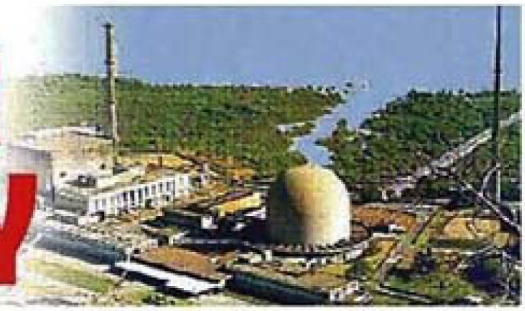
NUCLEAR SECURITY



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

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OPINION – Yonah Jeremy Bob

Iran's Latest Threat on Israel: An Arsenal of Nuclear Weapons

A report leaked by the IAEA on Tuesday [26 Dec] revealed that Iran has again sped up – or tripled – its pace of 60%-uranium enrichment at least as of late November. This reality places before Israel and the West a challenge more ominous than anything out of Gaza or Lebanon. The threat is no longer "just" one nuclear weapon, but rather a potential arsenal of them. At its current rate, Iran can roughly produce enough uranium for a new nuclear weapon every four and half months – if it decides to break out over the nuclear threshold. The threat may not be very imminent, though. For Hamas, it was a detrimental mistake to carry out the October 7 attack, since the IDF's response has either ended the group's 16-year rule or at the very least set it back five to 10 years.

Mutually Assured Destruction: In the same vein, for Iran, it would make no sense to launch nuclear weapons against Israel, given that the Jewish state reportedly retains 80 to 200 nuclear weapons, including the "triad" of land, air, and sea weapons. That means no matter how "successful" a nuclear attack by Tehran could be, the ayatollahs would face a much greater "second strike" by Jerusalem. But what October 7 reminded Israelis is that in the Middle East, especially when rife with fanatical religious messianism, fateful decisions are not always made by rational Western measurements.

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It turns out that Hamas leader Yahya Sinwar was either so confident in estimating Israel's weakness, or was so unsatisfied with his 16-year rule of Gaza in the shadow of a Zionist entity, that he was willing to risk everything just for the chance to flip the narrative. We may never fully know what Sinwar's goals were, but any Western rational thinker would have seen that the gravity of the threat of a massive Israeli counter-invasion outweighed whatever he could

have hoped to achieve. But Sinwar is not Western, and neither are the ayatollahs.

Perhaps one good development is that the Islamic Republic may be less likely to gamble on Israeli weakness, witnessing Sinwar's error. But if its leaders are less risk-averse than we think, a nuclear arsenal versus one nuclear weapon is a very big deal. Top Israeli officials already had said by the first half of this year that Iran possessed sufficient enriched uranium at the 60% and 20% levels that, if weaponized, could give it about half a dozen nuclear weapons. Enough uranium for an additional bomb every four and a half months is a handy recipe for a quick potential arsenal.

Top Israeli officials already had said by the first half of this year that Iran possessed sufficient enriched uranium at the 60% and 20% levels that, if weaponized, could give it about half a dozen nuclear weapons. Enough uranium for an additional bomb every four and a half months is a handy recipe for a quick potential arsenal.

The debate rages as to whether weaponization can be accomplished by Iran in six months or two years. The longer that IAEA inspectors are out of the country – Iran kicked out some of the most important inspectors in September – the more likely that gap period for weaponization could drop without anyone knowing. As long as Tehran was working on developing one or two nuclear weapons, even a Middle East-style version of rationality might have worried that trying to attack Israel with nuclear weapons made no sense, because if the one or two failed, they might achieve nothing and face a devastating Israeli response.

If the ayatollahs' new decision about nuclear breakout is not about whether to try for one or two weapons, but rather for an entire arsenal, then attacks against Israel could be more reliable and credible for Iran. An arsenal of nuclear weapons might also discourage Israel and the US from any preemptive strike because it would be harder to eliminate all the weapons, and missing even one could be a disaster.

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This is exactly the dilemma the world now faces with North Korea, which is estimated to have dozens of nuclear weapons. That is nothing compared with the thousands of nuclear weapons the US has, but it is enough of a deterrent that Pyongyang has been, for years, getting away with things that other countries could never dream of getting away with. Imagine if that power was in the hands of the more religiously fanatical ayatollahs. That is not to say a single nuclear weapon in Iran's hands was not a scary prospect, but a potential arsenal, especially after October 7, alters the entire picture.

Source: https://www.jpost.com/middle-east/article-779775, 27 December 2023.

OPINION – Li Zhe

US Plots to Undermine Regional Peace, Stability by Deploying Intermediate-Range Ballistic Missiles Overseas

US Pacific Army spokesman Rob Phillips recently said that the military plans to deploy IRBMs in the Indo-Pacific region in 2024. This will mark the country's inaugural deployment of land-based IRBMs in the region since the end of the Cold War, and also its first deployment of such weaponry after withdrawing from the INF Treaty in 2019. Such a move will inevitably raise the risk of regional wars and severely undermine global strategic stability.

According to the plan, the US will deploy the launch system code-named "Typhon" as well as land-based Standard SM-6 missiles and Tomahawk cruise missiles with a range of 500 to 2,700

kilometres. Among them, the Standard SM-6 missiles were originally designed as ship-borne air defence and anti-ship missiles with ground-strike capability, which feature a short range but rapid response and flight speeds, capable of striking certain sensitive targets. It is especially important to keep an eye on the US sea and air-based Tomahawk cruise missiles, which were previously installed with conventional warheads under the restrictions by the INF Treaty.

It is analysed that these IRBMs will be deployed to the so-called first island chain and second island chain military bases of the US, which have multiple purposes. To disrupt the anti-access/area denial capabilities of the opponents. In recent years, the US has been endeavouring to establish a joint all-domain manoeuvre operational posture characterised by dispersed forces and concentrated firepower in the Western Pacific region and to build miniaturised and multi-functional strike packages such as the Army's Multi-Domain Task Forces (MDTF).

Now, the US military may load it with nuclear warheads after re-initiation of this deployment. It is analysed that these IRBMs will be deployed to the so-called first island chain and second island chain military bases of the US, which have multiple purposes. To disrupt the anti-access/area denial capabilities of the opponents. In recent years, the US has been endeavouring to establish a joint all-domain manoeuvre operational posture characterised by dispersed forces and concentrated firepower in the Western Pacific region and to build miniaturised and multi-functional strike packages such as the Army's Multi-Domain Task Forces (MDTF), the Air Force Vanguards and the Marine Littoral Regiments, aiming to counter the anti-access/area denial capabilities of the adversaries. The Typhon system has been tested to be capable of deploying the Army's MDTFs, which will be empowered with diverse striking functions upon deployment in the Indo-Pacific, posing realistic threats to regional countries due to its advantages of shortened distance, improved accuracy, and reduced costs for striking missions.

To enrich deterrence options. Since the release of the 2018 Nuclear Posture Review, the US has stepped up efforts in shaping tailored deterrence capabilities, that is, to expand the available options and range of deterrence by combining large-scale retaliation and flexible response. In this context, the US has been focusing on the development and production of low-yield and dual-capable weapons in the past years, in a bid to generate a persistent sense of real security risks for the adversaries through indistinct nuclear threshold. Land-based IRBMs can effectively fill in the deterrence options for the US Army.

However, it must be noted that this type of weapon features due-capable, which will dramatically escalate the risk of nuclear wars. To strengthen strategic ties with allies. Despite the fact that countries like Japan, the ROK, and the Philippines are not proactive enough in responding to the US deployment of IRBMs, there is a real possibility that the US will deploy IRBMs on the territories of its Indo-Pacific allies and partners within a short time when situation requires son in the future, considering that Japan and the ROK have actively expressed desire to seek nuclear sharing with the US since 2022, and the Philippines has repeatedly promised to provide military bases for the US. This will undoubtedly disturb the relatively peaceful and tranquil security environment that has been maintained in the Asia-Pacific region for many years.

To push aggressively for self-serving arms control negotiations. In recent years, the US has been shaping public opinion to create the perception that China and Russia have gained an advantage in the deployment of intermediate-range missile weapons, but skirts around the fact of its continuous advance of military deployment in the name of providing extended deterrence and ensuring the so-called collective security for its allies and partners. The US deployment of IRBMs in the Indo-Pacific by clamouring the Russian and Chinese missile-based threats aims at replicating the carrot-and-stick policy of combining deterrence and persuasion that was used to force the Soviet

Union into the INF Treaty negotiations during the Cold War in an attempt to trap the opponent in a dilemma. The announcement of the deployment of intermediate-range missile weapons by the US is the epitome of its military pressure and containment in recent years.

For the time to come, the US military may continue to undermine global strategic stability and deteriorate the regional security environment by using approaches including further deploying land-based intermediate-range weapons such as the "Dark Eagle" hypersonic missiles and equipping submarines with Tomahawk anti-ship missiles. These actions warrant utmost caution from the international community.

Source: http://eng.chinamil.com.cn/OPINIONS_209196/Opinions_209197/16275333.html#:~:text=US%20Pacific%20Army%2 0spokesman%20Rob,Indo%2DPacifi c%2 0region%20in%202024, 21 December 2023.

OPINION – Sama Bilbao Y León

The Legacy of Eisenhower's Atoms for Peace Speech

Ladies and gentlemen, esteemed guests, and fellow advocates for a brighter future, it is an honour to stand before you today at this historic conference, commemorating seven decades of the enduring legacy of Atoms for Peace. Today, we gather not just to reflect on the past but to chart the course for a future energised by the transformative potential of nuclear energy.

Seventy years ago, in 1953, President Dwight D Eisenhower delivered his historic Atoms for Peace speech. On that day, he set out a vision to harness the power of the atom for the betterment of humanity, setting the stage for international cooperation in the pursuit of peace and prosperity - a vision that has grown into a lasting legacy. As we know, "it only takes one seed to grow a forest," and now, as we reflect on the past 70 years, we see that Eisenhower's vision has indeed germinated into a forest of possibilities for the peaceful uses of nuclear applications. Looking back, we have witnessed remarkable achievements in the peaceful application of nuclear technology. From powering our cities to advancing medical diagnostics and treatment, nuclear technology has become an indispensable ally in our pursuit of a brighter, sustainable future.

Today, there are 436 nuclear power reactors operating, and 213 more reactors that did operate for many years and are now shut down. All of these together have provided people in more than 30 countries with clean, reliable, and affordable electricity. Over the past 50 years they have avoided the emission of 80 billion tonnes of carbon dioxide, more than twice the total amount of carbon dioxide emitted globally each year.

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Beyond power generation, the world has seen more than 800 research reactors operate in 53 countries, in universities and research institutes, expanding our knowledge and the uses of nuclear science and technology for the benefit of humanity. Research and development are fundamental to the nuclear sector, with nuclear techniques reaching all areas of our lives: agriculture and the food we eat, historical and geological measurements, and producing life-saving medical radioisotopes. Lloyd's Register also shows that some 700 maritime nuclear reactors have been used at sea since the 1950s. Combined with land-based power and research reactors, that is more than 2000 nuclear reactors with tens of thousands of years of operating experience that have operated since that original seed was planted 70 years ago.

Moreover, nuclear technology has ventured beyond land and sea, and even beyond our planet,

supporting space exploration missions, demonstrating the versatility and adaptability of nuclear technology. Radioisotope thermoelectric generators, or RTGs, have powered a number of space missions and continue to propel human exploration beyond the realms of our solar system, with the Voyager space probes transmitting information back to earth since 1977, thanks to the power of nuclear technology.

Moreover, nuclear technology has ventured beyond land and sea, and even beyond our planet, supporting space exploration missions, demonstrating the versatility and adaptability of nuclear technology. Radioisotope thermoelectric generators, or RTGs, have powered a number of space missions and continue to propel human exploration beyond the realms of our solar system, with the Voyager space probes transmitting information back to earth since 1977, thanks to the power of nuclear technology.

From Apollo, Pioneer, Galileo, Cassini, and New Horizons space missions and the Martian rovers, Curiosity and Perseverance, nuclear technology is at the forefront of humanity's quest for knowledge and exploration. However, as we stand on the shoulders of all these significant accomplishments, we must also acknowledge the missed opportunities. Had we expanded the use of nuclear energy as fast and as widely as we originally planned, humanity might not be facing the climate crisis we are confronting today. Climate change is now an urgent threat to both the planet and humanity.

From hydrogen production, and water desalination to cogeneration for industrial processes and more. Nuclear innovation holds the key to unlocking a myriad of possibilities. The potential of nuclear energy extends far beyond what we have achieved to date.

For many years nuclear power plants have been the backbone of electricity generation, powering homes and industries around the world while significantly reducing greenhouse gas emissions. They have brought energy security, helping nations reduce their dependence on fossil fuels and stabilise their grids. But our vision extends beyond power generation. It encompasses a holistic approach to energy and sustainability, embracing non-power applications of nuclear technology. From hydrogen production, and water desalination to cogeneration for industrial processes and more. Nuclear innovation holds the key to unlocking a myriad of possibilities. The potential of nuclear energy extends far beyond what we have achieved to date.

Looking forward, we must paint an ambitious outlook for the nuclear sector, one that honours Eisenhower's vision and prepares us for the challenges and opportunities of the 21st century. The legacy of Atoms for Peace must inspire us to increase the contribution of nuclear for a better and brighter world. We must dream big and work tirelessly to transform those dreams into reality.

So, what are the key actions for us today that will lead us into this brighter future? First, safety and security will remain paramount. Our commitment to non-proliferation and safeguards is unwavering and was a pillar of the Atoms for Peace vision. We must continuously invest in research and development to enhance the safeguarding of nuclear materials. Second, we must prioritise sustainability. We know well the contribution of nuclear to mitigating climate change. Our actions must reflect a profound commitment to reducing impacts on the environment; by extending the life of existing nuclear power plants, we can maximise 24/7 clean energy contributions. The continued presence and integration of nuclear energy into a broader energy mix, alongside renewables, can help us achieve a more resilient, low-carbon future.

Third, innovation is the lifeblood of progress. We must accelerate the development and deployment of the next generation of reactor designs, such as small modular reactors and advanced-

generation technologies, which promise enhanced efficiency and applications beyond electricity. Let us also harness the power of technology outside of the nuclear sector, like artificial intelligence, automation, additive manufacturing and advanced materials, to revolutionise the nuclear industry.

Fourth, we must promote international collaboration. Nuclear energy knows no borders, and our collective success depends on our shared knowledge and experience. The legacy of Atoms for Peace calls upon us to work together, transcending geopolitical divides, to tackle global challenges like climate change and socio-economic inequity. We will succeed together or we will fail separately.

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Lastly, we must engage the public. Transparency, open dialogue and education are essential in dispelling misconceptions and building public trust in nuclear energy. An informed public can better appreciate the positive impact of nuclear technology on our world. Progress in these key areas of nuclear energy: security, sustainability, innovation, collaboration, and communication, can help advance our contribution to a brighter future for all.

The discovery and harnessing of the atom is considered one of the greatest achievements of humankind in the 20th Century. Let the 21st Century see full utilisation of the atom to attain a decarbonised planet and sustainable development for all. As we commemorate the 70th anniversary of President Eisenhower's visionary speech, Atoms for Peace, let us acknowledge the remarkable progress we've made, but let's also recognise the challenges that lie ahead.

The challenges ahead are formidable, but so is our collective resolve. I am speaking to you from COP28 in Dubai. This has been a very positive COP in which nuclear energy has been very visible. We saw something that has never happened at a COP before. Eight heads of state, and many more ministers, totalling 22 countries in 4 continents, openly declared their intention to work towards a goal of tripling global nuclear capacity by 2050.

