMM) into the Type 45, which will see the missile outload of the platform increased from 48 to 72 missiles.**

operations and providing humanitarian aid.

Source: <https://www.gov.uk/government/news/type-45-ballistic-missile-defence-upgrade-to-support-more-than-100-uk-jobs>, 24 May 2022.

## USA

### Missile Defense Agency Eyes Command Center for Guam

Integrating current and future sensor data is key to protecting Guam from future missile threats.

The “hardest” challenge the Missile Defense Agency will face in protecting Guam from missile threats will be integrating multiple data streams into a single, coherent picture for commanders, the agency’s commander said. To address that challenge, the agency hopes to build an integrated missile defense command and control center on the island, which would give military leaders better control over the variety of missile defense tools at their disposal, Vice Adm. Jon Hill said. Guam is expected to play a critical role in the U.S. military’s future efforts to deter a Chinese attack on Taiwan, and would be among the first targets of Chinese long-range missile strikes in the event of armed conflict. Over the years, the U.S. military and MDA in particular have added missile defense capabilities in the region—land-based defenses on Guam itself, such as the land-based Terminal High Altitude Area Defense system and soon the Patriot missile battery, as well as ship-based interceptors paired with a variety of radar and other sensors. ...

The new class of highly-maneuverable hypersonics are sometimes described as “invincible,” but developing new interceptors that can effectively take them out is a big part of MDA’s future. The agency requested \$130 million for the Hypersonic & Ballistic Tracking Space Sensor and Space-based Kill Assessment in its most recent budget request.

**Integrating current and future sensor data is key to protecting Guam from future missile threats. The “hardest” challenge the Missile Defense Agency will face in protecting Guam from missile threats will be integrating multiple data streams into a single, coherent picture for commanders.**

**The new class of highly-maneuverable hypersonics are sometimes described as “invincible,” but developing new interceptors that can effectively take them out is a big part of MDA’s future. The agency requested \$130 million for the Hypersonic & Ballistic Tracking Space Sensor and Space-based Kill Assessment in its most recent budget request.**

But ... the Defense Department is still trying to solve some hard physics and engineering problems before it can determine what hypersonic missile defense will look like.

Much of it depends on the effects of incredibly high temperatures on sensitive, missile-finding technology in the nose of the interceptor missile, a portion of the interceptor sometimes called the seeker. That seeker is going to experience a wide

range of conditions as it plows through the atmosphere into space, and then comes back down to “near space” where it can effectively intercept the incoming missile. ...

Source: <https://www.defenseone.com/threats/2022/05/missile-defense-agency-eyes-command-center-guam/367311/>, 23 May 2022.

### US Tests Hypersonic Missile that ‘Flies at 6,000 kph’

America, Russia and China are racing to develop very fast weapons that give little time to react

US Air Force file photo showing the X-51A WaveRider hypersonic flight test vehicle under the wing of a B-52 Stratofortress during testing. The US Air Force claims to have successfully launched a hypersonic missile — capable of travelling at five times the speed of

sound, or 1.7 kilometres per second — from a B-52 bomber The US Department of Defence has requested \$4.7 billion to invest in hypersonic weapons development for its 2023 budget, part of an effort to match Chinese and Russian capabilities that some analysts fear may be ahead of US research into the extremely fast weapons.

“Following separation from the aircraft, the

ARRW's booster ignited and burned for expected duration, achieving hypersonic speeds five times greater than the speed of sound," the US Air Force said of the test, referring to the 6,000-kilometres-per-hour Air-launched Rapid Response Weapon tested on May 24, 2022. The launch, one of a series of test firings, was conducted off the coast of California and came after Russia said it had successfully fired a Kinzhal hypersonic missile during the war in Ukraine, the first combat use of a hypersonic missile. Russia said the Kinzhal, delivered from one of its fastest jets the MIG-31K, could reach 10 times the speed of sound. But some experts question whether the Kinzhal fits the US definition of a hypersonic weapon.

US Joint Chiefs of Staff chairman General Mark Milley told a defence committee earlier this week that the Russian missile was not "game-changing". "Other than the speed of the weapon, in terms of its effect on a given target, we are not seeing really significant or game-changing effects to date with the delivery of the small number of hypersonics that the Russians have used," he said. Russia has also tested the Zircon and Avangard hypersonic missiles, the latter reportedly capable of re-entering Earth's atmosphere after detaching from a ballistic missile travelling at 20 times the speed of sound.

However, US government analysts define hypersonic weapons not simply by their speed. Existing nuclear ballistic missiles, which are in some cases based on decades-old technology, fly to the edge of Earth's atmosphere or into space, descending towards their target at many times the speed of sound — in some cases over Mach 20, or four times the minimum speed of a hypersonic missile. Despite this incredible speed, the US says these are technically not hypersonic weapons, which are "manoeuvring weapons that fly at speeds of at least Mach 5".

The manoeuvring aspect is key, making it much harder for enemy air defences to intercept. Ballistic missiles can in some cases be shot down by existing air defence systems such as the US Terminal High Altitude Air Defence system, because their fixed trajectory can be determined by radar and space-based infrared detection systems shortly after launch.

The air defence system, which travels at Mach 8, is designed to intercept ballistic missile high above the ground, and is said to have maximum altitude after launch of 150 kilometres. In contrast to a ballistic missile, a hypersonic missile is able to change course in flight and flies on a low trajectory — a design aspect that has challenged researchers for decades because of extreme forces such as drag and friction when changing course at hypersonic speed, which can damage or destroy a weapon.

**Existing nuclear ballistic missiles, which are in some cases based on decades-old technology, fly to the edge of Earth's atmosphere or into space, descending towards their target at many times the speed of sound — in some cases over Mach 20, or four times the minimum speed of a hypersonic missile. Despite this incredible speed, the US says these are technically not hypersonic weapons, which are "manoeuvring weapons that fly at speeds of at least Mach 5"**

Unlike the Avangard, which re-enters the Earth's atmosphere, the US ARRW is known as an air-launched weapon. Aside from trying to match Russia's capabilities, the US has also been concerned about China's research into hypersonic weapons. In October, the US accused China of testing a hypersonic missile launched from a ballistic missile in space, known as a Fractional Orbital Bombardment System. ...

Source: <https://www.thenationalnews.com/world/2022/05/17/us-tests-hypersonic-missile-that-flies-at-6000kph/>, 17 May 2022.

