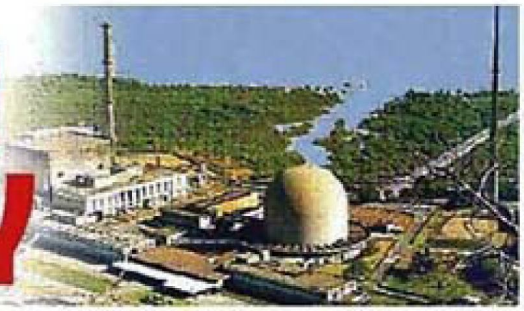
NUCLEAR SECURITY



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

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OPINION – Manpreet Sethi

A Cautious and Conservative US Nuclear Posture Review

The much-awaited fifth US Nuclear Posture Review (NPR) was announced on 27 October 2022. It was published along with two other documents: the National Defence Strategy and Missile Defence Review. These three strategic reviews were released together for the first time, and even conducted in an integrated manner to ensure a linkage between strategy and resources. Divided into eight short sections across 24 pages, the NPR covers all the usual nuclear issues. It dwells upon the US' complex geopolitical environment. It establishes nuclear weapons as central to addressing these security challenges, and charts pathways to upgrade legacy systems and develop new capabilities. It emphasises integrated deterrence and the need to use every tool at the US' disposal to address its threats, including close collaboration with allies and partners to also leverage their strengths.

The NPR admits that the US cannot handle these complex challenges alone, and that a collective response that takes advantage of the Euro-Atlantic and Indo-Pacific security architectures is necessary. This is a change from the last NPR of 2018 that adopted a more US-centred approach, with then President Trump raising doubts about US extended deterrence commitments. The latest NPR lays them to rest and reiterates the value of alliances and partnerships. This article examines the latest NPR's highlights across three issues: US threat perceptions, the role of nuclear weapons, and arms control. It also explains the NPR's likely impact on other nuclear-armed states, especially China and Pakistan, since this would have a bearing on India.

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US Security Environment: Russia and China, not surprisingly, are among the foremost security challenges listed by the

CONTENTS

NPR. In fact, for the first time, it flags that by the 2030s the US will face "two major nuclear powers as strategic competitors and potential adversaries." This appears to be a huge change from President Obama's 2010 NPR that had downgraded this challenge to below the threat of nuclear terrorism. In contrast, the 2022 NPR believes that nuclear Russia and China will pose new stresses on deterrence, assurance, arms control, and risk reduction. While Russia's nuclear capabilities, including modernisation and expansion, remain an enduring concern, the NPR identifies the "unprovoked and unlawful invasion of Ukraine in 2022" as the contemporary nuclear danger. Russian brandishing of its nuclear weapons in support of a revisionist security policy has contributed, in the US view, to a perception of the growing salience of nuclear weapons.

Russia and China, not surprisingly, are among the foremost security challenges listed by the NPR. In fact, for the first time, it flags that by the 2030s the US will face "two major nuclear powers as strategic competitors and potential adversaries.

Interestingly, this Russian behaviour has also awakened Washington to the threat of nuclear brinkmanship. It calls out Moscow for aggressing under the nuclear shadow, "irresponsible sabre-rattling," and using nuclear weapons "as a shield behind which to wage unjustified aggression against their neighbours." But this is not a new trend. India has faced such behaviour from Pakistan since 1999, when its illegal occupation of Indian heights in Kargil first demonstrated the use of nuclear weapons as a shield to deter a conventional response. However, this didn't affect American threat perception then, or hasn't since. Having now been subjected to Russian nuclear brinkmanship, the US NPR has finally taken cognisance of irresponsible nuclear behaviour, but it still stops short of addressing others that use the same tool.

The NPR also recognises China as a "pacing challenge" for US' defence planning and nuclear deterrent, given Beijing's increasingly aggressive attempts to reshape the global order. The US feels that the growth in Chinese nuclear forces and capabilities would "provide the PRC with new options before and during a crisis or conflict to leverage nuclear weapons for coercive purposes, including military provocations against US allies and partners in the region.

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Besides state actors, the NPR also flags the threat of integrating kinetic and non-kinetic capabilities, including cyber, space, information, and advanced conventional strikes. The integration of multi-domain capabilities will increase the tendency to pursue coercive strategies, creating operational dilemmas for the US. It will also heighten the chances of conflict escalation, since "collective experience, common understandings, and established norms of behaviour (such as cyber and space) are lacking."

Role of Nuclear Weapons: Given these challenges, the NPR reiterates the centrality of nuclear weapons and makes a case for capability enhancement. It reaffirms the traditional roles of US nuclear weapons to deter strategic attacks,

assure allies and partners, and achieve US objectives if deterrence fails. While categorically asserting that "hedging against an uncertain future is no longer a stated role for nuclear weapons," the NPR nevertheless underscores that the US will sustain actions that build advantage and resilience in its stockpile, production complex, and science and technology efforts to ensure a "resilient and adaptive nuclear enterprise."

Interestingly, in the context of nuclear weapons employment guidance to the president, the NPR emphasises maintaining "consistency with the Law of Armed Conflict." It asserts that the US would not "purposely threaten civilian population or objects." As a first user of nuclear weapons, this attempts to showcase the US' law-abiding nature.

The NPR also states, "nuclear weapons are required to deter not only nuclear attack, but also a narrow range of other high consequence, strategic level attacks." While claiming to "maintain a very high bar for nuclear employment," it admits that the US doesn't find it prudent to accept no first use (NFU) or sole purpose as the role for its nuclear weapons. Much like the 2018 NPR, in fact, the 2022 NPR echoes the need to deter limited nuclear attacks by signalling to the adversary that even a limited nuclear escalation wouldn't deter the US from achieving its war aims. The Joint Forces would be able to fight in a CBRN environment by ensuring the resilience of conventional systems and personnel to limited nuclear use effects. The US would adopt a tailored deterrence strategy seeking "to end any conflict at the lowest level of damage possible." This can be read as a hint at the limited use of nuclear weapons. The 2022 NPR retains the W76-2 'low-yield' SLBM warhead, which was introduced by the 2018 NPR to give the president "a range of limited and graduated options, including a variety of delivery systems and explosive yields."

The NPR also expresses US readiness to engage with Russia on further arms control beyond New START, and with PRC on a full range of strategic issues that would include arms control, crisis communication, information-sharing, mutual restraint, and risk reduction.

Interestingly, in the context of nuclear weapons employment guidance to the president, the NPR emphasises maintaining "consistency with the Law of Armed Conflict." It asserts that the US would not "purposely threaten civilian population or objects." As a first user of nuclear weapons, this attempts to showcase the US' law-abiding nature. However, the problem is that any nuclear use, even if it starts with low yield weapons for limited use, can spiral out of control. An adversary's retaliation cannot be controlled by Washington. Hence, the assumption that a limited nuclear war can be lawfully conducted and managed is flawed. In this regard, India has a mature stand in its NFU doctrine, which only claims nuclear retaliation in self-defence—it deters, meanwhile, through the threat of unacceptable damage.

Strategic Stability and Arms Control: To its credit, the NPR expresses the intention to renew "emphasis on arms control, non-proliferation, and risk reduction to strengthen stability, head off costly arms races and signal our desire to reduce the salience of nuclear weapons globally." Mutual, verifiable nuclear arms control is listed as the "most effective, durable and responsible path" to limit the role of nuclear weapons. It also flags the need for new technical capabilities for verification and monitoring, and is ready to invest in these, including through international collaboration. The NPR also expresses US readiness to engage with Russia on further arms control beyond New START, and with PRC on a full range of strategic issues that would include arms control, crisis communication, information-sharing, mutual restraint, and risk reduction.

Global Impact: While the NPR is a legally mandated US national exercise, the document has a bearing on global nuclear trends and strategies. Others are likely to model similar behaviour and

engage in comparable technological developments. Five worrisome aspects stand out for India. The first pertains to the emphasis on nuclear weapons and deterrence centrality, premised on the modernisation and expansion of capabilities. This is likely to beget more of the same from other nuclear-armed states. Tense nuclear dyads will make worst case assumptions of the adversary and lean further on their military and nuclear capability build-ups. The vicious cycle of negative security perceptions thus set into motion will only further vitiate the international security environment.

India will be affected the most by Chinese modernisation. Beijing has read the NPR as a call for "bloc confrontation," with it declaring that it will "not be intimidated by the nuclear blackmail of the US." Chinese military capability enhancement can thus be expected.

Second, India will be affected the most by Chinese modernisation. Beijing has read the NPR as a call for "bloc confrontation," with it declaring that it will "not be intimidated by the nuclear blackmail of the US." Chinese military capability enhancement can thus be expected. This development will also be used by China to increase influence in Asia, which will have repercussions for India's security.

With the US focus on establishing credible deterrence against its nuclear peers, relatively less attention can be expected on nuclear terrorism—a threat that India can'tignore. New Delhi will have to continue its individual efforts to address this challenge, while also striving to forge effective collective approaches.

Third, the NPR accepts a role for low-yield nuclear warheads in order to deter similar capabilities in another. Pakistan is only likely to derive further justification for its own brinkmanship strategy that is premised on the use of 'small' nuclear weapons.

Fourth, the American emphasis on integration of nuclear and non-nuclear as well as non-strategic capabilities—irrespective of how the US practices this—will lead to a perception of blurring of lines between conventional and nuclear. With deployment of newer technologies such as hypersonic delivery and AI-enabled command and control, compressed decision-making timelines, along with entanglement, will heighten risks of inadvertent escalation.

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Source:http://ipcs.org/comm_select. php?articleNo=5841%E2%80%A6, 10 January 2023.

OPINION – Hera Rizwan

India's First Tactical Quasi-Ballistic Missile

The Indian armed forces are now planning to purchase the Pralay ballistic missile, which can hit targets up to 500 kms away, amid the ongoing conflict with China. A high-level meeting held a few days ago approved the proposal put forth by the Indian armed forces. The proposal is also significant because it comes at a time when the Defence Ministry's highest levels have been discussing the creation of a rocket force by the Indian forces.