And during the first ever COP Presidency event dedicated to nuclear energy, I had the honour and the pleasure to launch the Net Zero Nuclear Industry Pledge, endorsed by more than 120 companies, headquartered in 25 countries, and active in over 140 nations worldwide, matching the ambition and pragmatism shown by the 22 governments which signed the Nuclear Ministerial Declaration earlier in the week. Both the Ministerial Declaration and the Net Zero Nuclear Industry Pledge are more than a mere numerical target but a call to join efforts in materialising the full potential of nuclear energy. By tripling our capacity, we can amplify our impact on climate change mitigation, energy security, and technological innovation.

If we can achieve this feat together, overcoming barriers and challenges to extend and deploy nuclear energy and technology for a brighter future - then in 2050, when we look back 27 years, we will remember this moment as another marker of significance in the race to net-zero electrons and molecules. The discovery and harnessing of the atom is considered one of the greatest achievements of humankind in the 20th Century. Let the 21st Century see full utilisation of the atom to attain a decarbonised planet and sustainable development for all. As we commemorate the 70th anniversary of President Eisenhower's visionary speech, Atoms for Peace, let us acknowledge the remarkable progress we've made, but let's also recognise the challenges that lie ahead.

Our commitment to Eisenhower's legacy drives us to ensure that nuclear energy remains a

cornerstone of peace, prosperity, and sustainability for generations to come. Together, we can transform its promise into a living legacy - a legacy that transcends borders and benefits all of humanity. Let us dream big, work tirelessly, and transform those dreams into reality, for the legacy of Atoms for Peace is a legacy of hope, progress, and a better world for all.

Source: https://www.world-nuclear-news.org/Articles/Viewpoint-The-legacy-of-Eisenhower-s-Atoms-for-Pea, 14 December 2023.

OPINION – Zhao Huasheng

A Dangerous Gamble: The Russia-American Nuclear Game in the Ukraine Crisis

Since the outbreak of the Russian-Ukrainian conflict, Russia and the United States have been engaged in an almost open nuclear game, but in different forms and with different objectives. Both Russia and the United States are well aware of the presence of the nuclear weapons factor in this conflict. Russia's main objective is to deter the United States and NATO from directly intervening in the Russia-Ukraine conflict. The U.S., on the other hand, tends to believe that Russia will not or dare not use nuclear weapons and can, therefore, boldly provide military support to Ukraine. Both sides are at loggerheads, but both carry an internal logic of self-escalation that carries deadly risks. A week before the start of the special military operation, on February 17, Russia held nuclear exercises.

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On the fourth day of the Russo-Ukrainian military conflict, February 27, 2022, President Putin ordered strategic containment forces, including nuclear forces, to be placed on special operational readiness. This marked another step in the U.S.-Russian nuclear game. In his speech announcing the implementation of the special military operation, President Putin said that if there is an attempt to interfere, Russia will immediately respond and subject it to serious consequences never before experienced in its history. It is conceivable that the only thing capable of causing such unprecedented consequences would be nuclear weapons, which is a very stern warning.

However, unlike in the 2008 Georgian conflict and the 2014 Crimea incident, the United States and NATO reacted swiftly and firmly. Not only were they not deterred, but they immediately began to assist Ukraine, including militarily. Under these circumstances, the natural way to maintain the effectiveness of nuclear deterrence was to continue to raise the stakes, making the nuclear danger more real and realistic so that the U.S. and NATO would feel that this was not a bluff and would back off. The U.S. and NATO cannot ignore the risk of nuclear war, having developed a set of options to deal with Russia's possible use of nuclear weapons, but despite differences of opinion, the overall judgment of the U.S. is that a nuclear strike by Russia is unlikely and, if used at a tactical level, would be unlikely to endanger the U.S. homeland directly. White House spokesman Psaki dismissed Putin's warning as an "empty threat". Secretary of State John Blinken accused Putin of making nuclear threats and demanded that he stop "empty talk" about nuclear war.

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At the NATO Vilnius Summit in July 2023, NATO condemned Russia's nuclear rhetoric and coercive

nuclear signaling and called on Russia to reconfirm the January 2022 Joint Statement on the Prevention of Nuclear War and the Avoidance of Arms Rivalry, signed by the heads of the five nuclear powers, warning of the serious consequences of Russia's possible use of nuclear weapons, but the NATO response did not see a sense of urgency that nuclear war was imminent. The tendency toward cautiously optimistic estimates has dared the United States to increase its military assistance to Ukraine. Concluding that Russia is unlikely to launch a nuclear strike, the U.S. and NATO have not been afraid to break through the "red line" drawn by Russia, and have continued to deepen their involvement in the Russia-Ukrainian conflict. They have adopted the tactics of "boiling frog in warm water", carefully assessing the risks, step by step, making Russia irritated but not so angry as to cause it to take asymmetrical nuclear strikes.

Concluding that Russia is unlikely to launch a nuclear strike, the U.S. and NATO have not been afraid to break through the "red line" drawn by Russia, and have continued to deepen their involvement in the Russia-Ukrainian conflict. They have adopted the tactics of "boiling frog in warm water", carefully assessing the risks, step by step, making Russia irritated but not so angry as to cause it to take asymmetrical nuclear strikes.

The first heavy weapons provided to Ukraine by NATO countries were the old Soviet tanks, which the U.S. and NATO were not directly involved in, but were implemented through the former Warsaw Pact countries such as Poland, the Czech Republic and Hungary. Providing Ukraine with aging tanks has the dual benefit of meeting Ukraine's needs and cleaning up Soviet-style weapons that NATO state-members no longer need, and with relatively low sensitivity.

Subsequently, the U.S. and NATO countries began supplying advanced artillery directly to Ukraine. This crosses another threshold, breaking the taboo of the United States not to provide Ukraine with heavy weaponry, and the provision of HIMARS rockets and M777 howitzers by the U.S. to Ukraine has become the focus of public opinion for a while. In order to calm Russia and not to overreact, the United States said that it asked Ukraine not to use these weapons against the "Russian mainland" and keep the range to a shorter distance. Following the provision of artillery to Ukraine, the United States and NATO were planning to provide Ukraine with airplanes in another escalation of the West's confrontation with Russia. The approach adopted by the U.S. and NATO continues to be to provide old Soviet fighters first, still through the hands of the former Warsaw Pact countries. With the consent of the U.S. and Germany, Poland and Slovakia transferred a large number of MiG-29 fighters to the Ukrainian Air Force.

The supply of old Soviet tanks and airplanes to Ukraine was successfully accomplished, which opened the door for the direct supply of tanks and airplanes by the United States and NATO. After a short time of indecision, Germany reversed its position and announced in January 2023 that it had agreed to supply Ukraine with advanced Leopard-2 battle tanks, and the United States decided to supply Ukraine with M1 Abrams battle tanks. In May 2023, the U.S. also announced that it had agreed to supply Ukraine with F-16 fighter jets. At this point, the U.S. and NATO have provided Ukraine with the basic heavy weapons needed for modern warfare, including airplanes, tanks, and artillery, as well as a large number of other weapons and equipment of various types. But this was still not the limit. In July, the U.S. decided to supply Ukraine with cluster bombs, which are highly lethal to personnel, pushed the confrontation to an even higher point.

The Russia-Ukrainian conflict has brought the world violently to the brink of nuclear war, and the world has come so close to it that some people even consider it's even more dangerous than the Cuban Missile Crisis. This situation was unimaginable a few years ago, and one cannot but be surprised and dismayed. However, if we look back, we can feel that the occurrence of all this is not as sudden and incomprehensible as it seems at the first glance, and that it has the soil for brewing and forming, and is not born out of thin air and without a reason. The fundamental crux of the problem lies

in the U.S.-Russia relations, which are both the basic background and the direct cause of the current nuclear crisis.

Simply put, as the world's two super-nuclear powers, the relations of Russia and the U.S. are inseparable from nuclear risk; as long as the two countries form a military-strategic confrontation, nuclear risk naturally exists, and the deeper the confrontation, the greater the risk, and once they come to the level of direct or indirect military confrontation, it will bring the world to the brink of nuclear war. The Russia-Ukrainian conflict is the most serious military stand-off between Russia and the U.S. in last three-quarter century, and although it has been called a "proxy war", the United States is almost directly involved in it in the traditional understanding, and the two countries just don't want to "poke the last layer of window-paper" to keep the superficial reasons for avoiding a big war. But there is no doubt that the U.S. is present and is party to the conflict.

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Since the outbreak of the conflict, U.S. military aid to Ukraine has amounted to $43.7 billion, while Russia's military budget for 2020 was only $61.7 billion. 2023 will see a significant increase in Russia's military budget, which will be only slightly more than $100 billion. According to other sources, the Western aid to Ukraine since February 2022 has amounted to 160 billion dollars, of which military aid amounted to 75 billion dollars, with the United States taking the leading role in the aid to Ukraine, which amounted to 113 billion dollars. In fact, Ukraine could not support itself, militarily or financially, without the support of the U.S. and, more broadly, the West. Russia sees the United States and NATO as its main rivals, and its nuclear containment and threats are therefore mainly directed at the United States and NATO rather than Ukraine, and it is from this that the nuclear game has been emerging. In a certain sense, the current state of U.S.-Russia relations is even worse than during the Cold War.

During the Cold War, there was still basic mutual respect between the United States and the Soviet Union, and there was a tacit consensus to abide by common rules, there were acquiescent boundaries of interests, there were mechanisms of constraints, there was mutual nuclear inspection, and there was also a "hotline" between the White House and the Kremlin for emergency contact, but now all these are basically gone, Russia and the U.S. will be given a complete free hand in the field of nuclear arms control, and the two countries will enter a state where they are not bound by any rules or institutions. The nuclear game between the two is going with the flow, blindly moving forward in groping and guessing.

Before and after the collapse of the Soviet Union, there was a period of détente and even amity between the United States and Russia (USSR), a period of harvest in the field of nuclear disarmament, with the signing of the START, a significant reduction in the number of nuclear warheads, and an increase in the level of mutual trust between the two countries. In 1982, the USSR committed itself to the no-first-use of nuclear weapons, and in November 1985, at the U.S.-Soviet summit in Vienna, the so-called Reagan-Gorbachev paradigm emerged, which said "a nuclear war cannot be won and must not be fought." Although they were not the first to create this paradigm, it is true that it is due to them that it has become widespread. It was a period when nuclear risk was at its lowest and the possibility of nuclear war had almost completely disappeared.

After a brief romantic period following the end of the Cold War, Russia-American relations have undergone a shift in direction, gradually becoming worse and worse, until they became open

adversaries. The relationship between the U.S. and Russia in the military-strategic and nuclear spheres has changed accordingly, becoming increasingly hostile, and the two countries have shifted from a construction-oriented direction to a destruction-oriented trajectory in the field of arms control.

The United States withdrew from the ABM Treaty in 2002, the INF Treaty in 2019, and the Open Skies Treaty in 2020, followed by Russia's withdrawal from that treaty in 2021. In February 2023, Russia announced the suspension of the New START treaty, followed by the abrogation of the Treaty on Conventional Armed Forces in Europe (CFE) in May. In November 2023, Russia has completed the withdrawal of its ratification of the CTBT in order to be on an equal footing with the United States, which has never ratified the Treaty. Thus, the arms control systems that had been painstakingly built up were almost totally dismantled.

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At present, the New START, which has been suspended by Russia, will probably not be extended after its expiration. Against the background of the Russia-Ukrainian conflict, it will be difficult to start new negotiations, and if no new agreement can be reached when the treaty expires in 2026, Russia and the U.S. will completely be laissez-faire in the field of nuclear arms control, and the two countries will be entering a state where they will not be bound by any mutually accepted rules or systems. The military doctrines of Russia and the United States are changing accordingly as well, with the mutual targeting of each other as enemies becoming more explicit and overt. In U.S. defence and military strategy documents, the language against Russia has become increasingly harsh, with the latest 2022 U.S. National Defense Strategy Report positioning Russia as the most pressing threat, including a nuclear threat to the U.S. homeland.

The 2014 Russian Military Doctrine identified two conditions for the use of nuclear weapons, namely, an enemy attack on Russia with nuclear weapons and other weapons of mass destruction, or an attack on Russia with conventional weapons that pose a threat to the survival of the Russian state. The 2020 Russian Military Doctrine added two more conditions, namely, the receipt of credible information on the launch of ballistic missiles to attack the territories of Russia and/or allies; an attack on Russia's critical state or military facilities, the destruction of the functioning of which would result in a loss of nuclear countermeasure capability. At the annual Valdai conference in October 2023, President Putin succinctly articulated the conditions for Russia's use of nuclear weapons as two, one of which could be a nuclear attack on Russia and the other is a threat to Russia's national survival. Each country's nuclear strategic doctrine sets out the conditions for the use of nuclear weapons.

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However, the doctrines are generalized and inevitably have some ambiguity and openness to interpretation. Decisions ultimately depend on the interpretation and judgment of the decision-maker. In other words, theory is static, while reality is dynamic. This also means that there is no safety valve in the bilateral nuclear game, which does

not necessarily escalate in accordance with the theoretical order explained in textbooks, and no one knows at which step the nuclear switch could be triggered.

Since the beginning of the nuclear age, a large number of complex theories have been produced around the issue of nuclear weapons, which have also evolved in line with the nuclear arms control situation and the development of nuclear technology, and different and opposing points of view have always existed, both in the United States and in Russia. Naturally, regardless of the position, all the assumptions of nuclear theories are virtual, and none of them have been or can be tested in a real nuclear war. The high level of tension between Russia and the United States, and especially the outbreak of the Russia-Ukrainian conflict, have led on the one hand to an increasing number of warnings about the renewed nuclear danger, and on the other hand to the activation of a number of offensive views and concepts. For example, the viewpoints of the failure of nuclear deterrence, which holds that since people have become convinced that nuclear weapons cannot be used and are no longer worried about nuclear war, the function of nuclear deterrence has failed, and the fear of nuclear weapons therefore needs to be brought back to realistic policies in order to restore the fear of nuclear war and its deterrent effect.

There is also the theory of nuclear disaster exaggeration, which holds that some concepts of nuclear war have exaggerated the degree of disaster it may cause, and that the so-called nuclear winter, destruction of the earth, and extinction of human beings will not occur.

Another example is the theory of limited nuclear war, which posits that due to the miniaturisation of nuclear weapons and the precision of their delivery, the lethality of nuclear weapons can already be controlled in a smaller range, which is only equivalent to bombs of greater power, and that they can already be used as weapons of war, and that limited nuclear war or hybrid war can therefore be fought, and that victory in the war can be achieved. There is also the theory of nuclear disaster exaggeration, which holds that some concepts of nuclear war have exaggerated the degree of disaster it may cause, and that the so-called nuclear winter, destruction of the earth, and extinction of human beings will not occur.

All of these provide a theoretical basis for the conduct of nuclear war and contribute to the transformation of the use of nuclear weapons from an abstract concept to a realistic policy. It is not difficult to reveal the reasons for the nuclear game between the U.S. and Russia, but it is difficult to find a way out of the dead end. Improving U.S.-Russian relations is the fundamental solution to both the symptoms and the root causes of the problem, but the likelihood of this in the foreseeable future is minimal. Even if there is hope for the future, it is still too far away to quench the thirst of the near future. Many would naturally prefer a ceasefire of the Russia-Ukrainian conflict. Undoubtedly, a ceasefire is the right way to think and the indispensable way to avoid escalation.

Could Russia and NATO then engage in some kind of interest exchange, with mutual commitments, such as that NATO would not deploy nuclear weapons close to Russia, or that NATO would not admit Ukraine to the organization, in exchange for assurances from Russia that it would not use nuclear weapons? Neither Russia nor NATO would accept this.

However, an unconditional ceasefire implies status quo, which, in the current situation, means that Russia will keep the lands it now controls and that Ukraine will stop fighting to regain them, a prospect Ukraine has repeatedly rejected. And a ceasefire under Ukraine's peace program would require Russia to withdraw its troops, something Russia would never agree to. Therefore, although a ceasefire is the right direction to follow, it is very difficult to quickly find mutually acceptable conditions for a ceasefire in the current situation.

