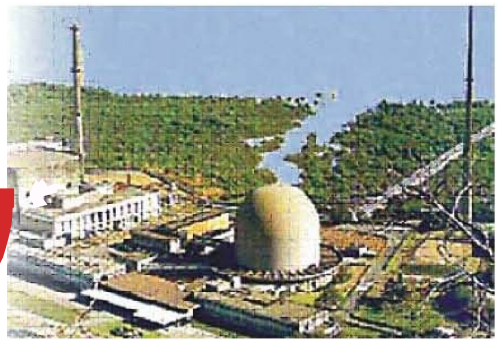
NUCLEAR SECURITY



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

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OPINION – Michael Tkacik

Will China Embrace Nuclear Brinkmanship as it Reaches Nuclear Parity?

A war between the United States and China would have catastrophic global consequences. Thus, deterring Chinese revisionism must be the sine qua non of U.S. policy in the Indo-Pacific. While war has been avoided to date, China's behavior is increasingly assertive as it seeks to become the dominant global power. China has shown itself adept at utilizing political coercion to achieve its goals. It uses a wide variety of statecraft tools and tactics to achieve its goals, from hybrid warfare to "comprehensive national power" (CNP) to the PLA's "Three Warfares" framework to "gray zone tactics."

China's revisionist efforts typically occur below the level of outright violence, but are nevertheless illegal under international law or violate the norms and expectations that make up the liberal international order, incomplete though it is. Similarly, China does not appear to distinguish between peacetime and wartime conflict, again giving it an advantage in perpetual struggle.

The one tool of statecraft that China has avoided is nuclear weapons. China has not threatened other states with nuclear weapons and its declaratory policy is "no first use." Many believe China will continue its no-first-use policy, even after it reaches parity with the United States. But this thinking finds its root in China's traditional position as an inferior nuclear power and simply projects straight-line into the future.

The one tool of statecraft that China has avoided is nuclear weapons. China has not threatened other states with nuclear weapons and its declaratory policy is "no first use." Many believe China will continue its no-first-use policy, even after it reaches parity with the United States. But this thinking finds its root in China's traditional position as an inferior nuclear power and simply projects straight-line into the future.

China's approach to achieving its strategic goals since at least 2008 reveals another possibility: Beijing may incorporate nuclear weapons into its framework of political threats, intimidation, and even the use of force to achieve its international goals. After all, nuclear weapons are another

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element of CNP. I am not arguing that China will use its nuclear forces as political instruments; rather I am arguing that we should examine the possibility more carefully, given China's willingness to incorporate all elements of statecraft into its geopolitical strategy.

China is revisionist in nature and willing to violate international law, norms, and expectations. Moreover, China has been willing to walk up to, and sometimes cross, the line of violence in achieving its international goals. Examples of China's increasingly assertive behavior abound, from its Himalayan border with India, to the East and South China Sea.

Gray Zone Tactics: The South China Sea and Beyond: China effectively maneuvers at levels just below violent conflict to achieve its goals. For example, in the South China Sea, China deploys fleets of fishing vessels (maritime militias), backed by heavily armed coast guard ships, themselves supported over the horizon by warships. Using these ostensibly civilian assets, China encroaches upon the legal rights of the surrounding states, which are stipulated under the United Nations Convention on the Law of the Sea.

When these states try to protect their rights, China often escalates, such as by ramming and sinking the smaller state's vessels, preventing resupply to local outposts, or employing its myriad other tools of statecraft. China has, in essence, conventional escalation dominance. At the same time, China produces a never-ending onslaught of propaganda and regulations to underscore its version of reality. Beijing created the nine-dash line claim and now insists that maps worldwide depict it.

It has created new administrative regions and capitals (Sansha City, Woody Island) to administer its claimed territory. It enacted fishing laws over the entire region and the Chinese Coast Guard enforces these extraterritorial applications of law. China thus demonstrates a willingness to undermine the status quo through political coercion and threats of violence. Examples proliferate beyond the South China Sea: China cut off trade relations with Lithuania after the country failed to use the name "Taipei" rather than Taiwan with regard to its representative office.

Similarly, China imposed punitive tariffs against Australian wine, barley, beef, and other exports after Australia called for an independent investigation into the origins of COVID-19. Not only has China interacted violently with the Philippines in the South China Sea, but it has also punished the Philippines economically. Japan lost access to rare earth minerals when it detained a Chinese fishing boat captain who had trespassed in Japanese administered waters around the Senkaku Islands (claimed by China as the Diaoyu Islands).

Since China does not seem to acknowledge a clear distinction between the threat of violence and violence itself, it may be that it likewise sees less of a firewall between conventional weapons and nuclear weapons. This view is a radical departure from mainstream thinking, which emphasizes China's no-first-use strategy and the implied clear separation of nuclear weapons from other tools of state.

China's intimidation, especially in the Indo-Pacific, is often successful because it carries the very real possibility of overt violence. Given the integration of non-violent coercion, threats of violence, and violence via the application of CNP (something Carl Von Clausewitz would be familiar with), it is reasonable to ask how China might integrate nuclear weapons into its strategy, once it achieves parity with the United States.

Compellence with Nuclear Weapons: There is debate over whether a state can compel action with nuclear weapons. Thomas Schelling argued that compellence was possible, though he acknowledged deterrence was far easier. But given a willingness to breach expectations and take risks, compellence becomes more plausible. Schelling famously used the example of two drivers speeding toward a head-on collision. The most effective strategy to win this game of chicken would be to toss the steering wheel out of the window. China has shown a willingness to take risks during geopolitical competition.

Moreover, since China does not seem to acknowledge a clear distinction between the threat of violence and violence itself, it may be that it

likewise sees less of a firewall between conventional weapons and nuclear weapons. This view is a radical departure from mainstream thinking, which emphasizes China's no-first-use strategy and the implied clear separation of nuclear weapons from other tools of state. But China's behavior in the South China Sea and elsewhere belies this assumption. The evidence is that China sees no such lines, as demonstrated by gray zone tactics and Sun Tzu's philosophy that strategy is a continuum rather than a set of discrete options.

There are at least two disruptive ways nuclear parity may impact a crisis. First, China may be willing to use nuclear weapons to intimidate other actors. This is not so much the case with small states such as the Philippines or Vietnam, as these states are already intimidated by China's conventional superiority.

In this view, then, the only reason Beijing has walled off nuclear weapons is that China has traditionally been a weak nuclear state with very few weapons. But that is changing rapidly as China builds out its nuclear forces. There are at least two disruptive ways nuclear parity may impact a crisis. First, China may be willing to use nuclear weapons to intimidate other actors. This is not so much the case with small states such as the Philippines or Vietnam, as these states are already intimidated by China's conventional superiority.

Nuclear parity means that there is no longer a strategic backstop of U.S. nuclear superiority in any crisis. To date, every crisis that has occurred between the two states has occurred in an environment of significant U.S. nuclear superiority. China had to remain cognizant that any crisis could wind up going nuclear, which would threaten its existence.

Rather, a near-peer state such as Japan might find itself facing an implicit or even explicit nuclear threat from China. China's parity with the United States means that China has a greater capability to threaten other states with nuclear weapons during a crisis because these states rely on the U.S. extended deterrent, which always faces credibility challenges.

Second, nuclear parity means that there is no longer a strategic backstop of U.S. nuclear superiority in any crisis. To date, every crisis that has occurred between the two states has occurred in an environment of significant U.S. nuclear superiority. China had to remain cognizant that any crisis could wind up going nuclear, which would threaten its existence. To be sure, the existence of overwhelming superiority did not necessarily make U.S. threats likely or credible. Nonetheless, that nuclear differential existed in the past and implicitly influenced crises. It is about to disappear. Thus, the environment in which a future great power crisis occurs will be fundamentally different than it has been in the past.

This is especially troublesome given that China has sought to use risk as a means of maneuvering for political advantage, while the United States has primarily sought to avoid miscalculation. This willingness to take risks was evident recently in the PLA Navy's near collision with the USS Chung-Hoon as it transited the Taiwan Straits along with a Canadian frigate.

Similarly, only days before that, a Chinese fighter aggressively maneuvered in front of a patrolling U.S. RC-135. U.S. government sources say this aggressive behavior has become more common in recent years. After these incidents, the United States sought to communicate in order to reduce the chances of miscalculation, while China refused such discussions, apparently willing to accept the risk of miscalculation and escalation. These two disruptive impacts of nuclear parity can be examined through the lens of a hypothetical Taiwan crisis.

