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OPINION – Lynn Rusten

Will New START Get a New Lease of Life?

Since the SALT initiated fifty years ago, the United States and Russia have relied on verifiable nuclear arms control to constrain their competition in nuclear arms. The most recent of these agreements – the New START entered into force on February 5, 2011. The Treaty limits the United States and Russia to a total of 1,550 deployed nuclear warheads and 700 deployed ICBMs, SLBMs, and heavy bombers equipped for nuclear armaments. In addition to establishing the lowest level of U.S. and Russian deployed nuclear armaments ever mandated by a treaty, the agreement includes robust verification mechanisms to confirm each side is complying with its terms.

New START has a duration of 10 years (until February 4, 2021) and includes a provision for extending the Treaty by executive agreement for up to five additional years (until February 4, 2026). Russia has indicated willingness to extend the Treaty, while noting some compliance concerns. The U.S. government is conducting a policy review and has thus far not committed to extension.

In his October 30, 2019 nomination hearing for the position of U.S. Ambassador to Russia, Deputy Secretary of State John Sullivan pointed to the

The new Sarmat ICBM and Avangard hypersonic vehicles deployed on ICBMs would indeed be covered by New START when deployed. With this significant Russian clarification about its new strategic systems, and the departure from the administration of some its most vocal critics of extension – could the prospects for New START extension be improving.

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need to discuss Russia’s strategic weapons systems “that they would view as not covered by New START,” and that the U.S. position should be to engage immediately with the Russians on not just the terms of extension but also on these new weapons systems. Russia subsequently clarified that the new Sarmat ICBM and Avangard hypersonic vehicles deployed on ICBMs would indeed be covered by New START when deployed. With this significant Russian clarification about its new strategic systems, and the departure from the administration of some its most vocal critics of extension — could the prospects for New START extension be improving?

Why it Make Sense to Extend New START: From a U.S. perspective, the case for extending New START is straight forward- provides limits on Russian strategic nuclear forces, strict verification, and predictability. Without it, there would be no constraints or verification on Russia's nuclear forces. The case is equally valid from Russia's perspective. Both countries are complying with New START and both have met the central limits as they were required to have done by February 5, 2018.

New START contains robust and intrusive verification and transparency measures. These include up to 18 on-site inspections in each country annually, as well as exhibitions of nuclear weapons systems, and data exchanges and notifications regarding the number, location, status and movements of strategic offensive arms and facilities covered by the Treaty. As of August 2019, the U.S. and Russia have exchanged approximately 18,500 notifications and U.S. inspectors have conducted more than 150 on-site inspections (18 per year) in Russia. These verification and transparency measures deter cheating and remove uncertainties that drive both sides to "worst case" military planning.

What about the New Russian Weapon Systems?: A key issue in the debate about New START extension relates to the new nuclear weapon systems President Putin has discussed in the past few years, some of which are closer to deployment than others. The most effective means to address those Russian strategic systems likely to be deployed in the next six years is to extend New START. Mark Melamed and I concluded in a recent NTI report, *Russia's New Nuclear Weapon Delivery Systems: Implications for New START, Future Arms Control, and Strategic Stability*, that the two strategic systems Russia is most likely to be able to deploy before 2026 (the timeframe of an extended New START Treaty) — the Sarmat heavy

ICBM and the Avangard hypersonic vehicle deployed on Russian ICBMs — will, according to its definitions, be accountable under the Treaty.

Just last month [Nov 2019], Russian Foreign Minister Lavrov and Vladimir Leontiev, the Russian Commissioner to the Bilateral Consultative Commission (BCC), the Treaty's implementing body, stated publicly that both of these systems would in fact be covered by the Treaty. This is a significant clarification from Russia that should give the United States confidence that these new systems will not run free of the Treaty's limits and verification provisions.

Moreover, Russia is required by the Treaty to exhibit these new systems, allowing US on-site inspectors to observe and confirm their distinguishing features for the purposes of verification. Without the Treaty, the United States would not get to inspect them. It was precisely this Treaty requirement that resulted in the exhibition of the Avangard system for US inspectors as reported by the Tass News Agency.

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Under the Treaty, a similar exhibition of the Sarmat ICBM will be required before Russia may deploy it.

As Russia's position on these two systems now seems clear, there should be no objection to codifying, in the context of an agreement on an extension if not before, that Sarmat and Avangard will be subject to the Treaty — a significant accomplishment for the Trump administration, building on the original agreement.

Regarding the other strategic systems Russia is pursuing, Jill Hruby, NTI's inaugural Sam Nunn Distinguished Fellow and a former director of Sandia National Laboratories, assessed in a recent report, *Russia's New Nuclear Weapon Delivery Systems: An Open-Source Technical Review*, that they are less mature in development, and therefore not likely to be deployed during the lifetime of even an extended New START. One is the Poseidon

strategic range nuclear powered nuclear torpedo, the other is the Burevestnik nuclear powered air-launched strategic range cruise missile.

Neither of these systems fits the definition of the types of strategic offensive arms that are covered under the Treaty. However, the Treaty includes a provision stating that a party can raise in the BCC questions about the emergence of a “new kind” of strategic offensive arm. The United States can use this forum to discuss these systems and make the case that the Treaty should apply to them in the event that either is deployed while the Treaty remains in force. The United States could go further and seek to get Russia to agree in principle now that if these systems are deployed while New START is in force, they will discuss and agree on how to include them under the Treaty’s limits and verification provisions. That said, given the state of development of these two systems, there is ample time to address them, and they are certainly not a compelling reason to allow the Treaty to lapse in 2021.

What about Negotiating a New Treaty Instead?: President Trump has expressed an interest in negotiating a new agreement with Russia, and in bringing China into negotiations. While laudable, these goals cannot be achieved before New START expires.

Future negotiations and agreements with Russia are likely to be much more complex than New START. They will need to address new systems and technologies, and additional classes of weapons. There simply isn’t time to develop a detailed U.S. negotiating position, negotiate one or more agreements with Russia, and get them ratified before New START lapses in February 2021. Moreover, with the United States and Russia still holding over 90% of the world’s nuclear weapons, China has made clear it won’t join nuclear reduction talks anytime soon.

More realistic in the near term is to continue

efforts bilaterally and within the P-5 context to engage China in discussions of strategic stability, and to encourage enhanced transparency about its nuclear policies, doctrine and posture and plans. We should be aiming to bring all of the P-5 into the nuclear reductions process, consistent with our collective obligation under the NPT, but this will take time, and realistically will need to be preceded by greater progress on reductions by the United States and Russia.

Extension of New START is a Win for US and Euro-Atlantic Security: So long as Russia continues to comply with New START, it is in the interest of the

United States and its allies to maintain the Treaty’s limits, verification, and predictability. The alternative to extension is no limits, no verification, and no transparency. It would be reckless to forego the benefits of New START for U.S. and Euro-Atlantic

security, when as a practical matter there is nothing more effective that could be negotiated and put in place before it expires on February 4, 2021.

All countries in the Euro-Atlantic space have a stake in this matter, and some ability to affect it by making their views known to the Russian and American presidents. The presidents need to hear from their advisors and from world leaders that the extension of New START is the best policy course. It would be a demonstration of leadership that would be broadly welcomed on a bipartisan basis in the United States and by the international community. Taking this step before the 2020 Nonproliferation Treaty Review Conference would maximize global attention and reassure the world that the United States and Russia have not lost their will when it comes to reducing nuclear risks.

Source: Lynn Rusten is the Vice President, Global Nuclear Policy Program at NTI. <https://www.europeanleadershipnetwork.org/commentary/will-new-start-get-a-new-lease-of-life/>, 05 December 2019.