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such as that NATO would not deploy nuclear weapons close to Russia, or that NATO would not admit Ukraine to the organization, in exchange for assurances from Russia that it would not use nuclear weapons? Neither Russia nor NATO would accept this. NATO has always insisted on the autonomy of its state-members in deciding on defence matters, and the bloc does not accept the veto power of other countries over NATO's decision-making, and it will not give Russia a guarantee that it will not deploy nuclear weapons in the territories of its member states, including the newcomers of Finland and Sweden.

For Russia, nuclear weapons are its "talisman", which is the last resort for its security, and giving up nuclear deterrence will enable the U.S. and NATO to let go and intervene or even directly participate in the war without fear. NATO has a huge advantage in terms of overall strength, and it might be difficult for Russia to win in a conventional war. Appeals and demands by other neutral states that a country should not use nuclear weapons are also a way of preventing the use of nuclear weapons, which is politically necessary.

For Russia, on the other hand, renouncing the use of nuclear weapons would not be consistent with its nuclear strategy and, more to the point, it would be virtually tantamount to removing Russia's most powerful armour. For Russia, nuclear weapons are its "talisman", which is the last resort for its security, and giving up nuclear deterrence will enable the U.S. and NATO to let go and intervene or even directly participate in the war without fear. NATO has a huge advantage in terms of overall strength, and it might be difficult for Russia to win in a conventional war. Appeals and demands by other neutral states that a country should not use nuclear weapons are also a way of preventing the use of nuclear weapons, which is politically necessary. It expresses an attitude and creates a certain amount of international pressure.

But appeals alone are far from enough, since they do not address Russia's security concerns, and Russia will not be convinced if its security concerns are not met. Russia has always insisted that its nuclear strategy is defensive, that it is the United States and NATO that are pushing for nuclear war, and that the danger does not come from Russia, but from the United States and NATO. As N. Patrushev, Secretary of the Security Council of Russia, said, the U.S. policy is increasing the risk of use of nuclear weapons. Moreover, Russia believes that the West has used weapons with a nuclear component, such as a depleted uranium bomb, and it calls for the prevention of nuclear war as well.

Indeed, the U.S. and NATO have shown no weakness on the nuclear issue, and have gone toe-to-toe with Russia. The NATO Vilnius Declaration of July 2023 reaffirmed NATO as a nuclear alliance, which meant that NATO had pushed its nuclear borders in the direction of Russia after expanding northward. NATO held the Firm Midday nuclear exercise in October 2022, which was routine but the rare participation of U.S. B-52 strategic bombers made it unusual. To maintain nuclear superiority, the United States plans to allocate $634 billion between 2021 and 2030 to modernise its nuclear forces.

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At present, the Russia-American nuclear game is still on an upward trajectory, and neither side has fully achieved its goals; Russia's actions has not prevented the United States and NATO from getting more and more deeply involved in the war, and the deepening involvement of the United States and NATO has not overwhelmed Russia. The two sides have formed a stalemate, but in the military implications, its seriousness is no longer on a level compared to the early stages of the conflict, and both sides are faced with the problem of how to break the stalemate and

achieve a breakthrough. Compromise does not yet seem to be an option for either side. For Russia, if the situation in battlefield takes the direction to deteriorate, it can only continue to increase the level of the nuclear threat, which means moving closer to the threshold of use of nuclear weapons.

From the U.S. perspective, after already providing weapons such as airplanes, artillery, tanks, cluster bombs, and even ATACMS, if it still can't get Russia out of the conflict, unless it accepts the reality that it can't win and change policy to negotiate peace, it will have to continue to raise the stakes, either by increasing the number of heavy weaponry, or by providing more powerful weaponry, which will mean pushing Russia further and further into the corner, stimulating a higher risk of Russia resorting to nuclear weapons. In a two-way spiral of stimulus, the risk of loss of control is always there, and it will grow.

Both the United States and Russia should get rid of the temptation to completely defeat its opponent. As two major world powers and the strongest nuclear powers, the total defeat of its opponent would mean world war and nuclear war. The U.S. and Russia need to have the necessary limits on their war goals and cannot aim to completely defeat each other strategically—actually, this is not possible.

What can be expected now is that, before the crisis subsides, the United States and Russia will not lose a minimum degree of rationality and restraint, will not go to the point of no return, will leave room for themselves and its opponent not to take risks in desperation, and will also leave time and opportunity to seek a better way out. Both the United States and Russia should get rid of the temptation to completely defeat its opponent. As two major world powers and the strongest nuclear powers, the total defeat of its opponent would mean world war and nuclear war. The U.S. and Russia need to have the necessary limits on their war goals and cannot aim to completely defeat each other strategically—actually, this is not possible. The U.S. has often stated that the objectives of the war are of Ukraine's own choosing, and that the U.S. will support them all but will not make decisions for Ukrainians. Even if this were true, the achievement of the objectives would depend, to a considerable extent, on the United States, without whose financial and military support it would be impossible for Ukraine to achieve any strategic victory. In this sense, the U.S. can still influence the choice of Ukraine's war goals.

The United States and Russia should try to confine the stand-off to the local level and avoid its geographical expansion. This is an important way to prevent an escalation of the conflict, which the United States and Russia can and should be willing to do. Of course, this is not to say that a localized military action is acceptable, but to prevent it from escalating further and causing greater harm in the first place when the conflict cannot be stopped for the time being. The United States have an incentive to keep it localized, been cautious and dissuasive of Ukraine's attack on the Russian inland and its retaking of the Crimea, although it has stated that the final decision is in Ukraine's hands. It is not that the U.S. disapproves of Ukraine's goals, but it fears a massive Russian retaliation and the expansion of the battlefield into Europe, with the U.S. being directly involved.

Russia should also have the desire to keep it localized. Since the outbreak of the Russia-Ukrainian conflict, it seems the situation on the battlefield has changed, and as it stands now, for Russia, the preservation of the new four territories and Crimea should be its basic focus. Unfortunately, it is extremely difficult to solve the territorial problem and there is no solution in sight that could be accepted by both sides, and the localized Russia-Ukrainian conflict is likely to continue for a long time, even if it does not escalate. Under this background, reducing its intensity and narrowing its scope would therefore be a step towards the peace process.

The international community, especially countries of the Global South, should also do something as there should be more voices speaking out firmly against nuclear war, expressing their positions more clearly and exerting their influence on all

sides. Notably, this should be directed at all nuclear powers, not just one of them. It is true that the party that uses nuclear weapons first will certainly be condemned and opposed by the whole world in the harshest terms. This does not mean, however, that the party that pushes for the intensification of the situation is completely blameless.

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More importantly, if a nuclear war occurs, disaster has already struck and condemnation will not help. Therefore, the first step is to avoid the worst-case scenario. The international community should make it clear that there are greater interests and higher values than the Russia-Ukrainian conflict, and that nuclear war is not only a bilateral matter for Russia and the United States, as it concerns interests and destiny of all nations, and it will be a destructive act against all the humanity and civilisations.

Source: https://moderndiplomacy.eu/2023/12/18/a-dangerous-gamble-the-russia-american-nuclear-game-in-the-ukraine-crisis/,18 December 2023.

NUCLEAR STRATEGY

NORTH KOREA

Top DPRK Leader Says No Hesitation to Launch Nuclear Attack if Provoked with Nukes

The top leader of the DPRK said the country would not hesitate to launch a nuclear attack if an enemy makes nuclear provocations, the country's state media reported Thursday. Kim Jong Un, general secretary of the Workers' Party of Korea and president of the State Affairs of the DPRK, made the remark as he met in Pyongyang with the missile unit that participated in the launching drill of an "Hwasongpho-18" ICBM earlier this week, the official Korean Central News Agency (KCNA) reported.

Kim said the test-launch demonstrated the loyalty and strong stand of the country's armed forces, and stressed that the maneuver served as "a clear explanation of the offensive counteraction mode and the evolution of the nuclear strategy and doctrine of the DPRK not to hesitate even (to launch) a nuclear attack when the enemy provokes it with nukes," the KCNA said. He also underscored the necessity of developing the capability for preemptively attacking the enemy anywhere and maintaining a war posture, calling such a capability "the genuine defense capability" to make lasting peace.

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Separately, in a press statement issued via the KCNA, Kim Yo Jong, vice department director of the Central Committee of the Workers' Party of Korea, accused the United States and its followers of "persistently pushing the security environment on the Korean Peninsula and in Northeast Asia into a vortex of confrontation and conflict." In the statement designed to respond to an open session of the UNSC on the DPRK's ICBM launch, she slammed the ceaseless military drills by the United States and its followers and the frequent demonstrations of U.S. strategic nuclear assets on the peninsula. She said they were clearly aimed at the DPRK and the "root cause" of the escalating situation in the region.

Source: https://english.news.cn/20231221/83e067c2a67c44b3a988a574031c993d/c.html, 21 December 2023.

North Korea Resumes Weapons Testing with Launch of Long-Range Missile

North Korea on Monday conducted its first intercontinental ballistic missile test in five months, likely launching a developmental, more agile weapon, as it vows strong responses against U.S. and South Korean moves to boost their nuclear deterrence plans. The South Korean government described the missile tested as a solid-fueled weapon, a likely reference to the North's road-mobile Hwasong-18 ICBM whose built-in solid propellants make its launch more difficult for adversaries to detect than liquid-fueled weapons. North Korean leader Kim Jong Un previously called the Hwasong-18 the most powerful weapon of his nuclear forces.

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South Korea's military said the North Korean missile flew about 1,000 kilometres (620 miles) before landing in the waters between the Korean Peninsula and Japan. It said the missile was launched at an elevated angle, an apparent attempt to avoid neighbouring countries. Japanese lawmaker Masahisa Sato, citing Japan's Defense Ministry, said the missile rose as high as 6,000 kilometres (3,730 miles). The reported flight details matched those of North Korea's second test of the Hwasong-18 missile in July. ...

U.S. national security adviser Jake Sullivan spoke with his South Korean and Japanese counterparts on the phone and condemned the North Korean launch as a violation of multiple U.N. Security Council resolutions that ban any ballistic activities by the North. South Korean President Yoon Suk Yeol separately ordered officials to maintain a solid South Korean-U.S. joint defence posture and respond "swiftly and overwhelmingly" to any North Korean provocations against South Korea. The North's ICBM test was its second weapon firing in less than a day. On Sunday night, it launched a short-range ballistic missile designed to strike South Korea that also splashed in the water off its east coast, according to its neighbours.

Observers said the back-to-back launches were likely to protest announcements by South Korea and the United States that they will bolster their joint nuclear deterrence capabilities in the face of North Korea's evolving nuclear threats. Senior U.S. and South Korean officials met in Washington for their second Nuclear Consultative Group meeting. They agreed to update their nuclear deterrence and contingency strategies and incorporate nuclear operation scenarios in their combined military exercises next summer, according to officials in Seoul. The consultative body is responsible for sharing information on nuclear and strategic weapons operation plans and joint operations, though the U.S. will retain operational control of its nuclear weapons. U.S. officials said the group's establishment and other steps to solidify U.S. security commitment were meant to ease South Korean worries about North Korean provocations while keeping Seoul from pursuing its own nuclear program.

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North Korea's Defense Ministry on Sunday called its rivals' decision to include nuclear operation scenarios in their joint drills an open threat to

potentially use nuclear weapons against the North. It said any attempt by enemies to use military force against North Korea will be met with "a preemptive and deadly counteraction." ...

Source: https://www. pbs.org/newshour/world/north-korea-resumes-weapons-testing-with-launch-of-long-range-missile, 18 December 2023.

RUSSIA

Intercontinental Ballistic Missile Deployed in Western Russia

Russia's intercontinental ballistic missile Yars, which has a nuclear attack capacity, has been deployed at a silo in the western Kaluga region, the Defense Ministry announced yesterday. The Kozelsky Unit of the Russian Strategic Missile Forces located in Kaluga continues to be armed, said a ministry statement. The ballistic Yars missile can escape detection by Defense systems and also hit three to six targets at the same time, it added. The ministry reported that it placed the Yars missiles in the silo in November and that the intercontinental hypersonic Avangard missile, also with nuclear attack capacity, was placed in the launch silo in the southwestern Orenburg region.

When Putin invokes his arsenal, he is not trying to warn that Russia could use tactical nuclear weapons in Ukraine. Rather, his rhetoric is designed to threaten NATO itself," Schroeder said in his article. Schroeder said that Putin wasn't just engaging in sabre-rattling whenever he touted Russia's nuclear capabilities. He believes that going nuclear is something Putin could actually do if he wanted to win the war in Ukraine swiftly.

Source: https://www.aa.com.tr/en/europe/intercontinental-ballistic-missile-deployed-in-western-russia/3085282, 17 December 2023.

An Ex-CIA Analyst Says the US Might be Underestimating the Possibility of Nuclear War between Russia and NATO

"That is a mistake. US officials have it backward," Peter Schroeder wrote in an article for Foreign Affairs published on Wednesday. "It is actually quite unlikely that Russian President Vladimir Putin will use a nuclear weapon on the battlefield in Ukraine, but it is very possible that he will move toward using one against NATO," Schroeder added. The former public servant spent nearly two decades working on issues relating to Russia. Besides working for the CIA, Schroeder had done stints at the US embassy in Moscow and the National Intelligence Council.

"When Putin invokes his arsenal, he is not trying to warn that Russia could use tactical nuclear weapons in Ukraine. Rather, his rhetoric is designed to threaten NATO itself," Schroeder said in his article. Schroeder said that Putin wasn't just engaging in sabre-rattling whenever he touted Russia's nuclear capabilities. He believes that going nuclear is something Putin could actually do if he wanted to win the war in Ukraine swiftly. "Unlike the West, Putin may not fear a nuclear standoff: he is well-versed in Russia's nuclear arsenal and the tenets of nuclear deterrence, and possibly sees himself as uniquely suited to navigating a nuclear crisis," Schroeder wrote.

"And Putin has been remarkably consistent that Russia is willing to use nuclear weapons against NATO to defend its interests in Ukraine," he added, referencing Putin's remarks eight years ago when he said Russia was ready to mobilise its nuclear forces during its invasion of Crimea. Schroeder then outlined how Putin could ratchet up Russia's pressure against NATO. "If Putin does escalate the war, for instance, by attacking NATO with conventional weapons, he will likely move very swiftly so as not to give the United States a chance to manoeuvre away from a crisis," he wrote.

"From there, Moscow might actually begin using force against NATO," Schroeder said, adding that Russia could attack NATO aircraft, ships, and convoys to drag NATO into the fight. "Finally, in a worst-case scenario—one where the Kremlin sought to shock the world into ending the war in Ukraine quickly and on Putin's terms—Russia could actually launch a nuclear weapon directly at NATO territory," Schroeder continued. Both the

US and Russia have sought to downplay the possibility of nuclear war. ...

Source: https://www.businessinsider.com/ex-cia-analyst-putin-could-use-nuclear-weapon-on-nato-2023-12?amp, 20 December 2023.

Putin Says Russia's Nuclear Arsenal is Near Fully Modernized

President Vladimir Putin said Russia had modernised almost its entire strategic nuclear arsenal, reviving atomic rhetoric as he boasted the war in Ukraine has shifted in his favour. The role of Russia's air, sea and land nuclear triad in ensuring a balance of power "has increased significantly" amid the "emergence of new military-political risks," Putin told a Defense Ministry meeting in Moscow on Tuesday. The proportion of modern weaponry in its nuclear forces this year "has been brought to 95% and in the naval component almost 100%," he said. In a speech laced with familiar claims that he ordered the unprovoked invasion of Ukraine to counter alleged threats to Russia's security from the U.S. and its NATO allies, Putin said his forces "have the initiative" on the battlefield. "We do what we think is necessary, what we want," he said, adding that Ukraine "is suffering heavy losses and has largely squandered its reserves."

Finally, in a worst-case scenario—one where the Kremlin sought to shock the world into ending the war in Ukraine quickly and on Putin's terms—Russia could actually launch a nuclear weapon directly at NATO territory," Schroeder continued. Both the US and Russia have sought to downplay the possibility of nuclear war.