**EMERGING TECHNOLOGIES AND NUCLEAR DETERRENCE**

**RUSSIA**

**Russia to Deploy Nuclear-Armed Drone Torpedo**

Russia's navy later this year will deploy a drone torpedo armed with a megaton-class nuclear



warhead capable of destroying entire cities or ports, according to the commander of the U.S. Indo-Pacific Command.

Adm. John Aquilino, the commander, disclosed in House testimony that the drone torpedo, dubbed Poseidon by the Russians, will be carried on a massive new special-purpose submarine called the Belgorod that will be deployed this year. In addition to the Belgorod, the Russian military is adding at least one Dolgorukiy II-class nuclear

ballistic missile submarine to the two Dolgorukiy I missile submarines already in the Pacific Fleet.

The four-star admiral did not say whether the Belgorod would be deployed with Russian forces in the Atlantic or the Pacific, but the Belgorod is said to be one of the most worrying new strategic systems because of the introduction of the Poseidon. According to Pentagon officials familiar with intelligence reports, the Poseidon will be equipped with a nuclear warhead measured in the tens of megatons of explosive power. A megaton is the equivalent of 1 million tons of TNT. Additionally, the drone torpedo will be capable of traveling at speeds as high as 100 knots, considered extremely fast for an underwater robot vehicle. The Belgorod is believed to be capable of carrying six Poseidons. Each torpedo would be capable of destroying a port or city by detonating near the coast.

Russian state-run press reports have described the Poseidon as a second-strike weapon that will cause a "radioactive tsunami" against targets such as the U.S. nuclear submarine bases in Kitsap, Washington, or Kings Bay, Georgia, after

an enemy surprise attack. The four-star admiral stated that Russia wants to become "a center of gravity in a multipolar world order by undermining democratic, free and open societies in favor of authoritarian structures."

Most of that effort is in the European region. In the Pacific, Moscow is supporting the Myanmar military junta, and providing aid to North Korea in evading and undermining U.N. Security Council sanctions. According to

defense officials, the Poseidon drone torpedo is one of several nuclear "superweapons" that are part of President Vladimir Putin's bid to return Russia to nuclear superpower status. Others include the nuclear-armed, ICBM-launched Avangard hypersonic glide vehicle and the Skyfall nuclear-powered and nuclear-armed cruise missile.

**Russia's navy later this year will deploy a drone torpedo armed with a megaton-class nuclear warhead capable of destroying entire cities or ports, according to the commander of the U.S. Indo-Pacific Command. Adm. John Aquilino, the commander, disclosed in House testimony that the drone torpedo, dubbed Poseidon by the Russians, will be carried on a massive new special-purpose submarine called the Belgorod that will be deployed this year.**

**According to defense officials, the Poseidon drone torpedo is one of several nuclear "superweapons" that are part of President Vladimir Putin's bid to return Russia to nuclear superpower status. Others include the nuclear-armed, ICBM-launched Avangard hypersonic glide vehicle and the Skyfall nuclear-powered and nuclear-armed cruise missile.**

Source: [https://www.realcleardefense.com/2022/05/19/russia\\_to\\_deploy\\_nuclear\\_armed\\_drone\\_torpedo\\_833128.html#:~:text=Russia's%20navy%20later%20this%20year,the%20U.S.%20Indo%2DPacific%20Command,19May2022](https://www.realcleardefense.com/2022/05/19/russia_to_deploy_nuclear_armed_drone_torpedo_833128.html#:~:text=Russia's%20navy%20later%20this%20year,the%20U.S.%20Indo%2DPacific%20Command,19May2022).

## **NUCLEAR ENERGY**

### **SOUTH KOREA**

#### **S. Korea Seeks to Resume Construction of 2 Nuclear Reactors in 2025: Report**

South Korea's new administration will seek to resume currently suspended construction of two nuclear reactors in the coastal county of Uljin in 2025, government and industry sources said. In its key policy implementation plan, apparently

written in April, President Yoon Suk-yeol's transition team proposed restarting the construction of Shin-Hanul reactors No. 3 and No. 4 in the first half of 2025, according to sources. Yoon said multiple times during his election campaign that he would scrap the Moon Jae-in administration's nuclear phase-out drive, Yonhap news agency reported. The project to build the two 1,400-megawatt reactors has been on hold since 2017. They had been scheduled to be completed by 2023.

**The IAEA has endorsed Uganda's plan to build its first nuclear power plant as the country seeks to raise its electricity generation capacity by nearly 14 times to 17,000MW in the medium term. On May 23, 2022, IAEA's director for Africa Aline des Cloizeaux briefed President Yoweri Museveni on the approval, saying the agency was ready to help Uganda to actualise the project.**

Source: [https://www.business-standard.com/article/international/s-korea-seeks-to-resume-construction-of-2-nuclear-reactors-in-2025-report-122051200653\\_1.html](https://www.business-standard.com/article/international/s-korea-seeks-to-resume-construction-of-2-nuclear-reactors-in-2025-report-122051200653_1.html), 12 May 2022.

## UGANDA

### IAEA Approves Uganda's First Nuclear Power Project

The IAEA has endorsed Uganda's plan to build its first nuclear power plant as the country seeks to raise its electricity generation capacity by nearly 14 times to 17,000MW in the medium term. On May 23, 2022, IAEA's director for Africa Aline des Cloizeaux briefed President Yoweri Museveni on the approval, saying the agency was ready to help Uganda to actualise the project. "We have concluded that Uganda is ready for the plant. We are ready for all the support through training so that the project becomes a reality," des Cloizeaux said. The approval follows IAEA's eight-day mission to Uganda last December to review the country's infrastructure development for a nuclear programme.

**Nuclear Weapons:** President Museveni said Uganda was seeking to develop nuclear energy to make up for shortfalls in hydropower, currently its main source of power generation. "For us, we want

that power for electricity, for agriculture, and not for nuclear weapons," President Museveni said after receiving the agency's report. IAEA, whose mission is to assist member countries to build safe and secure plants, has asked Uganda to build its nuclear facility in a phased approach.

In phase one, Uganda is expected to put in place u n d e r s t a n d i n g commitments, obligations and resource requirements before embarking on the project. Phase two will involve building

specialised nuclear institutions and preparatory work toward construction of the nuclear power plant. The third phase of the project will involve managing construction and preparing for commissioning and operations of the power plant. Uganda's energy minister Sidronius Opolot Okasai said the government had already acquired land for the 2,000MW plant, although he did not disclose the site. This puts Uganda one step ahead of Kenya – which is scouting for a site for construction of a \$5 billion nuclear power plant that is expected to generate 1,000MW by 2027.