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OPINION – Masahiro Kohara

North Korea: Agree, but Verify

No progress has been made in denuclearization negotiations since U.S. President Donald Trump and North Korean leader Kim Jong Un held their historic first face-to-face meeting in Singapore last year [2018]. Worse still, since May Pyongyang has resumed provocative short-range ballistic missile launches that violate United Nations Security Council resolutions and threaten the security of Japan and South Korea. Relations between the United States and North Korea appear to be returning to the confrontation it was in 2017.

In 2018, North Korea suspended nuclear and missile tests and the United States halted joint military drills with South Korea. These double suspensions provided conditions for dialogue. However, this formula has collapsed. Trump said that Kim had lived up to his pledge to halt long-range missile tests. Then, this month [December 2019], North Korea claimed that it conducted a “very important test” twice, signaling it could be ready to launch an intercontinental ballistic missile at any time.

Kim warned that Dec. 31 is the deadline for a new proposal from Washington. North Korea has put the U.S. on notice that it will face a “greater threat” if it ignores this deadline. Kim, in his 2019 New Year’s speech, already warned that North Korea would be “compelled to explore a new path” if the US “seeks to force something upon us unilaterally ... and remains unchanged in its sanctions and pressure.”

Is Kim’s provocative posture a bluff or for real? As the deadline and presidential election year approaches, it appears uncertain if Trump can maintain the status quo on the Korean Peninsula, which seems stable compared with 2017’s “fire and fury.”

Apparently Kim is frustrated by the US stance and wonders how far he can go on a new path. On the other hand, Trump’s all-or-nothing deal has

stalled. What Kim and Trump are facing are mutual warnings — namely, Kim’s Dec. 31 deadline and Trump’s red line of a nuclear weapon test and ICBM launch. In the midst of growing uncertainty, there are three possible scenarios for before and after the Kim’s deadline.

Scenario A is the status quo. The current situation is acceptable for Trump, who is seeking re-election next year and has repeatedly pointed to the current relatively stable situation of the Korean Peninsula as a major diplomatic achievement. Kim also might carefully limit his “new path” so as to not cross Trump’s red line.

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Trump, in response, would have no choice but to return to the “maximum pressure” strategy that he

abandoned after the summit in Singapore. Under this scenario, once the Korean Peninsula returns to the 2017 crisis, it would be difficult to repeat the “fall-in-love” diplomacy in which they engaged in 2018. Tensions would grow and lead to a confrontation that risks a military conflict.

Scenario C is a risky scenario in which Trump changes the US negotiating position and makes a partial deal with Kim. Trump and Kim can no longer enrapture one another, nor convince the world of their determination to achieve denuclearization through a vague and ambiguous political deal like the one they made at the 2018 Singapore summit. At the same time, it is almost impossible to reach an agreement on complete denuclearization based on the Libya model in which the US lifts sanctions only after the complete dismantlement of North Korea’s nuclear capabilities, because that would remind him of the end of the Gadhafi dictatorship and make him suspect that a future US administration will pursue regime change after North Korea gives up

its nuclear arsenal.

Some say that a partial deal is a bad deal and that no deal would be a better choice. However, not reaching a deal would create significant uncertainty and danger, including countenancing Pyongyang's continuous development of more sophisticated nuclear weapons and missiles in an effort to become a de facto nuclear power.

It is important to avoid the same failures that marked past negotiations and agreements by defining the scope and sequence of the measures taken by both sides in a step-by-step approach toward denuclearization and the foundation of a peaceful North Korea regime.

On the other hand, if a partial deal is made at the beginning of a sequence of several stages leading to complete denuclearization, it would not necessarily be a bad one. A Stanford University research institute report concluded that a gradual approach starting with the most dangerous part of North Korean's nuclear capabilities would be the best approach, as the denuclearization process would take at least 15 years. It is important to avoid the same failures that marked past negotiations and agreements by defining the scope and sequence of the measures taken by both sides in a step-by-step approach toward denuclearization and the foundation of a peaceful North Korea regime.

The negotiations, however, are difficult because the measures to be traded between the two sides are asymmetric. They are more complicated than symmetric nuclear disarmament negotiations, such as those held on the Intermediate-Range Nuclear Forces Treaty, which eliminated 2,682 missiles by 1991 followed by 10 years of on-site verification inspections by both sides.

More than that, any positive response toward the foundation of a peaceful regime in North Korea would have a tremendous impact on the security environment in East Asia. In addition, Trump has demanded Seoul to pay 400 percent more in 2020 for hosting 28,500 US troops in South Korea. If

Trump is not satisfied by Seoul's response and orders even a partial troop withdrawal from South Korea to please his political base ahead of the presidential election, the security implications would be significant. It could weaken U.S.-Japan-South Korea defenses against North Korea and undermine the US allies' trust in Washington's security assurances.

Therefore, any partial deal should be designed very carefully. It would be

important to start from the most difficult part of denuclearization and be verified through international inspections.

US President Ronald Reagan, who signed the INF Treaty with Soviet leader Mikhail Gorbachev, said, "Trust, but verify." In effect, anyone might doubt Kim is prepared to give up his nuclear weapons and missiles, which have been developed at great cost, increase North Korea's security and status internationally, and maintain the military's loyalty domestically. North Korea's poor track record may also remind policymakers in the US and Japan of its noncompliance with the deals that have been made.

Verification is an indispensable element in the step-by-step denuclearization of North

Korea. If it is incorporated in the deal with a road map toward complete denuclearization, a gradual and simultaneous approach is worth trying. The next US president may say, "Agree, but verify."

Source: Masahiro Kohara is a professor at the University of Tokyo's Graduate School of Law and Politics. Previously he served as a career diplomat in the Foreign Ministry. <https://www.japantimes.co.jp/opinion/2019/12/23/commentary/world-commentary/north-korea-agree-verify/>, 23 December 2019.

NUCLEAR STRATEGY

INDIA

Indian Navy Planning to Build Six Nuclear Attack Submarines: Navy to Parliamentary Panel

To strengthen its underwater fleet, the Indian Navy plans to build 24 submarines, including six nuclear attack submarines, a parliamentary panel was told. The Navy also told the panel that Medium Refit Life Certification (MRLC) of submarine *Sindhuraj* has been held up since the Russian side has not been able to submit bank guarantees and integrity pact due to sanctions imposed by the US. In its report tabled this month, the Navy stated that there are presently 15 conventional submarines and two nuclear submarines in its fleet.

The Indian Navy has two nuclear submarines *INS Arihant* and *INS Chakra*, with the latter being leased from Russia. Majority of the conventional submarines are over 25 years old. Thirteen submarines age between 17 and 32 years, it said. "Eighteen (conventional) + six SSN (nuclear attack submarines) are planned..." it stated. ...

Source: PTI, <https://economictimes.indiatimes.com/news/defence/indian-navy-planning-to-build-six-nuclear-attack-submarines-navy-to-parliamentary-panel/printarticle/73017759.cms>, 30 December 2019.

PAKISTAN

Imran Khan Threatens India with Nuclear War over Citizenship Law

Pakistan Prime Minister Imran Khan has once again threatened India with nuclear war over the recently enacted Citizenship (Amendment) Act, which promises Indian citizenship to non-Muslim refugees of the neighbouring countries. Khan,

while addressing the first Global Refugee Forum as a co-convenor here, said: "I want to tell the whole world that they should be aware of the biggest impending refugee crisis (in South Asia)."

He was apparently referring to the recently enacted Citizenship (Amendment) Act, 2019, which promises Indian citizenship to non-Muslim refugees of Pakistan, Bangladesh, and Afghanistan, who arrived in India on or before December 31, 2014. "We in Pakistan are not just worried that there'll be a refugee crisis; we are worried that this could lead to a conflict. A conflict between two nuclear-armed countries," Khan remarked.

