



Vol 14, No. 07, 01 FEB. 2020

OPINION – Manpreet Sethi

The Hype Over Hypersonics

On December 27, 2019, Russia announced that its new hypersonic glide vehicle (HGV), Avangard, launched atop an intercontinental ballistic missile, had been made operational. Russia claims that this nuclear-armed HGV can fly at over 20 times the speed of sound and is capable of such manoeuvring as to be “invulnerable to interception by any existing and prospective missile defence means of the potential adversary”. With this induction, it appears that Russia has beaten the U.S. and China in deploying the HGV. But China and the U.S. are also close on the heels: the U.S. has moved from the research to the development stage, and China demonstrated the DF-17, a medium-range missile with the HGV, at the military parade in October 2019. The induction of such capability is inevitable in the next few years. But is it going to be a game changer?

A hypersonic delivery system is essentially a ballistic or cruise missile that can fly for long distances and at speeds higher than 5 Mach at lower altitudes. This allows it to evade interception from current BMD. It can also execute a high degree of manoeuvres.

Fearful that US BMD that can intercept ballistic

Fearful that US BMD that can intercept ballistic missiles would erode their nuclear deterrence, Russia and China had been in search of such a capability ever since the US walked out of the anti-ballistic missile treaty in 2002. Believing that hypersonic HGVs and hypersonic cruise missiles will re-establish lost strategic stability, Russia has declared such missiles as nuclear capable, while China has declared them dual-use capable.

CONTENTS

- ☞ **OPINION**
- ☞ **NUCLEAR STRATEGY**
- ☞ **BALLISTIC MISSILE DEFENCE**
- ☞ **URANIUM PRODUCTION**
- ☞ **NUCLEAR ENERGY**
- ☞ **NUCLEAR COOPERATION**
- ☞ **NUCLEAR NON-PROLIFERATION**
- ☞ **NUCLEAR PROLIFERATION**
- ☞ **NUCLEAR SAFETY**
- ☞ **NUCLEAR WASTE MANAGEMENT**

missiles would erode their nuclear deterrence, Russia and China had been in search of such a capability ever since the US walked out of the anti-ballistic missile treaty in 2002. Believing that hypersonic HGVs and hypersonic cruise missiles will re-establish lost strategic stability, Russia has declared such missiles as nuclear capable, while China has declared them dual-use capable. On the other hand, the US explains

this capability mainly for attacking time-sensitive targets as part of its prompt global strike strategy and hence has designated them a conventional role.

Risks of Misperception: How would the induction of hypersonics complicate security concerns? First, we must realise that these missiles are being added to the military capabilities of countries that possess nuclear weapons. For these nations, the concern is always an attack on nuclear assets to degrade retaliation. Another layer of complication is added by the fact that these missiles bring in warhead and destination ambiguities. In both cases, when an adversary's early warning detects such missiles headed in its direction, but cannot be sure whether they are conventional or nuclear-armed, nor ascertain the target they are headed towards, the tendency would be to assume the worst. For an adversary that faces a country with a BMD but itself has a small nuclear arsenal, it would fear that even conventionally armed hypersonic missiles could destroy a portion of its nuclear assets. The tendency could then be to shift to more trigger-ready postures such as launch on warning or launch under attack to ostensibly enhance deterrence. But such shifts would also bring risks of misperception and miscalculation in moments of crisis.

Offence-Defence Spiral: Second, the induction of hypersonics would lead to an offence-defence spiral. According to reports, the U.S. has begun finding ways of either strengthening its BMD or looking for countermeasures to defeat hypersonics, besides having an arsenal of its own of the same kind. The stage appears set for an arms race instability given that the three major players in this game have the financial wherewithal and technological capability to play along. This looks particularly imminent in the absence of any strategic dialogue or arms control.

For an adversary that faces a country with a BMD but itself has a small nuclear arsenal, it would fear that even conventionally armed hypersonic missiles could destroy a portion of its nuclear assets. The tendency could then be to shift to more trigger-ready postures such as launch on warning or launch under attack to ostensibly enhance deterrence.

The stage appears set for an arms race instability given that the three major players in this game have the financial wherewithal and technological capability to play along. This looks particularly imminent in the absence of any strategic dialogue or arms control.

A third implication would be to take offence-defence developments into outer space. Countermeasures to hypersonics have been envisaged through placement of sensors and interceptors in outer space. While none of this is going to be easy or quick, weaponisation of outer space would, nevertheless, be a distinct possibility once hypersonic inductions become the norm.