**The government had already acquired land for the 2,000MW plant, although he did not disclose the site. This puts Uganda one step ahead of Kenya – which is scouting for a site for construction of a \$5 billion nuclear power plant that is expected to generate 1,000MW by 2027.**

Kenya plans to build a nuclear power plant despite warnings by experts who believe the county is better off developing more geothermal wells, solar parks and wind farms.

Long construction timelines (about 10 years), and costly decommissioning of plants at the end of their lifespan, have dissuaded some countries from investing in nuclear energy. For example, Germany, the world's eighth-largest nuclear power producer, plans to close its last operating reactor in 2022 as part of its nuclear phase-out. Belgium is also planning to close all of its existing nuclear reactors by 2025.

**Electricity Demand:** Nonetheless, several countries are betting on nuclear energy to meet

their rising electricity demands – with a third of the nearly 30 countries being in Africa, according to IAEA. These states include Egypt, Morocco, Ghana, Kenya, Uganda, Sudan, Niger, Zambia, Tunisia, and Nigeria. Some of these countries have already engaged with the IAEA to evaluate their readiness to adopt a nuclear program. Globally, five countries account for 71.6% of the world's nuclear power production. These include the US (with 96 reactors generating 789,919 GWh), China (50 reactors generating 344,748 GWh), France (58 reactors generating 338,671 GWh), Russia (39 reactors generating 201,821 GWh) and South Korea (24 reactors generating 152,583 GWh). In the U.S., nuclear power generates over 50% of the country's carbon-free electricity. Nuclear power makes up to 70% of France's electricity mix. The country now plans to expand its nuclear capacity, just as is the case with China – which is planning to build 150 new reactors by 2035 at a cost of \$440 billion.

**Nonetheless, several countries are betting on nuclear energy to meet their rising electricity demands – with a third of the nearly 30 countries being in Africa, according to IAEA. These states include Egypt, Morocco, Ghana, Kenya, Uganda, Sudan, Niger, Zambia, Tunisia, and Nigeria. Some of these countries have already engaged with the IAEA to evaluate their readiness to adopt a nuclear program.**

**In 2015, Jordan signed an agreement with Russia's Rosatom to build a \$10 billion nuclear power plant with a capacity of 2,000 megawatts. The Jordanian Uranium Mining Company announced that its extraction plant had produced 20 kilos of yellowcake from 160 tons of uranium ore. Mohammad Shunnaq, general manager of the state-owned JUMCO, said the factory would produce tens of kilograms of yellowcake from processing hundreds of tons of ore over the next few months.**

yellowcake from 160 tons of uranium ore. Mohammad Shunnaq, general manager of the state-owned JUMCO, said the factory would produce tens of kilograms of yellowcake from processing hundreds of tons of ore over the next few months.

He said Jordan had large uranium reserves and that its central area alone, about 80 km south of Amman, was home to around 42,000 metric tons of uranium oxide. According to the Jordan Atomic Energy Commission, Jordan has estimated conventional uranium reserves of 140,000 tons. Shunnaq told Arab News that the

extraction of uranium ore deposits, especially in the central region, was easily mined and cost-effective as they were less than 5 meters underground. He described the yellowcake as being of "excellent quality" with an average concentration of 150 ppm (parts per million). Asked whether Jordan intended to produce large quantities of uranium oxide for commercial purposes, Shunnaq replied: "Yes, that is possible. We will first

embark on a large-scale treatment of thousands of tons of uranium ores, conduct feasibility studies, and then evaluate the commercial aspect of such operations."

The locally produced yellowcake will be used as fuel for the country's nuclear power reactors. He said the uranium exploration and extraction operations in the center, called the Central Jordan Uranium Project, were integral to the national nuclear program. It also covered the Nuclear Power Plant Project and the Nuclear Reactor Project for Research and Training...

Source: <https://www.arabnews.com/node/2082031/middle-east>, 14 May 2022.

Source: <https://www.constructionkenya.com/10792/uganda-nuclear-power/>, 13 May 2022.

## **URANIUM PRODUCTION**

### **JORDAN**

#### **Jordan Announces Uranium Production**

The locally produced yellowcake will be used as fuel for the country's nuclear power reactors. In 2015, Jordan signed an agreement with Russia's Rosatom to build a \$10 billion nuclear power plant with a capacity of 2,000 megawatts. The Jordanian Uranium Mining Company announced that its extraction plant had produced 20 kilos of

USA

**Drilling Begins on Consolidated Uranium's Three US Projects Aiming at Historic Mineral Resources**

Consolidated Uranium has announced that drilling has started on its past-producing uranium projects in the US; Tony M Mine, Rim Uranium and Vanadium Mine, and Daneros Mine situated in south-eastern Utah. All three underground mines are completely developed and officially permitted, with production taking place most recently between 2006 and 2013. The mines are also exclusively situated close to the White Mesa Mill owned and operated by Energy Fuels, with whom Consolidated Uranium has a Toll Milling Agreement.

Consolidated Uranium has contracted DrillRite to carry out a scheduled 21,000 ft of surface drilling throughout all three projects, which will comprise traditional open hole rotary pre-collars with core "tails". Borehole geophysical logging services will be carried out by Century Geophysical. Tony M Mine: An 8-hole program encompassing 6,000 ft is currently in progress to confirm the historical exploration drill hole data set and enable the preparation of an existing mineral resource estimate.

*Rim Uranium and Vanadium Mine:* A 15-hole program encompassing 10,000 ft will begin directly after the completion of the Daneros program and will concentrate on areas beyond the historic resource estimate.

*Daneros Mine:* An 8-hole program encompassing 7,200 ft will start directly after the completion of the Tony M program and will concentrate on areas beyond the historic resource estimate.

Commencement of these drill programs represents an important step in demonstrating what we believe to be the tremendous inherent value and upside potential of our US uranium project portfolio. By verifying the historic mineral resource at Tony M and testing areas outside of the historic mineral resources at Daneros and Rim, we hope to position the Company to make a production decision in the second half of the year, subject to market conditions said Philip Williams, Chairman and CEO, Consolidated Uranium. ... "All three mines were in production during the uranium bull market of 2006 to 2010 with substantial capex spent by the previous operators. The projects are all fully permitted and expected to allow for rapid restart following a production decision".