Leaving no opportunity to condemn India on the world stage, Khan also put forth his rhetoric on

New Delhi's decision to revoke Article 370 that accorded special status to Jammu and Kashmir, saying "It is time for the world to take notice of the situation in Kashmir," despite India time again stating that such matters are entirely "internal" to the country. "We know from our past experience that prevention is better than cure. If the right now and puts pressure

world acts on the Indian government to stop this illegal activity, we could prevent this crisis," the cricketer-turned-politician told the forum, adding that millions of Muslims could flee from India because of the "curfew imposed in Kashmir".

It should be noted that this is not the first time when Pakistan has abused the global platform to imply a clear message of threat asserting that if India provokes Pakistan - Islamabad will not hesitate to use its nuclear weapons. In his maiden address to the September UN General Assembly meeting in New York, Khan had warned of dire consequences in the event of a nuclear war with India after New Delhi revoked the special status of Jammu and Kashmir on August 5. "If a conventional war starts between the two countries, anything could happen. A country seven

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times smaller than its neighbour, what will it do — either surrender or fight for its freedom,” he told the UN.

“My belief is we will fight and when a nuclear-armed country fights till the end it will consequence far beyond the borders. I am warning you. It’s not a threat but the worry about where are we heading to. If this goes wrong, you hope for the best but prepare for the worst” the prime minister added.

Source: ANI, <https://www.livemint.com/news/india/imran-khan-threatens-india-with-nuclear-war-over-citizenship-law-11576678903721.html>, 18 December 2019.

USA–RUSSIA

US and Russia Want a New Treaty on Nuclear Weapons: Trump

U.S. President Donald Trump said the United States and Russia wanted to reach a new treaty agreement on nuclear weapons. “Frankly, the whole situation with nuclear is not a good situation,” Trump said ahead of NATO leaders summit. “We ended the treaty because it wasn’t being adhered to by the other side. But they want to make a treaty and so do we and I think it would be a great thing. I think it’s one of the most important things we can do, frankly.”

Trump said China was interested in joining the talks. “They were extremely excited about getting involved. So some very good things can happen with respect to that.” In August, Washington pulled out of the INF, citing violations by Russia that Moscow denies.

Source: Reporting by Guy Faulconbridge and Kate Holton; writing by William Schomberg; editing by Stephen Addison. <https://www.reuters.com/>, 03 December 2019.

BALLISTIC MISSILE DEFENCE

INDIA

Indian Submarine-Launched Ballistic Missile Test Fails

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A recent flight-test attempt of India’s K-4 SLBM failed. According to The Print, a December 17 attempt to launch a K-4 SLBM from a submerged pontoon failed. It’s unclear what caused the failure. The solid-fueled K-4 missile is a still-in-development SLBM for use

with the Indian Navy’s Arihant-class ballistic missile submarines, which will form the third leg of the country’s nuclear triad at sea. The missile is being developed by India’s DRDO.

The missiles will possess a maximum range of approximately 3,500 kilometers and will allow India to secure a second strike capability against a range

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of adversaries in the Asia-Pacific region, including Pakistan and China. India currently has two Arihant-class ballistic missile submarines, the INS Arihant and the recently launched INS Arighat.

According to The Print, the December 17 failure of the K-4 can be attributed to a failure in the missile’s ignition following its ejection from the submerged pontoon. “Sources said that the K-4 missile did not activate during the test, with its battery getting drained after the launch command was given” the report noted. “It is believed that DRDO scientists were even unable to retrieve the missile from the test pontoon following the failure, raising safety concerns for the programme,” the report added.

Source: Ankit Panda, <https://thediplomat.com/2017/12/report-indian-submarine-launched-ballistic-missile-test-fails/>, 28 December 2019.

RUSSIA

Russia Deploys Hypersonic Missile into 'Combat Duty,' State Media Claims

Russia's new hypersonic missile system known as Avangard has entered service, the country's state media has reported. Russia's Defense Minister Sergei Shoigu confirmed the nuclear-capable missiles had been added to service during a conference call with President Vladimir Putin. Shoigu gave his congratulations to "everyone with this significant event for our country and for its armed forces," according to remarks carried by Zvezda, the Defense Ministry's news network.

Hypersonic is generally defined as a speed of Mach 5 or over 3,806 mph. The missiles fly into space after launch, but then come down and fly at high speeds on a flight path similar to an airplane. Their lower trajectory make them more difficult for US missile defense satellites and radars to detect. Earlier reports from Russian state news agency TASS claimed the Avangard has intercontinental range and the ability to fly as fast as Mach 20, more than 15,000 mph. A still image taken from video footage released by Russia's Defense Ministry on December 26, 2018, shows a test launch of an Avangard new hypersonic missile in the Orenburg Region.

Russia announced the testing of the Avangard missile system back in 2018, when Putin called the system "invulnerable" due to its ability to evade US defenses. It has also openly stated it is developing underwater hypersonic drones. But US military analysts have been skeptical of Russia's claimed military capabilities surrounding

hypersonic missile systems. The country has also seen significant setbacks, including a deadly accident earlier this year at a military test range.

... Putin boasted of his country's "unique" advances in hypersonic weaponry, saying other countries were "trying to catch up with us." Speaking at a Russian Defense Ministry board meeting, Putin added that "not a single country possesses hypersonic weapons, let alone continental-range hypersonic weapons," according to a transcript released by the Kremlin.

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According to TASS, US inspection officials were shown the latest developments from the Avangard missile system in late November in accordance with the New START Treaty. Like Russia, the US and China are working on hypersonic projects. Beijing said in August that it had successfully tested a hypersonic aircraft, while the US Air Force awarded a contract to Lockheed Martin to develop a missile earlier this year.

Turkey, which has NATO's second-largest military, denies it is walking away from the alliance, but its row with the US over its purchase of the Russian S-400s is escalating. Congress is pushing for sanctions against Ankara over the objection of President Donald Trump, who says such a move could drive Turkey closer to Moscow.

Source: Nathan Hodge, Lauren Said-Moorhouse and Maija Ehlinger, <https://www.newsweek.com/treaty-prevent-new-arms-race-dying-trumps-watch-opinion-1477529>, 28 December 2019.

TURKEY

Turkey to Keep Russian Missiles, Defying US Sanctions Threat

Turkey dug into its refusal to abandon its new Russian missile defense, saying it won't bow to threat of crippling US sanctions or trade the S-400s for an American system. "They said they would not sell Patriots unless we get rid of the S-400s. It is out of question for us to accept such a precondition," Ibrahim Kalin, a spokesman for President Recep Tayyip Erdogan, said late Tuesday after a cabinet meeting.

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denies it is walking away from the alliance, but its row with the US over its purchase of the Russian S-400s is escalating. Congress is pushing for sanctions against Ankara over the objection of President Donald Trump, who says such a move could drive Turkey closer to Moscow.

Pentagon Chief Queries Turkey's NATO Loyalty After Base Threat. "An irrational anti-Turkish sentiment has prevailed in the Congress and it is not good for Turkish-American relations," Kalin said. "They should know that such language of threat would push Turkey exactly toward places that they don't want it turn to." Turkey plans to acquire a second S-400 battery and pursue a joint-development agreement with Moscow in order to be able to produce its own sophisticated ballistic missiles.