Taiwan and Nuclear Escalation: Acknowledging China's willingness to take risks to undermine the status quo illuminates the current standoff over Taiwan. In a future crisis, China will likely use all of its tools to attempt to eliminate the de facto independent Taiwan, from non-violent to violent

methods. In the case of an initially non-violent attempt such as a blockade, China would likely be willing to risk collisions and other dangerous interactions that are just below the threshold of war, such as occurred in the recent RC-135 and Chung-Hoon incidents.

Any state attempting to breach the blockade would face intense harassment from China and forcing the blockade would likely require, or inadvertently result in, escalation to violence and presumably, war. Although notions of an escalation ladder (a la Herman Kahn) have fallen out of favor, it is still helpful to view any such crisis as a set of escalatory interactions whereby each side prefers to avoid war, but one side is willing to take greater risks.

The United States would be forced to back down or escalate into a larger war, which itself could escalate to a nuclear exchange. If limited nuclear escalation was threatened, Schelling's game of chicken would become central. Which state could more credibly threaten nuclear use? Two factors would be important: willingness and capability.

China's preference would be using "operations other than war" (e.g., the blockade) to force Taiwan's capitulation. But given China's willingness to take risks and to engage in coercion up to and including violence, China would have an advantage over states seeking to force the blockade. Ultimately, the actors trying to breach the blockade would have to engage in overt violence or to back down.

Put another way, China's political interest in Taiwan, and therefore willingness to escalate, is greater than the United States' interest. This willingness to escalate is enhanced by China's longstanding willingness to take greater risks than its opponents. Consequently, the only thing stopping China from making successful nuclear threats would be superior U.S. capabilities. This is why China's move to nuclear parity is so important.

In the case of Taiwan, any violent engagement would take place well within the range of China's vast anti-access and area denial arsenal. China would have local escalation dominance. If the United States tried to force the blockade, China could not only sink the ships present, but launch missile assaults on Anderson Air Force base in Guam and numerous other U.S. or allied facilities.

It is true that the United States might horizontally escalate into another geographical area or by blockading China, but given that Taiwan has more limited stores than does China, these options are not likely to be successful. The United States would be forced to back down or escalate into a larger war, which itself could escalate to a nuclear exchange. If limited nuclear escalation was threatened, Schelling's game of chicken would become central. Which state could more credibly threaten nuclear use? Two factors would be important: willingness and capability.

Given that an independent Taiwan represents an existential threat to the Chinese Communist Party's existence, it is likely that China places greater value on Taiwan than does the United States. Therefore, China is likely willing to take greater risks, up to and including the plausible threat of using nuclear weapons.

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It removes the final barrier to China enforcing its will in Taiwan and probably other high value areas such as the South China Sea. Facing a China that in the near future has nuclear parity, if not superiority, the United States would have to ask itself whether Taiwan was worth risking nuclear conflict, especially given China's ability and willingness to escalate at each opportunity. On the other hand, if China does not have nuclear parity, the United States would retain strategic escalation dominance, and might

manage any crisis from a position of strength (though the impact of lesser political interests could still cause the United States to back down).

Conclusion: Although the logic of strategic behavior is consistent across time and space, the cultural expectations and the lessons learned over time differ. While China uses all its tools of statecraft to achieve political goals, the West has placed greater emphasis on avoiding unintended conflict, perhaps due to how World War I started and how close the world came to nuclear war in 1962.

These differences did not manifest so long as China was in a position of nuclear inferiority. However, as China approaches nuclear parity with the United States, its willingness to use all tools of statecraft may give it an advantage over the U.S. during crises. Washington would do well to consider how this gap in appetites for risk may affect a future crisis in the Indo-Pacific.

Source: https://thediplomat.com/2023/08/will-china-embrace-nuclear-brinkmanship-as-it-reaches-nuclear-parity/, 05 August 2023.

OPINION – Biman Mukherji

Forget Fukushima, from Japan to India Nuclear Power is Retaking Centre Stage in the Fight against Climate Change

Japan's plan to release treated waste water from the crippled Fukushima nuclear plant may have ignited controversy recently, but more than a decade after the 2011 disaster, the world's gaze is once again turning to the low-carbon energy source as unprecedented heatwaves underscore Earth's new 'era of global boiling'.

In a G20 statement on the energy transition last month, world leaders highlighted the role nuclear energy can play in cutting emissions and providing energy security. Nuclear plants are also capable of meeting baseload demand – providing the minimum amount of electricity a grid needs – because their power output is much more constant than intermittent sources such as solar or wind.

In a G20 statement on the energy transition last month, world leaders highlighted the role nuclear energy can play in cutting emissions and providing energy security. Nuclear plants are also capable of meeting baseload demand – providing the minimum amount of electricity a grid needs – because their power output is much more constant than intermittent sources such as solar or wind.

Climate experts say the prominence given to nuclear power by the G20 text is a sign of its possible resurgence. It's certainly making a comeback in Asia, where China, South Korea, Japan, and India are leading the way. "Japan is like a large Singapore with not so much land," Tatsuya Terazawa, the chairman of Japan's Institute of Energy Economics, told a July 26 webinar on Asia's 'Road to a Sustainable Energy Future'. Tatsuya cited this lack of space for solar panels and other infrastructure as among the "constraints on expanding renewable energy" in the country.

Restarting more of the nuclear plants taken offline in the wake of the 2011 earthquake and tsunami that hit Fukushima could provide a way forward, but fears over atomic power have lingered ever since the disaster – with the Japanese government in 2012 promising to phase out its use entirely by the 2030s.

Policymakers now appear to be changing their tune, however, with Terazawa noting that a spike in global oil prices following third-largest producer Russia's invasion of Ukraine last year had helped refocus minds on nuclear energy, despite the psychological scars. "If we are to realise carbon neutrality, if we are to realise energy security, we will have to have at least some significant portion of our energy mix through nuclear," Tatsuya said. "We believe that will be applicable to many Asian countries." Tatsuya said. Under a new policy adopted in December, Japan said it will aim to maximise the use of existing reactors and prolong the operating life of ageing ones. The government also pledged to develop next-generation reactors. "In order for Japan to achieve carbon neutrality by 2050, nuclear power will [have to] contribute 20-22 per cent of its target energy mix in 2030," said Ada Li, vice-president at financial research company Moody's Investors Service.

Rebuilding Confidence: New technologies such as small modular reactors – which are a fraction of the size and more adaptable than mammoth, traditional reactors – have revived confidence in nuclear energy's safety, affordability and ability to meet multiple energy demands. As of 2020, more than 50 per cent of the Asia-Pacific's nuclear-power generation was done in China, according to International Energy Agency data, with South Korea in second place at just under 25 per cent, followed by India and Japan both with around a 6 per cent share each. New plants are coming online all the time. China is leading the charge, with construction expected to finish on 23 new reactors over the next seven years, according to the World Nuclear Association. India has eight in the works. But the effect of plants being decommissioned elsewhere will mean nuclear's share of the global energy mix won't surpass the current level of around 10 per cent before 2050, International Atomic Energy Agency projections predict.

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China, India and Japan are exploring using thorium instead of uranium to power nuclear reactors, as it is much more abundant in the Earth's crust. But Moody's Li said extraction costs for the element remain high and there are other challenges in terms of handling the material and its waste. Still, China's nuclear-safety regulator issued a 10-year operational permit in June for the nation's first thorium reactor, built by the Shanghai Institute of Applied Physics of the Chinese Academy of Sciences on the edge of the Gobi desert, while construction is also under way on an onshore small module reactor that's been touted as a world first.

... China aims to double its nuclear capacity by building more than 150 reactors by 2035, and if achieved, it will mean the country would have built "more nuclear reactors than the rest of the world has done in the past 35 years", Ghi said. The United States currently has the most nuclear capacity in the world. India is also gearing up for a major expansion of nuclear power, with plans to more than triple its capacity to 22.5 gigawatts from around 7GW currently, mainly through the construction of large plants.

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But the importation of new reactors is likely to depend on negotiations surrounding India's nuclear liability law, which assigns responsibility for compensation in case of an accident, said Kaveri Ashok, a senior associate at the Bengaluru-based Centre for Study of Science Technology and Policy think tank. New Delhi is currently reviewing a six-decade old law that limits private firms' involvement in the nuclear sector, Bloomberg reported. Private companies can build but not operate plants at present, potentially stifling the development of smaller reactors. ...

Power demand is expected to boom in Asia over the coming decades, powered by a growing population and energy-intensive industries, and experts say regional players will need to explore multiple paths to reach net-zero emissions. Ghi cited Indonesia as an example, where four Danish companies signed a memorandum of understanding with state-owned corporations in May to build a nuclear-powered ammonia plant on the island of Borneo.