**Tony M Mine, Rim Uranium and Vanadium Mine, and Daneros Mine situated in south-eastern Utah. All three underground mines are completely developed and officially permitted, with production taking place most recently between 2006 and 2013. The mines are also exclusively situated close to the White Mesa Mill owned and operated by Energy Fuels, with whom Consolidated Uranium has a Toll Milling Agreement.**

**Commencement of these drill programs represents an important step in demonstrating what we believe to be the tremendous inherent value and upside potential of our US uranium project portfolio. By verifying the historic mineral resource at Tony M and testing areas outside of the historic mineral resources at Daneros and Rim, we hope to position the Company to make a production decision in the second half of the year, subject to market conditions.**

Further, our toll-milling agreement with Energy Fuels for processing of our material at the White Mesa Mill, positions CUR as the only conventional uranium developer that can both mine and have its material processed for the ultimate sale of uranium into the market in the near term. In

our view, the attributes of these projects, when taken together, set CUR apart from its peers and we are poised to benefit from the expected continued strength in the uranium market, Philip Williams added.

Source: <https://www.azominer.com/News.aspx?newsID=16981>, 27 May 2022.

**NUCLEAR COOPERATION**

**BANGLADESH-SOUTH KOREA**

**Bangladesh, South Korea Ink MoU on Cooperation for Peaceful Nuclear Energy Use**

The Korea Atomic Energy Research Institute (KAERI) and Bangladesh Atomic Energy Commission (BAEC) have signed MoU for the collaboration in the peaceful use of nuclear energy. The signing ceremony was held at the BAEC building in Dhaka. Dr Park Won Seok, president of KAERI, Dr Md Azizul Haque, chairman of BAEC, Lee Jang-keun, ambassador of the Republic of Korea to Bangladesh, and other officers of BAEC and KAERI were present.

According to the MOU, KAERI and BAEC will strengthen cooperation in various aspects of peaceful utilization of atomic energy, including development, utilization, and upgrade of research reactors, production and application of radioisotopes; development of radiation technology, neutron science and management of nuclear/radioactive waste.

**According to the MOU, KAERI and BAEC will strengthen cooperation in various aspects of peaceful utilization of atomic energy, including development, utilization, and upgrade of research reactors, production and application of radioisotopes; development of radiation technology, neutron science and management of nuclear/radioactive waste.**

Korea expects that the signing of the MOU will provide important momentum to take the existing collaboration between the two agencies to a new height. Mentioning that KAERI has established a solid infrastructure as well as operation know-how of research reactors through the development of HANARO of Korea, JRTR of Jordan, OYSTER of the Netherlands during the past 50 years, Dr Park Won Seok expressed his confidence in cultivating and strengthening trustful partnership in the peaceful use of nuclear energy.

Ambassador Lee Jang-keun stressed that the signing of the MOU today has a significant meaning in the relations between Korea and Bangladesh as it opens a new avenue of promising collaboration in the field of nuclear energy and science. Reminding that the two countries will

celebrate the 50th anniversary of diplomatic relations next year, he mentioned that both countries are making efforts to diversify areas of cooperation based on the successes in the fields of RMG, human resources development, health and ICT during the past several decades....

*Source: <https://www.tbsnews.net/bangladesh/bangladesh-south-korea-ink-mou-cooperation-peaceful-nuclear-energy-use-426770>, 25 May 2022.*

**NUCLEAR PROLIFERATION**

**GENERAL**

**PM Lee Warns Against Nuclear 'Arms Race' on Asian Soil, Isolating China during Tokyo Conference**

Singapore's Prime Minister Lee Hsien Loong has sounded the alarm over the ongoing public debate on whether US treaty allies South Korea and Japan should deploy or develop their own nuclear weapons. Speaking at Nikkei's Future of Asia conference on May 26, Lee questioned if public discussions would contribute to an "arms race" in the region, amid a refocus on territorial defence capabilities following Russia's invasion of Ukraine. "In Japan and South Korea, sensitive issues are being raised publicly, including whether to allow nuclear weapons to be deployed on their soil, or even go a step further and build capabilities to develop such weapons," Lee said. "But if we only look at regional security from the perspective of individual nations, we may end up with an arms race, and an unstable outcome," he said. "We should maximise the opportunities for countries to work and prosper together, and minimise the risk of tensions worsening into hostilities."

Both President Joe Biden and the governments in Seoul and Tokyo have not publicly mooted the possibility of deploying US nuclear weapons in the

respective Asian countries. Still, talk of such development has come to the fore following Biden's visit to the countries. In a joint press conference following talks with Biden, South Korea's new president Yoon Suk-yeol said the US president "affirmed the ironclad US commitment to the defence of the Republic of Korea and substantive extended deterrence". The term "extended deterrence" has often been used in Washington's strategic circles to refer to the ability of the US to use its entire range of military capabilities, including its nuclear arsenal, to defend its allies.

Lee, who has repeatedly called on the US and China to have open lines of communication even as their strategic competition escalates, reiterated that point in his remarks, noting that Washington and the Soviet Union had such avenues during the Cold War. "Such channels need to be worked out and established between the US and China, and between other countries which have disputes with each other," he said. Lee also urged that China remain integrated in the region. "If US-China relations continue on this path, it will lead to a further bifurcation of technology and splitting of supply chains or even worse unintended consequences." Lee's comments came after Biden paid his first visit to Asia as president this week, holding summit talks in South Korea and Japan, and launching the Indo-Pacific Economic Framework, a grouping of 13 regional nations that includes Singapore, but excludes China, the world's second-largest economy.

Lee also warned against "reshoring" or "friend-shoring," where countries build supply chains only

with friends and allies. "Such actions shut off avenues for regional growth and cooperation, deepen divisions between countries and may precipitate the very conflicts that we all hope to avoid," he said. In a dialogue session with Shigesaburo Okumura, the editor-in-chief of Nikkei Asia, Lee also addressed questions about his ruling People's Action Party's (PAP) recent decision to name Finance Minister Lawrence Wong as his eventual successor. ...

Source: <https://www.asiaone.com/asia/pm-lee-warns-against-nuclear-arms-race-asian-soil-isolating-china-during-tokyo-conference>, 26 May 2022.

## IRAN

### Biden Made Final Decision to Keep Iran's IRGC on Terrorist List

President Joe Biden has finalized his decision to keep Iran's Islamic Revolutionary Guard Corps on a terrorist blacklist, according to a senior Western official, further complicating international efforts to restore the 2015 Iran nuclear deal. Another person familiar with the matter said Biden conveyed his decision during an April 24 phone call with Israeli Prime Minister Naftali Bennett, adding that the decision was conveyed as absolutely final and that the window for Iranian concessions had closed. Bennett later confirmed the contents of his conversation with Biden last month in a tweet. ...