Pralay: "Pralay" is powered by solid propellant rocket motors and other cutting-edge technologies, and has a range of 150 to 500 km. While primarily ballistic, a quasi-ballistic missile can manoeuvre while in flight and has a low trajectory. With a 500 kg payload, Pralay will be able to hit a target 400 kms away. To combat the Chinese Army's stationing of the Dongfeng-12 (DF-12) short-range tactical ballistic missile along India's border, Pralay was developed. The Dongfeng-12 (DF-12) is thought to have a maximum range of 400 kms and a range between 100 and 250 kms. The Pralay missile will play a

significant role in the upcoming Rocket Force, which will be raised soon as India's fourth branch of the armed forces. Pralay (havoc, devastation) will be able to quickly strike and hit important targets inside the enemy camp while also avoiding the air defence system thanks to its non-parabolic trajectory. Due to its jet vane control system (JVC) and tandem fins, Pralay is able to fly depressed trajectories and vary its flight in the terminal phase. A ballistic missile that flies like a subsonic cruise missile inside the atmosphere but at nearly hypersonic speeds will be difficult for any modern dedicated anti-ballistic missile defence system as well as any air defence system to intercept. The missile was created domestically by DRDO and is a variant of the enemy weapon-destroying, high-altitude Prithvi Defence Vehicle (PDV) Exo-atmospheric interceptor missile. Pralay, which is more rapid and precise, has a 350- to 500-kilometre strike range and weighs about five tonnes. It can cover a distance of 350 km with a payload of 1,000 kg. According to the Indian Defence News, if the payload is cut in half, the missile will be able to reach a target up to 500 km away.

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Similarities with Russia's Iskander: The Russian military has made extensive use of the NATO-designated SS-26 "Stone" 9K720 Iskander-M SRBM during the ongoing conflict with Ukraine. With a maximum flying range of 310 miles, each launcher vehicle can carry two missiles (nearly 500 kms). This shows that Iskander's range, which it used to strike targets deep inside Ukrainian territory, is comparable to the range of India's Pralay ballistic missile. Iskander has a payload capacity of about 1500 pounds, or more than 680 kilograms. According to earlier reports, it could cover a distance of 350 kms with a heavy payload. However, if Pralay's payload is split in half, the missile can strike a target up to 500 kms away. As a result, the Pralay missile's range and trajectory parameters are similar to those of the Russian 9K720 Iskander missile. To identify targets, the Iskander missile instead employs an optical Digital Scene Matching Area Correlator (DSMAC). The DSMAC ensures increased attack precision and is an autonomous missile guidance concept based on area correlation of sensed ground scenes. According to the Iskander missile in Ukraine, penetration aids (PENAIDs), which take the form of decoys that resemble mortars, are used to trick enemy radars and interceptor missiles.

Significance of Pralay: The missile, which will be the country's first tactical quasi-ballistic missile, will enable the armed forces to strike strategic installations and enemy positions in actual battle zones. The BrahMos supersonic cruise missile and Pralay will be the main components of India's proposed Rocket Force, which was envisioned by the late General Rawat, a former CDS. Only conventional missiles would fall under the planned Rocket Force as and when it is ready, according to sources in the defence establishment, while nuclear weapons would continue to fall under the purview of the Strategic Forces Command. Former DRDO scientist Gupta said "Pralay is a game-changer. It will completely change the tactical battlefield dynamics and India will have two conventional missiles with long range. The BrahMos will be a cruise option and this one will be the ballistic option" he added, as cited by the *Indian Defence News*. Both ballistic and cruise missiles have specific advantages. While ballistic missiles have the advantage of speed and can be defended against even by modern air defence systems, cruise missiles have the advantage of high agility, stealth, and even loitering capabilities. The Pralay missile programme, which is a variation of the Prahaar

The missile, which will be the country's first tactical quasi-ballistic missile, will enable the armed forces to strike strategic installations and enemy positions in actual battle zones.

missile programme, which underwent its first test in 2011, was sanctioned in 2015. Since a longer range was desired, that missile has not yet been introduced.

Source: https://www.indiatimes.com/explainers/news/explained-indias-first-tactical-quasi-ballistic-missile-589567.html, 08 January 2023.

OPINION – Ariel Ben Solomon

How Can Iran be Disarmed amid its Civil Unrest?

Negotiations for the return to the Iran deal have been stalled and aren't likely to continue amid the nation's civil unrest. The negotiations between world powers and Iran over its nuclear program have stalled again, and it is unlikely to be revived soon in light of ongoing protests and Tehran's continued uranium enrichment.

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How can Iran's Nuclear Program be Brought to a Stop? In November, the IAEA said that Iran has begun to enrich uranium to 60% purity at its Fordow NPP and intends to continue expanding its program. Enrichment of approximately 90% results in weapons-grade fissile material. Civilian nuclear power requires 5% enrichment. Uranium, between 5% and 90%, has a military objective primarily. The advancement of the nuclear program, along with Iran's bloody crackdown on protesters and its sales of missiles and drones to Russia, has cooled the atmosphere for talks. With Republican control of the US House of Representatives following the midterm elections, US policy over Iran's nuclear program may become more rigid. This comes after President Biden expressed his frustrations in September over the stalled talks and sought other "options" to block Iran's nuclear program. PM Netanyahu is bound to push for a more aggressive stance on Iran.

Iran and Russia have increased their ties to offset international sanctions and isolation. Reports indicate that Iran has supplied Russia with drones and missiles to aid its war against Ukraine. Kazakhstan, which has tried to maintain a neutral, multi-vector foreign policy, is seeking cargo transit through its country, including between Russia and Iran, a senior Kazakh official said last month.

Iran's Choice: With the Iranian regime facing months of domestic unrest and violence, questions continue to be raised about the stability of the government. The question is whether Iran will seek economic relief and a deal as it tries to end the ongoing protests, or alternatively, if it views nuclear weaponry as the ultimate guarantor of regime survival. The international community should be aiding the Iranian people in their unprecedented uprising against this state sponsor of terror. Iran and Russia have increased their ties to offset international sanctions and isolation. Reports indicate that Iran has supplied Russia with drones and missiles to aid its war against Ukraine. Kazakhstan, which has tried to maintain a neutral, multi-vector foreign policy, is seeking cargo transit through its country, including between Russia and Iran, a senior Kazakh official said last month. "During the first nine months of this year, 80,000 tons of cargo have been shipped along this [eastern] route, which is an eightfold increase from last year, although the corridor's capacity allows 6 million tons of shipments [annually]," said Deputy PM Zhumangarin last month. While Kazakhstan, a former Soviet republic has officially distanced itself from Moscow, Astana is still eager to increase its transit role in the so-called North-South corridor between Russia and Iran, according to Zhumangarin.

The Central Asian Role: Kazakhstan is negotiating with the EU to increase its transit capacity as part of a scheme to redirect European energy imports

and China-Europe overland trade from Russia to the Caspian and Caucasus. The Central Asian country is also not a novice to nuclear diplomacy. Kazakhstan, under its first president, Nazarbayev (who ruled the country from 1990 until 2019), has been intimately involved with international denuclearization efforts and hosted the early stages of the Iran nuclear talks. Kazakhstan is the perfect example of how Iran and North Korea should eliminate nuclear weapons. Its successes in dismantling the world's fourth-largest nuclear arsenal and nuclear cleanup have made it a widely studied case. Nazarbayev also ordered the Semipalatinsk nuclear test range to shut down while the Soviet Union was still standing. Nazarbayev managed to expand the nation's economy after it had to find a path to development after breaking off from the former Soviet Union. Unfortunately, successful examples of denuclearization, such as Ukraine, Belarus, Kazakhstan and South Africa, suggest why the mullahs in Iran are unlikely to follow in their footsteps unless the regime is toppled. Tehran is only likely to follow this model after the fall of the Islamic Republic.

Kazakhstan is negotiating with the EU to increase its transit capacity as part of a scheme to redirect European energy imports and China-Europe overland trade from Russia to the Caspian and Caucasus. The Central Asian country is also not a novice to nuclear diplomacy. Kazakhstan, under its first president, Nazarbayev (who ruled the country from 1990 until 2019), has been intimately involved with international denuclearization efforts and hosted the early stages of the Iran nuclear talks.

Amid the important visit of Chinese President Jinping to Kazakhstan in September, there were also critical visits by US nuclear officials aimed at continuing US-Kazakhstan cooperation in nuclear non-proliferation.

Kazakhstan's Anti-proliferation Model: Amid the important visit of Chinese President Jinping to Kazakhstan in September, there were also critical visits by US nuclear officials aimed at continuing US-Kazakhstan cooperation in nuclear non-proliferation. US Defense Threat Reduction Agency (DTRA) personnel visited Kazakhstan's National Nuclear Center in late September, which included the Semipalatinsk Test Site (STS). Hruby, administrator of the National Nuclear Security Administration (NNSA), and Rose, principal deputy administrator of the NNSA, followed with their visits to Kazakhstan on October 5. This visit helped facilitate US-Kazakhstan cooperation. It prompted Hruby to note, "Kazakhstan has been an outstanding partner of the US on nuclear security and nonproliferation for over 30 years."

This process required extraordinary trilateral collaboration between the US, Kazakhstan, and Russia to transfer nuclear, chemical, and biological weapons from Kazakhstan to the Russian Federation and clean up the test sites and other facilities. As a result, 1,040 nuclear warheads were removed from 104 SS-18 intercontinental ballistic missiles and 370 nuclear-tipped cruise missiles. Kazakhstan's decision was followed by creating the Central Asian Nuclear-Weapon-Free Zone (CANWFZ) Agreement, which was signed in 2006 at the Semipalatinsk test site. Denuclearization in Kazakhstan was informed by South Africa's nuclear experience while also helping to refine nuclear inspection and uranium control processes. These achievements are why so many regard Kazakhstan as a model for denuclearization for Iran and North Korea.

Future Iranian Disarmament: Unfortunately, Tehran and Pyongyang are unlikely to follow in Kazakhstan's footsteps today. Not only has Russia transitioned from partner to pariah, but Iran is entirely intransigent on the issue of denuclearization. The window for negotiation has slammed shut. The US can only hope for a denuclearized Iran by supporting the Iranian people vocally and covertly. The focus of US and Israeli policy on Iran must be to support the people fighting to remove the violent theocracy, bolster

internal opposition, and avoid pursuing a deal with the current murderous regime. This should also be the policy of the Biden administration, which has remained relatively silent over the protests and crackdown.