Singapore has also identified nuclear energy as a potential alternative power source by 2050, Ghi said. The city state's Energy Market Authority concluded in a March 2022 report that nuclear energy could supply 10 per cent of the country's

needs. 'Grasping at straws'? But opinions remain sharply divided over the use of nuclear energy in the region. "The quest for new nuclear power plants appears to be grasping at straws – very expensive straws – as a substitute for other, fossil-based thermal power plants," said Grant Hauber, a US-based strategic energy finance adviser at the global Institute for Energy Economics and Financial Analysis.

Japan had 136MW of installed offshore wind capacity – a fraction of the nearly 14GW installed in Britain and 31GW in world leader China, according to the Global Wind Energy Council. Japan aims to have 10GW installed by 2030 and up to 45GW by 2040 as it wants renewables to provide 36-38 per cent of its electricity mix by the end of that decade, up from around 20 per cent now.

"New-build nuclear [power plants] will cost tens of billions of dollars per plant and take the better part of a decade to complete per unit. That is valuable [resources] and time being burnt while the use of higher-intensity carbon fuels continues," Hauber said. Coal, gas and nuclear have all historically come with high monetary or environmental costs and countries like Japan would be better off focusing on renewables, Hauber said. "Japan's efforts on renewable energy have been greatly lagging. This has happened despite Japan having one of the largest and most consistent renewable resources literally surrounding them: offshore wind," Hauber said.

As of last year, Japan had 136MW of installed offshore wind capacity – a fraction of the nearly 14GW installed in Britain and 31GW in world leader China, according to the Global Wind Energy Council. Japan aims to have 10GW installed by 2030 and up to 45GW by 2040 as it wants renewables to provide 36-38 per cent of its electricity mix by the end of that decade, up from around 20 per cent now. The nation is aiming to be carbon-neutral by 2050.

Countries like India and China – which are staring down the barrel of a surge in demand and do not have Japan's land constraints – would also be better off deploying more renewables, Hauber said, especially as nuclear facilities will not be able to replace the millions of jobs lost as fossil fuel-run plants close.

Nuclear power produces about the same amount of emissions per unit of electricity as wind and about one-third that of solar, energy expert Ghi said. But the power plants also generate radioactive waste, which is hazardous to human health if not indefinitely and securely stored away. This waste is best disposed of in deep underground repositories, said Ximena Vasquez-Maignan, a nuclear expert with global law firm White & Case, such as the one Finland has already built to store waste for thousands of years, and the ones France and Sweden are developing. On the whole, anti-nuclear sentiment appears to have ebbed in the years since the Fukushima disaster, she said – even as Russia's seizure of the plant in Ukraine's Zaporizhzhia has again highlighted the risks involved with nuclear power.

The reshuffle at the PLA Rocket Force suggests a marked shift in Xi's nuclear strategy towards the so-called "nuclear triad" — a three-pronged force that enables nuclear missiles to be launched from the air, sea and land — under an integrated command system, analysts warn.

Source: https://www. scmp.com/week-asia/politics/article/3230033/forget-fukushima-japan-india-nuclear-power-retaking-centre-stage-fight-against-climate-change?module=perpetual_scroll_0&pgtype=article&campaign=3230033, 06 August 2023.

NUCLEAR STRATEGY

CHINA

Analysts Say Shakeup at China's Rocket Force Suggests Strategy Shift Toward 'Nuclear Triad'

President Xi, also the military's commander-in-chief, this week replaced two leaders of the elite force overseeing the People's Liberation Army's conventional and nuclear missiles. The reshuffle at the PLA Rocket Force suggests a marked shift in Xi's nuclear strategy towards the so-called "nuclear triad" — a three-pronged force that enables

nuclear missiles to be launched from the air, sea and land — under an integrated command system, analysts warn. That will help strengthen China's nuclear deterrent capabilities and thus pose a greater threat to U.S. security, they say.

Nuclear Triad: Xi, on July 31, appointed Wang Houbin, former deputy commander of the navy, and Xu Xisheng, former political commissar of the air force's Southern Theater Command, to serve, respectively, as the rocket force's commander and political commissar. "What has happened is that, in order to have a modern and effective nuclear deterrent, is to have what is called the nuclear triad. So, three ways of delivering nuclear missile or nuclear deterrence ... This is more about putting nuclear weapons on planes, on submarines and not necessarily on land-based missiles," Alexander Neill, a Singapore-based adjunct fellow at the think tank Pacific Forum, told VOA Mandarin by phone on August 1. Neill said that China, in order to be a modern nuclear power with aggressive and offensive capabilities, has to acquire the ability to launch nuclear weapons from various positions – something that will keep its enemy guessing.

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Fresh Leadership: ...Xi's selection of former navy and air force leaders to head up the rocket force suggests he is building a unified command system that will combine nuclear weapon arsenals across three armed forces, said Chang Ching, a research fellow at the Taipei-based Society for Strategic Studies. "[The PLA] will eventually integrate the navy's and the air force's nuclear defense and offense capabilities. This is an inevitable trend. I believe that nuclear weapons-related officers from both the navy and the air force have already served in the rocket force before the top leadership reshuffle. China's finally moving toward a nuclear force with a unified command structure," Chang told VOA Mandarin by phone on August 1. He said there's speculation about whether Wang had experience with the navy's nuclear missile unit or Xu with the air force's bomber squadron, which if true, would bolster the assertion of a combined approach....

Source: https://www. voanews.com/a/analysts-say-shakeup-at-china-s-rocket-force-suggests-strategy-shift-toward-nuclear-triad-/7208792.html, 02 August 2023.

NORTH KOREA

North Korea Defends its Nuclear Weapons, Slams US

The Permanent Mission of North Korea to the United Nations criticized the US for having nuclear weapons and defended its own nuclear weapons. North Korea urged the US to stop "sharing nuclear" or "beefing up extended deterrence," state media KCNA reported on August 5. North Korea defended its own nuclear weapons as an "exercise of sovereignty". It criticized the US over the AUKUS alliance and Nuclear Consultative Group with South Korea. "Signatories to the NPT should not take issue with the DPRK over its legitimate exercise of sovereignty, as it had legally withdrawn from the NPT 20 years ago," the DPRK permanent mission to the UN Office and international organizations in Vienna was quoted as saying. "Its nuclear force will never be a threat to those countries respecting its sovereignty and security interests," the permanent mission said.

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North Korea has found itself at odds with the West for decades and recently for flurry of missile tests that included Intercontinental Ballistic Missiles.... However, North Korea has continued issuing threats to the United States as well as South Korea. It has openly hinted that it plans to have a sizeable arsenal of nuclear weapons, something the US is absolutely against...

Source: https://www.wionews.com/world/north-korea-defends-its-nuclear-weapons-slams-us-622655, 05 August 2023.

RUSSIA

Russia to Equip New Nuclear Submarines with Hypersonic Missiles

Russia is in the process of equipping its new nuclear submarines with hypersonic Zircon missiles, the head of Russia's largest shipbuilder told the RIA state news agency in an interview published on Monday (14 August). "Multi-purpose nuclear submarines of the Yasen-M project will ... be equipped with the Zircon missile system on a regular basis", Alexei Rakhmanov, chief executive officer of the United Shipbuilding Corporation (USC), told RIA. "Work in this direction is already underway."

The EU's revised 2018 capability development plan identified shortfalls in capabilities for anti-access, area denial and ballistic missile defence capability, and made Air Superiority one of its 11 EU capability development priorities.

Yasen-class submarines, also known as Project 885M, are nuclear-powered cruise missile submarines, built to replace Soviet-era nuclear attack submarines as part of a programme to modernise the army and fleet. The sea-based Zircon hypersonic missiles have a range of 900 km (560 miles), and can travel at several times the speed of sound, making it difficult to defend against them. President Vladimir Putin said earlier this year that Russia would start mass supplies of Zircon missiles as part of the country's efforts to boost its nuclear forces. The Russian multi-purposes frigate Admiral Gorshkov, which has tested its strike capabilities in the western Atlantic Ocean earlier this year, has been already equipped with Zircon missiles.

Source: https://www.reuters.com/world/europe/russia-equip-new-nuclear-submarines-with-hypersonic-missiles-2023-08-14/, 14 August 2023.

BALLISTIC MISSILE DEFENCE

EU

Hypersonic interceptor HYDIS backed by European Commission

MBDA, leaders of the Hypersonic Defence Interceptor Study (HYDIS) consortium researching ground and naval-launched hypersonic-missile interceptors, announced on August 2 that the project framework has been proposed for funding by the European Commission through the European Defence Fund (EDF) 2023 work programme. The emergence of new threats, including maneuvering ballistic missiles, hypersonic cruise missiles and hypersonic glide vehicles, represents a challenge for European and NATO air defence systems.