The United States placed the IRGC on its "Foreign Terrorist Organizations" list in 2019. The designation was part of the "maximum pressure"

**Both President Joe Biden and the governments in Seoul and Tokyo have not publicly mooted the possibility of deploying US nuclear weapons in the respective Asian countries. Still, talk of such development has come to the fore following Biden's visit to the countries.**

**President Joe Biden has finalized his decision to keep Iran's Islamic Revolutionary Guard Corps on a terrorist blacklist, according to a senior Western official, further complicating international efforts to restore the 2015 Iran nuclear deal. Another person familiar with the matter said Biden conveyed his decision during an April 24 phone call with Israeli Prime Minister Naftali Bennett, adding that the decision was conveyed as absolutely final and that the window for Iranian concessions had closed.**

campaign then-President Donald Trump imposed on Iran after pulling the United States out of the nuclear deal, which had restricted Iran's nuclear activity in exchange for sanctions relief. Israel has long been among the most vocal foreign governments in opposing the removal of the Iranian military branch from the terrorism list and the continuation of the nuclear agreement.

Biden administration officials have spent more than a year in often-indirect discussions with European, Iranian and other officials aimed at reviving the nuclear agreement. But while the negotiations have made significant progress, the IRGC's terrorist designation has become a major stumbling block to a final restoration. Iranian officials want the United States to lift the terror label before Tehran returns to compliance with the nuclear deal. But the United States has refused to do so, unless Iran offers some security-related concessions beyond the nuclear agreement.

U.S. officials point out that the IRGC terrorist designation was technically never part of the nuclear deal itself, and they say that the deal could be restored with the designation still in place. But supporters of a return to the deal argue that the terror label was among a host of non-nuclear penalties Trump imposed on Tehran partly to make it politically and legally harder to revive the agreement.

Source: <https://www.politico.com/news/2022/05/24/biden-final-decision-iran-revolutionary-guard-terrorist-00034789>, 24 May 2022.

## **NORTH KOREA**

### **US Effort to Impose Tougher UN Sanctions on North Korea Blocked by China, Russia**

China and Russia blocked an effort to impose tougher sanctions on North Korea at the United Nations Security Council that was led by the U.S. after North Korean leader Kim Jong Un conducted a spate of missile tests this year, including the launch of several intercontinental ballistic missiles. Both China and Russia hold veto powers at the U.N. Security Council, which they exercised after the introduction of the DPRK for the tests with more restrictive sanctions.

China's Ambassador to the U.N., Zhang Jun, said at the UN meeting that "the reason why today's draft resolution failed to pass" was because the U.S. had refused to accept proposals other than implementing sanctions. "China's voting position is based on our assessment as to whether a proposal contributes to a solution," Zhang said. "Perhaps some people wanted nothing but this situation, based on their cynical intentions."

The U.S. and South Korea led the push in recent weeks for the U.N. to impose tougher sanctions on North Korea following more than 15 missile launches from the regime this year. If the effort had passed, the U.N. would have toughened sanctions on North Korea for the first time since 2017. Following President Biden's visit to East Asia over the weekend, North Korea fired at least three ballistic missiles off its east coast on 25 May 2022.

**Biden administration officials have spent more than a year in often-indirect discussions with European, Iranian and other officials aimed at reviving the nuclear agreement. But while the negotiations have made significant progress, the IRGC's terrorist designation has become a major stumbling block to a final restoration.**

**China and Russia blocked an effort to impose tougher sanctions on North Korea at the United Nations Security Council that was led by the U.S. after North Korean leader Kim Jong Un conducted a spate of missile tests this year, including the launch of several intercontinental ballistic missiles. Both China and Russia hold veto powers at the U.N. Security Council, which they exercised after the introduction of the DPRK for the tests with more restrictive sanctions.**

Tensions between Russia and the U.S. have mounted amid the war in Ukraine, while U.S.-China relations have been strained over Taiwan's status and China's treatment of Uyghur Muslims and other minority groups in the country, among other reasons. Russia and China proposed a counter-resolution that would have eased sanctions on North Korea over humanitarian concerns, given that the country has teetered on the brink of a famine and is reportedly in the midst of a COVID-19 outbreak.

The number of missile tests this year have also alarmed North Korea's neighbors, Japan and South Korea. Biden met with South Korea's newly elected president and with Japan's prime minister during his visit to East Asia. South Korean Ambassador to the U.N. Oh Joon said the resolution imposing tougher sanctions was "long overdue." "This could send the wrong signal to both the DPRK and other [nuclear-proliferating nations] that they can do whatever they want with impunity," Oh said. "Unchecked provocations will only embolden the DPRK's continued escalatory behavior."

Source: <https://thehill.com/policy/international/3503257-us-effort-to-impose-tougher-un-sanctions-on-north-korea-blocked-by-china-russia/>, 26 May 2022.

## **NUCLEAR DISARMAMENT**

### **NORTH KOREA**

#### **North Korea to Head UN Disarmament Forum, 40 NGOs Urge Walk-Out**

North Korea on May 30, 2022 will take over as chair of the world disarmament forum which negotiated the nuclear non-proliferation treaty,

sparking an appeal by over 40 UN-accredited non-governmental organizations for UN chief Antonio Guterres, the U.S., Canada, UK, EU states and other democracies to strongly protest, and for

their ambassadors to walk out of the conference during the four weeks of the North Korean presidency, starting on May 30, 2022.

The 65-nation Conference on Disarmament, based in Geneva, is considered the cornerstone of nuclear disarmament efforts. The UN-backed body calls itself "the single multilateral disarmament negotiating forum of the international community." "Having the North Korean regime of Kim Jong-un preside over global nuclear weapons disarmament will be like putting a serial rapist in charge of a women's shelter," said Hillel Neuer, executive director of UN Watch, a Geneva-based non-governmental organization that monitors the United Nations, and which spearheaded the joint protest.

"This is a country that threatens to attack other

UN member states with missiles, and that commits atrocities against its own people. Torture and starvation are routine in North Korean political prison camps where an estimated 100,000 people are held in what is one of the world's most dire human-rights situations," said Neuer. Under UN rules, the North Korean ambassador to the forum, Mr. Han Tae Song, will help organize the work of the conference and assist in setting the agenda. He will exercise all functions of a presiding officer, and represent the body in its relations with states, the General Assembly and other organs of the United Nations, and with other international organizations.