The Kazakhstan model of post-Soviet denuclearization still has many lessons for today and the future. Nazarbayev's leadership exemplified what can be accomplished, a model of what is required for denuclearization to succeed. The lessons of Kazakhstan and other examples of successful denuclearization are not "negotiation at any cost" but rather the requirement of sincere mutual cooperation. The regime in Iran lacks the desire, standing, and sincerity required to succeed in nuclear negotiations.

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Source: https://www.jpost.com/middle-east/iran-news/article-726286, 01 January 2023.

OPINION – DB Venkatesh Varma

Japan's National Security Strategy: Why if Japan Goes Nuclear, India should Welcome the Decision

Indo-Pacific can be truly multipolar only if Japan is assured of national defence through the means of its choosing. As a strategic partner and friend, we must keep faith that Japan will make the right decision at the right time. Japan's National Security Strategy released in December is a remarkable document. Russia's invasion of Ukraine, China's assertive rise, and DPRK provocations are listed as key developments creating for Japan the most severe and complex security environment since the end of the Second World War. Japan's response – the document states with the tranquillity of a sober tea ceremony – will be to build comprehensive national power, reaffirm the security alliance with the US, develop autonomous capabilities through a sustained military build-up, procurement of deep strike weapons and investing in the Indo-Pacific and the Quad. On the surface, the new Strategy has nothing startlingly new to offer. However, probing beneath for the pulse of the understated, Japan's new concerns – the inadequacy of its current defence posture and its military alliance with the US to measure up to future security needs — echo through the document, mildly but with the certainty of the heartbeat of a newborn baby.

DPRK is riding a runaway proliferation train. Having shaken off all the limits to its nuclear programme it pretended to accept during the Trump Administration, its nuclear programme is perhaps now unstoppable. Ballistic missile tests, conducted with the scantest regard to international reaction, have overflown Japanese airspace. The mood in South Korea is despondent but slowly turning in favour of its own nuclearisation.

Unconstrained by bilateral or multilateral agreements, Chinese military power is noted as growing exponentially. In less than a decade, the Chinese nuclear arsenal would match numbers currently held by the US and Russia. Expectations are low that the US would have the will or the capacity to bring China to the arms control table. DPRK is riding a runaway proliferation train. Having shaken off all the limits to its nuclear programme it pretended to accept during the Trump Administration, its nuclear programme is perhaps now unstoppable. Ballistic missile tests, conducted with the scantest regard to international reaction, have overflown Japanese airspace. The mood in South Korea is despondent but slowly turning in favour of its own nuclearisation.

As underlined by the document, extended deterrence including nuclear weapons is the cornerstone of the US-Japan alliance. Its success until now allowed Japan the luxury of its three nuclear no's policy – no production, possession, or introduction of nuclear weapons on its territory. But it was never truly tested in Asia, as US nuclear superiority over China

was largely uncontested. Now it is no longer so, and will be less so in the future. Japan has no reason to question the validity of its security alliance with the US. What perhaps worries Japan is its future adequacy. The options going forward are three – one stated and two unstated.

The National Security Strategy calls for Japan to strengthen the deterrence and response capabilities of its alliance with the US, including extended deterrence by the US, backed by its full range of capabilities, including nuclear. This is the stated position, not very different from previous Japanese pronouncements on the subject. Ukraine's sorry plight about security assurances – provided by Russia in the past and the US in the current war — would not have gone unnoticed in Tokyo. The unstated part is the possibility of nuclear-sharing by Japan. If implemented, this may be new to Asia but is a long-standing US practice with its key NATO allies in Europe. US willingness to share nuclear-powered submarines with Australia as part of AUKUS is an indicator of possible trends.

The National Security Strategy calls for Japan to strengthen the deterrence and response capabilities of its alliance with the US, including extended deterrence by the US, backed by its full range of capabilities, including nuclear.

The second unstated option is the possibility of Japan itself acquiring nuclear weapons. The document makes no reference to this. But there are references to the US – in Japan's view the "world's greatest comprehensive power" finding it increasingly "difficult to maintain a free and open international order". Behind Japanese politeness, the message is clear. Significantly, the document adds that Japan would seek to strengthen its defence capabilities to the point at which Japan is able to take "primary responsibility" for its defence, without excluding support from the US. These are the green shoots of strategic autonomy, Japanese style. Japan's turn towards an explicit nuclear option will come, if at all, not out of choice but out of necessity. Its strategic predicament, laid bare by the document, is compounded by the lack of easy answers, a predicament that India should view with sympathy and understanding of a fellow Asian country. As the only country the target of two nuclear bombings, public sentiment runs deep against Japan acquiring nuclear weapons. Japan is also a strong supporter of the NPT, and its derivative non-proliferation regime but it is also painfully aware that the NPT does precious little to constrain China, nor for that matter DPRK. The gap between Japan's security needs in a nuclearised world and its non-nuclear public sentiment was papered over in the past by US extended deterrence. It looks less likely that will be the case in the future.

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If Japan goes nuclear, India should welcome the decision. In our separate ways, India and Japan privileged nuclear disarmament as a priority. But there comes a time when this national preference must be subordinated to the demands of national security. India reached this conclusion reluctantly but with good reason in 1998. If Japan were to reach the same conclusion, it too would have good reason to do so. Its technological capabilities are not in doubt. It is for Japan to exercise its inherent and inalienable right of ensuring the necessary means of self-defence. Thinking the unthinkable in terms of changing policy is an attribute of sovereignty, not its negation. A multipolar Indo-Pacific can be truly multipolar only if Japan is assured of national defence through the means of its choosing. As a strategic partner and friend, we must keep faith that Japan will make the right decision at the right time.

Source: https://indianexpress.com/article/opinion/columns/japan-national-security-strategy-japan-goes-nuclear-india-should-welcome-8363720/, 05 January 2023.

NUCLEAR STRATEGY

INDIA–PAKISTAN

India and Pakistan Exchange List of Nuclear Installations and Prisoners

India and Pakistan exchanged the customary lists of nuclear installations and prisoners on New Year's Day. While New Delhi shared lists of 339 Pakistani civilian prisoners and 95 fishermen currently in Indian custody, Pakistan shared lists of 51 civilian prisoners and 654 fishermen who are Indians or are believed to be Indians in its custody....

The two nuclear-armed neighbours exchange the list of nuclear installations every year on January 1. These installations are "covered under the Agreement on the Prohibition of Attack against Nuclear Installations and Facilities between India and Pakistan". The MEA said that this is the 32nd consecutive exchange of such lists between the two countries, the first one having taken place on January 1, 1992.

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Source: https://www.deccanchronicle.com/nation/in-other-news/010123/india-and-pakistan-exchange-list-of-nuclear-installations-and-prisoner.html, 02 January 2023.

NORTH KOREA

Kim Jong Un Orders New ICBM, Bigger Nuclear Arsenal

North Korean leader Jong Un called for developing new intercontinental ballistic missiles and a larger nuclear arsenal to counter U.S.-led threats, state media said, amid flaring tension between the rival Koreas. At a meeting of the ruling Workers' Party, Kim highlighted the need to secure "overwhelming military power" to defend its sovereignty and security. The meeting came amid cross-border tensions over last week's intrusion by North Korean drones into the South, and the North's series of missile launches, including ICBMs. South Korea's President Suk-yeol, during phone calls with military chiefs, called for "solid mental readiness and practical training" to ensure any North Korean provocations will be met with retaliation, according to a statement from his office. Kim accused Washington and Seoul of trying to "isolate and stifle" Pyongyang with U.S. nuclear strike assets constantly deployed in South Korea, calling it "unprecedented in human history." He vowed to develop another ICBM system "whose main mission is quick nuclear counter-strike" under a plan to bolster the country's nuclear force, the official KCNA news agency said.

North Korean leader Jong Un called for developing new intercontinental ballistic missiles and a larger nuclear arsenal to counter U.S.-led threats, state media said, amid flaring tension between the rival Koreas.

South Korea has become "our undoubted enemy" being "hell-bent on imprudent and dangerous arms buildup" and hostile military moves, Kim said. Japan's coast guard said the missile reached an altitude of around 100 km and flew around 350 km. Defence Minister Hamada said Tokyo had protested to North Korea over the launch via diplomatic channels in Beijing. The U.S. Indo-Pacific Command said the launch did not pose an immediate threat to U.S. personnel or territory but highlighted the destabilising impact of North Korea's weapons programme.

Source: https://www.reuters.com/world/asia-pacific/north-korea-fires-missile-new-years-day-yonhap-2022-12-31/, 01 January 2023.

USA–AUSTRALIA

US Senators Urge Biden Not to Sell 'Scarce' Nuclear Submarines to Australia

Democrat and Republican lawmakers reportedly warned president that Aukus security pact could stress US submarine industrial base 'to breaking point'. Two top US senators have urged president Biden not to sell nuclear-powered submarines to Australia, warning it would diminish US national security given the vessels are "scarce". The intervention confirms the US is under pressure not to sell its submarines before Australia is able to build its own as part of the Aukus alliance – meaning it could be decades before Australia gains nuclear submarines. A spokesperson for the Australian defence minister, Richard Marles, played down the leak, saying "the optimal ...year."

Democrat and Republican lawmakers reportedly warned president that Aukus security pact could stress US submarine industrial base 'to breaking point'. Two top US senators have urged president Biden not to sell nuclear-powered submarines to Australia, warning it would diminish US national security given the vessels are "scarce".

The Australian government is due to announce whether it plans to buy nuclear submarines from the US or UK by March.The US aims to build its own fleet of at least 60 nuclear-powered submarines but is struggling to meet its own needs. In December the US secretary of defence, Austin, recommitted the Biden administration "to ensuring that Australia acquires this capability [nuclear submarines] at the earliest possible date". Australia was "grateful" for the US and UK enabling Australia to acquire a nuclear-powered submarine capability. In September 2021, Australia tore up a $90bn conventional submarine contract with France to instead acquire nuclear submarine technology from the US or the UK as part of the new Aukus alliance.

Roughly 70 percent of the lab's funding is for its nuclear weapons program, which includes research, computer testing and pursuing the goal of producing 30 plutonium bomb cores, or "pits," per year by 2026.

Source: https://www.theguardian.com/world/2023/jan/06/us-senators-urge-joe-biden-not-to-sell-scarce-nuclear-submarines-to-australia, 06 January 2023.