Thus induction of this technology would likely prove to be a transitory advantage eventually leading nations into a strategic trap. India needs to make a cool-headed assessment of its own

deterrence requirements and choose its pathways wisely.

Source: Manpreet Sethi is Distinguished Fellow at Centre for Air Power Studies, Delhi, Hindu, 27 January 2020.

OPINION – Hina Pandey

Denuclearization of the Korean Peninsula: China has its Limits with North Korea

Does the New Year hold a new promise for resolving the North Korean nuclear conundrum after President Trump's offer to resume talks with North Korea, which were stalled post their Stockholm meeting in October 2019? Maybe not! As DPRK does not seem too pleased with the birthday greetings sent by President Trump, while the North Korean leader has acknowledged the courtesy, the message is clear-personal equations and outreach between both leaders do not imply any significant shift in the negotiating strategy towards the larger goal of denuclearization. It is clearly conveyed that "he (Kim) would not lead his country on the basis of personal feelings", as cited by the adviser to the

North Korean foreign ministry in his statement.

Additionally, can China now possibly influence the stalled talks to steer in the direction of denuclearization? Unfortunately, the recent nuclear posturing from DPRK, which includes withdrawal from the voluntary moratorium on nuclear testing and long-range missiles, also challenges the prospects of such a possibility. Moreover, it is recently reiterated by the Supreme Leader that “the world will soon witness a new strategic weapon”. It is to be recognized that the failure of US-DPRK talks has led denuclearization efforts to deteriorate further.

Clearly, the failure of US-DPRK diplomacy has once again made China relevant in resolving the nuclear conundrum in the Korean Peninsula. At least, a space for third party intervention has undoubtedly been created. In fact, those who observe nuclear affairs in this context have often argued that China can exert substantial pressure on North Korea towards giving up its nuclear capability because of its economic clout on the country. In any case, China had remained opposed to North Korean nuclear capability since 2009 and had consistently opposed all its nuclear tests and launches.

Thus, the policy of maximizing economic pressure is somewhat in line with China’s own attitude towards the larger nuclear issue. However, on the other hand, the reality remains distinguished- as recent Chinese (along with Russian) bid at the UNSC actually suggested “the UNSC to lift some sanctions on Pyongyang on December 17, 2019”, as reported by The Global Times. One can argue that the Chinese rationale for such a policy emanates primarily from its own priorities, which places the possibility of the economic collapse of the North Korean State with more urgency than the possibility of a nuclear use or accident. Thus, China continues to argue in favor of preventing any instability in the region, especially a complete economic breakdown of the State. However, it is

worth pondering over, what would the outcome be like, if China comes completely onboard with maximizing sanctions approach? Would that compel DPRK to change its nuclear behavior and possibly give up its nuclear weapons pursuit, as advancing nuclear capability would invite stricter measures?

While, in the short term, this would make for a sensible approach to some, however, in the long term, this might prove to be counterproductive as the Chinese influence, no matter how substantial, does not alter North Korean resolve or its threat perceptions. As this has maintained elsewhere that if one has to derive any lessons from the DPRK’s nuclear behavior of the past three years, one might conclude that the country is not ready

Would the outcome be like, if China comes completely onboard with maximizing sanctions approach? Would that compel DPRK to change its nuclear behavior and possibly give up its nuclear weapons pursuit, as advancing nuclear capability would invite stricter measures.

to give up on its nuclear capability. More so, not yet and not without any reciprocal American commitments that would ensure no security threat to its country in future. Additionally, it is to be noted that the DPRK has repeatedly showed its nuclear resolve through its

nuclear tests and continued advancement of its nuclear capability. In 2016, post the nuclear tests, the state-run news agency reiterated, “... history proves that powerful nuclear deterrence serves as the strongest treasured sword for frustrating outsiders’ aggression...” In fact, in 2012, the DPRK’s website has officially stated that “...the new preamble asserts that Kim Jong Il made the DPRK into an indomitable and nuclear state...”