The role of Russia's air, sea and land nuclear triad in ensuring a balance of power "has increased significantly" amid the "emergence of new military-political risks," Putin told a Defense Ministry meeting in Moscow on Tuesday. The proportion of modern weaponry in its nuclear forces this year "has been brought to 95% and in the naval component almost 100%," he said.

Despite incurring massive Russian troop losses, Putin continues to enjoy broad domestic support for the February 2022 invasion that was meant to deliver victory within days and is now in its 22nd month. With fighting along the front line largely at a stalemate as winter sets in, Putin said last week that Russia has 617,000 troops deployed in Ukraine.

The Kremlin appears confident Russia can hold on to eastern and southern Ukrainian territory seized by its forces. He highlighted the readiness of Russia's nuclear forces amid political divisions in the U.S. and the European Union over support to Ukraine that are holding up as much as $110 billion in assistance. Defense Minister Sergei Shoigu told the same meeting that Russia completed the introduction of the Avangard hypersonic nuclear missile to its strategic forces and is continuing to bring the Yars intercontinental ballistic missile into service. Russia is also adding four new Tu-160 strategic bomber aircraft, he said. Putin oversaw annual drills in October including with Yars that Shoigu said simulated a "massive nuclear strike by strategic forces in response to an enemy's nuclear attack." Throughout the war in Ukraine, Putin has repeatedly warned the U.S. and its allies against involvement in the conflict, hinting at Russia's willingness to use any weapon in its arsenal to protect its security. ...

Source: https://www.leadertelegram.com/news/world/putin-says-russia-s-nuclear-arsenal-is-nearly-fully-modernized/article_bbfdd7a5-ec01-5246-994d-fb216be8bbf2.html, 19 December 2023.

USA

US Reaffirms Commitment to S. Korea after N. Korea Warns US Against Making 'Wrong' Choice

The United States reaffirmed Tuesday its "ironclad" commitment to South Korea's defence and willingness for dialogue with North Korea, as Pyongyang warned Washington against making a "wrong" choice after its test-firing of an

intercontinental ballistic missile. Matthew Miller, the spokesperson for the State Department, made the comments after North Korean leader Kim Jong-un said the latest launch of a Hwasong-18 ICBM shows what option he would take when "Washington makes a wrong decision." Monday's ICBM launch came with criticism levelled at the U.S. and South Korea for holding a Nuclear Consultative Group meeting in Washington on the nuclear strategy against the North.

"We have tried to make it a policy of never — not reacting to every provocative statement that he makes," Miller said in a briefing." We remain committed to a diplomatic approach to the DPRK and call on the DPRK to engage in dialogue. We harbour no hostile intent to the DPRK," he said, referring to North Korea by its official name, the Democratic People's Republic of Korea. "And our commitments to the defence of the Republic of Korea and Japan remain ironclad," Miller added. John Kirby, National Security Council coordinator for strategic communications, stressed US efforts to revitalise alliances and partnerships against growing North Korean threats. "We've added military capabilities to the region, including intelligence-collection capabilities. And that's not going to change," he said. "We take our responsibility to our allies, Japan and the Republic of Korea, seriously," he said. ...

Source: https://www.koreaherald.com/view.php?ud=20231220000152, 20 December 2023.

BALLISTIC MISSLE DEFENCE

EGYPT

Egypt Eyes India's Akash Air Defence Missile System

Egypt, one of India's strategic partners in the Middle East, has expressed interest in acquiring the Akash air defence missile system, a medium-range mobile SAM system developed by India's DRDO and produced by Bharat Dynamics Limited (BDL). The Akash missile system can target aircraft up to 45 km (28 mi) away and has the capability to neutralise aerial targets like fighter jets, cruise missiles, air-to-surface missiles, and ballistic missiles. It is in operational service with the Indian Army and the Indian Air Force.

Egypt's interest in the Akash missile system comes amid India's efforts to expand the export of its indigenous military hardware, which have reached an all-time high of nearly Rs 16,000 crore ($2.2 billion) in FY 2022-23, according to the defence ministry. India has also claimed that its design and development capabilities are reaching over 85 countries. Egypt and India already have an existing robust defence cooperation, particularly in the area of military sales, training, and technical transfer of knowledge.

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The two countries have also been conducting joint exercises and port visits by their naval and air forces. The bilateral defence ties received a boost when Egyptian President Abdel Fattah El-Sisi visited New Delhi in January 2023 and held talks with Indian Prime Minister Narendra Modi. The two leaders discussed ways to enhance their collaboration in the interaction between armed forces and the sale of Indian-made weapon systems. ... This ambition has seen India focus its efforts on selling its domestically produced weapons to African militaries, which are often unable to afford Western-made equipment. India has already had some success in this sector and is now looking to build upon this as it hopes to become a major player in African arms deals.

India has developed and manufactured a vast array of weapons and defence systems, ranging from small arms to sophisticated aircraft. These are made available to African militaries at a fraction of the cost of their Western counterparts,

making them an attractive option for poorer nations. India has also made great strides in providing maintenance and support for its weapons systems, making them a reliable and cost-effective option for African militaries. Apart from the Akash missile system, Egypt has also shown interest in other Indian-made defence products, such as the Akash NG (New Generation) air defence system, which has a longer range and higher accuracy than the Akash Mk1, and the Smart Anti-Airfield Weapon (SAAW), a precision-guided glide bomb developed by DRDO.

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However, Egypt has reportedly decided to procure the Korean T-50 trainer aircraft with transfer of technology (ToT) for local production, instead of the Indian LCA-Tejas trainer aircraft, which India had offered to set up production facilities for in Egypt. The Tejas is a light combat aircraft developed by India's HAL. Although, India's HAL chairman, Shri C.B. Ananthakrishnan, announced at Aero-India 2023 that the company is still in talks with Egypt and Argentinian officials to secure a contract to supply 35 Tejas LCA Mk-1A to the nation's armed forces.

The Akash missile system is one of India's most successful defence exports, having been sold to countries like Armenia, while Vietnam, Bangladesh, and Sri Lanka have shown interest. India hopes to increase its defence exports to $5 billion by 2025 and become a major player in the global arms market. Egypt, as a key regional power and a close partner of India, could be a potential buyer of more Indian-made defence equipment in the future.

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Meanwhile, Egypt's military is interested in acquiring the CAMM air defense missile system from MBDA. Egypt is actively exploring its options when it comes to modernizing its air defence capabilities. The country is keenly interested in acquiring the MBDA CAMM air defence missile system. This system is a more advanced, modern system that is designed to provide a high degree of protection against incoming threats. It boasts an impressive array of capabilities, including advanced detection and tracking, guidance, and interception capabilities. The system is also capable of engaging multiple targets simultaneously, providing Egypt with a formidable defence against any potential threats.

Source: https://www.military.africa/2023/12/egypt-eyes-indias-akash-air-defence-missile-system/, 22 December 2023.

JAPAN

Japan Locks in Funding for 2 New Aegis Destroyers

Japan's Defense Ministry has secured funding to build two new Aegis destroyers, the country's defence minister announced on 19 December 2023. In a press conference, Defense Minister Minoru Kihara said he obtained approval for the funding following a Tuesday meeting with Finance Minister Shunichi Suzuki to discuss the budget. Japan plans to begin the construction of the two destroyers, known as the Aegis System Equipped Vessels (ASEV), in Fiscal Year 2024 and FY 2025, respectively, with commissionings in 2027 and 2028. Japan will spend 373.1 billion yen, or $2.6 billion, in FY 2024 funding for the destroyers. That amount is slightly

reduced from the 379.7 billion yen, or $2.64 billion, that the Ministry sought in its August FY 2024 budget request.

The ASEVs are the replacement for the two cancelled Aegis Ashore sites. The destroyers have an expected displacement of 12,000 tons and a length of 623 feet. They will carry 128 vertical launch systems cells for ballistic missile defence and launchers for the Type 12 anti-ship missiles and Tomahawk cruise missiles. The Japanese defence chief said the construction of the ships is essential to rapidly and drastically improve Japan's BMD capabilities in light of the threat posed by North Korean missiles. He added that the Ministry of Defense will scrutinise and examine the ASEV program to keep it within the scope of the overall 43 trillion yen, or $299 billion, defence spending cap under the five-year Defense Buildup Plan.

The live-fire test reportedly validated the functions of the weapon system, including sending a missile interceptor to a designated target location. "This is a major milestone for our team to cross," company operations manager Larry Barisciano said. "Being able to say these prototypes are ready for government testing by succeeding at this demonstration is a huge win for us as well as our warfighters.

The weakening yen has led to concerns that the cost of the program will significantly rise, while the Japanese government faces problems over how to secure stable defence funding without raising taxes. The government is expected to shelve a tax increase until 2026. Kihara also said the MOD will establish an effective project management system for the program. The decision to use the Lockheed Martin SPY-7 radar for the two destroyers does not necessarily mean that future ships or upgrades to the Japan Maritime Self-Defense Force's current Aegis destroyers would utilise the same radar.

... Meanwhile, U.S. Transportation Command chief General Jacqueline Van Ovost said her command is working to grow logistics partnerships and security throughout the Indo-Pacific. In a Tuesday media call, Van Ovost said that over the past week she visited senior government officials and multinational service members in Papua New Guinea, Australia, and Japan to discuss regional security and how all the nations can continue to work together to promote stable economies, increase interoperability, deter aggression, and be ready to respond to any crises in the Indo-Pacific region.

... TRANSCOM is helping Papua New Guinea fulfil its desired role as the regional leader for humanitarian assistance and disaster response; Van Ovost told reporters. Her command is working with the United States Agency for International Development, U.S. Indo-Pacific Command, and the state partnership lead unit, which is the Wisconsin National Guard, to assist with training, force development, and more exercises so Papua New Guinea can improve its capabilities to respond to disasters in the region. Van Ovost said she held discussions with Papua New Guinea officials on how the U.S. could support developing infrastructure to support HADR response. ...

Source: https://news.usni.org/2023/12/20/japan-locks-in-funding-for-2-new-aegis-destroyers, 20 December 2023.

USA

US Army 'Enduring Shield' Fires AIM-9X Missile Interceptor in Latest Trial

The US Army's Enduring Shield air defence system launched an experimental AIM-9X missile interceptor during a recent flight demonstration. According to manufacturer Leidos, the system utilised a simulated Integrated Battle Command System (IBCS) interface to carry out the launch. The IBCS will serve as the new capability's command-and-control system. The live-fire test reportedly validated the functions of the weapon system, including sending a missile interceptor to a designated target location. "This is a major milestone for our team to cross," company operations manager Larry Barisciano said. "Being able to say these prototypes are ready for government testing by succeeding at this demonstration is a huge win for us as well as our warfighters."

12 Launchers: With the flight demonstration complete, the US Army is expected to receive 12 launchers for the development test program, which will commence in January 2024. An operational assessment is also planned for next year, with data from the recent demonstration and the 2024 testing to further mature the system. "We're ready to move to the next phase with more confidence and excitement for our future work with our US Army customer," Barisciano added.

Closing Capability Gaps: Enduring Shield is a ground-based air defence system to combat cruise missiles and unmanned aerial systems. It is designed to defend critical civilian and military infrastructure by providing 360-degree coverage. It is also capable of engaging multiple targets simultaneously. According to Leidos, the weapon system aims to bridge the gap between the service's tactical short-range air defence systems and the Terminal High Altitude Area Defense anti-ballistic missile defence system. Enduring Shield will serve as the US Army's Indirect Fire Protection Capability.

There is no such thing as a perfect sensor architecture design," said the report titled "Getting on Track: Space and Airborne Sensors for Hypersonic Missile Defense." Hypersonic weapons fly at more than five times the speed of sound. Their speed and unpredictable flight paths make them difficult to detect and track.

Not Smooth Sailing: In September 2021, Leidos received a $247-million contract to build 16 Enduring Shield prototype launchers for the US Army. However, the company announced that there had been a one-year delay due to supply chain issues. The service was supposed to receive the launchers in 2022, but a prototype still needs to be delivered. The delay is also expected to affect the system's fielding date.

Source: https://www.thedefensepost.com/2023/12/20/us-army-enduringshield/?expand_article=1, 20 December 2023.

EMERGING TECHNOLOGIES AND DETERRENCE

USA

Hypersonic Weapons Challenge Pentagon Tracking Capabilities

A new study released December 18 sheds light on potential challenges in the Pentagon's ambitious effort to deploy a network of space sensors for detecting and tracking hypersonic missiles. Based on internal modelling and simulation efforts, the study by the CSIS identifies areas for improvement in the planned network and raises questions intended to inform the conversation on what it takes to defeat these highly manoeuvrable missile threats. "There is no such thing as a perfect sensor architecture design," said the report titled "Getting on Track: Space and Airborne Sensors for Hypersonic Missile Defense." Hypersonic weapons fly at more than five times the speed of sound. Their speed and unpredictable flight paths make them difficult to detect and track.

The study highlights Defense Department initiatives to build a multi-layer system of missile-tracking sensors and warns that more effort needs to be put into the technology used to stitch together sensor data — known as sensor fusion. This is critical to build accurate "tracks" and avoid confusion, the report said, as one missile travelling fast can look like several other objects. DoD is investing billions of dollars in space sensors as the linchpin of hypersonic defence architecture and has "a lot of really smart people that are working on this problem," said Thomas Karako, director of the CSIS Missile Defense Project. The report, he said, is an effort to broaden the conversation and warn of potential pitfalls.

Technical Challenges: While infrared and electro-optical sensing technologies are mature, hypersonic missile tracking is far more difficult than traditional ballistic missile warning, the report said. "Distinguishing a hypersonic heat signature against the Earth's background has been likened to tracking a slightly brighter candle in a sea of candles, requiring extensive testing to validate." The author of the report, Masao Dahlgren, said models and simulations used for the study highlight the importance of "fire control" data — precise enough to guide an interceptor to shoot down the incoming missile. Dahlgren, a fellow at the CSIS Missile Defense Project,

explained that having higher quality fire control data reduces the burden on the interceptor, and that is a key tradeoff that needs to be considered. "If you have more precise data, you could use an interceptor that maybe wouldn't need to manoeuvre as much and could be cheaper," he said.

Conversely, less precise data puts more of the burden on the interceptor to make up for weaknesses in the data. Sensor fusion — the process of combining data from multiple sensors to create a more accurate and complete picture of the environment — is another concern flagged in the report. Dahlgren compared it to the challenge of autonomous vehicles. Cars use a variety of sensors to navigate their surroundings, and sensor fusion helps to ensure that the car has a 360-degree view of its environment and can avoid obstacles. In missile defence, "the challenge comes when you try to get data feeds from multiple satellites and integrate them into one target track," he said. DoD now relies on a handful of missile-warning satellites. Still, the future low Earth orbit architecture currently in the works by the Space Development Agency will have dozens of tracking satellites. ...

The study suggests other tradeoffs could be considered in order to ensure coverage of the Indo-Pacific region, where Chinese hypersonic missiles might be deployed. DoD's planned multi-orbit architecture includes low, medium, geostationary, and highly elliptical orbit satellites.

Trade-offs in Coverage: The study suggests other tradeoffs could be considered in order to ensure coverage of the Indo-Pacific region, where Chinese hypersonic missiles might be deployed. DoD's planned multi-orbit architecture includes low, medium, geostationary, and highly elliptical orbit satellites. LEO constellations benefit from proliferation and economies of scale but suffer challenges with persistence and orbital lifespan, the study said. MEO constellations offer more coverage and persistence but require potentially costlier satellites with larger apertures GEO and HEO orbits require few satellites to cover a given pole or longitude selectively, but they are far more expensive. Airborne sensors can provide persistent coverage and are unbounded by spacecraft orbital mechanics but have smaller detection footprints and require basing locations to operate. ...

Source: https://spacenews.com/report-hypersonic-weapons-challenge-pentagon-tracking-capabilities/, 18 December 2023.