USA

LANL's Record $4.6B Budget will Still Mostly Fund Nuclear Weapons

Los Alamos National Laboratory's record $4.6 billion budget for this fiscal year will give officials an unprecedented amount of money for its nuclear weapons program, which still makes up the bulk of the lab's spending. The lab's hefty funding was part of the U.S. Energy Department's budget request tucked into the recently passed $1.7 trillion omnibus spending package, which will cover the costs of agencies and programs through this fiscal year, ending in October. Roughly 70 percent of the lab's funding is for its nuclear weapons program, which includes research, computer testing and pursuing the goal of producing 30 plutonium bomb cores, or "pits," per year by 2026.

The war in Ukraine and Russian President Putin's threats to unleash nuclear weapons if any country directly intervened in the conflict have heightened tensions and led to the military establishment pushing harder to bolster the arsenal through increased spending. Modernizing nuclear programs requires revitalizing production, as described in the Nuclear Posture Review, she wrote, referring to the guidebook that every presidential administration crafts for managing the arsenal and assessing global threats. The U.S. has the most powerful arsenal in the world and stands little chance of falling behind adversaries, but amping up its weaponry could drive other countries to do likewise, creating a destabilizing effect globally, Wilson wrote.

Source: https://www.santafenewmexican.com/news/local_news/lanls-record-4-6b-budget-will-still-mostly-fund-nuclear-weapons/article_18c59118-8b85-11ed-85d2-dfcab050252f.html, 04 January 2023.

BALLISTIC MISSILE DEFENCE

ISRAEL

Rafael Upgrades Spyder System to Counter Tactical Ballistic Missiles

The Spyder air defense system can now counter tactical ballistic missiles thanks to an upgrade by its Israeli manufacturer, driven by "urgent operational requests from several existing customers throughout the world." The new feature by Rafael Advanced Defense Systems comes amid Russia's war in Ukraine, which has featured a barrage of aerial attacks, as well as missile tests by North Korea and Iran. The Spyder was seen in the last year in the UAE, a country that signed a peace deal in 2020 with Israel and which has faced drone and missile threats. Georgia, Vietnam, Singapore, the Czech Republic and the Philippines are among those who have acquired the system, according to media reports and open-source information. However, Israeli companies often do not divulge the name of their customers. The company also announced its Spyder "all-in-one" system in Singapore in early 2022, which incorporates radar, electro-optical/ infrared, and launcher technology onto a single platform.

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Rafael is one of Israel's largest defense companies and is behind the successful Iron Dome system, which is a short-range air defense system. The company also makes the David's Sling air defense system. Together with Israel's long-range Arrow, the three air defense systems are part of the country's multilayered approach to countering aerial threats. It is an open-architecture platform that can be integrated with other systems, and it can use Rafael's Python-5 and Derby missiles. Depending on the interceptor chosen, the system can confront targets out to 80 kms.

Source: https://www.defensenews.com/industry/techwatch/2023/01/06/rafael-upgrades-spyder-system-to-counter-tactical-ballistic-missiles/, 06 January 2023.

JAPAN

Japan to Develop 3,000-km Long-range Missiles, Deploy in 2030s, Kyodo Reports

Japan's Ministry of Defence is arranging to develop multiple long-range missiles with a range of up to about 3,000 kms and aims to deploy them in the 2030s, Kyodo news reported, citing a source familiar with the matter. The government is looking to deploy a 2,000-km range missile by the early 2030s and a 3,000-km hypersonic missile that can reach anywhere in North Korea and some parts of China by around 2035, Kyodo said. Japan this month unveiled its biggest military build-up since World War Two with a $320 billion plan that will buy missiles capable of striking China and ready it for sustained conflict, as regional tensions and Russia's Ukraine invasion stoke war fears.

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Source:https://www.reuters.com/business/aerospace-defense/japan-develop-3000-km-long-range-missiles-deploy-2030s-kyodo-2022-12-31/, 31 December 2022.

RUSSIA

Russia's Putin Deploys Frigate with New Zircon Hypersonic Cruise Missiles to Atlantic

President Putin sent a frigate to the Atlantic Ocean armed with new generation hypersonic

cruise missiles, a signal to the West that Russia will not back down over the war in Ukraine. Russia, China and the US are in a race to develop hypersonic weapons, which are seen as a way to gain an edge over any adversary because of their speeds - above five times the speed of sound - and manoeuvrability. A US Congressional Research Service report on hypersonic weapons says that Russian and Chinese hypersonic missiles are designed to be used with nuclear warheads. The target of a hypersonic weapon is much more difficult to calculate than for intercontinental ballistic missiles because of their manoeuvrability. Beyond Russia, the US and China, a range of other countries are developing hypersonic weapons including Australia, France, Germany, South Korea, North Korea and Japan, according to the US Congressional Research Service.

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Source: https://www.scmp.com/news/world/russia-central-asia/article/3205600/russia-sends-unique-new-hypersonic-cruise-missiles-atlantic-and-indian-oceans?module=perpetual_scroll_0&pgtype= article & campaign=3205600, 04 January 2023.

Ukraine's Defence Minister Shares Latest Data on Number of Missiles in Russia

Russia has used up many of its Kalibrs, Iskander ballistic missiles and Iranian-made drones, but it still has a fair number of S-300 missiles and Iskander cruise missiles. According to Reznikov's data, Russia currently has 19% of its strategic precise missiles, about 78% of tactical missiles and 12% of Iranian drones. In particular, 9% of its Kalibr and 11% of Iskander ballistic missiles are left. However, Russia still has a sufficient number of Iskander cruise missiles and S-300s.

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Source:https://news.yahoo.com/ukraines-defence-minister-shares-latest-204105949.html, 07 January 2023

SOUTH KOREA

South Korea Asks US for Greater Role in Managing Nuclear Weapons Amid North Korea Threats

South Korean President Suk-yeol said his government is in talks with the US on taking a more active role in managing nuclear weapons on the Korean peninsula, which would mark a significant shift in a decades-old policy among American allies to deter North Korea. Yoon said the strategy of "nuclear umbrella" or "extended deterrence" is no longer reassuring for the public now that North Korea has developed nuclear weapons and a range of missiles to deliver them. Since taking power in May, Yoon has sought to put South Korea on a path of overwhelming military strength against North Korea, which has launched scores of missiles in defiance of UN resolutions and is preparing for another nuclear test.

North Korea fired three short-range ballistic missiles on the last day of the year and then launched one more a few hours after the New Year started in a defiant show of force that could set the tone for a further ratcheting up of tensions. Last week, Kim's regime sent five drones across the border into South Korea, temporarily disrupting flights at major airports. With little threat of new sanctions and plans already afoot to further develop weapons including drones, submarines

and missiles, Kim has been honing his ability to deliver a credible nuclear strike against the US and its allies, such as South Korea and Japan. The North Korea leader has raised tension to levels not seen in years by firing off more than 70 ballistic missiles in 2022, lowering his guardrails for the use of nuclear weapons and saying he sees no need to going back to the bargaining table for talks on winding back his nuclear arsenal in return for relief from sanctions that have largely cut the nation off from the world economy.

Source: https://www.scmp.com/news/asia/east-asia/article/3205274/south-korea-asks-us-greater-role-managing-nuclear-weapons-amid-north-korea-threats, 02 January 2023.

Due to the lack of coordination in the Ukrainian army, the air defense of Ukraine mistakenly shot down its own combat aircraft, which struck with AGM-88 HARM cruise missiles. As a result of an accurate missile launch, the combat aircraft was shot down.

UKRAINE

Ukrainian Air Defences Shoot Down Friendly MiG-29 Fighter on Frontlines – Reports

Due to the lack of coordination in the Ukrainian army, the air defense of Ukraine mistakenly shot down its own combat aircraft, which struck with AGM-88 HARM cruise missiles. As a result of an accurate missile launch, the combat aircraft was shot down. However, according to preliminary data, the pilot managed to eject, although there is no information about his condition. According to the data provided by Ukrainian information resources, the Ukrainian MiG-29 fighter launched two cruise anti-radar missiles. However, for unknown reasons, was forced to return to the airfield by a different route. At this time, Ukrainian air defense systems detected the approach of an unidentified aircraft and opened fire on it, resulting in the fighter being shot down. It is known that the Ukrainian MiG-29 fighter was shot down in the area of the settlement. Kurakhovo in the Donetsk region, while it is specified that the Osa air defense system calculation opened the fire.

Any other circumstances of the incident by the Ukrainian military have not yet been announced. However, the current situation indicates that coordination between various units of the Ukrainian army is at a shallow level. The MiG-29 is a Soviet-designed air superiority fighter that has been in service with the Ukrainian Air Force since the dissolution of the Soviet Union in 1991. The MiG-29 is known for its agility, high speed, and advanced avionics and has been widely exported to other countries around the world. In Ukraine, the MiG-29 has played a key role in defending the country's airspace and has participated in various military operations. Despite being a relatively old design, the MiG-29 has undergone numerous upgrades and is a formidable fighter aircraft.

Source:https://www.defenceview.in/ukrainian-air-defences-shoot-down-friendly-mig-29-fighter-on-frontlines/, 08 January 2023.

USA–ITALY–UKRAINE

The USA Discussed with Italy the Transfer of SAMP-T Air Defense Systems to Ukraine

The US called on Italy to provide Ukraine with the next aid package as soon as possible, in particular, the SAMP-T anti-aircraft missile systems. The media sources in diplomatic circles shared that Jake Sullivan, the national security adviser to the US president, discussed the issue of supplying Ukraine with a new aid package from Italy in a conversation on January 5 with the diplomatic adviser of the Italian PM, Talo. According to sources, Sullivan called on Talo to speed up the transfer of air defense systems, particularly the Italian-French SAMP-T anti-aircraft missile complex.

The media writes that SAMP-T is a powerful system against aircraft, drones, and cruise missiles, but it has limited capabilities against ballistic missiles. Thus, the SAMP-T complex can protect such a large city as Kyiv. Italy has five working SAMP-T air defense batteries and one training battery in service. It lacks a launcher, but work on its modernization is already underway. At the political

level, Italy promised to transfer the SAMP-T air defense system to Ukraine a few weeks ago. However, the country's government has not yet approved this decision in the sixth decree on military aid to Ukraine.

Source: https://odessa-journal.com/the-usa-discussed-with-italy-the-transfer-of-samp-t-air-defense-systems-to-ukraine/, 07 January 2023.