The EU's revised 2018 capability development plan identified shortfalls in capabilities for anti-access, area denial and ballistic missile defence capability, and made Air Superiority one of its 11 EU capability development priorities. The HYDIS project is a component of European states' contributions to the mission of defending populations and armed forces against emerging hypersonic threats that represent a radical shift from ballistic threats.

As of 30 March 2023, €123m of EDF funds had been earmarked for projects in air and missile defence, for the development of counter-UAS capabilities and an endo-atmospheric interceptor, from a total of €1.2bn that the EDF will provide for defence Research Design and Innovation (RD&I).

The consortium contributes to the AQUILA concept – which received €80m ($87.2m) without a call for funding through EDF's 2030 work programme – for an endo-atmospheric hypersonic interceptor capability that can reach 100km above the surface of the Earth. As of 30 March 2023, €123m of EDF funds had been earmarked for projects in air and missile defence, for the development of counter-UAS capabilities and an endo-atmospheric interceptor, from a total of €1.2bn that the EDF

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Global missiles and missile defence market is set to reach $67.5bn by 2033, according to GlobalData's "The Global Missiles & Missile Defense Systems Market Forecast 2023-2033."... The goal of HYDIS is to design various interceptor concepts and mature the associated critical technologies in order to deliver the best interception solution that meets the needs of the four member countries – France, Italy, Germany, and the Netherlands – while also complying with the European TWISTER capability programme.

MBDA has worked for five years on options for counter-hypersonic air-defence, and has brought together a consortium of 19 partners and 30 subcontractors across 14 European countries to form HYDIS. In GlobalData's report on Hypersonic Technologies (2022), we find that the key advantage of hypersonic technology is speed, and the capability to adjust course during fight – providing conventional missile defence technologies with a challenge beyond that provided by other ballistic missiles.

In comments from 20 June, Eric Béranger, CEO of MBDA, said the project will help to strengthen Europe's sovereign missile systems industry by sustaining and developing critical expertise, technologies, and materials, thereby increasing European industrial competitiveness. "The technologies in the hypersonic domain are evolving, and it is a priority for MBDA to remain at the forefront of innovation, guiding Europe towards the most efficient solution to counter hypersonic threats." Eric said.... In June 2023, Rafael revealed its own hypersonic interceptor, Sky Sonic, with maneuverability and speed capabilities at ten times faster than the speed of sound.

Source: https://www.airforce-technology.com/news/hypersonic-interceptor-hydis-backed-by-european-commission/#catfish, 03 August 2023.

NUCLEAR ENERGY

CHINA

Six Reactors Approved for Construction in China

China's State Council has approved the construction of six nuclear power units: units 5 and 6 of the Ningde plant in Fujian Province; units 1 and 2 of the Shidaowan plant in Shandong Province; and units 1 and 2 of the Xudabao plant in Liaoning Province. The approvals, made at a State Council executive meeting on 31 July chaired by Premier Li Qiang, mark the first approvals for Chinese nuclear power projects so far in 2023. In 2022, a total of 10 new reactors were approved. "Safety and quality will be the top priority in the construction of these projects," the State Council said in a statement.

China's State Council has approved the construction of six nuclear power units: units 5 and 6 of the Ningde plant in Fujian Province; units 1 and 2 of the Shidaowan plant in Shandong Province; and units 1 and 2 of the Xudabao plant in Liaoning Province. The approvals, made at a State Council executive meeting on 31 July chaired by Premier Li Qiang, mark the first approvals for Chinese nuclear power projects so far in 2023. In 2022, a total of 10 new reactors were approved.

In a statement to the Hong Kong Stock Exchange, China General Nuclear (CGN) said units 5 and 6 of the Ningde plant would feature Chinese-designed HPR1000 (Hualong One) pressurised water reactors. "Currently, the company and Ningde Second Nuclear Power Co Ltd are carrying out various preparatory work for the construction of Ningde unit 5 and unit 6 in an orderly manner," CGN said....

CGN noted Ningde was the first nuclear power plant to be constructed and put into operation in Fujian Province. The plant currently comprises four 1018 MWe CPR-1000 reactors, which began commercial operation between April 2013 and July 2016. "As of 30 June 2023, the cumulative on-grid electricity of the four units in the first phase of the project is 257.9 billion kilowatt-hours," CGN said...

Meanwhile, China National Nuclear Corporation (CNNC) subsidiary China Nuclear Power Co Ltd informed the Shanghai Stock Exchange that it had received approval for units 1 and 2 of the Xudabao (also known as Xudapu) plant. While not

disclosing the reactor design planned for the two units, it said each unit would have a capacity of 1291 MW. "CNNC Liaoning Nuclear Power Co Ltd, which is controlled by our company, is the owner unit of the approved project, responsible for project investment, construction and operation management," CNNC noted….Construction of the six approved units represents an estimated total investment of CNY120 billion (USD16.8 billion), China Daily reported.

The military coup in Niger last week – and unconfirmed reports that the West African country intends to suspend uranium supplies to France – have raised questions over what role the industry should play in France's future. The reports led some opposition politicians in France to question the role of nuclear power in France's energy portfolio, notably given President Macron's repeated calls for "energy independence.

Source: https://world-nuclear-news.org/Articles/Six-reactors-approved-for-construction-in-China, 01 August 2023.

FRANCE

Does the Coup in Niger Threaten Nuclear Power Plants in France?

Due to a long-standing policy that dates back to ex-president Charles de Gaulle, France derives about 70 percent of its electricity from nuclear energy, more than any other country. France is also the world's largest net exporter of nuclear energy, bringing in more than €3 billion per year. …The military coup in Niger last week – and unconfirmed reports that the West African country intends to suspend uranium supplies to France – have raised questions over what role the industry should play in France's future.

The reports led some opposition politicians in France to question the role of nuclear power in France's energy portfolio, notably given President Macron's repeated calls for "energy independence". … Niger has maintained a market share of between 4 and 6 percent of the global uranium trade for the last decade, according to the OECD's Nuclear Energy Agency (NEA). But despite its modest share of the market, Niger supplied France with around 18 percent of its uranium between 2005 and 2020.

France's largest suppliers, Kazakhstan and Australia, provided 20 and 19 percent, respectively, while Uzbekistan's supplies have been on the increase in recent years. This reliance on diverse sources is a cornerstone of the energy security strategy of state-owned Électricité de France (EDF), designed to ensure it is able to withstand large shocks to the market – such as an unexpected export ban on Nigerien uranium. "France is not dependent on any one site, company or country to ensure the security of supply for its power plants," an anonymous government official told Politico on July 31.

The possible suspension of uranium supplies to France also raises questions about whether Niger could effectively replace French demand without seeing a sharp economic decline itself – 33 percent of Nigerien exports go to France, almost all of which are radioactive fuel.

The EU's nuclear agency Euratom – which gets one-quarter of its uranium from Niger – has also said it is not worried about the coup affecting nuclear power production. "If imports from Niger are being cut, there are no immediate risks to the security of nuclear power production in the short term," Euratom told Reuters. The European Commission said the 27-nation bloc had "sufficient inventories of uranium to mitigate any short-term supply risks"…. The possible suspension of uranium supplies to France also raises questions about whether Niger could effectively replace French demand without seeing a sharp economic decline itself – 33 percent of Nigerien exports go to France, almost all of which are radioactive fuel….

Source: https://www.france24.com/en/africa/20230801-does-the-coup-in-niger-threaten-nuclear-power-plants-in-france, 01 August 2023.

GENERAL

Decentralizing Nuclear Energy: How SMRs and MMRs could Reshape Power Distribution

Decentralizing nuclear energy has long been a dream for many in the energy sector, as it promises to bring about a more resilient and efficient power distribution system. In recent years, the development of SMRs and Micro Modular Reactors (MMRs) has shown great potential in making this dream a reality. These innovative technologies could reshape the way we generate and distribute power, offering a cleaner, safer, and more sustainable energy future.

The smaller size of these reactors offers several advantages, including reduced construction time, lower upfront capital costs, and the ability to be deployed in remote or off-grid locations.

SMRs and MMRs are nuclear reactors that are significantly smaller in size and capacity compared to traditional nuclear power plants. SMRs typically have a capacity of less than 300 MWe, while MMRs have a capacity of less than 10 MWe. The smaller size of these reactors offers several advantages, including reduced construction time, lower upfront capital costs, and the ability to be deployed in remote or off-grid locations.