L3Harris Gets Green Light to Produce 16 Space-Based Hypersonic Missile Trackers

Defense contractor L3Harris announced on 20 December 2023 it has received approval from the Space Development Agency to move into production on 16 satellites designed to detect and monitor hypersonic missiles aimed at the U.S. or its allies. L3Harris said its satellites cleared a critical design review and a production readiness review. The Space Development Agency (SDA) is a U.S. Space Force organization building a layered network of satellites known as the Proliferated Warfighter Space Architecture. It includes a Transport Layer of interconnected communications satellites that will transmit data collected by the Tracking Layer of sensor satellites. L3Harris in 2022 won a $700 million contract to design and produce 16 Tracking Layer Tranche 1 satellites, and to provide ground systems and support services. The company selected Maxar Technologies as its satellite bus supplier.

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'Destabilizing Weapons': "Hypersonic missiles are the most destabilising kinetic weapons in our

adversaries' arsenals due to their dim flight profiles, varied launch points and high manoeuvrability," said Bob De Cort, L3Harris's director of program management. "To deter their use and, when needed, to defeat them, the United States requires a resilient sensor platform to remove the veil from their flight paths." L3Harris produces satellites in Melbourne, Florida and Fort Wayne, Indiana. The company has already delivered four prototype tracking satellites under a previous $193 million contract for Tranche 0 of the program. Those satellites were slated to launch this year but have faced delays. The Tracking Layer Tranche 1 satellites are scheduled to launch in 2025. Northrop Grumman and Raytheon RTX also produce Tracking Layer Tranche 1 satellites under separate contracts. The push to field reliable hypersonic detection comes as China, Russia and other nations race ahead to develop manoeuvrable high-speed weapons intended to evade traditional defensive systems.

Source: https://spacenews. com/l3harris-gets-green-light-to-produce-16-space-based-hypersonic-missile-trackers/, 20 December 2023.

NUCLEAR ENERGY

FRANCE

EDF Eyes Flamanville EPR Nuclear Reactor Fuel Loading in March

The Flamanville EPR nuclear reactor is scheduled to be loaded with fuel in March next year with connection to the grid expected in mid-2024, in line with the latest forecasts, schedule details published by French power group EDF showed on Thursday. Following the connection to the grid, the reactor should produce 14 TWh of power until its first planned shutdown, which should happen mainly in 2026 and last "several months", the state-owned utility said. EDF had previously indicated that fuel loading at Flamanville would take place in the first quarter of 2024.

The cost of the project, originally put at 3 billion euros when the project was announced in 2004, were hiked to an estimated 13.2 billion euros by the end of 2022 as repeated difficulties led to numerous delays and additional costs. The reactor was originally scheduled to go into service in 2012. EDF expects nuclear power generation in France in 2026 to be between 335-365 TWh, while confirming 2024 and 2025 targets of 315-345 TWh and 335-365 TWh, respectively.

Source: https://www.world-energy.org/article/39158.html, 22 December 2023.

The final COP28 Decision Text which was adopted at the end of the two-week conference, recognises the need for "deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways" and calls for global efforts to accelerate zero- and low-emission technologies, including nuclear, renewables, and abatement and removal technologies such as carbon capture and utilisation and storage.

GENERAL

COP28 Recognises the Critical Role of Nuclear Energy for Reducing the Effects of Climate Change

The 28th United Nations COP28 was a historic event for nuclear energy when it was formally specified as one of the solutions to climate change in the First Global Stocktake of progress toward meeting the goals of the Paris Agreement. A delegation from the OECD Nuclear Energy Agency (NEA), led by NEA Director-General William D. Magwood, IV, attended the conference to participate in these discussions about nuclear energy's potential to help countries meet their net zero emission targets by 2050. World leaders and innovators in climate change solutions came together in Dubai to keep the world on track to keep global warming below 1.5°C.

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Magwood welcomed the news, saying: "The OECD Nuclear Energy Agency welcomes the outcome of the COP 28 global stocktake, which for the first time acknowledges the crucial role that nuclear energy could play in helping countries to lower their carbon emissions. Global emissions must reach net zero by 2050." "This has been a historic COP for the nuclear energy sector. Advancements in nuclear technology, including the development of small modular reactors and the launch of such initiatives as the NEA's Accelerating SMRs for Net Zero provide realistic pathways to providing the clean energy that countries need to meet this goal," NEA Director-General Magwood added.

In the lead up to the final COP28 Agreement, discussions and declarations between countries had put the spotlight on the advancements of nuclear energy technology which provided the basis for a growing support of nuclear energy. COP28 also saw 22 world leaders sign a declaration to make efforts to triple nuclear energy by 2050. The declaration, announced by President of the French Republic Emmanuel Macron at a ceremony on 2 December 2023, referenced 2022 NEA analysis which found that tripling nuclear energy capacity by 2050 would significantly help countries reach their net zero carbon emission targets while creating and maintaining energy security. "If you want to reconcile jobs creation, strategic autonomy and sovereignty and sovereignty, and low carbon emissions, there is nothing more sustainable and reliable than nuclear energy," said Emmanuel Macron during his address at the Tripling Nuclear Energy by 2050 ceremony.

COP28 also saw 22 world leaders sign a declaration to make efforts to triple nuclear energy by 2050. The declaration, announced by President of the French Republic Emmanuel Macron at a ceremony on 2 December 2023, referenced 2022 NEA analysis which found that tripling nuclear energy capacity by 2050 would significantly help countries reach their net zero carbon emission targets while creating and maintaining energy security.

Many of the discussions at COP28 around nuclear energy were focused on innovation within the sector, including the development of advanced reactor technologies, such as SMRs. This created a timely environment for the launch of the new NEA initiative Accelerating SMRs for Net Zero which was announced during the UAE COP28 Presidency's high-level Atoms for Net Zero event on 5 December by NEA Director-General Magwood, U.S. DOE Deputy Secretary, David Turk, and French Ministry of Ecological Transition, Director General for Energy and Climate, Sophie Mourlon.

Accelerating SMRs for Net Zero leverages NEA's network of industry leaders, government officials, researchers, and experts to establish a practical, solutions-oriented platform with a defined plan of work for collaboration and knowledge exchange to support decision makers in maximising the full potential of SMRs. The NEA delegation took part in a variety of other events over the two weeks whilst also supporting NEA member countries at events in the country pavilions of France, Finland, Korea, Turkiye and the United Kingdom. These events covered a broad range of topics, including nuclear financing, the future of nuclear energy, strengthening clean energy partnerships and diversity within the nuclear workforce.

Engaging with the next generation of nuclear professionals is a critical task for the NEA, and the delegation spent some time meeting with young professionals during COP28. Director-General Magwood was invited to address the joint ENEC and FANR Youth Circle event on "The importance of International Co-operation among the Nuclear Energy Key Players in addressing Climate Change" and was interviewed by Nuclear for Climate at their COP28 stand.

At the conclusion of COP28, Director-General Magwood noted that the global nuclear sector has been left with a renewed confidence and a clear outline of actions which include boosting the workforce and sourcing new financing streams. "For the countries who choose to include nuclear energy as part of their energy mix, we are hopeful that this global recognition will help propel growth within the nuclear workforce and unlock the financing the sector needs. Both these elements are crucial if the nuclear sector to fulfil its potential and reduce carbon emissions while providing

energy security" the Director-General concluded.

Source: https://www.oecd-nea.org/jcms/pl_89153/cop28-recognises-the-critical-role-of-nuclear-energy-for-reducing-the-effects-of-climate-change, 21 December 2023.

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INDIA

India Plans to Triple Nuclear Power Generation Capacity to 22,480 MW by 2031

The minister outlined the significant progress in India's nuclear power sector, stating annual electricity generation from nuclear power plants has increased from 35,334 million units in 2013-14 to 46,982 million units in 2022-23. The government has initiated steps to triple its nuclear power capacity from the current 7,480 MW to 22,480 MW by 2031-32, Union minister Jitendra Singh said. This move is part of the country's strategy to boost clean energy production and meet its longterm energy security needs.

Annual electricity generation from nuclear power plants has increased from 35,334 million units in 2013-14 to 46,982 million units in 2022-23. Furthermore, the installed nuclear capacity has also risen from 4,780 MW in 2013-14 to 7,480 MW presently. The minister said that for the current fiscal year 2023-24, nuclear power generation in India is around 32,017 million units, against an aspirational target of 52,340 million units. India currently operates 23 nuclear power reactors, which have generated approximately 411 billion units of electricity over the past ten years.

In a written reply during a parliamentary session in the Lok Sabha, the minister outlined the significant progress in India's nuclear power sector. He stated that annual electricity generation from nuclear power plants has increased from 35,334 million units in 2013-14 to 46,982 million units in 2022-23. Furthermore, the installed nuclear capacity has also risen from 4,780 MW in 2013-14 to 7,480 MW presently. The minister said that for the current fiscal year 2023-24, nuclear power generation in India is around 32,017 million units, against an aspirational target of 52,340 million units. India currently operates 23 nuclear power reactors, which have generated approximately 411 billion units of electricity over the past ten years, preventing the release of about 353 million tons of CO_2 equivalent.

Singh detailed the ongoing projects, stating that construction and commissioning of ten reactors totaling 8,000 MW are in progress across states such as Gujarat, Rajasthan, Tamil Nadu, Haryana, Karnataka, and Madhya Pradesh. He also mentioned the initiation of pre-project activities for ten reactors that have been sanctioned by the government, with completion expected by 2031-32. The minister concluded by underscoring nuclear power's role as a clean, environment-friendly source of continuous electricity, essential for India's sustainable energy future and its goal of achieving a net zero economy by 2070.

Source: https: // energy.economictimes. indiatimes. com/news/ power/india-plans-to-triple-nuclear-power-generation-capacity-to-22480-mw-by-2031/106199000, 22 December 2023.

JAPAN

Japan Receives Green Light to Resume Operations in World's Largest Nuclear Plant

Japan's nuclear power regulator lifted the operational ban on Tokyo Electric Power's Kashiwazaki-Kariwa nuclear power plant, imposed two years ago. This move enables the power company to actively pursue local permission for restarting operations. Tepco is keen on bringing the world's largest atomic power plant back online to reduce operating costs. However, resuming operations still hinges on obtaining consent from the local governments of Niigata prefecture, Kashiwazaki city, and Kariwa village, where the plant is situated. The timing of the plant's restart remains uncertain. With a capacity of 8,212 MW, the Kashiwazaki-Kariwa

nuclear power plant has been offline since 2012 following the Fukushima disaster, which prompted the shutdown of all nuclear power plants in Japan at that time.

In 2021, the Nuclear Regulation Authority (NRA) prohibited Tepco from operating Kashiwazaki-Kariwa, its sole operable atomic power station. The ban was a result of safety breaches, including the failure to adequately protect nuclear materials and lapses that allowed an unauthorized staff member to access sensitive areas of the plant. The Nuclear Regulation Authority (NRA) lifted a corrective action order that had restricted Tepco from transporting new uranium fuel to the Kashiwazaki-Kariwa nuclear power plant or loading fuel rods into its reactors, essentially impeding a potential resumption of operations. The decision was based on observed improvements in the safety management system.

Japan, facing resource constraints, aims to revive more nuclear power plants to reduce dependence on imported fossil fuels, particularly LNG. According to the Institute of Energy Economics, Japan (IEEJ), LNG imports are projected to decline to 58.5 million metric tons in the 2024/25 fiscal year, factoring in expected nuclear reactor restarts and an increase in renewable energy sources.

In response, Tepco expressed its commitment to ongoing efforts aimed at regaining the trust of the local community and society as a whole. Simultaneously, Japan's chief cabinet secretary assured that the government would play its part in supporting the process. This development marks a potential step forward in the efforts to bring the world's largest atomic power plant back online, though the actual restart is contingent on obtaining consent from local authorities. "The government, emphasizing 'safety-first,' will engage with Niigata prefecture and local communities to garner understanding and cooperation," stated Yoshimasa Hayashi, the government's top spokesperson, in response to the regulatory decision to lift the corrective action order on the Kashiwazaki-Kariwa nuclear power plant.

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Source: https://myind.net/Home/viewArticle/japan-receives-green-light-to-resume-operations-in-worlds-largest-nuclear-plant, 28 December 2023.

Kyushu on Track to Extend Lifespan of Sendai Reactors

Kyushu secured safety approval from the country's NRA in November to extend the operational lifespan of the Sendai No.1 and No.2 reactors by 20 years to 60 years. Kyushu has restored operations at all its four reactors, with a combined capacity of 4,140MW, after clearing stricter safety inspections following the Fukushima disaster. Two other reactors, the 1,180MW Genkai No.1 and No.2, have operated for 29 years and 26 years respectively.

Japanese utility Kyushu Electric Power is on track to extend the lifespan of the 890MW No.1 and No.2 rectors at its Sendai nuclear power plant past their 40-year lifespan, following local government approvals. The governor of Kagoshima prefecture Koichi Shiota on 21 December granted approval for Kyushu to continue operating the two ageing reactors past their 40-year deadlines, which will fall on 3 July 2024 for the No.1 reactor and 27 November 2025 for the No.2 unit. Permission from local authorities is not officially required to prolong the lifespan of nuclear reactors in Japan, even under the stricter safety regulations created following the 2011 Fukushima nuclear disaster.

But consent from local governments make it easier for a nuclear operator to keep using the reactors. Kyushu secured safety approval from the country's NRA in November to extend the operational lifespan of the Sendai No.1 and No.2 reactors by 20 years to 60 years. Kyushu has restored operations at all its four reactors, with a combined

capacity of 4,140MW, after clearing stricter safety inspections following the Fukushima disaster. Two other reactors, the 1,180MW Genkai No.1 and No.2, have operated for 29 years and 26 years respectively. The current nuclear rules also allow nuclear operators to use reactors beyond a maximum lifespan of 60 years by excluding the time spent under increased safety scrutiny in the wake of the Fukushima disaster. Any extension will require approval by Japan's trade and industry minister, as well as safety confirmation from the NRA.

Source: https://www.world-energy.org/article/39176.html, 22 December 2023.

NUCLEAR SAFETY

CHILE

A record number of 31 disused sealed radioactive sources (DSRSs) were removed from Chile earlier this year, and transferred to a recycling facility abroad, in a large removal operation supported by the IAEA. The removed radioactive sources were mainly cobalt sources previously used for cancer treatment in Chile's hospitals and clinics. Since the end of their use in 1992, they have been in temporary storage at a specialized facility managed by the Chilean Nuclear Energy Commission (CCHEN).

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The DSRSs transfer operation is part of an IAEA interregional project aimed at improving nuclear safety and security by providing comprehensive technical assistance for the sustainable management of DSRSs. "Chile's case of DSRSs management is a successful example of how effective international cooperation can benefit national and global nuclear security," said Elena Buglova, Director of the IAEA's Division of Nuclear Security. "The IAEA strongly encourages countries to establish a national policy and strategy for safe and secure DSRSs management, and offers its assistance to those countries that would like to invest in a sustainable approach."

In Chile, radioactive material and sealed radioactive sources are used mostly for industrial applications, for example in measuring parameters such as thickness and density of materials; in medicine for diagnosis and treatment purposes; as well as for research purposes. The DSRSs represent about half of the radioactive material received yearly in waste management facilities from different activities around the country.

... The operational plan was agreed among involved parties, namely the IAEA, the end-user representing Chile, and the contractor, in December 2021. The operation involved the physical and the radiological verification of the radioactive sources, the appropriate packaging for transport, the transportation, and as a last step, the shipment and export to a recycling facility in Europe. The export of the first 17 sources was made in October 2022, while 14 more were exported in July 2023. ...

Thermodynamic data are used for various analyses involving nuclear fuels and materials. Detailed modelling of the fuel-cladding system is of major importance for studies related to safety improvements, lifetime extensions of Generation II and III reactors and the design of advanced Generation IV systems.

Source: https://www.iaea.org/newscenter/news/iaea-supports-removal-of-high-activity-disused-radioactive-sources-in-chile, 20 December 2023.