EMERGING TECHNOLOGIES AND DETERRENCE

RUSSIA

Draft Design for Molten-Salt Research Reactor Plant in Russia

Russia's NA Dollezhal Research and Development Institute of Power Engineering (NIKIET) has completed the draft design for a research reactor with a circulating molten salt fuel (IZhSR) due to be built at the Federal State Unitary Enterprise Mining and Chemical Combine in Krasnoyarsk region. According to Rosatom, which includes NIKIET among its operations, the research reactor is intended "to develop ...reactors". Tretyakov, chief designer of research and isotope reactors of NIKIET, said that it had "in broad ...reactor facility." The work, carried out with the Kurchatov Institute, includes a detailed R&D programme with work already under way on structural materials, "the SNF processing module, the technology for preparing fuel and washing salts and other technologies". The next steps will be justifying the investment and the development of its technical design. The project is part of the wider Russian federal project to develop "new materials and technologies for advanced energy systems".

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Source: https://www.world-nuclear-news.org/Articles/Draft-design-for-molten-salt-research-reactor-plan, 06 January 2023.

USA

Holtec Debuts Innovative Decommissioning Technology

The company said the HI-CUT technology used at Indian Point unit 3 has exceeded expectations and "revolutionises" segmentation of reactors undergoing decommissioning. HI-CUT has been developed in a two-year programme to improve the efficacy of dismantling radiation-hardened and embrittled reactor internals and pressure vessels at retiring nuclear units with minimum personnel dose, assured control of spread of contamination and multi-layered protection to ensure personnel safety, the company said. The system was first deployed in November, segmenting Indian Point 3's upper reactor vessel internals at more than double the projected severance rates. The HI-CUT system has been tested on materials harder than severely irradiated reactor material under simulated conditions, with the test results informing the design, the company said.

Holtec claims its fleet approach to decommissioning means it can complete the physical work of decontamination and dismantlement decades sooner than if the current nuclear plant owner retains ownership of the plant.

Holtec Decommissioning International (HDI) President Trice said the company hopes to bring its decommissioning technologies - including an innovation which can reduce the number of containers needed to package nuclear waste - to other countries facing decommissioning "in the coming years". Holtec claims its fleet approach to decommissioning means it can complete the physical work of decontamination and dismantlement decades sooner than if the current nuclear plant owner retains ownership of the plant. HDI, a wholly-owned subsidiary of Holtec International, is the licensed operator for Holtec-owned NPPs and provides the licensee oversight of the decommissioning work that is performed.

Source: https://www.world-nuclear-news.org/Articles/Holtec-debuts-innovative-decommissioning-technology, 06 January 2023.

NUCLEAR ENERGY

BANGLADESH

Bangladesh Puts Energy Hopes in First NPP, Despite Delay

Daily power outages over the summer due to fuel shortages, worsened by Russia's invasion of Ukraine, show the need for the Rooppur NPP, some experts say, but others question the cost and safety of the project. The Rooppur NPP, with a planned power generation capacity of 2,400 MW, is to add Bangladesh to the list of more than 30 nations that have operating reactors. Since the summer, Bangladesh has grappled with power cuts amid spiking fuel prices around the world — and nuclear energy is seen by some experts as a potential way out.

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However, construction delays, cost concerns and public fears about nuclear safety are clouding the outlook for the new plant. Bangladesh's power generation capacity exceeds demand — but the fuel needed to run existing plants partly relies on imports, including one-quarter of natural gas used, with prices rocketing this year after Russia's invasion of Ukraine. The South Asian nation experienced daily power outages in the summer last year due to gas supply shortages, which have eased as winter set in and demand for cooling dropped off, especially in Dhaka. Many Rooppur residents think that work on the NPP would drag on beyond the initial timeline. Some experts and members of the public are worried about safety, following the 1986 Chernobyl disaster in Ukraine and Japan's 2011 Fukushima Dai-ichi NPP crisis.

Source: https://www.taipeitimes.com/News/biz/archives/2023/01/08/2003792171, 08 January 2023.

FINLAND

OL3 Nuclear Plant in Finland Restarts Test Production

The Olkiluoto 3 (OL3) nuclear reactor in Finland has begun test production of electricity again following a disruption of two months, Reuters reported citing operator Teollisuuden Voima (TVO). Reliance on the plant has grown amid the energy crisis emanating from Russia's military attack on Ukraine. Russia had been a key energy supplier to Europe. Finland too has been bracing up for blackouts his winter. However, OL3 has suffered multiple technical issues, leading to several delays. In October this year, cracks were found in four feedwater pumps of the reactor, which are crucial to the facility's power output.

Reliance on the plant has grown amid the energy crisis emanating from Russia's military attack on Ukraine. Russia had been a key energy supplier to Europe. Finland too has been bracing up for blackouts his winter.

However, these pumps did not result in risk to security, operator TVO stated. Test output was slated to resume on 27 December though was deferred by one more day. Billed to be the most powerful NPP in Europe and third most powerful worldwide at 1,600 MW, Olkiluoto 3 reached full power in September. The plant is expected to start permanent production on 8 March 2023 after conducting tests at various output levels. This reactor has been under construction in Finland since 2005, marking the country's first new NPP in more than 40 years. It is also the first such facility in Europe in nearly 15 years. The plant, which will provide almost 14% of Finland's electricity, reached first criticality a year ago.

Source: https://www.power-technology.com/news/ol3-finland-test-production/, 29 December 2022.

ROMANIA

NuScale Marks SMR Progress in USA, Romania

NuScale Power Corporation has submitted an application for approval of its updated SMRdesign to US nuclear regulators. The company has also signed a contract with Romania's RoPower Nuclear S.A. for front-end engineering and design work toward the deployment of a VOYGR-6 SMR power plant at Doice'ti. The NuScale Power Module, on which the company's VOYGR plants are based, is a pressurised water reactor incorporating all the components for steam generation and heat exchange. The US Nuclear Regulatory Commission (NRC) issued a Final Safety Evaluation Report (FSER) for the design in September 2020, approving it for use in the USA - the only SMR design to date to receive such approval. Later that year, after further studies supported by increased analysis and test data, NuScale concluded that the technology could generate 25% more power per module, for a total of 77 MW per module (gross). It therefore decided to seek approval of a six-module design, instead of the 12-module configuration that was in the previously approved design. The Portland, Oregon-headquartered company said it completed the submission of its Standard Design Approval (SDA) application for the updated design - based on the six-module VOYGR-6 plant configuration, powered by the 77 MW module - on 1 January. The design features the same fundamental safety case and passive safety features approved by the NRC in 2020, the company said.

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Source: https://www.world-nuclear-news.org/Articles/NuScale-marks-SMR-progress-in-USA,-Romaniaa, 05 January 2023.

RUSSIA

Outer Dome Installed at Kursk II-1

The dome of the outer containment shell has been hoisted into place at the first reactor under construction at the Kursk II NPP, Russian state nuclear corporation Rosatom announced. The installation was preceded by the pre-assembly of the components on a special site on the ground. The lower part of the dome - a large-sized structure weighing 235 tonnes - was initially assembled. Five days later the upper part of the dome - with a diameter of 34.7 metres and weighing 175 tonnes - was assembled. Now with the outer dome in place, the unit's containment building has a height of 65.4 metres. The assembly and installation of the dome was performed by specialists from the Kursk branch of Trest RosSEM LLC, part of Rosatom's engineering division. Kursk II is a new power plant under construction, intended to replace the four older units of Kursk, which will retire from service from 2022 to 2031. The new units are the VVER-TOI design by Gidropress, which are optimised with a focus on digital manufacturing and operation.

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Source: https://www.world-nuclear-news.org/Articles/Outer-dome-installed-at-Kursk-II-1, 05 January 2023.

SOUTH KOREA

Samsung Completes Design of CMSR Power Barge

South Korean shipbuilder Samsung Heavy Industries (SHI) has completed the conceptual design for the CMSR Power Barge - a floating NPP based on compact molten salt reactors - and

obtained the basic certification of the design from the American Bureau of Shipping (ABS). In December 2020, ABS said it had completed a new technology qualification of a compact molten salt reactor (CMSR) developed by Danish company Seaborg Technologies. The concept was found to satisfy the Feasibility Stage, the first milestone in the ABS New Technology Qualification process.

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In April last year, SHI and Seaborg signed a Memorandum of Understanding to manufacture and sell turnkey power plants combining SHI's ship-building expertise and Seaborg's CMSR. It also covered the development of hydrogen production plants and ammonia plants. Seaborg's design is for modular CMSR power barges that can produce between 200 MW and 800 MW of electricity, with an operational life of 24 years. Instead of having solid fuel rods that need constant cooling, the CMSR's fuel is mixed in a liquid salt that acts as a coolant, which means that it will simply shut down and solidify in case of emergency.

ABS has now issued an Approval In Principle (AIP) to SHI for using the CMSR design in the CMSR Power Barge.

Source: https://www.world-nuclear-news.org/Articles/Samsung-completes-design-of-CMSR-Power-Barge, 04 January 2023.

UK

Copenhagen Atomics Puts Forward SMR Design for UK Appraisal

UK Atomics - a subsidiary of Denmark's Copenhagen Atomics - has submitted a Generic Design Assessment (GDA) entry application for its small and modular thorium molten salt reactor to the UK Department for Business, Energy and Industrial Strategy (BEIS). GDA is a process carried out by the Office for Nuclear Regulation (ONR) and the Environment Agency (EA) to assess the safety, security, and environmental protection aspects of a NPP design that is intended to be deployed in Great Britain. The reactor design utilises innovative technologies to generate energy through a thorium molten salt reactor, enabling clean, reliable and cheap energy for the world," the company said. "This ... produce energy."

A prototype reactor has already been constructed at a new facility in Copenhagen which "will be tested to support the goal-oriented approval process". According to Copenhagen Atomics, UK Atomics, who will build, own and operate a fleet of autonomous reactors, "eventually numbering in thousands", will deploy the reactors. This business model, selling energy-as-a-service, will enable a cost-effective and low-risk deployment. The first commercial reactor is scheduled to begin operating in 2028.

UK Atomics - a subsidiary of Denmark's Copenhagen Atomics - has submitted a Generic Design Assessment (GDA) entry application for its small and modular thorium molten salt reactor to the UK Department for Business, Energy and Industrial Strategy (BEIS).

Source: https://www.world-nuclear-news.org/Articles/Copenhagen-Atomics-puts-forward-SMR-design-for-UK, 05 January 2023.