The development of Small Modular Reactors and Micro Modular Reactors has the potential to reshape the way we generate and distribute power. By decentralizing nuclear energy, these innovative technologies can provide a more resilient, efficient, and sustainable power distribution system. As the world continues to grapple with the challenges of climate change and the need for clean, reliable energy sources, SMRs and MMRs could play a crucial role in our energy future.

One of the key benefits of SMRs and MMRs is their potential to decentralize power distribution. Traditional nuclear power plants are large, centralized facilities that require significant infrastructure and investment. In contrast, SMRs and MMRs can be deployed in a more distributed manner, providing power to smaller communities or industrial sites that may not have access to the main power grid. This could help to reduce the reliance on long-distance transmission lines, which are vulnerable to natural disasters and other disruptions.

Moreover, the modular nature of SMRs and MMRs allows for a more flexible approach to power generation. Rather than building a single, large-scale nuclear power plant, multiple smaller reactors can be deployed to meet the specific energy needs of a region. This can help to avoid the issues of overcapacity and underutilization that can plague traditional power plants. Additionally, as energy demand grows, more modules can be added to an existing SMR or MMR site, providing a scalable solution to meet the changing needs of a community or industry.

Another significant advantage of SMRs and MMRs is their potential to reduce greenhouse gas emissions. Nuclear power is a low-carbon energy source, and the deployment of smaller reactors could help to displace more carbon-intensive forms of power generation, such as coal and natural gas. This could be particularly beneficial in remote or off-grid locations, where diesel generators are often used as a primary source of power. Replacing these generators with SMRs or MMRs could significantly reduce both local air pollution and global greenhouse gas emissions.

Safety is also a critical consideration in the development of SMRs and MMRs. Many of the designs for these reactors incorporate passive safety features, which rely on natural processes such as gravity and convection to maintain safe operating conditions. This can help to reduce the risk of accidents and improve the overall safety of nuclear power generation. Furthermore, the smaller size and lower power output of SMRs and MMRs can also help to mitigate the potential consequences of an accident, should one occur.

...The development of Small Modular Reactors and Micro Modular Reactors has the potential to reshape the way we generate and distribute power. By decentralizing nuclear energy, these

innovative technologies can provide a more resilient, efficient, and sustainable power distribution system. As the world continues to grapple with the challenges of climate change and the need for clean, reliable energy sources, SMRs and MMRs could play a crucial role in our energy future. With ongoing research and development, as well as supportive policies and regulations, these advanced nuclear technologies could soon become a reality, ushering in a new era of clean, safe, and decentralized power generation.

Source: https://www. energyportal.eu/news/decentralizing-nuclear-energy-how-smrs-and-mmrs-could-reshape-power-distribution/1575/#google_vignette, 03 August 2023.

Japanese utilities Chugoku Electric Power Company and Kansai Electric Power Company plan to jointly investigate the construction of a used fuel interim storage facility in Kaminoseki town in Yamaguchi prefecture.

JAPAN

Chugoku, Kansai Consider Joint Development of Used Fuel Store

Japanese utilities Chugoku Electric Power Company and Kansai Electric Power Company plan to jointly investigate the construction of a used fuel interim storage facility in Kaminoseki town in Yamaguchi prefecture. The facility would be built on land Chugoku acquired to build a nuclear power plant, plans for which have stalled....Tetsuo Nishi, mayor of Kaminoseki - which has been receiving reduced government subsidies for hosting the planned plant - asked Chugoku in February to consider new proposals to aid regional development.

In response, Chugoku has now suggested the construction of an interim storage facility for used nuclear fuel on the site, in partnership with Kansai. Chugoku has asked the mayor for permission to carry out an investigation of the site - including a literature survey, surface geological survey, as well as drilling - to determine its suitability to host such a facility.

It noted the investigation would begin as soon as preparations are complete and would take about six months. "In considering the interim storage facility, while considering the facility scale and economic efficiency, the Kansai region, which has judged that it would be difficult to construct and operate on its own, has a need for an interim storage facility similar to ours," Chugoku said.

"Based on the premise of joint development with Kansai Electric Power Co, we will proceed with investigations and examinations in the future. We plan to formulate a specific plan based on the results of the survey and examination." Chugoku said. Kansai, whose used fuel storage pools are approaching full capacity, has been requested by Fukui prefecture to transport used fuel out of the prefecture.

Based on the premise of joint development with Kansai Electric Power Co, we will proceed with investigations and examinations in the future. We plan to formulate a specific plan based on the results of the survey and examination." Chugoku said.

Source: https://world-nuclear-news.org/Articles/Chugoku,-Kansai-consider-joint-development-of-used, 03 August 2023.

USA

Final Environmental Assessment Issued for US Reactor Experiment

The US DOE has released a final environmental assessment and draft finding of no significant impact (FONSI) for the design, construction, and operation of the Molten Chloride Reactor Experiment, which is to be built by Southern Company at Idaho National Laboratory (INL). Southern Company is leading a collaborative effort to design, build and test the Molten Chloride Reactor Experiment at INL, under a DOE Advanced Reactor Demonstration Program Risk Reduction award. The team will construct the experimental system offsite and ship it to INL, where it will be fuelled using materials currently in storage at the laboratory.

The proof-of-concept critical fast-spectrum salt reactor is scheduled to run for about six months at INL, after which it will be decommissioned. The results will provide data crucial to the development of TerraPower's Molten Chloride Fast Reactor design. It will use liquid salts as both a coolant and fuel, allowing it to operate at high temperatures to produce heat or electricity more efficiently than today's reactors. The final environmental assessment and proposed FONSI will be open for public comment until August 31.

Source: https://world-nuclear-news.org/Articles/Final-environmental-assessment-issued-for-US-react, 04 August 2023.

SMALL MODULAR REACTORS

INDIA

India Eyes SMRs but Focuses on Large Nuclear Reactors

The Indian government is exploring options for SMRs, but large-size plants are still the mainstay of the country's plans to expand its nuclear generating capacity, Minister of State Jitendra Singh has told the country's parliament. "SMR is a promising technology in industrial decarbonisation especially where there is a requirement of reliable and continuous supply of power. India is considering steps for development of SMR, to fulfil its commitment to Clean Energy transition," the minister said in an answer to the Lok Sabha – the lower house of the Indian parliament – on August 2.

Detailed technical discussions are currently under way to plan a roadmap for studying the feasibility and effectiveness of deployment of such reactors. Augmentation of nuclear power capacity through large size reactors is the primary goal of the Department," Singh added. A report on the role of small modular reactors in the energy transition issued earlier this year by the government's NITI Aayog found that successful deployment of SMR technology must leverage private sector investment.

"Detailed technical discussions are currently under way to plan a roadmap for studying the feasibility and effectiveness of deployment of such reactors. Augmentation of nuclear power capacity through large size reactors is the primary goal of the Department," Singh added. A report on the role of small modular reactors in the energy transition issued earlier this year by the government's NITI Aayog public policy think-tank found that successful deployment of SMR technology must leverage private sector investment.... "The Government of India is exploring the options of collaborating with other countries and taking up indigenous development of SMRs," Singh told the Lok Sabha. "Provisions of Atomic Energy Act, 1962 are being examined to allow participation of private sector and start-ups." Singh said.

As well as plans for the construction of Indian-designed 700 MWe PHWRs in "fleet mode", Indian plans also envisage the construction of large reactors from overseas vendors, including further Russian-designed VVER reactors in addition to those already in operation and under construction. These include both AP1000 and EPR reactors, for which negotiations have been ongoing for some years.

In a separate answer, the minister also confirmed that India's DAE has been allocated INR 25,078.49 crore (USD3,006 million) for 2023-24, which is lower than its INR 25,965.67 crore allocation in 2022-23. NPCIL proposes to "mobilise" INR 12,863 crore from its internal and external budgetary resources, "mainly through internal resources and borrowings". There was no change to the reactors listed earlier in the year by Singh as "under construction", although the minister noted that one of those – Kakrapar 3 – is now in commercial operation. As well as plans for the construction of Indian-designed 700 MWe PHWRs in "fleet mode", Indian plans also envisage the construction of large reactors from overseas vendors, including further Russian-designed VVER reactors in addition to those already in operation and under

construction. These include both AP1000 and EPR reactors, for which negotiations have been ongoing for some years.

Source: https://www.eurasiareview.com/04082023-india-eyes-smrs-but-focuses-on-large-nuclear-reactors/, 04 August 2023.

In August last year, CNEA and Argentina's INVAP completed the start-up of a radioisotope producing plant in Mumbai, India, in the highest profile result of the two countries' cooperation on peaceful use of nuclear technology so far.