Trump has so far refrained from using a piece of legislation that allows the US president to slap sanctions on any country that makes a sizable arms purchase from Russia. But a Senate committee recently approved a bill that would enforce the legislation, which could freeze Turkish assets in the US, restrict visas and limit access to credit. The last time the US sanctioned Turkey, to pressure it to release a detained US pastor last year, the lira crashed and sent the Turkish economy into a recession from which it is still recovering.

Source: Selcan Hacaoglu, Bloomberg, <https://www.livemint.com/>, 25 December 2019.

NUCLEAR ENERGY

SWITZERLAND

Switzerland Switches Off Nuclear Plant as it Begins Exit from Atomic Power

The 373-megawatt-capacity plant which opened in 1972 has generated enough electricity to cover the energy consumption of the nearby city of Bern for more than 100 years. In scenes shown live on Swiss TV, at 12.30 pm (1130 GMT) a technician pressed two buttons in the control room to stop the chain reaction and deactivate the reactor, shutting down the plant for good.

The closure is the first of Switzerland's five nuclear reactors to be shuttered following the 2011 nuclear accident in Fukushima, Japan, which triggered

safety concerns about nuclear power around the world. Neighboring Germany is due to abandon nuclear power stations by 2022, while Switzerland's government has said it would build no new nuclear reactors and decommission its existing plants at their end of their lifespan.

The Swiss decision to quit nuclear power was upheld in a 2017 referendum which also supported government plans to push forward sustainable energy with subsidies to develop solar, wind and hydroelectric power. No dates have been set for the shutdown of Switzerland's other nuclear power stations, although the Beznau plant near the German border, which dates back to 1969, is expected to be next.

As recently as 2017, Switzerland's nuclear power stations generated a third of the country's power, compared with around 60% from hydroelectric and 5% from renewable. Muehleberg's operator, the state-controlled energy company BKW, decided in October 2013 to shutter the plant, saying plans to invest in its long-term future were no longer viable. Output has been winding down in the last few weeks as the final fuel loaded in the summer of 2018 was depleted.

After the shutdown, a 15-year decommissioning process will get under way, costing 3 billion Swiss francs (\$3.06 billion). No plans have been agreed for how the site will be redeveloped. Shutting down Muehleberg has generated mixed emotions. "There is a lot of Swiss know-how in the power plant. Old valves, for example, which still come from (Swiss engineering company) Sulzer. A piece of factory and economic history is lost," said one worker, who asked not to be named. "It also hurts when we cut up everything that we have nurtured over the years." Anti-nuclear campaigners, however, hailed the move. "Clearly, we welcome the decision to close the plant," said Philippe de Rougement, president of the campaign group Sortir du Nucleaire. "We would have loved it to close much earlier."

Switzerland's use of nuclear energy had delayed its development of renewable energy sources, he said. "Nuclear energy was a grave mistake for Switzerland. We have had the electricity, but the

future generations will have to manage the toxic waste and they won't thank us."

Source: Reporting by John Revill and Marina Depetris; editing by Susan Fenton, <https://www.reuters.com/article/us-swiss-nuclearpower/switzerland-switches-off-nuclear-plant-as-it-begins-exit-from-atomic-power-idUSKBN1YO19J>, 20 December 2019.

PHILIPPINES

Philippines Seeks to Relaunch Nuclear Power Ambitions

The Philippines plans to revive its long-discontinued nuclear energy programme to combat the threat of a future power supply crunch — a prospect likely to raise safety concerns in a country prone to typhoons and earthquakes. The country is working with the IAEA to meet the UN watchdog's safety and other requirements, and investigating potential suppliers from Russia, South Korea, China and the US, said Alfonso Cusi, the energy secretary.

"Nuclear would be one of the things we would like to have in our energy mix," Mr Cusi told the Financial Times in an interview. "We need a stable, secure and affordable power source, and nuclear will help achieve that." The Philippines built a nuclear plant on the Bataan peninsula near Manila during the rule of dictator Ferdinand Marcos, but it faced public opposition and the project was shelved when successor Corazon Aquino took power in 1986.

Any nuclear plant would probably face popular opposition. Critics say the Bataan plant sits on a dormant volcano in a region prone to earthquakes, a notion that the government, which has played down safety concerns, rejects. "Wherever you build nuclear plants, it is doubly risky. You could have the danger of nuclear contamination which could be worsened by the geological conditions

of the country," said Lea Guerrero, country director for Greenpeace. "We are in the Ring of Fire," he added, referring to the circle of active volcanoes and frequent earthquakes in the Pacific Ocean.

In a sign of its renewed interest, the country's president Rodrigo Duterte signed a letter of intent with Russia's state nuclear company to co-operate on reactor technology during a trip to Moscow in October. Mr Cusi said the Philippines was also considering rehabilitating the Bataan plant with South Korean help. Westinghouse, which has its headquarters in the US, built the original plant, which was completed but never put into operation, and could also build a new facility, he said, but there was "nothing definite" on this front. The Malampaya offshore gasfield provides the main energy source for the Philippines, but analysts expect it to begin running out of the commodity within a decade.

The South China Sea west of the Philippines is believed to have abundant oil and gas reserves, but the Philippines' ability to exploit it has been vetoed by China, which lays claim to the area. The two

countries have formed an intergovernmental committee on oil and gas exploration, but have not agreed on any projects. "Why are we looking at nuclear energy?" Mr Cusi said. "We need that to secure the energy supply in the future."

The IAEA sent a mission to the country last year that concluded the Philippines had a "strong commitment" to setting its nuclear power strategy and addressing safety and other issues. Mr Cusi said that getting a nuclear plant running would take seven to eight years from the time all the relevant laws were passed, adding that the country was also looking at other sources of power, including oil, coal, gas and renewable energy.

Some analysts voiced scepticism over the Philippines' ability to execute a nuclear project because of the cost, as well as delays other big

The Philippines plans to revive its long-discontinued nuclear energy programme to combat the threat of a future power supply crunch — a prospect likely to raise safety concerns in a country prone to typhoons and earthquakes. The country is working with the IAEA to meet the UN watchdog's safety and other requirements, and investigating potential suppliers from Russia, South Korea, China and the US.

infrastructure projects have faced. "The Philippines struggles to get far less technically complicated and far less politically controversial infrastructure projects through its bureaucracy and completed," said Jon Morales of the Singapore-based Vriens & Partners consultancy. "Seven years to nuclear power is overly optimistic." ...

Source: John Reed, <https://www.ft.com/content/4e5c8d72-20a8-11ea-b8a1-584213ee7b2b>, 24 December 2019.

RUSSIA

Nuclear Power in Russia

Russia's first nuclear power plant, and the first in the world to produce electricity, was the 5 MWe Obninsk reactor, in 1954. Russia's first two commercial-scale nuclear power plants started up in 1963-64, then in 1971-73 the first of today's production models were commissioned. By the mid-1980s Russia had 25 power reactors in operation, but the nuclear industry was beset by problems. The Chernobyl accident led to a resolution of these, as outlined in the Appendix. Rosenergoatom is the only Russian utility operating nuclear power plants. Its ten nuclear plants have the status of branches. It was established in 1992 and was reconstituted as a utility in 2001, as a division of SC Rosatom. Between the 1986 Chernobyl accident and mid-1990s, only one nuclear power station was commissioned in Russia, the four-unit Balakovo, with unit 3 being added to Smolensk.

Economic reforms following the collapse of the Soviet Union meant an acute shortage of funds for nuclear developments, and a number of projects were stalled. But by the late 1990s exports of reactors to Iran, China and India were negotiated and Russia's stalled domestic construction program was revived as far as funds allowed. Around 2000, nuclear construction

revived and Rostov 1 (also known as Volgodonsk 1), the first of the delayed units, started up in 2001, joining 21 GWe already on the grid. This greatly boosted morale in the Russian nuclear industry. It was followed by Kalinin 3 in 2004, Rostov 2 in 2010 and Kalinin 4 in 2011. By 2006 the government's resolve to develop nuclear power had firmed and there were projections of adding 2-3 GWe per year to 2030 in Russia as well as exporting plants to meet world demand for some 300 GWe of new nuclear capacity in that timeframe.