SMALL MODULAR REACTORS

CHINA

Small Modular Reactors to Power Green Push

The world's first commercial onshore SMR project is expected to play a major role in facilitating the country's low-carbon energy transition while helping ensure domestic energy security, said industry experts. SMRs, which are defined as advanced reactors producing electricity of up to 300 MW per module, can meet the demand for flexible power generation for a wider range of users and applications, including island power

generation and industrial park heating. It further offers the possibility of combining nuclear with alternative energy sources, including renewables, and sharing broad application prospects, said Zuoxian, head of intelligence and research at the Sinopec Economics and Development Research Institute.

As China has been leading in SMR projects, chances are high that the technology can further benefit countries and regions participating in the Belt and Road Initiative, as well as nations in the Middle East, including Saudi Arabia and the UAE, Luo said. Global interest in small and medium-sized or modular reactors has been increasing due to their ability to meet the need for flexible power generation for a wider range of users and applications and replace aging fossil fuel-fired power plants, according to the IAEA.

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Source:https://www.chinadaily.com.cn/a/202301/06/WS63b777d da31057 c47eba7fa5.html, 06 January 2023.

JAPAN–USA

Japan, U.S. to Step Up Cooperation in Developing Next-Generation Reactors

Japan and the US are arranging to strengthen cooperation in the development of next-generation reactors and other areas of nuclear energy, according to sources. Thanks to Japan's drastic shift away from a policy under which there were no plans to construct or rebuild nuclear reactors, Tokyo and Washington are set to once again share similar intentions for NPPs. Economy, Trade and Industry Minister Nishimura, who is currently visiting the US, is scheduled to meet with U.S. Secretary of Energy Granholm in Washington to confirm the deepening of cooperative relations. The two are expected to focus on the development of advanced light water reactors, which are believed to be safer than conventional reactors, and SMRs, which the US has taken the initiative in developing.

Nishimura will explain at the meeting a framework designed by the Japanese government that would allow nuclear reactors to effectively operate for more than 60 years and a policy to promote the construction of next-generation reactors with a view to rebuilding existing ones, according to the sources. The Japanese and U.S. ministers will discuss how NPPs can be used to realize a decarbonized society and the future of next-generation reactors, the sources said. At the meeting, the two are also expected to discuss concerns about the growing shortage of natural gas in the wake of Russia's invasion of Ukraine. Japan hopes to secure a stable supply of natural gas from the US.

The Japanese and U.S. ministers will discuss how NPPs can be used to realize a decarbonized society and the future of next-generation reactors, the sources said. At the meeting, the two are also expected to discuss concerns about the growing shortage of natural gas in the wake of Russia's invasion of Ukraine. Japan hopes to secure a stable supply of natural gas from the US.

Source: https://japannews. yomiuri.co.jp/politics/politics-government/20230108-82719/, 08 January 2023.

ROMANIA–USA

Romanian Consortium Hires US NuScale for Engineering and Design of SMR Nuke Plant

Romanian joint-venture RoPower Nuclear, owned in equal shares by state-controlled Nuclearelectrica and private energy company Nova Power & Gas, marked a significant step toward the deployment of the first SMR power plant in Romania when hiring on December 28 the US company NuScale Power for engineering and design work. Phase 1 of the Front-End Engineering and Design (FEED) work awarded to NuScale will define the major site and specific inputs for a

VOYGR-6 SMR power plant to be deployed at the Doicesti Power Station site in Romania, NuScale announced in a press release.

On November 4, 2021, at the UN Conference on Climate Change (COP26), NuScale and Nuclearelectrica signed a Teaming Agreement to advance the implementation of the first small-scale modular reactor in Europe in the presence of Romanian Minster of Energy, Popescu.

Following the allocation of a grant of USD 14 mln, announced by US President Biden in June 2022, the project company RoPower Nuclear will start the preliminary stage of the Front-End Engineering and Design study (FEED Study) for SMRs, Nuclearelectrica announced in September. The Doicesti candidate site, previously hosting a thermal power plant, was selected following an in-depth study based on a USD 1.2 mln grant obtained by Nuclerelectrica from the USTDA to identify and evaluate the potential sites for the SMRs. The site was owned by Nova Power & Gas, which thus became Nuclearelectrica's partner in the project designed to implement NuScale's SMRs in Romania. On November 4, 2021, at the UN Conference on Climate Change (COP26), NuScale and Nuclearelectrica signed a Teaming Agreement to advance the implementation of the first small-scale modular reactor in Europe in the presence of Romanian Minster of Energy, Popescu.

Source:https://www. romania-insider.com/ romania-nuscale-engineering-design-nuclear-plant, 05 January 2023.

UK

UK Ramps Up Outreach to Develop Small Nuclear Reactor Fleet

The U.K. government's push to develop more nuclear power as a cleaner energy alternative is going beyond its November buyout of China's interest in the planned 3.3-GW Sizewell C plant and a new 50% stake in the firm developing the megaproject on England's east coast. The government also is seeking proposals from developer and construction sector teams for SMR technology to expedite its fossil fuel transition. As part of an energy strategy announced last spring, Britain has committed to greater SMR investment and has formed Great British Nuclear to bring forward new projects to help meet a target of up to 24 GW of nuclear energy production capacity by 2050. This would represent an increase from 15% to about 25% of forecasted electricity demand, it said. The government also has set up the Future Nuclear Enabling Fund to financially support new nuclear projects.

Source: https://www.enr.com/articles/55677-uk-ramps-up-outreach-to-develop-small-nuclear-reactor-fleet, 30 December 2022.

USA

NuScale Seeks NRC Approval for Uprated SMR Design

NuScale Power said it submitted a second standard design approval application to the U.S. Nuclear Regulatory Commission for its updated SMR design, the latest development as the company prepares to bring its advanced nuclear technology to market by the end of the decade. The submitted design is based on the Portland, Oregon company's VOYGR-6, a six-module configuration powered by an uprated 250 MW (77 MW) module.

NuScale Power said it submitted a second standard design approval application to the U.S. Nuclear Regulatory Commission for its updated SMR design, the latest development as the company prepares to bring its advanced nuclear technology to market by the end of the decade.

In November 2020, NuScale concluded said its technology could generate 25 percent more power per module, at 77 MW each. As a result, the company decided to seek approval of the VOYGR-6 design instead of the 12-module configuration that was in the design approved by the NRC that year.

NuScale said all parts of the updated application were submitted to regulators on January 1, 2023, including a Final Safety Analysis Report (FSAR). NuScale's SMR is a pressurized water reactor that

can be scaled depending on need. The company's 12-module VOYGR-12 power plant can generate 924 MW. Its four-module VOYGR-4 can generate 308 MW. VOYGR is the official name of NuScale's SMR, which it plans to deploy for Utah Associated Municipal Power Systems' (UAMPS) Carbon Free Power Project (CFPP) at the Idaho National Lab (INL).

Source: https://www.power-eng.com/nuclear/nuscale-seeks-nrc-approval-for-uprated-smr-design/#gref, 06 January 2023.

NUCLEAR COOPERATION

BULGARIA–FRANCE

Kozloduy and Framatome Sign Nuclear Fuel Agreement

The agreement with France's Framatome follows a deal with US firm Westinghouse and is part of the Bulgarian NPP's diversification of nuclear fuel supply. Bulgarian energy minister Rossen Hristov said the agreement signed on 30 December made it "an important day in the history" of the Kozloduy NPP as it diversifies fuel supplies for the country's NPP - moving from its previous Russian supplier, TVEL, to the US and French suppliers for the VVER-1000 reactors.

France's Framatome follows a deal with US firm Westinghouse and is part of the Bulgarian NPP's diversification of nuclear fuel supply.

On 22 December, a contract for the production and supply of assemblies with fresh nuclear fuel for the fifth unit of the Kozloduy plant was signed with Westinghouse. The agreement with Framatome also sets out the schedule of future negotiations and the conclusion of a contract for the supply of fresh nuclear fuel for the sixth unit. The two parties will conclude a contract for up to 12 recharges for the period 2025-2034 inclusive. The Kozloduy plant is in the northwest of Bulgaria on the Danube River and provides about 34% of the country's electricity. It features two Russian-designed VVER-1000 units currently in operation, which have both been through refurbishment and life extension programmes to enable extension of operation from 30 to 60 years.

Source: https://world-nuclear-news.org/Articles/Kozloduy-and-Framatome-sign-nuclear-fuel-agreement, 04 January 2023.

CZECH REPUBLIC–RUSSIA

The Czech Republic has Stopped Joint Nuclear Research with Russia and Terminated the Agreement

From January 1, 2023, the Czech Republic officially ceased cooperation with the Russian Joint Institute for Nuclear Research in Dubna near Moscow. As stated in the statement of the Czech government, the main reason for this decision was the military aggression of the Russia Federation against Ukraine. The process of refusing such cooperation with a long-term Russian partner was launched in April 2022, but Czech President Zeman put the last point by signing the corresponding document. "Russia ... rights," the resolution says. Even earlier, the Ministry of Education of the Czech Republic decided to terminate its employees' participation in the Russian organization's research activities. According to the agency, the termination of membership will not be a significant limitation for Czech research.

From January 1, 2023, the Czech Republic officially ceased cooperation with the Russian Joint Institute for Nuclear Research in Dubna near Moscow.

Source: https://odessa-journal.com/the-czech-republic-has-stopped-joint-nuclear-research-with-russia-and-terminated-the-agreement/, 01 January 2023.

SWEDEN–FRANCE

Sweden Turns to France as it Looks to Buy Two New Nuclear Reactors

Sweden and France could be set to join forces to build new nuclear power stations in the Nordic nation, to boost domestic power production and guarantee security of supply. Swedish PM Kristersson outlined the possible partnership in Paris on his first trip to an EU capital since Sweden

took over the six-month rotating EU Council Presidency on 1 January. Kristersson came to power in mid-October. Although his party was only the third most popular in the general election, he was able to form an alliance with the far-right Sweden Democrats who wield enormous influence over all aspects of Kristersson's policy programme for government. Sweden "needs to buy two nuclear reactors", Kristersson told Swedish journalists during his visit to Paris.