NUCLEAR COOPERATION

ARGENTINA–INDIA

Argentina and India Continue to Develop Nuclear Cooperation

Adriana Serquis, president of Argentina's National Atomic Energy Commission (CNEA), said: "It is very valuable for the CNEA to receive today the visit of the delegation from India, not only to strengthen our cooperation ties in different areas related to nuclear medicine or reactors, but also so that they can get to know our facilities and workers, and the major priority projects that our institution is carrying out."

In August last year, the two countries' foreign ministers issued a joint statement in which they noted bilateral cooperation on a variety of issues, saying "the two large and vibrant democracies, had elevated their relationship to the level of Strategic Partners in 2019" and "it was agreed to explore areas for deeper cooperation for peaceful uses of nuclear energy".

The Indian delegation was headed by the CEO of the Heavy Water Board, S Satyakumar. During the visit, CNEA said meetings were held to discuss areas including "nuclear medicine, space alloys, radioisotopes and heavy water". Serquis said that, following the tour carried out in February to India, "we feel proud to be able to share what we do and have them tour our facilities". Serquis said that being able to jointly face challenges was beneficial.

In August last year, CNEA and Argentina's INVAP completed the start-up of a radioisotope producing plant in Mumbai, India, in the highest profile result of the two countries' cooperation on peaceful use of nuclear technology so far. Combustibles Nucleares Argentinos is in charge of supplying fuel for the country's three nuclear power units and its three research reactors. It is a joint venture between CNEA and the Pérez Companc Group....

Argentina and India signed an Agreement on Cooperation in the Peaceful Uses of Nuclear Energy in 2010 and in 2019 signed a memorandum of understanding to "enhance and explore cooperative ventures" in civilian nuclear power and "bolster institutional linkages" in civilian nuclear research and development and capacity building.

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Source: https://www.world-nuclear-news.org/Articles/Argentina-and-India-continue-to-develop-nuclear-co, o3 August 2023.

URANIUM PRODUCTION

KAZAKHSTAN

Uranium Results Reflect Market Improvements

The Kazakh uranium producer increased its 2023 sales guidance in its half-year trading update on 1 August, with group sales volumes increasing from 15,400-15,900 tU to 17,500-18,000 tU. This is due to customers asking to "flex up" their annual delivery quantities within existing contracts, some new long-term contracts with delivery in 2023, and Yellow Cake plc's execution of its annual option to purchase

uranium. The company's production guidance is unchanged at 20,500-21,500 tU (on a 100% basis).

Cameco published its second-quarter results on August 2, with an update to its consolidated revenue outlook for 2023 which is now CAD2.4 billion-2.5 billion (USD1.8 billion-1.9 billion), up from its previous outlook of CAD2.2 billion-2.4 billion. "The significant momentum seen in the nuclear energy industry and the heightened supply risk caused by geopolitical developments are translating into increased opportunities for Cameco," the company's President and CEO Tim Gitzel said in its August 2 announcement. "As a result, for 2023, we have increased our consolidated revenue outlook, which is primarily driven by higher expected average realised prices under our contract portfolio and increased deliveries in our uranium segment." Tim said....

"With over 118 million pounds of long-term contracting industry wide so far this year, we are happy to say that we believe there is clear evidence that the broader uranium market is moving toward replacement-rate contracting. Based on the rate of contracting seen year-to-date, we expect industry long-term contracting volumes in 2023 to exceed those in each of the last 10 years. We believe this is a good indication that a new long-term contracting cycle is underway." Tim said. ...

Source: https://www.world-nuclear-news.org/Articles/Uranium-results-reflect-market-improvements, 03 August 2023.

NUCLEAR NON-PROLIFERATION

GENERAL

Warning about 'Nuclear Sharing' Falls on Deaf Ears at NPT Meeting

The ICAN told a committee reviewing the NPT in Vienna, Austria, that its main concern was the growing number of NPT signatories that are undermining the treaty. "Nuclear sharing", ICAN spokesperson Elisabeth Saar said on August 2, is exacerbating nuclear risks and jeopardising international security. Elisabeth cited Russia's deployment of nuclear weapons to Belarus and the US' long-standing deployment of nuclear weapons in Belgium, Germany, Italy, the Netherlands and Türkiye, with NATO support, as of great concern.

"If the concerned states parties fail to take prompt action to cease this practice, the NPT membership should decide by vote at the next review conference on the inadmissibility of nuclear sharing under the NPT." Elisabeth said. "This practice runs counter to the fundamental tenets of the treaty and is a threat to the entire regime" Elisabeth said.

If the concerned states parties fail to take prompt action to cease this practice, the NPT membership should decide by vote at the next review conference on the inadmissibility of nuclear sharing under the NPT." Elisabeth said. "This practice runs counter to the fundamental tenets of the treaty and is a threat to the entire regime" Elisabeth said.

Saar said while NPT members had different opinions on nuclear sharing, the Treaty on the Prohibition of Nuclear Weapons, which includes undertakings not to develop, test, produce, acquire, possess, stockpile, use or threaten to use nuclear weapons, "leaves no room for doubt: nuclear sharing is expressly, absolutely prohibited". ...

Exploiting IAEA Loophole: The "loophole" is that the nuclear material being used in the AUKUS submarines will not be subject to an IAEA inspection because that international agency does not have to inspect nuclear material "non-proscribed military purposes". For James M. Acton from Carnegie Endowment for International Peace opined on why the AUKUS Submarine Deal is Bad for Nonproliferation — and what to do about it, he said "The efficacy of IAEA safeguards in preventing proliferation hinges on the willingness of the international community as a whole and of individual states to enforce the rules".

Australia argues that the use of naval nuclear vessel propulsion does not contravene the NPT, and it may become the first non-nuclear-weapon state to remove nuclear material from the IAEA inspection system. There are no automatic consequences for non-compliance (except referral to the UN Security Council, which is under no

obligation to act). For the NPT to work — that is, to prevent nuclear proliferation — it relies on non-nuclear weapon states, such as Australia, to declare all their nuclear materials and to then task the IAEA with verifying that none is being used to build nuclear weapons. These declarations and inspections are known as "safeguards".

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The ICAN, Australia, also believes AUKUS sets a "risky precedent". "It would become the first non-nuclear weapon state to be given this highly sensitive nuclear technology. And because, under the existing agreement, the uranium to be used is likely to be weapons-grade, the plan increases the risks to non-proliferation even further." ICAN said.

Highly enriched uranium can be rapidly converted into a nuclear bomb and while that is not easy to be removed from a submarine "the possibility of diverting such material for weapons' purposes cannot be ruled out", ICAN said. Australia is relying on the IAEA to maintain an in-principle agreement to support its interpretation of Paragraph 14 of the IAEA safeguard agreements to allow for the nuclear-propelled AUKUS submarines. But China is asking questions...Li Chijiang, Secretary-General of the China Arms Control and Disarmament Association, told the meeting on August 2 that the AUKUS deal was "a textbook example of nuclear proliferation" and sets a bad precedent.

Bad Precedent for Non-proliferation: "Such move is not only a flagrant violation of the object and purpose of the NPT, but also poses a new challenge to the IAEA safeguards system and poses a serious threat to peace and security in the Asia-Pacific region." Li said. Chijiang called on the IAEA states and board of governors to ensure "a reliable and effective arrangement for the AUKUS deal in favour of the NPT and non-proliferation regime".

A Chinese Embassy spokesperson to Britain and Northern Ireland was asked in April if the AUKUS agreement challenged the IAEA non-proliferation safeguard system. He said it did, adding that there was no international consensus on the definition of Article 14 of the CSA. He said taking into account the IAEA's "previous practice of strengthening the safeguards system", all IAEA states should be concerned and "an intergovernmental process" needed to discuss it.

... China's view is that the AUKUS agreement coerces the IAEA Secretariat into making safeguards exemption arrangements with some countries and therefore weakens the overall nuclear safeguards system. "It seriously compromises the authority of the IAEA, deals a blow to the Agency's safeguards system and undermines the international community's confidence in multilateralism," a Chinese Embassy spokesperson said....

The Philippines has called on the five nuclear weapons states (NWSs) to report on their disarmament obligations to allow all state parties to scrutinize them, the Department of Foreign Affairs (DFA) said.... The meeting of the NPT Working Group convened in Vienna, Austria from July 24 to 28, the DFA said. It also elected Philippine delegate Jonelle John Domingo as one of its two vice chairmen.

Source: https://www.greenleft.org.au/content/warning-about-nuclear-sharing-falls-deaf-ears-npt-meeting, 04 August 2023.