GENERAL

Progress in the Thermodynamic Study of Nuclear Materials

Thermodynamic data are used for various analyses involving nuclear fuels and materials. Detailed modelling of the fuel-cladding system is of major importance for studies related to safety improvements, lifetime extensions of Generation II and III reactors and the design of advanced Generation IV systems. The Nuclear Energy

Agency's Thermodynamics of Advanced Fuels - International Database (TAF-ID) was established in 2013 to provide a comprehensive, internationally recognised and quality-assured database of phase diagrams and thermodynamic properties of advanced nuclear fuels to meet the specialised requirements of the development of advanced fuels for future generations of nuclear reactors. More than 20 international experts gathered for the second meeting of the third phase of the TAF-ID project on 30 November and 1 December 2023 at McMaster University (Canada).

During the meeting, participants discussed the project's scope and the validation of the database through experimental work and educational activities. They also confirmed the two next developments of the database that will be released in 2024. The third phase of the project will continue to focus on systems relevant to the modelling of irradiated oxide and metal fuels and severe accidents. It will also focus on accident-tolerant fuels and claddings and oxide fuel interactions with new coolants (sodium and lead). This meeting allowed progress to be made on a new mechanism to provide restricted access to the TAF-ID database to non-participating countries, which is meant to be implemented in the coming year.

Source: https://www.oecd-nea.org/jcms/pl_89180/progress-in-the-thermodynamic-study-of-nuclear-materials, 21 December 2023.

ITALY

Work Begins to Dismantle Garigliano Reactor Vessel

Societa Gestione Impianti Nucleari SpA (Sogin) has begun the process of dismantling the pressure vessel of the boiling water reactor, which the company says is the most complex dismantling activity in the decommissioning of the boiling water reactor plant. Working with its subsidiary Nucleco, Sogin said it has now removed the top part of the vessel as it enters the final phase of the nuclear decommissioning of the Campania site. Removing the vessel head means that the rest of the vessel can now be submerged in the reactor channel. This will provide a natural radiation shield for subsequent dismantling operations which will be carried out under water, Sogin said. Preparatory activities carried out before the removal of the vessel head included restoring auxiliary electrical, ventilation and control systems to the reactor building, as well as the circuit to flood the reactor channel.

The removal of the vessel head was carried out under the supervision of Italy's National Inspectorate for Nuclear Safety and Radiation Protection. Work to remove equipment from the upper part of the reactor vessel is set to be completed in early 2024, after which Sogin said it will start the dismantling work on the vessel and the systems and components of the reactor building. Garigliano, a 150 MWe boiling water reactor, was connected to the grid in January 1964 and was shut down in 1982. Italy decided to phase out nuclear power in a referendum that followed the 1986 Chernobyl accident and Sogin was established in 1999 to take responsibility for decommissioning the country's former nuclear power sites and locating a national waste store.

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Source: https://www.world-energy.org/article/39198.html, 23 December 2023.

UKRAINE

IAEA Continues to Seek Reactor Rooftop Access at Zaporizhzhia

According to the latest update on the situation from IAEA Director General Rafael Mariano Grossi, no alternative date has yet been provided. IAEA teams have previously had access to the roofs of reactors 2, 3 and 4, but not the three other units. He said that the agency's team at the site, which has been under Russian military control since early March 2022, also had a request to visit the north-

western part of unit 5's turbine hall rejected, adding that there has been no access to the north-western part of any of the six turbine halls since mid-October.

They are also waiting to be able to see the maintenance plan for 2024. In the past week the team have visited the reactor hall and electrical safety system rooms of unit 3 and the main control room of unit 5, and visited the site's 750kV electrical switchyard, the on-site water treatment facility, the cooling pond and towers, inlet and outlet channels. They have reported continuing to hear explosions outside of the site, which is on the frontline of Russian and Ukrainian forces. The six unit nuclear power plant has one unit - unit 4 - in hot shutdown to produce steam and heat for safety and other functions at the plant and the associated town of Energodar where most of the staff live. The IAEA has in the past urged alternative methods to provide the heat and steam required, so that all six reactors could be in cold shutdown.

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For access to external power the site currently relies on the one functioning 750 kV power line and one back-up 330 kV line. There have been eight times during the conflict where the plant has had to reply on emergency diesel boilers after losing access to external power. The IAEA said that it had also completed the 33rd delivery of nuclear safety and security equipment to Ukraine, using contributions from Australia, and the agency reported that teams at the country's other nuclear energy plants - Rivne, Khmelnitsky, South Ukraine - and the Chernobyl site.

In Thursday's update Grossi said that four new mobile diesel boilers were being installed to generate additional steam in addition to nine mobile boilers which are already on site and being used to provide heating. Grossi said: "Nuclear power plants need significant amounts of steam to conduct important operational activities at the sites. This remains the case also for the Zaporizhzhia nuclear power plant, even though it has not produced electricity for well over a year now. The IAEA has encouraged the plant to install diesel boilers for this purpose and we welcome the planned additional capacity." For access to external power the site currently relies on the one functioning 750 kV power line and one back-up 330 kV line. There have been eight times during the conflict where the plant has had to reply on emergency diesel boilers after losing access to external power. The IAEA said that it had also completed the 33rd delivery of nuclear safety and security equipment to Ukraine, using contributions from Australia, and the agency reported that teams at the country's other nuclear energy plants - Rivne, Khmelnitsky, South Ukraine - and the Chernobyl site, said "nuclear safety and security is being maintained despite challenging circumstances."

Source: https://www.world-nuclear-news.org/Articles/IAEA-continues-to-seek-reactor-rooftop-access-at-Z#:~:text= International %20Atomic %20Energy%20Agency%20(IAEA,power% 20plant% 20on% 2019% 20December,22 December 2023.

NUCLEAR SECURITY

CAMBODIA

IAEA Mission to Cambodia Finds Progress in Nuclear Security Arrangements, Encourages Continued Improvement

The IAEA completed an advisory service mission to Cambodia focused on assessing the country's nuclear security regime for nuclear and other radioactive material out of regulatory control (MORC). The team said the country has implemented measures to detect and respond to criminal or intentional unauthorised acts involving

such material and encouraged Cambodia to improve its legal and regulatory framework further. The team also identified several examples of good practice. The mission, carried out at the request of the Royal Government of Cambodia, took place from 11 to 22 December and involved a team of nine international experts from Finland, Hungary, Japan, Morocco, Pakistan, the USA, Vietnam and the IAEA. It is the second mission of this kind to Cambodia.

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International Nuclear Security Advisory Service (INSServ) missions aim to help States to better prevent, detect and respond to criminal and intentional unauthorised acts involving nuclear or other radioactive material, known as MORC, which is lost, missing, stolen, improperly disposed of, or not adequately stored or handled. The mission aimed to review the current state of nuclear security in relation to MORC in Cambodia and provide recommendations on how to strengthen it in accordance with international guidance and best practices. The team conducted a series of meetings with officials from the Ministry of Mines and Energy, the General Department of Customs and Excise, the Secretariat of the National Counter Terrorism Committee, and the National Authority for the Prohibition of Chemical, Nuclear, Biological and Radiological Weapons (NACW).

The team said that Cambodia had implemented many elements of a legal and regulatory framework related to MORC. Still, it recommended the country to establish a national nuclear law and ratify the Amendment of the CPPNM and the ICSANT. Further recommendations include the establishment of national infrastructure to support sustainable training to enhance Cambodia's existing detection and response capabilities.

The INSServ team visited the Phnom Penh Autonomous Port (PPAP), the Sihanoukville Autonomous Port (PAS) and the Phnom Penh International Airport (PPIA) to assess the detection and response measures in place. The team also visited the NACW Institute of Explore and Experiment on Substance in Kampong Chhnang Province. "Cambodia established a solid basis for a comprehensive nuclear security regime, " said Team Leader Khammar Mrabit, former Director General of the Moroccan Agency for Nuclear and Radiological Safety and Security and member of the Moroccan Parliament. "We welcome Cambodia's cooperation in this mission and hope our recommendations and suggestions will be helpful for further improvements."

The team said that Cambodia had implemented many elements of a legal and regulatory framework related to MORC. Still, it recommended the country to establish a national nuclear law and ratify the Amendment of the CPPNM and the ICSANT. Further recommendations include the establishment of national infrastructure to support sustainable training to enhance Cambodia's existing detection and response capabilities. Several good practices were identified, including the categorization of offences in the country's legal framework, the radiation detection scan of all import and export cargo containers at PPAP and PAS, the use of the IAEA mobile app TRACE (Tool for Radiation Alarm and Commodity Evaluation), as well as the establishment of knowledge management and professional development measures for the staff with nuclear security detection responsibilities. ...

Source: https://www.iaea.org/newscenter/pressreleases/iaea-mission-to-cambodia-finds-progress-in-nuclear-security-arrangements-encourages-continued-improvement, 22 December 2023.

SMALL MODULAR REACTORS

GENERAL

Sir Stephen Lovegrove to Chair Rolls-Royce-led Nuclear Consortium

A former national security adviser Sir Stephen Lovegrove is to join the Rolls-Royce-led consortium developing small nuclear reactors as chair of its board, raising concerns about the revolving door between the public and private sectors. The role, which has been approved by the Advisory Committee on Business Appointments (Acoba), will begin in the new year. Lovegrove's background as a permanent secretary, the most senior civil servant, in the energy department from 2013-2016 are likely to prove valuable to the consortium. Lovegrove will be paid for his part-time role at Rolls-Royce SMR, a consortium that includes the Qatar Investment Authority as a partner.

Billions of pounds of public and private investment await the companies that successfully develop small modular reactors. Lovegrove will begin his work for Rolls-Royce SMR in 2024 when GBN hopes to announce contracts by the summer. His role as chair will include managing stakeholder and shareholder relations.

Rolls-Royce SMR is developing small modular reactor technology in part funded by the UK government. The relationship is managed through Great British Nuclear (GBN), an arm's-length body of the Department for Energy Security and Net Zero (DESNZ). GBN's non-executive directors include Hugo Robson, a senior civil servant who is the chief commercial negotiator for DESNZ. Robson has previously worked under Lovegrove in the energy department and in 2017 they gave evidence to a Commons select committee together. GBN is running a competition with six companies vying for lucrative contracts to build the small modular reactors the government hopes will expand nuclear power in the UK.

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Along with the other members of the company's board, Lovegrove will review, scrutinise and approve proposals by Rolls-Royce SMR's executive on the "deployment of its small modular reactors with proposed customers – including GBN." The Guardian has discovered, however, that while Lovegrove and Rolls-Royce SMR told Acoba he has had "no prior contact or engagement with the individuals within GBN," he has known and worked with DESNZ's chief commercial negotiator for a number of years. Lovegrove signed a letter in 2015 formalising Robson's appointment to a senior role on the Hinkley Point C nuclear power project, noting Robson was a member of the department's senior leadership team.

In 2017, Robson and Lovegrove, by then the permanent secretary at the MoD, gave evidence to the public accounts committee in the same hearing on Hinkley Point C. At times, Lovegrove suggested Robson may be better placed to answer the committee's questions. Now, Lovegrove is in a position to advise Rolls-Royce SMR as it prepares to negotiate with GBN, with years of experience as a senior manager to Robson, a non-executive director of GBN, which has given him a vantage point to understand his negotiation strategies, thinking and character, if Robson has

a role in the negotiations. ... Rolls-Royce SMR told Acoba that Lovegrove will not be involved in developing bids or contributing to the negotiation process run by GBN. A spokesperson for Rolls-Royce SMR said Lovegrove has had no dealings with, contact or engagement, with the individuals at GBN in relation to their roles there. Lovegrove did not comment.

The declaration calls for the two countries, among other things, to exchange experiences regarding financing models for the expansion of new nuclear power and encourage increased cooperation between the Swedish and French nuclear power industries. In addition, the countries will exchange technical experience in reactor maintenance, as well as lifetime and power upgrades of existing nuclear power reactors.

Source: https://www. theguardian.com/business/2023/dec/22/sir-stephen-lovegrove-to-chair-rolls-royce-led-nuclear-consortium, 22 December 2023.

NUCLEAR COOPERATION

FRANCE–SWEDEN

France and Sweden Plan Nuclear Cooperation

The declaration was signed in Brussels on 19 December by Sweden's Deputy Prime Minister and Energy & Industry Minister Ebba Busch (pictured above, left) and France's Energy Minister Agnés Pannier-Runacher (above right). The declaration calls for the two countries, among other things, to exchange experiences regarding financing models for the expansion of new nuclear power and encourage increased cooperation between the Swedish and French nuclear power industries. In addition, the countries will exchange technical experience in reactor maintenance, as well as lifetime and power upgrades of existing nuclear power reactors.

It says France and Sweden will "promote a regulatory, industrial and financial framework favourable to the realisation of nuclear installation projects with a high level of safety and ensuring institutional support for nuclear energy in compliance with the principle of technological neutrality and with the objective of strengthening Europe's sovereignty and energy security." In the field of the nuclear fuel cycle, the countries will seek to reinforce the security of supply of nuclear materials and fuels "by endeavouring to promote cooperation between their industries to diversify supply and reduce EU dependence on Russian nuclear materials and services." They will also aim to strengthen bilateral cooperation in the field of used fuel management, radioactive waste management and the associated logistics operations.

The countries noted the close relations that exist between their nuclear regulators, the French Nuclear Safety Authority and the Institute for Radiation Protection and Nuclear Safety and the Swedish Radiation Safety Authority. ...Last month, the Swedish government unveiled a roadmap which envisages the construction of new nuclear generating capacity equivalent to at least two large-scale reactors by 2035, with up to ten new large-scale reactors coming online by 2045.

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Source: https://www.world-energy.org/article/39170.html, 22 December 2023.

INDIA–RUSSIA

India, Russia Ink Pacts on Construction of Future Power Units of Kudankulam Nuclear Plant

In a major boost to their time-tested partnership, India and Russia on 26 Dec 2023 signed some "very important" agreements related to the construction of the future power-generating units of the Kudankulam nuclear power plant. External Affairs Minister S. Jaishankar, who is on a five-

day visit to Russia, made the announcement after his "comprehensive and productive" meeting with Deputy Prime Minister Denis Manturov on the bilateral economic cooperation during which they witnessed signing of agreements on nuclear power and in areas of medicines, pharmaceutical substances and medical devices. "Today, in my presence and that of Deputy Prime Minister Manturov, we signed some very important agreements pertaining to the future units of the Kudankulam nuclear project," he said addressing the Indian diaspora here.

The Kudankulam nuclear power plant, India's largest, is being built in Tamil Nadu with the technical assistance of Russia. The construction began in March 2002. Since February 2016, the first power unit of the Kudankulam NPP has been steadily operating at its design capacity of 1,000 MW. The plant is expected to start operating at full capacity in 2027, according to Russian state media. ...

Source: https://www.thehindu.com/news/national/india-russia-ink-pacts-on-construction-of-future-power-units-of-kudankulam-nuclear-plant/article67677964.ece, 27 December 2023.

SOUTH KOREA–NETHERLANDS

South Korea and Netherlands Agree on Nuclear Co-operation

During South Korean President Yoon Suk Yeol's state visit to the Netherlands an agreement was signed to cooperate on nuclear power, including a feasibility study by Korea Hydro & Nuclear Power (KHNP) for the construction of a NPP in the Netherlands.

A joint statement from President Yoon and Dutch Prime Minister Mark Rutte said: "The two leaders recognised the role nuclear energy can play in enhancing energy security, combatting climate change and reaching carbon neutrality, and agreed to maintain and further develop bilateral cooperation on nuclear energy topics such as construction and operation of nuclear power plants; workforce development; nuclear fuel; safety; and innovation of gigawatt-scale nuclear reactors, small modular reactors and other advanced nuclear reactors." South Korea's industry ministry said it had signed a Memorandum of Understanding with the Dutch Economic Affairs ministry to support the new plant order.