Early in 2016 Rosatom said that Russia's GDP gained three roubles for every one rouble invested in building nuclear power plants domestically, as well as enhanced "socio-economic development

Early in 2017 the CEO of Rosatom said that the government would end state support for the construction of new nuclear units in 2020, and so Rosatom must learn to earn money on its own, primarily via commercial nuclear energy projects in the international market.

of the country as a whole." However, early in 2017 the CEO of Rosatom said that the government would end state support for the construction of new nuclear units in 2020, and so Rosatom must learn to earn money on its own, primarily via commercial nuclear energy projects in the

international market. He said that Rosatom had come from being a consortium of unprofitable, separately-run businesses a decade ago to a vertically-integrated state corporation with improved strategies and financial performance, thanks in part to a "large-scale" programme of state funding. ...

In February 2010 the government approved the federal target program designed to bring a new technology platform for the nuclear power industry based on fast reactors. In June 2010 the government approved plans for 173 GWe of new generating capacity by 2030, 43.4 GWe of this being nuclear. However, by January 2015 this domestic 2030 nuclear target had halved. Nevertheless Rosatom said that it had reduced the cost of electricity production at nuclear power plants by 36% over 2011 to 2017. Rosatom's current long-term strategy up to 2050 involves moving to inherently safe nuclear plants using fast reactors

with a closed fuel cycle, especially under the Proryv (Breakthrough) project. It envisages nuclear providing 45-50% of electricity at that time, with the share rising to 70-80% by the end of the century.

The ultimate aim of the closed fuel cycle is to eliminate the production of radioactive waste from power generation. Early in 2017 the CEO of Rosatom said: "We took a punt on the Breakthrough project, on fast reactor technologies, and today we are leading in this field. It's necessary to make this leadership absolute and to deprive our competitors of their hopes of overcoming the gap in the technological race." Apart from adding capacity, utilisation of existing plants has improved markedly since 2000. In the 1990s capacity factors averaged around 60%, but they have steadily improved since and in 2010, 2011 and 2014 were above 81%. Balakovo was the best plant in 2011 with 92.5%, and again in 2014 with 85.1%. ...

Source: Excerpted, <https://www.world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-power.aspx>, December 2019.

NUCLEAR COOPERATION

INDIA-RUSSIA

Russia Supplies Key Components for Kudankulam Plant; Completes Fuel Supply for Tarapur N-Project

Russia's state-run nuclear energy corporation Rosatom has shipped the most essential equipment for Tamil Nadu-based Kudankulam nuclear power plant's unit-4 from St Petersburg. In another development, Rosatom's fuel division TVEL has completed the contract for supply of fuel pellets for Maharashtra-based Tarapur nuclear plant. Rosatom is the main equipment and fuel supplier for India's nuclear plants.

The reactor pressure vessel and core melt localisation device (called core catcher or CLMD) have been shipped in a cargo vessel from St Petersburg and the shipment will travel 1,500km to reach India in January, according to a Rosatom release. "In spite of inherent difficulties due to pressure under which the port is operating at the end of the year, we fulfilled our obligations

towards the customer and shipped the necessary equipment," said Alexander Kvasha, first deputy director for projects in India at ASE, engineering division of Rosatom.

The core catcher, the reactor vessel with internals and steam generators are the most essential equipment, critical for the construction of the reactor. It was 13th shipment for the TN plants unit-4. CMLD is installed at the bottom of the plants' protective shell. It is designed to localise and cool the molten core material in case of an accident that could lead to damage to the core. The "core catcher" allows the integrity of the protective shell to be preserved and thus excludes radioactive emission in the environment, even if the hypothetical accident is serious. The Petrozavodsk branch of Rosatom's AEM-technology has already completed manufacturing of valves for units 3 & 4. Valves are designed to stop, allow or throttle the flow of a process fluid.

In another development, Rosatom's fuel division TVEL has completed the contract for supply of fuel pellets to India for Tarapur Nuclear Power Plant. "Rosatom fuel division is capable of producing nuclear fuel components for all basic types of operational nuclear reactors. TVEL has a long-time successful track record of fuel pellets supplies to India for reactors of non-Russian design, such as BWR and PHWR, which is evidence that our market offer is competitive and viable both technically and commercially. Should the Indian partners be interested, we are committed to accomplishment of similar contracts, as well as new projects in nuclear fuel cycle", commented Oleg Grigoriyev, Senior Vice President for Commerce and International Business at TVEL. TVEL also provides shipments of fuel assemblies for Russian-made VVER reactors at the two operating units of the Kudankulam under the long-term contract with NPCIL. Tarapur in Palghar district is the first commercial nuclear power plant in India commissioned in 1969.

Source: Surendra Singh, <https://timesofindia.indiatimes.com/india/russia-supplies-key-components-for-kudankulam-plant-completes-fuel-supply-for-tarapur-n-project/articleshow/72917701.cms>, 21 December 2019.

IRAN–JAPAN–EUROPE

Japan Working with Europe to Uphold Nuclear Agreement

Japanese Prime Minister Shinzo Abe reiterated his support for Iran's 2015 nuclear agreement with six world powers, saying Tokyo has initiated cooperation with the three European signatories to help salvage the fraying deal. He made the statement in a meeting with President Hassan Rouhani in Tokyo, President.ir reported. The deal, formally known as the JCPA, has been unraveling since the United States pulled out of it last year and reimposed sanctions on Tehran.

France, Germany and Britain have been trying to compensate for the sanctions through a financial mechanism that aims to facilitate trade with Iran on a non-dollar basis. However, the system's operationalization has been long delayed, forcing Iran to eventually begin to reduce its compliance step by step. The activation of the channel, potentially with the help of Japan, could help address Iran's economic concerns in which case Iranian officials have pledged to return to full compliance. "We do not turn down any negotiation or agreement in this regard within the framework of our interests," Rouhani said.

The US restrictions have seriously restricted Iran's trade with the world, especially its export of oil, the lifeblood of its economy. To resist this pressure, Iran has engaged in close talks with its partners to find ways of bypassing the sanctions.

Rouhani said any plan that can increase Iran's trade ties, especially in energy, export and oil sectors, is welcome.

Abe expressed his country's willingness to expand ties with Iran in all fields, including in consular, technical and medical sectors as well as management of earthquake and other crises. ...US sanctions on Iran have given rise to tensions in the Persian Gulf region, raising global concern about the safety of shipping in the Strait of Hormuz.

The Japanese premier voiced support for Iran's Hormuz peace initiative that intends to bring all Persian Gulf states and the United Nations together to ensure security in the strategic waters. Rouhani said Iran welcomes the assistance of any country, including Japan, to advance its agenda for promoting peace and stability in the region and the world.

Japan holds friendly relations with both countries and has sought to mediate between the two to defuse tensions. The Japanese premier voiced support for Iran's Hormuz peace initiative that intends to bring all Persian Gulf states and the United Nations together to ensure security

in the strategic waters. Rouhani said Iran welcomes the assistance of any country, including Japan, to advance its agenda for promoting peace and stability in the region and the world.

Source: <https://financialtribune.com/articles/national/101310/japan-working-with-europe-to-uphold-nuclear-agreement>, 20 December 2019.