Sweden currently has six reactors in operation at three different plants, commissioned between 1975 and 1985. Several other reactors have been shut down since 1999. The Nordic countries have long been one of the French nuclear industry's hopes for an atomic power revival in Europe. After a 17-year construction period that was filled with delays and false-starts, France's Areva has built Europe's first EPR — pressurised water — reactor in Sweden's neighbour, Finland. The Swedish PM expressed his desire to strengthen cooperation with France in the defence and space sectors. The two leaders reaffirmed Europe's determination to support Ukraine in the tenth month of the Russian offensive, as winter sets in.

Source: https://www.euronews.com/2023/01/03/sweden-turns-to-france-as-it-looks-to-buy-two-new-nuclear-reactors, 03 January 2023.

URANIUM PRODUCTION

FINLAND

Finnish Company Plans to Start Extracting Uranium, in a First for Europe

Terrafame, a Finnish mining and metal processing company, announced that it has started preparing operations for uranium recovery, which would make it the only such site in all of Europe. A specially designed recovery plant has been built at its industrial site in Sotkamo (Eastern Finland) and it is expected to operate at full capacity in 2026. The move is sure to play a significant role in helping to prop up Europe's energy self-sufficiency. The uranium, which will be recovered as a by-product from metal ore, will be used as fuel for NPPs.

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Although nuclear energy production is environmentally clean, it also ties Europe into a dependency on foreign actors. 85% of the world's uranium is produced in six countries: Kazakhstan, Canada, Australia, Namibia, Niger, and Russia. The production process will allow for low concentrations of natural uranium found in locally mined ore to be used as a by-product. Terrafame has a ready-built uranium recovery plant and is now preparing it for operational use. In total, the launch will require an investment of approximately 20 million euros.The uranium recovered by Terrafame will be transported abroad for further processing, after which it will be used in nuclear energy production.

Source: https://www.themayor.eu/en/a/view/finnish-company-plans-to-start-extracting-uranium-in-a-first-for-europe-11351, 29 December 2022.

INDONESIA

Indonesia Adopts Regulation on Uranium Mining and Prepares for Possible NPP

The head of nuclear research at Indonesia's National Research & Innovation Agency (BRIN), Awaludin, says the National Energy Council (DEN) is preparing to establish a Nuclear Energy Programme Implementation Organisation (NEPIO) to improve the investment climate for the construction of NPPs. According to BRIN's Awaludin, Indonesia has uranium reserves of some 90,000 tonnes and thorium reserves of around 140,000 tonnes - enough to power 10 1,000MW nuclear for 30 years. However, he acknowledged that processing the raw materials to power the plants would be difficult. He said he hoped that Government Regulation 52/2022 on safe and secure mining of nuclear materials, which came into effect on 12 December, would encourage relevant parties to jump-start this process in Indonesia.

The new regulation requires businesses to complete a safety analysis before beginning to mine for nuclear materials. This includes a feasibility study, a design and construction plan for the mine, as well as emergency responses and countermeasures in case of a nuclear accident. In addition, businesses are required to manage their nuclear waste and conduct radiation exposure training programmes. Mining firms are also required to formally agree that they will not work in service of the development of nuclear weapons. They must submit a business and development plan and regularly provide authorities with an updated inventory of nuclear materials mined and imports of any special equipment.

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According to 2020 data from the National Nuclear Power Agency (Batan), Indonesia has uranium resources of 81,090 tons and thorium totalling 140,411 tons. These are located in several areas, including in Sumatra, Kalimantan and Sulawesi. Sumatra has a total of 31,567 tons of uranium and 126,821 tons of thorium; Kalimantan has some 45,731 tons of uranium and 7,028 tons of thorium; and Sulawesi has 3,793 tons of uranium and 6,562 tons of thorium.

Kazakhstan's state-owned nuclear company has delivered a batch of uranium to Canada via the Middle Corridor, a transport route that is in growing demand as exporters seek to bypass sanctions-hit Russia.

Source: https://www.neimagazine.com/news/newsindonesia-adopts-regulation-on-uranium-mining-and-prepares-for-possible-npp-10485065, 03 January 2023.

KAZAKHSTAN

Kazakhstan Moving Uranium Exports Through Middle Corridor

Kazakhstan's state-owned nuclear company has delivered a batch of uranium to Canada via the Middle Corridor, a transport route that is in growing demand as exporters seek to bypass sanctions-hit Russia. Kazatomprom "announces it has completed a physical delivery of natural uranium using the Trans-Caspian International Transport Route (TITR)," the company reported last month. The TITR is the official name of a route from China to Europe that entails crossing the Caspian Sea, loading goods onto trains and trucks in Azerbaijan and sending them onward to Georgia and Turkey.

This was not the first time Kazatomprom had used the Middle Corridor. But international sanctions against Kazakhstan's northern neighbor is a primary motivation for turning to the Middle Corridor now, the statement made clear. Part of the uranium batch was supplied by Kazatomprom itself, and part came from Inkai, a joint venture between the company and Canadian nuclear firm Cameco, which owns a 40 percent stake in Inkai. Freight traffic along the Middle Corridor increased exponentially following the imposition of stringent sanctions against Russia over its invasion of Ukraine, which have made companies leery of the shorter northern route to ports in the EU. Kazakhstan also plans to start exporting a small amount of its oil, the bulk of which is shipped abroad via Russia, through the Middle Corridor this year.

Source: https://www.eurasiareview.com/04012023-kazakhstan-moving-uranium-exports-through-middle-corridor/, 04 January 2023.

UK

Britain Opens Nuclear Fuel Fund with Goal of Cutting its Dependence on Russia

Britain said its $90.5 million fund aimed at helping boost domestic production of nuclear fuel for power plants and cutting reliance on Russian uranium supplies is open for applications. The fund, announced in July, will award grants to businesses involved in uranium conversion, a key

stage in the process of creating nuclear fuel from the metal. It will remain open for applications from Monday until Feb. 20. Russia currently owns around 20% of global uranium conversion capacity. Up to 13 million pounds from the fund has already been awarded to the Springfields nuclear fuel manufacturing site in northwest England, the government said. Energy supply has become a key focus since Russia's invasion of Ukraine drove costs sharply higher. Planned additions to nuclear electricity generation capacity will reduce Britain's reliance on natural gas, which fueled around 45% of generation in 2021.

The U.S. Department of Energy's National Nuclear Security Administration (NNSA) has awarded a trio of companies with contracts to supply the country with domestically produced uranium oxide. The aim is to boost local uranium production to such a degree that the US is not reliant on overseas suppliers for critical imports such as uranium.

Source: https://www.cnbc.com/2023/01/02/uranium-conversion-uk-opens-nuclear-fund-to-cut-reliance-on-russia.html, 01 January 2023.

USA

Three US Firms win Contracts to Supply Uranium Strategic Reserve

The U.S. Department of Energy's National Nuclear Security Administration (NNSA) has awarded a trio of companies with contracts to supply the country with domestically produced uranium oxide. The aim is to boost local uranium production to such a degree that the US is not reliant on overseas suppliers for critical imports such as uranium. Earlier this year, the NNSA issued a solicitation to buy up to a million pounds of uranium oxide (U308) from the domestic market as part of national efforts to initiate the country's strategic uranium reserve.

Energy Fuels Inc. and Strata Energy Inc., a subsidiary of Peninsula Inc., announced nearly a fortnight ago that the NNSA had chosen them to supply U308. enCore Energy, a Texas-based uranium producer, announced a few days later that it had also been awarded a contract to supply uranium oxide to the reserve. According to enCore Energy, it has been contracted to supply 10,000 pounds of U308 at $70.50 per pound. Once this uranium strategic reserve is full, the US will have a back-up uranium supply for American consumers to fall back on in case there is another severe market disruption.

Source: https://www. miningnewswire.com/three-us-firms-win-contracts-to-supply-uranium-strategic-reserve/, 29 December 2022.

NUCLEAR PROLIFERATION

IRAN

'Iran has Enough Enriched Uranium to Make 4 Nuclear Bombs,' Israeli Army Says

Iran currently has enough enriched uranium to make four nuclear bombs, Israel's outgoing military chief informed reporters. "Iran today has enough enriched material to produce four nuclear bombs, three at 20 per cent and one at 60 per cent," Israeli public broadcaster Kan reported outgoing Chief of Staff Aviv Kochavi telling reporters.

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Kochavi shared that over the last year, the Israeli army prepared three programmes to launch an attack in Iran as a retaliatory strike, unrelated to the nuclear programme, to destroy nuclear facilities supporting the nuclear project. Regarding targets for the Israeli army in Iran, he shared: "If it comes to entering a major battle, military sites and additional sites will be included in the list of targets."

Kochavi added: "We have been engaged in accelerating preparations to attack Iran's nuclear facilities in recent years and many other types of targets." According to Kochavi, the Israeli army has improved its intelligence related to targets in Iran and prepared enough munition for all of them. Kochavi also said that there are thousands of Hezbollah targets in Lebanon, ranging from underground arsenals to homes where missiles are hidden, noting that Israel has thousands of targets in Lebanon – far more than 3,000-6,000 targets. ...

Cold River has been involved in dozens of recent high-profile hacking incidents A Russian hacking team known as Cold River targeted three nuclear research laboratories in the US this past summer, according to internet records reviewed by Reuters and five cybersecurity experts.

Source:https://www. middleeastmonitor.com/20230114-iran-has-enough-enriched-uranium-to-make-4-nuclear-bombs-israeli-army-says/, 14 January 2023.

NUCLEAR SECURITY

USA

Russian Hackers Targeted US Nuclear Labs amid Vladimir Putin's Threats

A team known as Cold River conducted a digital blitz over the summer, as Putin indicated Russia was willing to use nukes to defend its territory Dubbed 'one of the most important hacking groups you've never heard of', Cold River has been involved in dozens of recent high-profile hacking incidents A Russian hacking team known as Cold River targeted three nuclear research laboratories in the US this past summer, according to internet records reviewed by Reuters and five cybersecurity experts.

Cold River has been involved in dozens of recent high-profile hacking incidents A Russian hacking team known as Cold River targeted three nuclear research laboratories in the US this past summer, according to internet records reviewed by Reuters and five cybersecurity experts.