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KHNP signed a memorandum of understanding with the Netherlands' Economic Affairs & Climate Policy Ministry on the feasibility study. The Dutch government said in a statement that KHNP will begin the feasibility study in January. The study will consider whether the reactor design complies with Dutch legislation and regulations, whether it can be fitted into the preferred location at Borssele. It will develop a more detailed estimate of the costs and time required to build the two new units. The possible impact on the environment will also be investigated. The study is expected to last at least six months.

The government said similar contracts with US Westinghouse and EDF "will follow soon". It added: "These studies are necessary to determine whether it is technically possible and safe to build new nuclear power stations at the preferred location in Borssele," it said. "An independent party will then evaluate the technical feasibility studies. The first results are expected to be shared in the autumn of 2024." The Netherlands' only operating NPP at Borssele was built in the 1970s and is due to be decommissioned in 2033.

In 2022, the Netherlands announced plans to build two reactors by 2035, taking nuclear's share of generating capacity from 3% to 13%. MOTIE said South Korea would participate in any bids for new nuclear plants, the Korean Times reported. The

ministry said: "We have agreed to cooperate in the entire cycle of the nuclear power sector, including construction and operation of nuclear power plants, supply of equipment, development of technology such as small modular reactors, education and training, fuel and safety and to establish a joint operation committee between the two governments to build a mutually beneficial partnership." President Yoon said in a statement: "Based on the nuclear power plant cooperation MOU...we will actively support Korean companies with the world's best construction competitiveness to participate in the new nuclear power plant project in the Netherlands."

Under the JDP, HD KSOE and KEPCO E&C will provide designs for future vessels and their reactors while LR will assess rule requirements for safe operation and regulatory compliance models. The JDP partners will work to address the challenges involved with nuclear propulsion, such as applying existing terrestrial nuclear technology to ships. The project aims to enable Zodiac to evaluate ship specifications and voyage considerations around nuclear technology.

Source: https://www.neimagazine.com/news/newssouth-korea-and-netherlands-agree-on-nuclear-co-operation-11383549, 19 December 2023.

UK–SOUTH KOREA

Zodiac Maritime, HD KSOE & Partners Team Up on Nuclear Propulsion

UK-based shipping company Zodiac Maritime has teamed up with Lloyd's Register (LR), South Korean shipbuilder HD KSOE and power plant design and engineering company KEPCO E&C in a joint development project for the research and development of nuclear-propelled ship designs. The companies have signed a MoU at Korea's HD Hyundai Global R&D Center to study nuclear propulsion for ships including bulk carriers and containerships. The move comes as the shipping industry looks more closely at nuclear as a future marine fuel in the context of the energy transition and decarbonization targets.

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A nuclear propulsion ship emits no carbon, and its paramount goal is to be designed with a life cycle cost (LCA) of less than half that of carbon-neutral ships. HD KSOE and KEPCO E&C are already collaborating on the design of a nuclear propulsion ship. The duo has received approval in principle (AiP) from the classification society ABS for a new design of a floating offshore nuclear power barge. The design involves a 240 MW SMR-powered ship, featuring four sets of 60-megawatt SMRs. The vessel would be a floating SMR facility on the sea, with the SMR placed on the bottom and a platform on top that produces carbon-free fuel such as hydrogen.

The floating SMR barge is intended to serve as offshore power generation for remote communities and island electrification. ...HD KSOE has invested $30 million in the fourth-generation SMR company, TerraPower, and the company has plans to accelerate the development of future nuclear-powered ships by establishing an SMR research team.

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Source: https://www.world-energy.org/article/39088.html, 20 December 2023.

NUCLEAR PROLIFERATION

AUSTRALIA

New Zealand's PM Insists on Nuclear-Free Position in Possible AUKUS Involvement

New Zealand Prime Minister Christopher Luxon on Wednesday expressed his interest in exploring part of the AUKUS agreement during his visit to Australia, but maintained his country had a "non-negotiable" nuclear-free position. In a bilateral meeting with Australian Prime Minister Anthony Albanese in Sydney, Luxon said New Zealand was interested in exploring pillar two of the AUKUS deal with regard to the new technologies and potential opportunities the country could participate in, the Australian news channel Sky News reported.

The New Zealand leader, who was on his first official trip abroad, described the AUKUS pact as an "important element" to regional stability and peace, but also laid out his country's "non-negotiable" condition for involvement. "We will always have our nuclear-free position. That's non-negotiable for us in New Zealand," Luxon told reporters in Sydney.

Under the trilateral AUKUS alliance, announced in September 2021, Australia can build nuclear-powered submarines with technology provided by the United States and the United Kingdom. The New Zealand leader, who was on his first official trip abroad, described the AUKUS pact as an "important element" to regional stability and peace, but also laid out his country's "non-negotiable" condition for involvement. "We will always have our nuclear-free position. That's non-negotiable for us in New Zealand," Luxon told reporters in Sydney. Pillar two of the AUKUS agreement involves developing advanced technologies to enhance military capabilities. New Zealand is not part of the agreement nor was it asked to join pillar one, according to local news website News.com.au. A joint report released by a Chinese and a Russian think tank in August showed that the AUKUS nuclear submarine deal poses a serious risk to regional and global security.

The report, called "The AUKUS submarine deal: risks for the nuclear non-proliferation regime and global security", was published by the China Arms Control and Disarmament Association and Russia's Center for Energy and Security Studies. "The AUKUS strategic military cooperation is unprecedented and goes against the goals and spirit of the NPT, may inflict severe damage on the international non-proliferation regime and the NPT itself," says the report. The AUKUS deal involves the transfer of up to four tons of weapons-grade highly enriched uranium from the United States and Britain, two nuclear-weapon states, to Australia, a non-nuclear-weapon state.

Source: https://english.news.cn/20231220/24295eb4af114637bd5aeff119c68c51/c.html, 20 December 2023.

The IAEA reports that the total stockpiles of Iran's enriched uranium now stand at 22 times the JCPoA limit. Iran's stockpiles of high enriched uranium up to 60% are unprecedented for a state without a nuclear weapons programme. Iran has been in violation of its nuclear commitments under the JCPoA, which is endorsed by Resolution 2231, for more than four years. There is no credible civilian justification for the state of Iran's nuclear programme.

IRAN

We Remain Determined that Iran Must Never Develop a Nuclear Weapon

Today, the Security Council discussed the implementation of UNSC Resolution 2231, particularly Iran's nuclear activity, missile development and continued weapons proliferation inconsistent with that resolution. In November, the IAEA Director General yet again issued a report which starkly outlines the deplorable state of Iran's commitments under the JCPoA.

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up to 60% are unprecedented for a state without a nuclear weapons programme. Iran has been in violation of its nuclear commitments under the JCPoA, which is endorsed by Resolution 2231, for more than four years. There is no credible civilian justification for the state of Iran's nuclear programme. The current trajectory only brings Iran closer to weapons-related capabilities; this is of utmost concern for international peace and security.

Iran's ongoing lack of cooperation with the IAEA prevents the IAEA from carrying out vital work to determine the nature of Iran's nuclear programme and undermines the global non-proliferation architecture. Iran's agreements with the IAEA and its legal obligations must be pursued in full, without further delay, as repeatedly requested by the Director General. It is especially concerning to see Iran flatly deny to the IAEA its legal obligation to implement Modified Code 3.1.

Deliveries took place in the knowledge that Russia uses them to target Ukrainian cities and critical infrastructure. Neither Russia nor Iran have ever sought authorisation for these transfers, which are therefore a breach of Resolution 2231 by both states. We continue to urge Iran to cease its reckless proliferative activities in the region and beyond.

All these actions undermine the case that Iran's nuclear programme is of an exclusively peaceful nature as well as any confidence the international community has in its wider commitments and obligations. We welcome the Secretary General's recognition of the UK's evidence exposing Iran's proliferation of missiles and missile technologies to non-state actors in the region and beyond, which endanger the region and the whole international community, and were carried out in violation of Resolution 2231.

Furthermore, while restricted by this resolution, Iran transferred hundreds of UAVs to Russia, deliberately supporting Russia's war of aggression against Ukraine. Deliveries took place in the knowledge that Russia uses them to target Ukrainian cities and critical infrastructure. Neither Russia nor Iran have ever sought authorisation for these transfers, which are therefore a breach of Resolution 2231 by both states. We continue to urge Iran to cease its reckless proliferative activities in the region and beyond.

Iran has developed and tested ballistic missiles and related technologies extensively in complete disregard for this resolution, undermining global non-proliferation principles and architecture. This requires particular scrutiny as Resolution 2231 restrictions on Iran's missile programme were automatically lifted on 18 October, despite Iran having consistently ignored these restrictions. Today we must reflect on Iran's continued and long-lasting contempt for UNSCR 2231 and its restrictions. We remain determined that Iran must never develop a nuclear weapon and must reverse its nuclear escalation. We emphasise once again our determination to find a diplomatic solution to the Iranian nuclear crisis, as demonstrated by our consistent efforts in that regard.

Source: https://onu.delegfrance.org/we-remain-determined-that-iran-must-never-develop-a-nuclear-weapon, 18 December 2023.

Effort to Restart Iran Nuclear Deal 'at a Standstill' Security Council Hears

The JCPOA agreed in 2015 lays out the rules for monitoring Iran's domestic nuclear programme and paved the way for US sanctions to be lifted. It was agreed by Iran, the five permanent members of the Security Council plus Germany together with the EU. The US left the deal in 2018 under former President Donald Trump. The Security Council laid out the lifting of sanctions in its 2015 resolution 2231. UN Political Affairs chief Rosemary DiCarlo said the lack of any diplomatic movement was despite "repeated calls on all parties concerned to renew dialogue and engagement aimed at a return to the full and effective implementation of the Plan and resolution".

Still 'Best Option': Nonetheless, she added, "the Secretary-General still considers that the JCPOA

represents the best available option to ensure that the Iranian nuclear programme remains exclusively peaceful." She said it was essential for Iran to reverse now steps taken since the deal fell apart "that are not consistent with its nuclear-related commitments under the Plan and which it has pledged are reversible." UN chief António Guterres has underscored that the US will also need to lift or waive its sanctions and extend waivers regarding the trade in oil with Iran for the deal to resume. Verification and monitoring of the JCPOA by the IAEA has been "seriously affected by Iran's cessation of its nuclear-related commitments under the JCPOA", she said, quoting its latest report.

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Uranium Stockpile: "The Agency is still unable to verify the stockpile of enriched uranium in the country", she added, saying that Iran maintains a stockpile of enriched uranium more than 20 times the limit set by the JCPOA. Restrictive measures on missile activities and transfers by Iran expired on 18 October this year, and numerous countries have reported alleged breaches of nuclear-related restrictions related to the JCPOA. Ms DiCarlo went through each case, including ballistic missile-related provisions and the use of missiles and drones manufactured or manufactured in part by Iran, in Ukraine, by Russian forces.

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She said examining a cruise missile used in a Houthi rebel attack in Yemen in November last year, "we observed numerous similarities relating to design, configuration, dimensions, manufacturers and part numbering between the debris seen in Yemen and previously examined components of cruise missiles used in prior Houthi attacks" on Saudi Arabia, the United Arab Emirates, as well as with cruise missile components seized by the US and the UK. ... She cited other instances where missile parts appeared to be in breach of the resolution and added that they had also received letters concerning drones allegedly transferred from Iran to Russia for use in Ukraine, although the ambassadors for the two nations "dismissed the evidence presented by the United States and Ukraine as 'utterly fabricated' and disputed any violation of resolution 2231."

Hopes 'Greatly Diminished': Ms DiCarlo said the adoption of the JCPOA "just over eight years ago was rightly and universally hailed as a historic breakthrough. Today, the hope the deal engendered has greatly diminished." She pledged the UN would "continue to urge the participants to exercise maximum restraint and to exhaust all available diplomatic avenues to restore the Plan. Indeed, the participants are responsible for its fate." She said its success or failure, "especially at this extremely dangerous juncture in global peace and security – matters to all of us." ...

Source: https://news.un.org/en/story/2023/12/1144917, 18 December 2023.

Accusations Against Tehran Baseless: Iran's Nuclear Chief

Speaking on the sidelines of the cabinet meeting on 20 Dec 2023, Eslami emphasized that the AEOI is operating in accordance with the strategic action approved by the Iranian Parliament, which

aims to pave the way for the lifting of sanctions on the country. He pointed to the recent report of the IAEA, which expressed concerns over unresolved nuclear issues in Iran, asserting that the report is politically biased and does not reflect the actual state of Iran's nuclear program.

"The relations between the IAEA and Iran are based on the framework of the NPT and safeguards, and the IAEA is fully inspecting Iran's nuclear program," Eslami clarified. He urged the remaining parties to the JCPOA, the nuclear deal with Iran, to abide by their commitments, just as Iran has fully implemented its obligations. "The nuclear issue is a national and strategic one, not a factional or political matter," Eslami underscored, emphasizing the public's awareness of the potential benefits of the peaceful nuclear industry for their lives.

He reiterated Iran's commitment to the JCPOA's objective of lifting sanctions, calling on the signatories to honor their pledges and cease coercive measures and attempts to undermine the agreement. Regarding Iran's agreement with the IAEA, Eslami highlighted that the three-paragraph document clearly states that Iran's cooperation with the IAEA is within the framework of safeguards and the NPT. Eslami reaffirmed Iran's unwavering stance on its nuclear rights, stating, "Iran will not take a step back from its peaceful nuclear program."

Source: https://www.tehrantimes.com/news/492736/Accusations-against-Tehran-baseless-Iran-s-nuclear-chief, 20 December 2023.

NORTH KOREA

North Korea Nuclear Reactor may be Operational: IAEA

The IAEA suspects North Korea may have launched a new operational nuclear reactor in Yongbyon. According to the UN nuclear monitoring arm, opening the site would result in an additional source of plutonium – an element used to make nuclear weapons. Pyongyang has been observed burning fuel from the facility's 5-megawatt reactor to produce the element. An October report from the South Korean news agency Donga said the move could be a "sign of reprocessing work to obtain weapons-grade plutonium." The latest IAEA update found that the site's cooling system reactor is already discharging warm water, implying its continuous operability in recent months. "Observations indicate that this water discharge is warm, which is also consistent with ongoing commissioning of the [Light Water Reactor], a process that takes some time for any new reactor," IAEA Chief Rafael Grossi stated.

An October report from the South Korean news agency Donga said the move could be a "sign of reprocessing work to obtain weapons-grade plutonium." The latest IAEA update found that the site's cooling system reactor is already discharging warm water, implying its continuous operability in recent months. "Observations indicate that this water discharge is warm, which is also consistent with ongoing commissioning of the [Light Water Reactor], a process that takes some time for any new reactor," IAEA Chief Rafael Grossi stated.

No Confirmation Yet: IAEA has had no access to the Yongbyon reactor since 2009 following North Korea's decision to cut ties with the agency and its inspectors. The UN has been observing the country through a satellite imaging capability, and this condition challenges them to obtain new information on the reactor's operational status. "The discharge of warm water is indicative the reactor has reached criticality," Grossi said. "It remains the case that without access to the facility the Agency cannot confirm its operational status." "Concerning the safety of the LWR, we do not have sufficient information to make an assessment." "Of course, safety should always be the paramount issue when starting a new reactor. Nuclear safety is a sovereign responsibility of the State and the IAEA supports the States in this area."

UN Security Council Violation: Grossi reiterated that North Korea's actions related to its nuclear

framework are a threat to international peace and security. "I repeat that the further development of the [Democratic People's Republic of Korea's] nuclear programme, including the construction and operation of the LWR, is a violation of UN Security Council resolutions and is deeply regrettable," Grossi emphasized. "I call upon the DPRK…to cooperate promptly with the Agency in the full and effective implementation of its [NPT] Safeguards Agreement and to resolve all outstanding issues, especially those that have arisen during the absence of Agency inspectors from the country." "The Agency is ready to engage on any of the above issues, including safety."