PH Calls on 5 Nuclear Weapons States to Report Disarmament Obligations

The Philippines has called on the five nuclear weapons states (NWSs) to report on their disarmament obligations to allow all state parties to scrutinize them, the Department of Foreign Affairs (DFA) said.... The meeting of the NPT Working Group convened in Vienna, Austria from July 24 to 28, the DFA said. It also elected Philippine delegate Jonelle John Domingo as one of its two vice chairmen.

It discussed recommendations to strengthen NPT processes, including a mechanism that will require the NWSs to report on their disarmament obligations. The Philippines "worked actively towards consensus on detailed measures that aim to hold nuclear weapon states accountable for their disarmament obligations under the NPT, including an interactive reporting process," the DFA said on August 1.

According to the Foreign Affairs department, an advisory opinion issued by the ICJ in 1996 affirmed the legal obligation of the five NWSs to pursue nuclear disarmament. This obligation is part of the NPT's "grand bargain," under which non-nuclear weapon states (NNWSs) forego their sovereign right to develop nuclear weapons on the condition that they will have access to peaceful uses of nuclear energy and that the five nuclear weapon states will disarm, the DFA said.

Among the recommendations the working group discussed include an interactive mechanism that would compel the five NWSs to the NPT to report regularly on how they are implementing their nuclear disarmament obligations. The last time state parties agreed on substantive outcomes to advance nuclear disarmament was during the review conference of 2010.

It pointed out that NNWSs, including the Philippines, are already subjected to stringent reporting, transparency, and accountability mechanisms at the IAEA to ensure nuclear non-proliferation. But no such mechanism exists to hold the five nuclear weapon states accountable for their nuclear disarmament obligations, the DFA stressed. State parties, the DFA said, hold review conferences every five years to monitor compliance with the treaty and to agree on measures to enhance the treaty's implementation.

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Source: https://www.manilatimes.net/2023/08/01/news/ph-calls-on-5-nuclear-weapons-states-to-report-disarmament-obligations/1903434, 01 August 2023.

USA

US Reaffirms Commitment to NPT

The US on July 31 said it insists on full compliance with the NPT safeguards and called on all NPT parties to raise standards wherever possible and to condemn violations where they occur. "We will insist on the fullest compliance with NPT nonproliferation safeguards and call on all NPT Parties to raise standards wherever possible and to condemn violations where they occur. We will also work with our partners to increase access to the benefits of peaceful uses, which are not just limited to nuclear energy, but also include the application of nuclear technologies for human and animal health, water resource management, food security, and much more," US State Department Spokesperson Matthew Miller said in a press statement on July 31.

Miller said the US stands firm in its commitment to work with States Parties at this Preparatory Committee meeting to ensure the agenda for the 2026 NPT Review Conference takes a balanced approach in addressing the Treaty's three pillars: nonproliferation, peaceful uses of nuclear energy, and further progress on disarmament.

... The US led by Special Representative of the President for Nuclear Nonproliferation Adam Scheinman will join other NPT States Parties for the 2023 Preparatory Committee Meeting (PrepCom) in Vienna for the next two weeks to address the top challenges facing the nonproliferation regime and further strengthen the NPT.

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2026 NPT Review Conference takes a balanced approach in addressing the Treaty's three pillars: nonproliferation, peaceful uses of nuclear energy, and further progress on disarmament. Miller said: "The challenges we face today serve as a stark reminder of why the NPT is indispensable and remains the cornerstone of the global nuclear nonproliferation regime."

As per the US State Department Spokesperson, Russia's seizure of Ukraine's nuclear power facilities poses serious nuclear safety issues and undercuts Ukraine's right under the NPT to access the peaceful uses of nuclear energy. "The People's Republic of China's rapid and opaque nuclear weapons expansion continues unabated, and questions remain on Iran's nuclear program and safeguards compliance. And 20 years after announcing its withdrawal from the NPT, the DPRK continues to develop its nuclear arsenal and engage in threatening rhetoric regarding its use," he said.

Miller said the US, and its partners around the world will work to address challenges and set out a positive agenda for this NPT review cycle. … "Our top priority for the PrepCom – and for this review cycle – must be to preserve and strengthen this critical treaty, not in spite of the challenges we face but because of them," he added.

Source: https://theprint.in/world/us-reaffirms-commitment-to-treaty-on-non-proliferation-of-nuclear-weapons/1696633/, 02 August 2023.

NUCLEAR SAFETY

GENERAL

40 Years of OSART: Improving Nuclear Power Plant Safety Worldwide

This year marks the 40th anniversary of the Operational Safety Review Team (OSART): one of the most important safety peer review services offered by the IAEA to its Member States. The OSART programme aims to help countries strengthen the safety of their nuclear power plants during commissioning and operation by comparing actual practices with the IAEA Safety Standards. Since the first mission to Kori Nuclear Power Plant in the Republic of Korea in August 1983, the IAEA has carried out 218 OSART missions to 37 countries, providing objective and independent assessments of their operational safety performance.

"Through these missions, thousands of experts have supported the continuous safety improvement of nuclear power plants operating across the globe," said IAEA Director General Grossi in a video message to mark the occasion. Performed at the request of IAEA Member States, OSART missions are designed to assist nuclear operators in strengthening the operational safety of their plants by identifying areas that should be improved and recommending ways to do so.

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During an OSART mission, experts from Member States and the IAEA assess safety performance at the nuclear facility against the IAEA Safety Standards, the internationally accepted standards for nuclear safety, and provide specific recommendations and suggestions for safety improvements. During the mission, the application of these standards in a wide range of areas, including plant management, personnel training and qualification, operations and safety culture are assessed.

OSART missions for operational nuclear power plants can be conducted at any time after a plant begins commercial operation. A follow up visit is usually held about 18 months after the main mission. Pre-OSART missions are conducted during the commissioning phase of a nuclear power plant, normally a few months before the first nuclear fuel is loaded into the nuclear reactor. Complementary to them, Corporate OSART missions are conducted to also review centralized functions of operational safety aspects of nuclear

power plants within the fleet, such as corporate management; safety performance monitoring; and oversight, procurement or human resources.

The OSART Programme Today: OSART missions have contributed to the improvement of nuclear safety worldwide. These safety peer review missions have led to significant improvements in operational safety performance. Recent analysis showed that operators of nuclear facilities act promptly on the findings of OSART missions and that over 95 per cent of the findings are resolved or have achieved satisfactory progress by the time follow-up missions are conducted.

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The OSART programme is also constantly evolving to meet the changing needs of the nuclear industry. In recent years, the programme has placed a greater emphasis on areas such as accident management and the interaction between humans, technology and organizations. While human, technological and organizational factors may play a separate and significant role in an operational failure, it is often a combination of these factors that lead to events and accidents. The programme also emphasizes safety culture, which refers to how an organization's culture prioritizes and values safety. The OSART programme strives to instil a safety culture that encourages the host organizations to identify and resolve safety issues themselves at an early stage.

Promoting Information-Sharing, Transparency and Trust: With the participation of various stakeholders, including each country's government, host organizations, regulators and industry peers, OSART missions serve as a wide international platform to exchange information and experiences, as well as to provide Member States with good practices and advice to improve safety performance at nuclear power plants. To date, OSART missions have identified 1350 good practices, which are also available to the public on the IAEA's website. Operating organizations frequently review these good practices and implement those that are applicable to them.

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To ensure transparency, the OSART guidelines are available to the public, as are the IAEA Safety Standards on which the service is based. "The IAEA's peer review missions are more crucial now than ever, as they lay the foundation for the significant expansion of nuclear energy required to meet global climate goals," Grossi said. "As we mark the 40th anniversary of the first OSART mission, I look forward to our Member States continuing to help us to field these critically important missions across the world," Grossi emphasized.

Source: https://www.iaea.org/newscenter/news/40-years-of-osart-improving-nuclear-power-plant-safety-worldwide, 08 August 2023.

Interfaces and Synergies Between Nuclear Security and Safety

The nexus between nuclear safety and nuclear security is an aspect that underpins the IAEA's work and assistance offered to countries around the world. Now international experts, members of the Advisory Group on Nuclear Security (AdSec) and

the International Nuclear Safety Advisory Group (INSAG) have issued their first joint report addressing the question of interfaces and synergies between nuclear safety and nuclear security, taking into account the developments of the last decade. The AdSec and INSAG members advise the IAEA Director General in the areas of nuclear security and nuclear and radiation safety respectively. Safety focuses on ensuring proper operating conditions, preventing – or mitigating the consequences of – accidents and, hence, protecting workers, patients, the public and the environment from undue radiation hazards.

In the case of nuclear security, the focus is on the prevention and detection of, and response to, criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities or associated activities. However, as Lydie Evrard, IAEA Deputy Director General and Head of the Department of Nuclear Safety and Security explains, they share the same objective. "The IAEA Fundamental Safety Principles and the Nuclear Security Fundamentals identify the overarching objective to protect people, society and the environment from harmful effects of ionizing radiation." Lydie said.