While the post is largely formal, "North Korea

**The number of missile tests this year have also alarmed North Korea's neighbors, Japan and South Korea. Biden met with South Korea's newly elected president and with Japan's prime minister during his visit to East Asia.**

**North Korea on May 30, 2022 will take over as chair of the world disarmament forum which negotiated the nuclear non-proliferation treaty, sparking an appeal by over 40 UN-accredited non-governmental organizations for UN chief Antonio Guterres, the U.S., Canada, UK, EU states and other democracies to strongly protest, and for their ambassadors to walk out of the conference during the four weeks of the North Korean presidency, starting on May 30, 2022.**



holding the president's gavel is liable to seriously undermine the image and credibility of the United Nations, and will send absolutely the worst message," said Neuer. "At a time when China, Cuba, Libya, Kazakhstan and Venezuela are sitting on the UN's human rights council, this won't help." North Korea is world's foremost weapons proliferator. ...North Korea has continued developing its nuclear and ballistic missile programs in 2021 in violation of UN sanctions and despite the country's worsening economic situation, UN sanctions monitors reported in August. "The North Korean regime of Kim Jong-un simply cannot be a credible chair of this or any other United Nations body. North Korea's illegal development of nuclear weapons, in breach of its disarmament obligations, run counter to the objectives and principles of the Conference on Disarmament itself." "North Korea's chairmanship will only undermine the integrity of both the disarmament framework and of the United Nations, and no country should support that." North Korea will assume the presidency of the Conference on Disarmament on May 30 and hold it over four weeks, until June 24.

The United Nations Security Council has adopted at least nine major sanctions resolutions on North Korea in response to the country's illicit nuclear and missile activities since 2006. Each resolution condemns North Korea's latest nuclear and ballistic missile activity and calls on North Korea to cease its illicit activity, which violates previous UN Security Council resolutions. In addition to imposing sanctions, the resolutions

give UN member states the authority to interdict and inspect North Korean cargo within their territory, and subsequently seize and dispose of illicit shipments.

Source: <https://unwatch.org/north-korea-to-head-un-disarmament-forum-30-ngos-urge-walk-out/>, 26 May 2022.

**NUCLEAR SAFETY**

**AUSTRIA**

**The North Korean regime of Kim Jong-un simply cannot be a credible chair of this or any other United Nations body. North Korea's illegal development of nuclear weapons, in breach of its disarmament obligations, run counter to the objectives and principles of the Conference on Disarmament itself. "North Korea's chairmanship will only undermine the integrity of both the disarmament framework and of the United Nations, and no country should support that.**

**The establishment of a collaborating centre in the area of computer security is of strategic importance for the implementation of the IAEA nuclear security programme. "The Agency's work in promoting and strengthening computer security in the nuclear sector will be significantly supported by the agreement with the AIT.**

**Austrian Institute of Technology becomes the First IAEA Collaborating Centre for Information and Computer Security for Nuclear Security**

The Austrian Institute of Technology has become the first IAEA collaborating centre for Information and Computer Security for Nuclear Security. The agreement signed builds on a long-term partnership between the IAEA and the

AIT, which is Austria's largest non-university research and technology organization. The establishment of a collaborating centre in the area of computer security is of strategic importance

for the implementation of the IAEA nuclear security programme. "The Agency's work in promoting and strengthening computer security in the nuclear sector will be significantly supported by the agreement with the AIT," said Lydie Evrard, IAEA Deputy Director General

and Head of the Department of Nuclear Safety and Security, at the signing ceremony of the agreement held at the AIT facilities in Vienna. "AIT's expertise and state-of-the-art facilities will support high-quality training courses and computer security demonstration sessions that

can have a significant impact in capacity building, as well as in research and development activities," she added.

The signed agreement is valid until 2026 and includes eight activities related to capacity building, contributions to the upcoming 2023 IAEA International Conference on Computer Security in the Nuclear World, and research and development in this specialised field. Specifically, under the scope of the agreed work plan, the AIT will provide support for international and regional training courses and exercises in the area of computer security for nuclear facilities and activities, develop technical demonstration modules for enhancing awareness about cyber threats and contribute to the development of training materials for the new Nuclear Security Training and Demonstration Centre at Seibersdorf.

...The signing ceremony included a visit at the AIT Center for Digital Safety & Security, which is focal point for the collaboration with the IAEA. The AIT has several world-class laboratory facilities; one of them is the AIT Cyber Range, which offers the infrastructure for virtualized training and exercises in computer security.

Source: <https://www.iaea.org/newscenter/news/ait-austrian-institute-of-technology-becomes-the-first-iaea-collaborating-centre-for-information-and-computer-security-for-nuclear-security>, 19 May 2022.

**FRANCE**

**IAEA Mission Sees Safety Commitment by France's Civaux Nuclear Power Plant**

**The signed agreement is valid until 2026 and includes eight activities related to capacity building, contributions to the upcoming 2023 IAEA International Conference on Computer Security in the Nuclear World, and research and development in this specialised field. Specifically, under the scope of the agreed work plan, the AIT will provide support for international and regional training courses and exercises in the area of computer security for nuclear facilities and activities**

An IAEA team of experts said the operator of France's Civaux NPP had strengthened operational safety by addressing the findings of an IAEA review which took place in 2019. The team's mission was carried out at the request of the Government of France. The OSART concluded on 13 May a five-day follow up mission

to the Civaux NPP to evaluate progress made in addressing the findings of the OSART mission conducted three years ago. The plant, which is located around 40 km southeast of the city of Poitiers, is operated by Électricité de France S.A.

(EDF). It consists of two 1450 MWe units with pressurised water reactors. The units were connected to the grid between 1997 and 1999. France's 56 nuclear power reactors supply more than 70 percent of the country's electricity.

**The team observed that several findings from the mission in 2019 were fully addressed and resolved, including by implementing improvements in the following areas such as, the effectiveness and timeliness of corrective actions related to the implementation and use of operating experience. The extension of the scope of the practical training, exercises and drills for the personnel involved in the implementation of the severe accident management guidelines at the plant.**

OSART missions aim to improve operational safety by objectively assessing safety performance using the IAEA's safety standards and proposing recommendations and

suggestions for improvement where appropriate. "Over the past three years, the plant staff made significant efforts to improve operational safety at Civaux NPP by responding to the recommendations and suggestions by the OSART team during the OSART mission in 2019," said team leader Yury Martynenko, IAEA Senior Nuclear Safety Officer. "This is an indication of a

commitment by EDF and the Civaux NPP's management and personnel to continuously improving their nuclear safety performance."