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Source: https://www.thedefensepost.com/2023/12/22/north-korea-nuclear-reactor-operational-iaea/#google_vignette, 22 December 2023.

Statement of the G7 Foreign Ministers on the Launch of an ICBM by North Korea

We, the G7 Foreign Ministers of Canada, France, Germany, Italy, Japan, the United Kingdom, the United States of America, and the High Representative of the European Union, condemn in the strongest terms North Korea's December 18 launch of an ICBM, following four previous ICBM launches this year as well as other launches using ballistic missile technology. North Korea continues to advance its unlawful nuclear and ballistic missile capabilities and to escalate its destabilizing activities.

We deplore North Korea's choice to prioritize its unlawful WMD and ballistic missile programs over the welfare of the people in North Korea. North Korea's repeated reckless actions must be met with a swift, united, and robust international response, particularly by the UNSC. We urge UNSC Members to follow through on their commitments and call on all UN Member States to fully and effectively implement relevant UNSCRs.

We reiterate our call for the complete denuclearization of the Korean Peninsula and demand that North Korea abandon all its nuclear weapons, existing nuclear programs, and all other existing WMD and ballistic missile programs in a complete, verifiable, and irreversible manner in accordance with all relevant UNSCRs. We deplore North Korea's choice to prioritize its unlawful WMD and ballistic missile programs over the welfare of the people in North Korea. North Korea's repeated reckless actions must be met with a swift, united, and robust international response, particularly by the UNSC. We urge UNSC Members to follow through on their commitments and call on all UN Member States to fully and effectively implement relevant UNSCRs.

In this context, we are deeply concerned about the potential for any transfer of nuclear or ballistic missile-related technology to North Korea, which would further threaten the peace and stability of the region as well as across the globe, and seriously undermine the global non-proliferation regime that we all value and that substantially contributes to our collective security. We also reiterate our strong condemnation on arms transfers from North Korea to Russia, which directly violate relevant UNSCRs. We urge North Korea and Russia to abide by relevant UNSCRs and immediately cease all such activities.

We continue to call on North Korea to engage in meaningful diplomacy and accept the repeated offers of dialogue without preconditions put forward by Japan, the United States, and the Republic of Korea. The G7 remains committed to working with all relevant partners toward the goal of peace and stability on the

Korean Peninsula and to upholding the international order based on the rule of law.

Source: https://www.auswaertiges-amt.de/en/newsroom/news/-/2636428, 19 December 2023.

URANIUM PRODUCTION

INDIA

Uranium Production in Andhra Pradesh to be Increased, Says Union Minister of State for Science and Technology

Union Minister of State (MoS) for Science & Technology Jitendra Singh said in the Rajya Sabha on Thursday that the AEC has given its in-principle approval for uranium production capacity expansion at some existing units in Andhra Pradesh. Accordingly, the UCIL initiated pre-project activities like obtaining statutory clearances, land acquisition, site development and R&D for preparing Detailed Project Reports (DPRs), Mr. Singh said in a written reply to a question asked by Sant Balbir Singh of Aam Aadmi Party (AAP). The MoS said the above activities are in different stages of execution for setting up new mines and plants at various locations in the country including Kanampalle in Kadapa district.

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Further, Mr. Singh informed the House that the Atomic Minerals Directorate for Exploration and Research (AMD) of DAE was carrying out integrated multi-disciplinary exploration (heliborne and ground geophysical surveys, ground geological, geochemical and radiometric surveys and drilling) in identified thrust areas of the country for undertaking uranium mining in the future. These areas in A.P. are Ambakapalle, Nallagondavaripalle, Kumarampalle, Bakkannagaripalle, Sivaramapuram, Pincha and Nagayapalle in Kadapa district, Sarangapalli, Madinapadu and Tangeda in Palnadu, Bommarajupalle, Minchalapadu and Kappatralla in Kurnool and Katimayakunta and Varikuntapalle, in Annamayya district.

Source: https://www.thehindu.com/news/national/andhra-pradesh/uranium-production-in-andhra-pradesh-to-be-increased-says-union-minister-of-state-for-science-and-technology/article67641139.ece, 15 December 2023.

NAMIBIA

Namibia Greenlights Bannerman Energy's Etango Uranium Project

Bannerman Energy said on Friday it had received the mining licence for its flagship Etango uranium project in Namibia, Africa's biggest producer. The permit comes at a time when prices for the radioactive material, needed in a world shifting away from fossil fuels, have rallied to hit almost 16-year highs. Morgan Stanley analysts last week said they were more bullish about uranium prices than any other mined commodity, as current supply can't keep up with demand. They expect prices to reach $95 a pound by the second quarter of 2024. Bannerman said receiving the mining licence has allowed the company to immediately award two key early works contracts with a combined value of $2 million. One is related to building a temporary construction water supply and the other one for setting a site access road.

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"Etango is now fully permitted, enabling us to drive key project workstreams towards a final investment decision in parallel with the ongoing strengthening in uranium market fundamentals," the Australian listed uranium developer said in the statement. The Etango uranium project is located in the Erongo region of Namibia, 30 km south-east of Swakopmund. The asset holds a uranium mineral resource of 207 million pounds of contained triuranium octoxide (U3O8). Only two of Namibia's three mines currently produce the nuclear fuel, according to the Namibian Uranium Association — Rossing uranium mine and Husab uranium, which are controlled by Chinese investors. Australia's Paladin Energy plans to resume commercial production at its Langer Heinrich mine in early 2024.

Source: https://www. mining.com/namibia-greenlights-bannermans-etango-uranium-project/ , 15 December 2023.

Licensing Milestone for Tumas Uranium Project

Namibia's Ministry of Mines and Energy has issued a mining licence to Deep Yellow Ltd for the Tumas uranium project. The company says it aims to make a final investment decision on the project in the third quarter of 2024. Licence ML 237 has been issued to Perth, Western Australia-based Deep Yellow's 100% owned subsidiary, Reptile Uranium Namibia (Pty) Ltd and is valid for 20 years from date of issue. Deep Yellow plans to develop Tumas to produce 3.6 million pounds U3O8 (1285 tU) per year, with an anticipated life of more than 30 years. Deep Yellow CEO and Managing Director John Borshoff said the mining licence "represents another key accomplishment in the progress to develop this significant uranium asset and our overall objective of building Deep Yellow into a reliable, geographically diverse and long-term uranium producer" and ensures the company can move forward on its stated development schedule. Tumas hosts one of the largest known paleochannel-hosted calcrete uranium deposits in Namibia, with a contained indicated mineral resource of 108.5 million pounds U3O8 (41,734 tU).

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Earlier in November, the company announced updated costs and forecast financial outcomes for the project following the completion of a reassessment of capital expenditures and operating expenses from the definitive feasibility study released in January. It also included a market reappraisal, with the base case uranium price increased "conservatively" to USD75 per pound U3O8 from the previously used value of USD65 per pound in recognition of "continued strengthening uranium market conditions." The company said the recent work provides a "strong platform" for it to proceed with project financing, product marketing and detailed engineering work ahead of a final investment decision. This is the second Namibian uranium mining licence to be issued in recent days: Bannerman Energy announced on 15 December that it had received a mining licence for its Etango uranium project, for which it has now awarded early works contracts with a combined value of about NAD36 million (USD2 million) to a Namibian construction firm.

Source: https://www.world-energy.org/article/ 39096.html, 20 December 2023.

NETHERLANDS

Urenco to Expand Capacity at Dutch Facility

Uranium enrichment services provider Urenco has announced plans to increase capacity at its plant in Almelo in the Netherlands by 15% in response to new commitments from customers. The project

will see multiple new centrifuge cascades added to an existing plant in Almelo, adding about 750 tonnes of SWU per year. The first new cascades are scheduled to come online around 2027. Urenco noted this is the third major investment to be approved under its capacity programme to strengthen the nuclear fuel supply chain worldwide. Earlier this year, Urenco approved its first expansion project at its plant in Eunice, New Mexico - the only operating commercial uranium enrichment facility in North America - providing an additional capacity of 700 tonnes of SWU per year. The first new cascades are due online in 2025. The plant currently has a production capacity of 4600 tSWU per year.

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At its site in Gronau, Germany, the company is re-fitting an existing space with more modern centrifuge technology which will enhance the capacity of the plant. Urenco said the capacity programme is a long-term plan to meet increasing customer demand as more countries and utility companies turn to nuclear for the first time, or seek to extend and/or diversify fuel supplies for existing nuclear operations. ... In addition to the Almelo, Eunice and Gronau plant, Urenco also operates an enrichment facility at Capenhurst in the UK.

Source: https://www.world-nuclear-news.org/Articles/Urenco-to-expand-capacity-at-Dutch-facility...., 14 December 2023.

NUCLEAR WASTE MANAGEMENT

BELGIUM

IAEA Mission Says Belgium Committed to the Safe Management of Radioactive Waste and Spent Fuel, Encourages Further Development of National Waste Policies

An IAEA team of experts found that Belgium demonstrates commitment to the safe management of its radioactive waste and spent fuel, while also noting opportunities to enhance the national policies and arrangements for eventual disposal. The Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) team concluded an eleven-day mission to Belgium. The mission was carried out from 3 to 13 December at the request of Belgium and hosted by ONDRAF/NIRAS, the Belgian National Agency for Radioactive Waste and Enriched Fissile Material management.

Belgium manages high-level waste from the five nuclear reactors in operation today in the Doel and Tihange NPPs which provided in 2022 roughly 47.3 per cent of the country's electricity. Waste is also managed from the additional two reactors which have been permanently shut down. Belgium delayed plans to close its nuclear reactors by 2025 and reached a Government agreement with Engie - operator of the two NPPs - to extend operation of Doel 4 and Tihange 3 nuclear reactors to 2035.

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Low- and intermediate-level radioactive waste is generated from the production and use of radiation sources in medical and industrial applications, as well as in science and research activities such as at the Belgian Nuclear Research Centre (SCK CEN). Waste is also generated from the decommissioning of research reactors such as BR2 and BR3 and the decommissioning of industrial facilities that covered almost all activities in the nuclear fuel cycle, including the Eurochemic pilot reprocessing plant, Belgonucléaire MOX fabrication facility and the FBFC International UO2 fuel fabrication facility. Radioactive waste and spent fuel in Belgium are managed by the ONDRAF/NIRAS after acceptance.

The challenges identified by the team to be addressed by Belgium in waste management include the need for consolidated policies for specific waste streams such as radium-bearing waste and spent fuel, and decision making on the geological repository. The team said the provision of adequate financial and human resources will be crucial to ensure timely implementation of such policies.

The Belgian National Programme for the Management of Spent Fuel and Radioactive Waste, adopted in October 2015, comprises a national strategy for the management of spent fuel and radioactive waste. It is expected that Belgium will publish an update of the National Programme in due time after the ARTEMIS mission and the finalization of the intermediate Government agreement with Engie to extend the life of Doel 4 and Tihange 3 nuclear reactors.

... Results from the IAEA Integrated Regulatory Review Service (IRRS) mission to Belgium, conducted in June 2023, were taken into account by the ARTEMIS team during its review, where relevant. The team was comprised of seven experts from Austria, Finland, France, Slovenia, the United Kingdom and the United States of America, as well as three IAEA staff members. The team met with officials from the ONDRAF/NIRAS, the Federal Agency for Nuclear Control (FANC), the SCK CEN, the Directorate-General for Energy, Synatom – the organization in charge of the management of the fuel cycle of Belgian nuclear power plants - and the Commission for Nuclear Provisions (CNP). One expert from the European Commission was invited to observe the mission.

The ARTEMIS team said that Belgium has established a robust national infrastructure for the management of radioactive waste and spent fuel and the implementation of decommissioning and remediation activities over the last decades. It found that ONDRAF/NIRAS demonstrates strong commitment to the long-term management of high-level and long-lived waste and spent fuel. This includes management of waste from historical radium production, spent fuel management options and the establishment of geological disposal plans for the preparation of a deep geological repository that will require continuing research and development activities and wide public consultations. ...

The ARTEMIS Review Team identified good practices in the Belgian approach towards centralized management of all radioactive waste by Belgoprocess (a subsidiary of ONDRAF/NIRAS) contributing to the minimization of radioactive waste, as well as in the approach for remediation of the former Olen radium and uranium production site leading to waste minimization. The challenges identified by the team to be addressed by Belgium in waste management include the need for consolidated policies for specific waste streams such as radium-bearing waste and spent fuel, and decision making on the geological repository. The team said the provision of adequate financial and human resources will be crucial to ensure timely implementation of such policies.

Main Recommendations and Suggestions:

- The Government should formulate well-defined national policies on spent fuel management options and the management of radioactive waste from radium production.

■ The Government should ensure that waste streams that are non-conforming – those requiring further processing – or have no clear end point should be included in the National Programme with proposed management options.

■ The Government should establish a comprehensive geological disposal policy for the management of high-level waste and spent fuel and complete the process of establishing safety requirements and a licensing scheme specific to disposal facilities.

The Government should establish a comprehensive geological disposal policy for the management of high-level waste and spent fuel and complete the process of establishing safety requirements and a licensing scheme specific to disposal facilities.

■ ONDRAF/NIRAS should focus main resources on solutions that are technically feasible and internationally acknowledged for the long-term management of high-level waste and spent fuel of the Belgian inventory.

■ The Government should consider enhancing the harmonization and justification of financial parameters to be used by all actors in the management of radioactive waste.

Hildegarde Vandenhove, IAEA Director of the Division of Radiation, Transport and Waste Safety, speaking at the closing session on 13 December, said she was confident that recommended improvements related to the safe management of radioactive waste and spent fuel, such as to enhance the national policies and arrangements for eventual disposal, will be considered and implemented by the respective stakeholder. ...The final mission report will be provided to the Government in two months.

Source: https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-belgium-committed-to-the-safe-management-of-radioactive-waste-and-spent-fuel-encourages-further-development-of-national-waste-policies, 15 December 2023.

UK

First Waste Received by New Sellafield Transfer Facility

The newly-opened Box Encapsulation Plant Product Store – Direct Import Facility at the Sellafield site in the UK has received its first box of historical radioactive waste. The Box Encapsulation Plant Product Store is a purpose-built, above-ground vault that can store intermediate-level wastes safely and securely for the next 100 years. The store has the capacity to store 6681 waste boxes inside its metre-thick walls, and can receive up to 9 boxes every 24 hours. The Direct Import Facility is an annex to the store, built to receive the packages of waste retrieved from ageing stores in the oldest parts of the Sellafield site. This facility received its first box of waste this week after years of planning and testing by hundreds of people, Sellafield Ltd announced. Its first package contains waste from the Pile Fuel Cladding Silo (PFCS), the oldest waste store at Sellafield, which has stored more than 3200 cubic metres of intermediate-level waste undisturbed for 70 years.

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Built between 1950 and 1951, the PFCS is 21 metres high, subdivided internally into six individual compartments. It contains irradiated cladding materials removed from fuel assemblies used in some of the UK's earliest reactors at Windscale and Chapelcross. The PFCS was originally designed to remain sealed forever, but equipment has now been installed to enable the safe removal of the wastes so the facility can be decommissioned. ... The first batch of waste was successfully retrieved from the silo in August this year. Giant shield doors were installed on the top of the silo to maintain a radiation barrier as holes were cut in the sides of the building to allow

access to its contents. The retrievals team then used a remotely-operated crane to reach into the silo, lift out the waste and place it into a specially designed 3-cubic-metre stainless-steel box. Once filled, the five-tonne box was loaded into a shielded transport flask, monitored, and cleared for export to the BEPPS-DIF.

The flask was transported from the silo by road and lifted into the new store by crane. Once inside, the flask had its lid bolts removed and was placed behind a shield door so operators could remotely remove the flask lid, lift out the box, and transfer it to its predetermined location in the store, where it will be held until it is ready for permanent disposal underground in a Geological Disposal Facility. ...

Source: https://www.world-energy.org/article/39135.html, 21 December 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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