NUCLEAR SAFETY

USA

A Nuclear Attack would Most Likely Target One of these 6 US Cities - but Experts Say None of them are Prepared

A nuclear attack on US soil would most likely target one of six cities: New York, Chicago, Houston, Los Angeles, San Francisco, or Washington, DC. But public-health experts say any of those cities would struggle to provide emergency services to the wounded. The cities also no longer have designated fallout shelters to protect people from radiation.

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shelters to protect people from radiation. The chances that a nuclear bomb would strike a US city are slim, but nuclear experts warn that it's not out of the question.

A nuclear attack in a large metropolitan area is one of the 15 disaster scenarios for which the US Federal Emergency Management Agency (FEMA) has an emergency strategy. The agency's plan involves deploying first responders, providing immediate shelter for evacuees, and decontaminating victims who have been exposed to radiation.

For everyday citizens, FEMA has some simple advice: Get inside, stay inside, and stay tuned. But according to Irwin Redlener, a public-health expert at Columbia University whose specializes in disaster preparedness, these federal guidelines aren't enough to prepare a city for a nuclear attack. "There isn't a single jurisdiction in America that has anything approaching an adequate plan to deal with a nuclear detonation," he said.

That includes the six urban areas that Redlener thinks are the most likely targets of a nuclear attack: New York, Chicago, Houston, Los Angeles, San Francisco, and Washington, DC. These cities are not only some of the largest and densest in the country, but they are also home to critical infrastructure (like energy plants, financial hubs, government facilities, and wireless transmission systems) that are vital to US security.

Each city has an emergency management website that informs citizens about what to do in a crisis, but most of those sites (with the exception of LA and New York) don't directly mention a nuclear attack. That makes it difficult for residents to learn how to protect themselves if a bomb were to hit one of those cities. "It would not be the end of life as we know it," Redlener said of that scenario. "It would just be a horrific, catastrophic disaster with many, many unknown and cascading consequences."

Cities might struggle to provide emergency services after nuclear strike. Nuclear bombs can

produce clouds of dust and sand-like radioactive particles that disperse into the atmosphere - what's referred to as nuclear fallout. Exposure to this fallout can result in radiation poisoning, which can damage the body's cells and prove fatal. The debris takes about 15 minutes to reach ground level after an explosion, so a person's response during that period could be a matter of life and death. People can protect themselves from fallout by immediately seeking refuge inside a steel or concrete building with no windows.

"A little bit of information can save a lot of lives," Brooke Buddemeier, a health physicist at the Lawrence Livermore National Laboratory, told Business Insider. Buddemeier advises emergency managers about how to protect populations from nuclear attacks. "If we can just get people inside, we can significantly reduce their exposure," he said. The most important scenario to prepare for, according to Redlener, isn't all-out

nuclear war, but a single nuclear explosion such as a missile launch from North Korea. Right now, he said, North Korean missiles are capable of reaching Alaska or Hawaii, but they could soon be able to reach cities along the West Coast.

Another source of an attack could be a nuclear device that was built, purchased, or stolen by a terrorist organization. All six cities Redlener identified are listed as "Tier 1" areas by the US Department of Homeland Security - meaning they're considered places where a terrorist attack would yield the most devastation. "There is no safe city," Redlener said. "In New York City, the detonation of a Hiroshima-sized bomb, or even one a little smaller, could have anywhere between 50,000 to 100,000 fatalities - depending on the time of day and where the action struck - and hundreds of thousands of people injured."

Some estimates are even higher. Data from Alex Wellerstein, a nuclear-weapons historian at the

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Stevens Institute of Technology, indicates that a 15-kiloton explosion (like the one in Hiroshima) would result in more than 225,000 fatalities and 610,000 injuries in New York City. Under those circumstances, not even the entire state of New York would have enough hospital beds to serve the wounded. "New York state has 40,000 hospital beds, almost all of which are occupied all the time," Redlener said.

He also expressed concern about what might happen to emergency responders who tried to help. "Are we actually going to order national guard troops or US soldiers to go into highly radioactive zones? Will we be getting bus drivers to go in and pick up people to take them to safety?" he asked. "Every strategic or tactical response is fraught with inadequacies."

In 1961, around the height of the Cold War, the US launched the Community Fallout Shelter Program, which designated safe places to hide after a nuclear attack in cities across the country. Most shelters were located on the upper floors of high-rise buildings, so they were only meant to protect people from radiation instead of the blast itself.

Cities were responsible for stocking those shelters with food and sanitation and medical supplies paid for by the federal government. By the time funding for the program ran out in the 1970s, New York City had designated 18,000 fallout shelters to protect up to 11 million people.

In 2017, New York City officials began removing the yellow signs that once marked these shelters to avoid the misconception that they were still active. Redlener said there's a reason why the shelters no longer exist: Major cities like New York and San Francisco are in need of more affordable housing, which makes it difficult for city officials to justify reserving space for food and medical supplies. "Can you imagine a public official keeping buildings intact for fallout shelters when the real estate market is so tight?" Redlener asked.

Redlener said many city authorities worry that even offering nuclear-explosion response plans might induce panic among residents. "There's fear among public officials that if they went out and publicly said, 'This is what you need to know in the event of a nuclear attack,' then many people would fear that the mayor knew something that the public did not," he said.

But educating the public doesn't have to be scary, Buddemeier said. "The good news is that 'Get inside, stay inside, stay tuned' still works," he said. "I kind of liken it to 'Stop, drop, and roll.' If your clothes catch on fire, that's what you should do. It doesn't make you afraid of fire, hopefully, but it does allow you the opportunity to take action to save your life." Both experts agreed that for a city to be prepared for a nuclear attack, it must acknowledge that such an

attack is possible - even if the threat is remote. "This is part of our 21st-century reality," Redlener said. "I've apologized to my children and grandchildren for leaving the world in such a horrible mess, but it is what it is now."

Source: *Aria Bendix*, <https://www.businessinsider.com.au/nuclear-bomb-targets-cities-us-disaster-plan-2019-12>, 18 December 2019.

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NUCLEAR PROLIFERATION

IRAN

Iran Unveils Development at Arak Reactor in Face of US Pressure

Iranian state media said technicians switched on a secondary circuit at Arak, a plant built to produce the heavy water used as a moderator to slow down reactions in the core of nuclear reactors. "Today we are ... starting a noteworthy section of the reactor," the head of Iran's atomic agency, Ali Akbar Salehi, said in remarks broadcast live on state TV.

Tehran has been reactivating parts of its nuclear programme in protest at the United States' withdrawal last year from an international deal meant to limit the Islamic Republic's ability to develop a nuclear bomb. Washington says its withdrawal and decision to reimpose sanctions lifted under the 2015 deal will force Iran to agree a broader pact.

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Tehran has always said its nuclear work is for power generation, medical work and other peaceful purposes. The secondary circuit was turned on as Iran worked on a modernisation of the Arak plant, the semi-official Mehr news agency reported. "The Arak heavy water nuclear reactor ... consists of two circuits," Mehr said. "The first circuit is tasked with removing heat from the heart of the reactor, and the secondary circuit is responsible for transferring the heat from the first circuit to cooling towers and finally to the outside environment," Mehr added.

Iran agreed to shut down the reactor at Arak, - about 250 km southwest of Tehran - under the 2015 deal. The foreign powers that signed the pact said the plant could eventually have produced plutonium, which can also be used in atom bombs. But Iran was allowed to produce a limited amount of heavy water and Tehran has been working on redesigning the reactor. Tehran says it will make isotopes for medical and agricultural use.