The five-member team comprised two experts from the United Arab Emirates, as well as three IAEA officials. The team observed that several findings from the mission in 2019 were fully addressed and resolved, including by implementing improvements in the following areas such as, the effectiveness and timeliness of corrective actions related to the implementation and use of operating experience. The extension of the scope of the practical training, exercises and drills for the personnel involved in the implementation of the severe accident management guidelines at the plant. The vigilance of all personnel to potential fire hazards to ensure compliance with existing prevention measures. The team noted that further enhancements are required to fully address some other findings from the mission in 2019, including in the following areas:

The processes and practices to manage temporary modifications limited in time and in number.

The foreign material exclusion programme to eliminate the risk of foreign objects entering plant equipment and systems. The upgrade of full scope simulator modelling to ensure control room operators are provided with a realistic training.

The team provided a draft report of the mission to the plant management. They will have the opportunity to make factual comments on the draft. These comments will be reviewed by the IAEA and the final report will be submitted to the

Government of France within three months....

Source: <https://www.iaea.org/newscenter/pressreleases/iaea-mission-sees-safety-commitment-by-frances-civaux-nuclear-power-plant>, 13 May 2022.

## IRAN

**The team observed that several findings from the mission in 2019 were fully addressed and resolved, including by implementing improvements in the following areas such as, the effectiveness and timeliness of corrective actions related to the implementation and use of operating experience. The extension of the scope of the practical training, exercises and drills for the personnel involved in the implementation of the severe accident management guidelines at the plant.**

### Mysterious "Accident" at Iran Weapons Facility with Suspected Links to Nuclear Program Kills Engineer

An unexplained incident struck a major Iranian military and weapons development base east of Tehran, the country's state TV reported, killing an engineer and injuring another employee. Iran's Defense Ministry said the "accident" occurred on

May 25<sup>th</sup> afternoon at a research center at the Parchin military complex. The ministry did not elaborate on the cause of the accident or provide

any further details, but said an investigation was underway. It identified the engineer who died as Ehsun Ghadbeigi.

**An unexplained incident struck a major Iranian military and weapons development base east of Tehran, the country's state TV reported, killing an engineer and injuring another employee. Iran's Defense Ministry said the "accident" occurred on May 25<sup>th</sup> afternoon at a research center at the Parchin military complex.**

Parchin is home to a military base where the IAEA previously said it suspected Iran conducted tests of explosive triggers that could be used in

nuclear weapons. Iran long has denied seeking nuclear weapons, though the IAEA previously said Iran had done work in "support of a possible military dimension to its nuclear program" that largely halted in late 2003.

Source: <https://www.cbsnews.com/news/iran-parchin-weapons-facility-nuclear-links-mysterious-accident-engineer-killed/>, 26 May 2022.

JAPAN

**IAEA Chief Inspects Fukushima Nuclear Plant after Japan Initially Approves Water Discharge Plan**

International Atomic Energy Agency Director General Rafael Grossi inspected the crippled Fukushima Daiichi nuclear power plant in northeastern Japan over the planned release of treated water into the sea. He inspected tanks storing treated water and an advanced liquid processing system that removes most radioactive materials from contaminated water except for tritium, during his first visit to the crippled plant since February 2020. "I am very impressed with the degree of progress," Grossi said of the decommissioning activities and preparations for the discharge, adding it was way beyond what he was expecting.

He added that the only way to earn the confidence and trust of the general public is by "being absolutely open in everything we do" and not hiding anything from them. The planned discharge of treated water is expected to begin around next spring. China and South Korea, as well as fishing communities in Japan, which fear reputational damage, have expressed concerns and opposition to the plan. South Korea will now take part in the IAEA-led monitoring of the planned discharge, according to an official of the country's Foreign Ministry.

In order for Tokyo Electric Power Company Holdings Inc., the plant operator, to begin construction of the discharge facilities, it is necessary to gain consent from the municipalities hosting the nuclear power plant, which was

devastated by an enormous earthquake and tsunami in 2011. The water treated through the ALPS system will be diluted with seawater to one-40th of the concentration permitted under

**The water treated through the ALPS system will be diluted with seawater to one-40th of the concentration permitted under Japanese safety standards and released 1 kilometre off the power plant via an underwater pipeline, according to the plan. Water that has become contaminated after being pumped in to cool melted reactor fuel has been accumulating at the complex, also mixing with rainwater and groundwater at the site. About 1.29 million tons of treated water is currently stored on the premises of the plant, and it is inching closer to the capacity of 1.37 million tons.**

Japanese safety standards and released 1 kilometre off the power plant via an underwater pipeline, according to the plan. Water that has become contaminated after being pumped in to cool melted reactor fuel has been accumulating at the complex, also mixing with rainwater and groundwater at the site.

About 1.29 million tons of treated water is currently stored on the premises of the plant, and it is inching closer to the capacity of

**The mission concluded that Denmark has developed and implemented a robust and well-functioning system for maintaining and further enhancing the safety and effectiveness of used fuel and radioactive waste management.**

1.37 million tons, according to the ministry. In response to the Japanese government's request for help, the IAEA has pledged to support Japan before, during and after the release of the water. The IAEA earlier this year sent a mission to the Fukushima plant to enhance transparency of the discharge plan and help gain international understanding.

Source: <https://www.scmp.com/news/asia/east-asia/article/3178376/iaea-chief-inspects-fukushima-nuclear-plant-after-japan>, 19 May 2022.

**NUCLEAR WASTE MANAGEMENT**

DENMARK

**IAEA Mission Finds Progress in Waste Management in Denmark**

The IAEA has revealed that an Integrated Review Service for Radioactive Waste and Spent Fuel

Management, Decommissioning and Remediation (ARTEMIS) team of experts had visited Denmark from 1-9 May at the request of the government. The mission concluded that Denmark has developed and implemented a robust and well-functioning system for maintaining and further enhancing the safety and effectiveness of used fuel and radioactive waste management. However, the team also noted that the national programme for the management of radioactive waste should be further developed and its implementation requires significant efforts.

Denmark has no NPPs but manages waste from the ongoing decommissioning of six nuclear facilities at Risø, including three research reactors, a hot cells facility, a fuel fabrication plant, and a waste treatment plant. The decommissioning waste is treated and stored by Danish Decommissioning, a state-owned company, which also manages radioactive waste from the previous operation of the facilities and the use of radiation sources in medicine, industry, and research in Denmark.