Between August and September, as President Putin indicated Russia would be willing to use nuclear weapons to defend its territory, Cold River targeted the Brookhaven (BNL), Argonne (ANL) and Lawrence Livermore National Laboratories (LLNL), according to internet records that showed the hackers creating fake login pages for each institution and emailing nuclear scientists in a bid to make them reveal their passwords. Cold River has escalated its hacking campaign against Kyiv's allies since the invasion of Ukraine, according to cybersecurity researchers and western government officials. The digital blitz against the US labs occurred as UN experts entered Russian-controlled Ukrainian territory to inspect Europe's biggest atomic power plant and assess the risk of what both sides said could be a devastating radiation disaster amid heavy shelling nearby.

Source:https://www. scmp.com/news/world/russia-central-asia/article/3205925/russian-hackers-targeted-us-nuclear-labs-amid-vladimir-putins-threats?utm_source=rss_feed, 07 January 2023.

NUCLEAR SAFETY

JAPAN

New Report Details IAEA's Independent Checks of Treated Water Discharge from Fukushima Daiichi

Japan's TEPCO, operator of the Fukushima Daiichi NPP, is required to determine the characteristics and activity of the ALPS treated water to be discharged into the sea. This characterization is used as a basis to establish and implement effective monitoring programmes to ensure that any public exposure due to the discharges is adequately considered.

The IAEA Task Force established to review the safety of Japan's plans to discharge the ALPS (Advanced Liquid Processing System) treated water stored at the Fukushima Daiichi NPP into the sea has today released its third report. The new report sets out how the Agency is conducting its own independent checks of key data related to the monitoring of the safety of the treated water before, during and after its discharge. This corroboration work is one of the three components in the Task Force's review of Japan's plans to

ensure they are in line with IAEA Safety Standards. The review also comprises assessments of the technical plans and of regulatory activities and processes related to the water discharge.

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Source: https://www.iaea.org/newscenter/pressreleases/new-report-details-iaeas-independent-checks-of-treated-water-discharge-from-fukushima-daiichi, 29 December 2022.

RUSSIA

Robots to be Used in Trials for REMIX Fuel

Russia's TVEL will begin the first trials of its TVS-5 fuel design in 2023 and manufacture the first assemblies robotically, a conference heard. Reporting on a conference held by the fuel specialist of Russia's Rosatom group, TVEL, the industry magazine Strana Rosatom listed a number of developments under way including TVEL's plans to begin trials of its TVS-5 design next year at one of the new VVER-1200 reactors at the Novovoronezh-II NPP. Three test fuel assemblies will be produced and used in the plant to gather real-life performance data before being taken for laboratory analysis.

Given good results, the fuel assembly design would be trialled on a larger scale before eventually being rolled out as a product offering. Russia's Rosenergoatom operates all the country's NPPs, while VVER-1200s are also under construction in Bangladesh, Egypt and Turkey. In addition, TVEL said that the trial assemblies will be produced by robots in a fully automated area without the presence of any workers, noting that this is a trial in itself. If successful, TVEL plans to create a pilot production line in 2025 at the Siberian Chemical Combine at Seversk.

Source: https://world-nuclear-news.org/Articles/Robots-to-be-used-in-trials-for-REMIX-fuel, 30 December 2022.

UKRAINE

Update 140 – IAEA DG Statement on Situation in Ukraine

Backup power to the Zaporizhzhya NPP was restored on January 6, after repairs to the 330 kV line, which was disconnected last week due to damage caused by shelling, were completed, the IAEA team currently present at the plant confirmed. The repair work of this last functioning external back up line – delayed by shelling in recent days – ensures that off-site electricity for essential nuclear safety and security functions can still be provided if the plant again loses connection to the 750 kV main external power line. The facility's supplies of electricity from the grid continue to be fragile, IAEA DG Grossi said today.

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Source: https://www.iaea. org/newscenter/pressreleases/update-140-iaea-director-general-statement-on-situation-in-ukraine, 07 January 2023.

Zaporizhzhia Nuclear Plant Loses Connection to Back-Up Power Line due to Shelling

The IAEA reported that late in the evening on Dec. 29, the last functioning back-up power line at

Europe's largest NPP, occupied by Russia, was disconnected as a result of shelling. "The facility's fragile supplies of electricity from the grid," the brief read. The last of the six plant's reactors was shut down in September due to the ongoing shelling, but still requires electricity for crucial cooling systems and "other essential nuclear safety and security functions," the IAEA reported. Both Russia and Ukraine have accused each other of shelling the plant. Independent investiagtions and satellite imagery have shown Russian military equipment placed inside turbine halls and beside reactor buildings, as well as rocket artillery shelling the opposite bank of the Dnipro River, which remains under Ukrainian control.

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Source:https://news.yahoo.com/iaea-zaporizhzhia-nuclear-plant-loses-195551603.html, 31 December 2022.

United Nation's Nuclear Watchdog IAEA to Increase Presence in Ukraine

The IAEA has said that it would step up its presence in Ukraine to help prevent a nuclear accident during the ongoing Russia-Ukraine conflict. The IAEA Director General Rafael Grossi said in a statement that he would travel to Ukraine next week to "establish a continuous presence of nuclear safety and security experts" at all of Ukraine's nuclear power facilities, Xinhua news agency reported. "This is an important step in our work to help Ukraine during these immensely difficult and challenging times," Grossi said. "Our nuclear safety and security experts will monitor the situation at the plants, assess their equipment and other needs, provide technical support and advice, and report their findings to IAEA headquarters."

The UN nuclear watchdog has previously established a permanent presence of up to four experts at the embattled Zaporizhzhia nuclear power plant (NPP), Ukraine's largest such facility, according to the statement. Ukraine and Russia have traded accusations of strikes on the Zaporizhzhia NPP, which has been controlled by Russian forces since last March. Grossi also said in the statement that he would meet senior Ukrainian government officials in Kiev next week to discuss setting up a nuclear safety zone around the Zaporizhzhia NPP. "I remain determined to make the much-needed protection zone a reality as soon as possible. My consultations with Ukraine and Russia are making progress, albeit not as fast as they should," Grossi said, adding that he remains hopeful about reaching an agreement on the issue soon.

Source: https://www.business-standard.com/article/international/united-nation-s-nuclear-watchdog-iaea-to-increase-presence-in-ukraine-123011400040_1.html, 14 January 2023.

NUCLEAR DISARMAMENT

DJIBOUTI

Djibouti Signs Treaty on the Prohibition of Nuclear Weapons

To date, 33 African countries have signed the TPNW, of which 15 have also ratified it. The TPNW complements and reinforces the 1996 Treaty of Pelindaba, which established Africa as a nuclear-weapon-free zone. The states parties to the Treaty of Pelindaba have called upon all African Union member states "to speedily sign and ratify the [TPNW]".

ICAN Executive Director, Beatrice Fihn, welcomed Djibouti's decision: " The steady increase in adherence to the landmark nuclear ban treaty reflects the strong desire of the international community to strengthen the global norm against nuclear weapons and see more rapid progress on disarmament."

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weapon-free zone. The states parties to the Treaty of Pelindaba have called upon all African Union member states "to speedily sign and ratify the [TPNW]".

Support for the TPNW: Djibouti has historically been a strong supporter of the TPNW. In 2016, Djibouti voted in favour of the UN General Assembly resolution that established the mandate for states to begin negotiations on "a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination," participated in the negotiation of the TPNW in 2017 and was among 122 states that voted in favour of its adoption.

More recently, in a statement to the United Nations in October 2022, Djibouti announced that it would adhere to the TPNW as part of its "commitment to peace and disarmament". It also encouraged other states that have not yet signed it to do so. In December 2022, Djibouti voted in favour of an annual UN General Assembly resolution calling on all states to sign, ratify, or accede to the TPNW "at the earliest possible date".

Source:https://www.icanw.org/djibouti_ tpnw_ signature, 09 January 2023.

NUCLEAR WASTE MANAGEMENT

MALAYSIA–GHANA

Borehole Disposal Projects Under Way in Malaysia and Ghana

The IAEA is providing technological and engineering support for the first-of-a-kind construction and implementation of borehole disposal facilities for disused sealed radioactive sources, as part of a pilot project under way in Malaysia and Ghana, funded by Canada. Most radioactive waste arising from nuclear applications consists of disused sealed radioactive sources (DSRSs). Radioactive sources are used in different devices in medical, industrial and agricultural facilities. According to the IAEA, for countries with limited amounts of radioactive waste, disposal could theoretically involve safe, secure and permanent placement inside boreholes, deep underground. The borehole disposal system is a detailed, engineering level system which enables the safe, secure and permanent disposal of all DSRSs categories (1-5) in specially constructed boreholes tens of metres into the earth.

In Malaysia, the preparatory work for the start of the borehole facility construction is now in its final stages and it is expected that the facility - which takes up to six weeks to build - will be operational soon. Ghana is also at an advanced stage of implementing its borehole project, with significant progress having been made in the regulatory authorisation processes. The borehole facility construction is expected to begin as soon as the licensing review process is completed.

The IAEA is providing technological and engineering support for the first-of-a-kind construction and implementation of borehole disposal facilities for disused sealed radioactive sources, as part of a pilot project under way in Malaysia and Ghana, funded by Canada.

Source: https://www.world-nuclear-news.org/ Articles/Borehole-disposal-projects-under-way-in-Malaysia-a, 06 January 2023.

NORWAY

NND Applies for Licenses for Norway's Nuclear Facilities

Norwegian Nuclear Decommissioning (NND - Norsk Nukleær Dekommisjonering) has applied for a licence to own and operate three nuclear facilities in Halden, Kjeller and Aurskog-Høland. The 7,525-page application was delivered directly to the Directorate for Radiation Protection & Nuclear Safety (DSA). The Halden and Kjeller facilities, currently owned by the Institute for Energy Technology (IFE), were closed down in 2018-19 and are awaiting decommissioning. They include the nuclear fuel and materials testing reactor at Halden and the JEEP-II neutron scattering facility at Kjeller.

The third facility is a combined storage and disposal facility for low and intermediate-level

radioactive waste (KLDRA) in Himdalen in Aurskog/Høland operated by IFE and owned by Statsbygg. NND previously submitted two partial applications in June and December 2021. It normally takes two years to process a licence application. Following processing of the application and a public consultation, DSA will make recommendations to the government, which will take the final decision on granting a licence to NND. NND is still in development but once the agency is fully operational and has obtained the necessary licences from DSA it will be the single point of contact for handling Norway's nuclear waste.

Source: https://www.neimagazine.com/news/newsnnd-applies-for-licences-for-norways-nuclear-facilities-10486142, 03 January 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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