The control room of the reactor, named Khondab, will take about five to six months to build and the remaining systems will be completed in about one year, Salehi told a news conference at the site. The reactor will be ready for initial tests in the Iranian calendar year which will begin in March 2021, Salehi added. Referring to President Hassan Rouhani's visit to Japan, Salehi said Tokyo was willing to mediate between Tehran and Washington. He said

discussions between Iran, Japan and other countries had included a proposal for Tehran to give assurances that it was not seeking nuclear arms by re-issuing a fatwa issued in the early 2000s by Supreme Leader Ayatollah Ali Khamenei that bans the development or use of nuclear weapons.

Source: Reporting by Babak Dehghanpisheh and Dubai newsroom; Editing by Richard Pullin and Andrew
<https://www.reuters.com/article/us-iran-nuclear-arak-idUSKBN1YR0KA>, 23

Heavens. December 2019.

NORTH KOREA

US-Led Pressure Fractures as China, Russia Push for North Korea Sanctions Relief

China and Russia proposed that the UNSC lift a ban on North Korea exporting statues, seafood and textiles, and ease restrictions on infrastructure projects and North Koreans working overseas, according to a draft resolution seen by Reuters.

The plan comes at a crucial moment - just weeks before the deadline set by North Korea for Washington to offer more concessions - and highlights deepening divisions over how to engage with North Korea. Russia and China, which both wield veto power on the Security Council, were key votes in imposing the sanctions in recent years under the "maximum pressure" campaign championed by U.S. President Donald Trump's administration.

The United States says it would be premature for the U.N. to consider lifting sanctions right now and has called for North Korea to return to the negotiating table. Since North Korea and the United States established a detente in 2018, however, both Moscow and Beijing have

Since North Korea and the United States established a detente in 2018, however, both Moscow and Beijing have increasingly voiced support for easing sanctions. Now, the official proposal represents a new level of public pressure on the United States.

increasingly voiced support for easing sanctions. Now, the official proposal represents a new level of public pressure on the United States, analysts said.

China's ambassador to the U.N. said a major cause of the deadlock and rising tensions was a failure to respond to "positive steps" taken by North Korea toward denuclearisation. "The Russia-China initiative at UNSC is likely coordinated with Pyongyang as the proposal reflects North Korea's demands to be rewarded for the concessions it has already taken," said Artyom Lukin, a professor at Far Eastern Federal University in Vladivostok. "Pyongyang's recent threats of escalatory action are now backed by the Sino-Russian diplomatic offensive."

China and Russia are effectively undercutting the United States' current strategy on North Korea, he said. "Pyongyang has again demonstrated its unrivalled capacity to exploit rivalry between great powers." China hopes the U.N. Security Council forms a consensus on the draft resolution, Foreign Ministry spokesman Geng Shuang said, urging North Korea and the United States to keep talking.

South Korea, which is a close U.S. ally but which has also expressed willingness to ease some sanctions as part of a deal with North Korea, said sanctions could only be eased through a consensus among Security Council members and called for diplomatic efforts to be focused on resuming talks.

Other analysts noted Beijing and Moscow have shown increasing unity on the issue of security on the Korean peninsula. Sanctions relief is crucial for both China's Northeast Area Revitalization Plan as well as Russia's economic interests in the Russian Far East, said Anthony Rinna, a specialist

in Korea-Russia relations at Sino-NK, a website that analyses the region. "Recently the Chinese government has stated that sanctions relief for North Korea is imperative, and Beijing has a much higher chance than Moscow of being taken seriously in Washington," he said. "Furthermore, sanctions are a part of the joint Sino-Russian action plan for peace on the Korean Peninsula."

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The call to lift sanctions affecting rail infrastructure and foreign workers, for example, are two areas that are key economic interests for Moscow, Rinna added. North Korea has set

a year-end deadline for Washington to make concessions like easing sanctions. Otherwise, leader Kim Jong Un has said he may be forced to choose an unspecified "new path". China and Russia appear concerned about what North Korea's next steps may be, and the call for sanctions relief is a way to try to avoid a return to the nuclear weapons tests and ICBM launches that led the two countries to join the United States and its allies in imposing the strict sanctions, analysts said.

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...China, meanwhile, appears to be wielding ever-greater economic clout over North Korea. A recent report by a South Korean trade association found China's proportion of the North's overall external trade rose to 91.8 percent last year, compared with 17.3 percent in 2001. Thousands of Chinese

tourists provide a further, much-needed economic lifeline. Behind the scenes, there are reports that unofficial trade between China and North Korea has also increased. ...

Source: Josh Smith, <https://www.reuters.com/article/us-northkorea-usa-un-china-analysis-idUSKBN1YL00X>, 17 December 2019.

US-North Korea Talks 'More Important than Anything,' Moon Tells Xi

It is "more important than anything" to keep up the momentum for talks between the United States and North Korea, South Korean President Moon Jae-in told Chinese President Xi Jinping in Beijing. North Korea has set a year-end deadline for the United States to change what it says is a policy of hostility amid a stalemate in efforts to make progress on their pledge to end the North's nuclear program and establish lasting peace.

North Korean leader Kim Jong Un and U.S. President Donald Trump have met three times since June 2018, but there has been no substantive progress in dialog while the North demanded crushing international sanctions be lifted first. State media said the United States would "pay dearly" for taking issue with the North's human rights record and said Washington's "malicious words" would only aggravate tensions on the Korean Peninsula. China is North Korea's most important diplomatic backer and trading partner, and Moon took his message about the significance of talks straight to Xi.

Former Trump adviser John Bolton warns of 'imminent' North Korea risk North Korea mass-producing mobile missile launchers, sources say "It is more important than anything to keep up the momentum for dialog between North Korea and the United States" Moon said, according to his spokeswoman Ko Min-jung, who was present at the meeting in Beijing's Great Hall of the People. Ko cited Xi as saying that many people are concerned about the tense situation on the Korean Peninsula.

Earlier, Moon's office quoted him as saying that the suspension of U.S.-North Korea talks and rising tensions was not beneficial for South Korea, China or North Korea. Xi told Moon that China supports South Korea's efforts to improve ties with North Korea and inject new impetus into promoting peace talks, China's Foreign Ministry said.

China and South Korea both advocate that the Korean Peninsula issue be resolved through dialog and consultation and are a "firm force for maintaining stability and promoting talks," the ministry paraphrased Xi as saying. Moon is visiting China for a trilateral meeting between him, Japanese Prime Minister Shinzo Abe and Chinese Premier Li Keqiang in the southwestern city of Chengdu.

Though various economic matters will also be on the agenda — as well as tensions between Seoul and Tokyo — North Korea appears likely to dominate the agenda. U.S. special envoy for North Korea Stephen Biegun met with two senior Chinese diplomats during his two-day visit to Beijing, following a similar meeting in South Korea and Japan days earlier, as diplomats make last-ditch attempts to prevent new confrontation.

Beijing, jointly with Russia, proposed that the United Nations Security Council lift some sanctions in what it calls an attempt to break the current deadlock and seek to build support. But

it's unclear whether Beijing can convince Seoul and Tokyo to break ranks from Washington, which has made its opposition clear and can veto any resolution.

Though South Korea sees China as instrumental in reviving negotiations, it has so far sidestepped questions on whether it supports the new proposal by Beijing and Moscow. For its part, Japan has historically been a staunch supporter of sanctions against North Korea. Japan Deputy Chief Cabinet Secretary Naoki Okada, speaking to reporters after Abe held his own meeting with Xi in Beijing, said Xi had asked Japan to support the joint Chinese-Russian proposal. But Japan considers easing sanctions on North Korea "still premature," Okada said.

Source: REUTERS, <http://www.asahi.com/ajw/articles/AJ201912240014.html>, 24 December 2019.