Denmark will build a new facility at the Risø site — scheduled to be operational in 2025 — for the storage of radioactive waste. The possibilities for deep geological disposal at a depth of 500 metres below surface are being considered, with the goal to transfer stored waste to the disposal facility at the latest by 2073. During this visit, the mission team conducted interviews with representatives of the Danish Ministry of Health, the Ministry of Higher Education and Science, the Danish Emergency Management Agency, the Danish Health Authority, Radiation Protection, and Danish Decommissioning. ...

The ARTEMIS review team comprised four experts from Germany, Italy, Lithuania and Switzerland, supported by three IAEA staff members. The draft report prepared by the team contains recommendations and suggestions including: The government should update the National

Programme for the management of all types of radioactive waste to include appropriate interim targets and end states for the monitoring of the programme's implementation.

**Denmark will build a new facility at the Risø site — scheduled to be operational in 2025 — for the storage of radioactive waste. The possibilities for deep geological disposal at a depth of 500 metres below surface are being considered, with the goal to transfer stored waste to the disposal facility at the latest by 2073.**

The government should establish a compliance assurance procedure for the implementation of the national programme. The implementer for the planned new disposal facility should develop generic waste acceptance criteria for disposal and, as soon as a facility specific

safety case is available, final waste acceptance criteria on the basis of regulatory body requirements. "Denmark has implemented a coherent national policy for waste management and takes considerable efforts to ensure its implementation in line with IAEA safety standards," said Peter Johnston, Director of the IAEA's Division of Radiation, Transport and Waste Safety, at the exit meeting of the mission.

Kristoffer Brix Bertelsen, Senior Adviser from the Ministry of Higher Education and Science, said: "We consider the recommendations and suggestions of the mission as very useful inputs to the continuing development of Denmark's national programme in this field, in particular the planning to achieve programme targets." The final mission report will be provided to the Government in about two months.

*Source: <https://www.neimagazine.com/news/newsiaea-mission-finds-progress-in-waste-management-in-denmark-9706008>, 17 May 2022.*

## **LITHUANIA**

### **IAEA Mission Says Lithuania Committed to Safe Management of Radioactive Waste, Sees Areas for Further Enhancement**

An IAEA team of experts said Lithuania's national programme for managing radioactive waste and for decommissioning demonstrated a commitment to safety, while also noting areas where it could

be further enhanced. The Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) team on 25 May 2022 concluded a ten-day mission to Lithuania.

The mission, carried out at the request of the Government of Lithuania, was hosted by the Ministry of Energy of the Republic of Lithuania.

The eight-member team, comprised of six experts from Australia, Belgium, Czech Republic, Finland, Germany, and Italy, as well as two IAEA staff members, held meetings with representatives from the Ministry of Energy, the Nuclear Power Safety Inspectorate (VATESI), the Radiation Protection Centre (RSC) and the State Enterprise Ignalina NPP.

The mission to Lithuania aimed to help the country meet European Union obligations that require an independent review of national programmes for the management of radioactive waste, and of the Ignalina NPP decommissioning programme. The expert mission evaluated the Lithuanian national programme and the national framework for implementing the country's obligations for safe and sustainable radioactive waste and spent fuel management as well as the decommissioning programme of the Ignalina NPP, which stopped operating in 2009.

Lithuania's radioactive waste and spent fuel management programme includes spent fuel and waste from the past operation, and the waste from the current decommissioning, of the Ignalina NPP and its two reactors. It also includes waste from industry, medicine and research. Large amounts of graphite originating from the Ignalina NPP's RBMK-type reactors require innovative waste management solutions. Apart from the waste from medical, industrial and research applications

stored at the Maišiagala storage facility, all radioactive waste management facilities in Lithuania are in the vicinity of the Ignalina NPP in the north-eastern part of the country. Radioactive

waste stored at Maišiagala, located 40 km from Vilnius, will be transferred to the Ignalina NPP by 2023 for further management.

The ARTEMIS team specifically highlighted the successful removal of all spent fuel from the Ignalina NPP two units to the dry spent fuel storage facilities,

the ongoing work being performed on dismantling the plant, the development of the national infrastructure for management of radioactive waste and a well-planned communication with interested parties "Lithuania has developed an

elaborate set of laws, regulations, safety requirements and guidance to deal with its radioactive and nuclear waste safety issues related to current and past activities," said ARTEMIS team leader Walter Blommaert, Waste Management Expert from

Belgium. "Lithuania is strongly committed to ensuring safe and effective management of spent fuel and radioactive waste now and in the future and invests in minimizing the generation of waste from decommissioning by applying appropriate processes."

Recommendations and suggestions provided to Lithuania by the team included, the Ministry of Energy should consider compiling the elements of the national policy into one document for the purpose of clarity. The Ministry of Energy should update the financial projections of its Development Programme based on, for example, evaluation of uncertainties and risks and consideration of inflation. The Government should revise the funding system for activities planned after 2030 to ensure that adequate financial

**The expert mission evaluated the Lithuanian national programme and the national framework for implementing the country's obligations for safe and sustainable radioactive waste and spent fuel management as well as the decommissioning programme of the Ignalina NPP, which stopped operating in 2009.**

**Lithuania has developed an elaborate set of laws, regulations, safety requirements and guidance to deal with its radioactive and nuclear waste safety issues related to current and past activities," said ARTEMIS team leader Walter Blommaert.**

resources are available when necessary for safe long-term management of radioactive waste, including its disposal. ...The final mission report will be provided to the Lithuanian Government in about two months. The Government has decided to make the report public. ...

*Source: <https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-lithuania-committed-to-safe-management-of-radioactive-waste-sees-areas-for-further-enhancement>, 25 May 2022.*



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 Anil Chopra, PVSM AVSM VM VSM (Retd).

Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,  
New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: [capsnetdroff@gmail.com](mailto:capsnetdroff@gmail.com)

Website: [www.capsindia.org](http://www.capsindia.org)

**Edited by: Director General, CAPS**

**Editorial Team:** Dr. Sitakanta Mishra, Dr. Poonam Mann, Dr. Silky Kaur, Abhishek Saxena, Anubhav S. Goswami, Prachi Lokhande, Dhruv Tara Singh

**Composed by: CAPS**

Disclaimer: Information and data included in this newsletter is for educational non-commercial purposes only and has been carefully adapted, excerpted or edited from sources deemed reliable and accurate at the time of preparation. The Centre does not accept any liability for error therein. All copyrighted material belongs to respective owners and is provided only for purposes of wider dissemination.