The recently published AdSec/INSAG report, "A Systems View of Nuclear Security and Nuclear Safety: Identifying Interfaces and Building Synergies", aims to provide an updated framework on the interface between nuclear safety and security. The publication examines both the commonalities of and differences relating to nuclear security and nuclear safety, with a view to stimulating new thinking on how to further enhance their robustness and create greater synergy in the management of nuclear and other related activities.

Key areas of this interface cover areas such as the allocation of various responsibilities and their coordination; institutional strength in depth; the management and leadership with focus on safety and security culture; human risk factors; computer security; information and communication; and emergency preparedness and response. "The interface between nuclear safety and nuclear security measures must be designed and implemented in a compatible manner so that security measures do not compromise safety and safety measures do not compromise security," said Evrard, adding that "their relationship is an ever-evolving one and the IAEA's mechanisms of assistance to countries are built to serve the effective and synergistic implementation of nuclear and radiation safety and nuclear security at national and international level."

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...In addition, it covers all stages of the life cycle of facilities and related activities – from siting, design, construction and commissioning to operation and decommissioning. Responsibilities, leadership and management, and risk management strategies are acknowledged by the AdSec and INSAG experts as the common foundations for effective nuclear safety and security. A "change of attitude" is deemed necessary for addressing current and future challenges, especially when policies, laws, regulations and relevant institutions are at the development stage.

Other areas of importance highlighted in the report include the strengthening of the national legislative system to enable effective management of nuclear safety and security, and the establishment of an integrated culture among national institutions respectively responsible for nuclear safety and security. Experts also underscore the importance of a broad understanding of nuclear safety and security through communications that balance openness and confidentiality. ...

Source: https://www.iaea.org/newscenter/news/new-publication-interfaces-and-synergies-between-nuclear-security-and-safety, 01 August 2023.

UKRAINE

IAEA Director General Statement on Situation in Ukraine

IAEA experts have observed no mines or explosives on the rooftops of Unit 3 and Unit 4 reactor buildings and the turbine halls at Ukraine's Zaporizhzhya Nuclear Power Plant (ZNPP), after having been given access on August 3 afternoon, Director General Grossi said on August 4. Following repeated requests, the team had unimpeded access to the rooftops of the two reactor units and could also clearly view the rooftops of the turbine halls. The team will continue its requests to visit the roofs of the other 4 units at ZNPP.

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Grossi has stressed the importance of IAEA experts being granted timely access to all areas of the ZNPP to monitor full compliance with the five basic principles for protecting Europe's largest nuclear power plant during the current military conflict. "I welcome the news that IAEA experts have finally been granted this additional access at the site. Timely, independent and objective reporting of facts on the ground is crucial to continue the IAEA's efforts to support nuclear safety and security during the military conflict in the country," Grossi said.The access to the roofs on August 3 came just after a successful ninth rotation of teams at the plant with IAEA experts once again crossing the front line as the teams departed and arrived at the plant. On the night before the rotation the team reported hearing a series of detonations in the vicinity of the plant. The team was informed by the ZNPP that there was no impact on the site, the neighbouring industrial area or the city of Enerhodar as a result of these detonations.

IAEA teams have carried out additional inspections and walkdowns at the ZNPP over the past week. After a walkdown within the site's perimeter on August 1, the team confirmed that the mines first observed on July 23 were still in place. No new mines or explosives were observed during any walkdowns over the past week.

Grossi said this was another stark reminder of potential nuclear safety and security risks facing the facility. "I reiterate my call on all sides to refrain from any action that could lead to a nuclear accident with potential consequences for public health and the environment," Grossi said.

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After Unit 5 reached cold shutdown on July 28, maintenance activities have commenced, including inspection and testing of the safety systems which protect the reactor and its fuel; and cleaning of the heat exchanger. However, the IAEA team has repeatedly requested more complete information regarding the full scope of maintenance activities planned to be conducted on Unit 5, given the limited availability of spare parts and significantly reduced maintenance staff available at ZNPP.

The IAEA team at ZNPP are continuing to closely monitor the situation regarding the availability of water for cooling the ZNPP six reactors, and to perform other nuclear safety and security functions. Since the destruction of the dam, the ZNPP has been relying on water from the site's cooling pond, the Zaporizhzhya Thermal Power Plant (ZTPP) discharge channel and underground water from the drainage system for its needs.

The height of the water in the ZNPP cooling pond

continues to reduce at a rate of about 1 cm per day while the water in the ZTPP discharge channel is periodically being topped-up with water that continues to enter the ZTPP inlet channel, primarily from groundwater. There is sufficient water available for many months.

On August 2, the IAEA team conducted a walkdown of the cooling pond area to examine the integrity of the isolation gate separating the cooling pond from what remains of the Kakhovka reservoir after the destruction of the downstream dam in June. The team was able to observe that the isolation gate had been reinforced with concrete blocks and soil to a total thickness of up to 4 metres.

Also at the cooling pond, the team visited the location of a pilot well that has been drilled near the port and learned that initial tests of the quality of the water and the groundwater flow rate have been conducted. If the results of all additional tests are positive the ZNPP site plans to extend the diameter of the pilot well, to increase the flow rate of water into the well. Once the well is established, the plant will install pumps and piping to provide an alternate supply of water to the sprinkler ponds that provide the essential cooling to the reactor units. The team also learned that the site is planning to drill an additional well within the perimeter of the ZNPP site.

Additionally, the IAEA experts performed radiation monitoring of the cooling pond area and the areas inside the site perimeter during the walkdowns. The measurements data are uploaded by the IAEA to the IAEA's IRMIS. All radiation levels were normal. Separately this week, IAEA teams at the Khmelnitsky, Rivne, and South Ukraine NPPs and the Chornobyl site did not report any issues related to nuclear safety and security over the past week. The IAEA conducted successful rotation of its teams at Chornobyl on August 4.

Source: https://www.iaea.org/newscenter/pressreleases/update-177-iaea-director-general-statement-on-situation-in-ukraine, 04 August 2023.

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NUCLEAR WASTE MANAGEMENT

GENERAL

The Intersection of Nuclear Waste Management and Energy Production

The intersection of nuclear waste management and energy production is a complex and multifaceted issue, one that requires a comprehensive analysis to fully understand its implications. As the world continues to grapple with the challenges of climate change and the need for sustainable energy sources, nuclear power has emerged as a potential solution. However, the management of nuclear waste remains a significant concern....

The search for a long-term solution to nuclear waste disposal has been ongoing for decades, with deep geological repositories often touted as the most viable option. Deep geological repositories involve burying nuclear waste deep underground in stable geological formations. The idea is that these formations will provide a natural barrier, preventing the waste from contaminating the environment.

The potential of nuclear power to help meet the world's energy needs while reducing greenhouse gas emissions is undeniable. However, the production of nuclear energy also results in the creation of nuclear waste, a byproduct that poses serious environmental and safety risks. Nuclear waste is highly radioactive and can remain hazardous for thousands of years. The process of managing and disposing of this waste is a complex and costly endeavor. Currently, most nuclear waste is stored on-site at nuclear power plants in specially designed pools or dry casks. However, these are only temporary solutions.

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Several countries, including Finland and Sweden, are already in the process of constructing such repositories. However, the implementation of this solution is fraught with challenges, including high costs, technical difficulties, and public opposition. The intersection of nuclear waste management and energy production is not just about finding technical solutions. It also involves navigating complex social, political, and ethical issues. For instance, the decision to build a nuclear power plant or a waste repository is often met with strong public opposition due to safety concerns. Moreover, there are ethical questions about the intergenerational equity of producing waste that will remain hazardous for future generations.

Despite these challenges, the potential of nuclear power as a sustainable energy source cannot be ignored. As such, there is a growing emphasis on research and innovation in the field of nuclear waste management. One promising area of research is the development of advanced reactor designs that can recycle nuclear waste, reducing its volume and radioactivity. Another is the exploration of alternative disposal methods, such as deep borehole disposal.

...While nuclear power offers a potential solution to the world's energy needs, the management of nuclear waste presents significant challenges. However, through continued research and innovation, it is possible to find solutions that balance the need for sustainable energy with the imperative of environmental and public safety. As we move forward, it is crucial that we continue to explore this intersection, understanding its complexities and working towards sustainable and responsible solutions.

Source: https://www.energyportal.eu/news/the-intersection-of-nuclear-waste-management-and-energy-production/64504/#google_vignette, 02 August 2023.

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).

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