John Bolton warns of 'imminent' North Korea risk North Korea mass-producing mobile missile launchers, sources say "It is more important than anything to keep up the momentum for dialog between North Korea and the United States.

NUCLEAR DISARMAMENT

CHINA-USA

China Urges US to Fulfill Duties on Nuclear Disarmament

China urged the United States to earnestly fulfill its special duties on nuclear disarmament and further cut its large nuclear arsenal. "As the country with the world's largest and most advanced nuclear arsenal, the United States

should earnestly fulfill its special duties on nuclear disarmament, respond to Russia's call for extending the New Strategic Arms Reduction Treaty, and further cut its large nuclear arsenal, so as to create conditions for other nuclear countries to join the multilateral nuclear disarmament negotiations" spokeswoman Hua Chunying said at a press briefing.

Hua made the remarks in response to U.S. Secretary of State Mike Pompeo's remarks at a joint press conference with Russian Foreign Minister Sergei Lavrov that delivery systems have evolved beyond the missiles, bombers and submarines, and other parties such as China needed to be brought in to a wider arms control discussion.

Reiterating China's position of having no intention to enter into a negotiation of a so-called China-U.S.-Russia trilateral arms control deal, Hua said that China firmly opposes the United States using China as an excuse to evade and shift its nuclear disarmament responsibilities.

She called on the United States to stop its negative move of undermining global strategic balance and stability, stop hyping competition and confrontation among large countries, immediately return to the right track of

As the country with the world's largest and most advanced nuclear arsenal, the United States should earnestly fulfill its special duties on nuclear disarmament, respond to Russia's call for extending the New Strategic Arms Reduction Treaty, and further cut its large nuclear arsenal, so as to create conditions for other nuclear countries to join the multilateral nuclear disarmament negotiations.

multilateralism, and earnestly safeguard the international order based on international law as well as the authority and effectiveness of the current arms control and non-proliferation legal system. "China has always been committed to safeguarding international arms control and the non-proliferation system, advancing the process of international arms control and disarmament, and safeguarding global strategic balance and

stability," she said.

China is willing to work with all parties to continue to strengthen communication and coordination and carry out discussions on issues concerning global strategic stability, so as to make positive contributions to global peace and security, Hua added.

Source: Editor: huaxia, http://www.xinhuanet.com/english/2019-12/11/c_138623563.htm, 11 December 2019.

NUCLEAR WASTE MANAGEMENT

UK

New Form of Uranium Found that could Affect Nuclear Waste Disposal Plans

A new form of uranium has been discovered which is likely to have implications for current nuclear waste disposal plans, say scientists. Many governments are planning to dispose of radioactive waste by burying it deep underground. However, new research has found that in such storage conditions a new chemical form of uranium can temporarily occur, while small amounts of uranium are released into solution. If uranium is in solution, it could make its way into groundwater.

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The nuclear industry currently provides 20% of the UK's power, and radioactive waste in the UK is estimated to amount to 750,000 cubic metres – enough to fill about 300 Olympic-sized swimming pools. It is currently stored in surface sites, but it could be hundreds of thousands of years before this waste ceases to be hazardous.

Governments are searching for a way to safely dispose of the waste, and an international consensus is moving towards geological nuclear waste disposal – burying it several hundred metres underground. Many countries are already building such disposal units.

You can't sterilise the Earth," says Prof Samuel Shaw, a mineralogist at the University of Manchester and one of the authors of the study, led by University of Manchester's Prof Katherine Morris and published in the journal *Environmental Science and Technology*.

Shaw explains that wherever you bury these disposal units, there will be a wide variety of microbes living under the ground as well. Since no man-made barrier can be expected to withstand degradation for hundreds of thousands of years, radioactive waste will be in contact with groundwater containing these microbes and the chemicals they produce.

As well as different radioactive isotopes – which describe how many neutrons the nucleus holds – uranium can have different oxidation states, which describe the number of electrons the element has when it forms a compound. Some oxidation states are more environmentally mobile than others. In the presence of sulphides, which are created by microbes underground, uranium should not be mobile, but reports have suggested small amounts of uranium are released into surrounding water – results no one has yet been

able to explain.

To investigate further, Shaw and his team studied samples subject to conditions designed to mimic a geological disposal unit. To identify what these new uranium forms look like, the researchers used an extremely bright light. The synchrotron at Diamond Light Source in Oxfordshire produces beams of light 10bn times brighter than the Sun, and using this allowed the team to identify a new form of uranium in the presence of sulphide that had not been seen before in those conditions. Theoretical modelling confirmed the results.

The study shows that uranium passes through this previously unknown chemical form under environmental conditions by binding to sulphur atoms that can dissolve as it is immobilised. About 1 to 2% of the uranium passes into solution for a couple of hours during the process.

The UK government's Radioactive Waste Management (RWM) group says this does not mean the radioactive substances would no longer be properly contained. They said they welcomed the clarity provided by the results, and that the newly discovered form passes too briefly to raise their concerns. In an official statement RWM's

chief scientist Prof Cherry Tweed said: "This evidence provides further confidence that geological disposal is the best long-term solution for higher activity radioactive waste, protecting people and the environment for generations into the future."

Source: Anna Demming, The Guardian, <https://www.theguardian.com/environment/2019/dec/20/new-form-of-uranium-found-that-could-affect-nuclear-waste-disposal-plans>, 20 December 2019.

The nuclear industry currently provides 20% of the UK's power, and radioactive waste in the UK is estimated to amount to 750,000 cubic metres – enough to fill about 300 Olympic-sized swimming pools. It is currently stored in surface sites, but it could be hundreds of thousands of years before this waste ceases to be hazardous.

To identify what these new uranium forms look like, the researchers used an extremely bright light. The synchrotron at Diamond Light Source in Oxfordshire produces beams of light 10bn times brighter than the Sun, and using this allowed the team to identify a new form of uranium in the presence of sulphide that had not been seen before in those conditions. Theoretical modelling confirmed the results.

USA

Congress Demands Investigation Into the U.S.'s Nuclear Coffin

The US Congress has ordered an investigation into the so-called "Runit Dome," a concrete dome containing contaminated radioactive debris leftover from nuclear weapons tests. The Department of Energy (DOE) has six months to report back on the status of the dome, which is apparently cracked and filling with seawater. Nuclear activists and others worry that a larger leak could threaten to spill radioactive waste over a wide area.

The Runit Dome, also known as "The Tomb," is a 328-foot-wide crater created by a nuclear explosion that was filled with radioactive debris from a variety of tests conducted at Runit Atoll. The dome is so large it is easily visible in Google Maps. The dome contains 110,000 cubic yards of radioactive contaminated soil and 6,000 cubic yards of contaminated debris. In 1980, the U.S. government built a concrete dome 18 inches thick over the crater, sealing the radioactive contents inside.

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Unfortunately, the government failed to build a concrete lining for the debris, and the dome is currently threatened by rising sea levels. Sea water has reportedly entered the dome, introducing the possibility that radioactive waste could seep out. The Marshall Islands government, which was saddled with responsibility for the dome, is worried that further deterioration could create an environmental hazard. A typhoon could create an all-out hazard.

The 2020 National Defense Authorization Act, otherwise known as the 2020 defense budget, directs the DOE to investigate "the status of the Runit Dome in the Marshall Islands" and the dangers posed by potential leaks. The DOE is also directed to come up with "a detailed plan to repair the dome to ensure that it does not have any harmful effects to the local population, environment, or wildlife, including the projected costs of implementing such plan."

Source: Kyle Mizokami, <https://www.msn.com/en-us/news/technology/congress-demands-investigation-into-the-uss-nuclear-coffin/ar-BBYoXTZ>, 27 December 2019.



Centre for Air Power Studies

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