A similar resolve has been shown by North Korea post the failure of the recent Trump-Kim talks at Stockholm in 2019. It has categorically been stated that “...there will never be such negotiations...in which we proposed exchanging a core nuclear facility of the country for the lift of some United Nations sanctions...” Additionally, one can argue that North Korea’s careful watchfulness of how President Trump handled the landmark Iranian nuclear deal might have added to North Korean resolve. To be sure, Iran agreed to contain its

nuclear program under the JCPOA, but what happened later acts as a deterrent on North Korea to enter any terms of denuclearization with the US. However, there was an opportunity a hand for denuclearization when a North Korean leader received an audience with a sitting US President!

In the current phase, the killing of Quassem Soleimani might translate into DPRK not making explicit nuclear threats, but does it kill the nuclear resolve completely? Possibly not. Thus, addressing the issue of DPRK's own resolve remains fundamental to bringing about any change in the nuclear dynamics of the Korean Peninsula.

Additionally, on the aspects touching China-DPRK relations, it is expected that their bilateral relations would witness more robustness. Xi, in his recent visit to North Korea, has conveyed that, "...as a good comrade and neighbor, no matter how the international situation changes, the CPC and the Chinese government have held and will always hold a firm position on consolidating and developing China-DPRK relations...will unswervingly support...DPRK to ...focus on developing economy and improving people's livelihood..." Indeed, China enjoys a considerable influence and will continue to do so, but when it comes to North Korea's resolve in giving up its capability, Chinese influence would have its own limits.

Source: <http://www.kiips.in/research/denuclearization-of-the-korean-peninsula-china-has-its-limits-with-north-korea/>, 19 January 2020.

OPINION – Manpreet Sethi

Nuclear Energy: Is it In or Out?

Two contrasting news on nuclear energy from two different parts of the world greeted the dawn of the new year. Germany announced the decommissioning of another of its nuclear power

plants in keeping with its plan to phase out nuclear energy by 2020. India, on the other hand, announced that its decision to commission a nuclear reactor every year for the next three years. So, is nuclear energy in or out of fashion in current times? The answer to this question lies in understanding the unique energy circumstances of each country, and the choices it can afford to make. There cannot be, and should not be, a one-size-fits-all approach to this subject.

Let us first understand why Germany is phasing out nuclear energy. This is a decision that was taken by the country two months after the nuclear accident at Fukushima, Japan, which severely shook public confidence in nuclear safety.

Succumbing to the pressure from Green parties, the government announced that all of the 17 nuclear power plants in Germany which were then producing about 22 per cent of the country's electricity would be phased out by 2022.

Over the last nine years, 11 of the 17 plants have been shut down, and Germany is today producing only 13 per cent of its electricity from nuclear energy. 30 per cent is being generated from

coal-fired plants, and 47 per cent from renewables. To its credit, the country has emerged, over the last decade, as a front runner in the use of renewables for electricity generation. However, several German business and industry leaders continue to argue in favour of nuclear energy for the sake of having a reliable baseload source of electricity. Many are concerned that the loss of nuclear electricity could end up pushing the country towards greater use of coal, thereby increasing its environmental emissions.

The German decision of a nuclear phase-out was, in part, triggered by the anti-nuclear inclinations of the political firmament of the time. But it was also facilitated by several national socio-economic realities. These included a stable population with high per capita energy availability

North Korea's careful watchfulness of how President Trump handled the landmark Iranian nuclear deal might have added to North Korean resolve. To be sure, Iran agreed to contain its nuclear program under the JCPOA, but what happened later acts as a deterrent on North Korea to enter any terms of denuclearization with the US. However, there was an opportunity a hand for denuclearization when a North Korean leader received an audience with a sitting US President.

of above 7000 kWh; the country's surplus electricity market that had been exporting electricity to the tune of about 15 billion kWh; a forecast of as low as 1.1 per cent per annum growth of electricity; the option of making up for the loss of electricity caused by the shutdown of nuclear plants by importing more coal from Poland, more gas from Russia, and even electricity from France and Czechoslovakia. Germany, therefore, has had the luxury of removing the option of nuclear electricity from its energy basket.

The German decision of a nuclear phase-out was, in part, triggered by the anti-nuclear inclinations of the political firmament of the time. But it was also facilitated by several national socio-economic realities. These included a stable population with high per capita energy availability of above 7000 kWh; the country's surplus electricity market that had been exporting electricity to the tune of about 15 billion kWh; a forecast of as low as 1.1 per cent per annum growth of electricity.

Meanwhile, India has indicated its plans to move ahead with its nuclear energy ambitions. The DAE has set a target of 63 GW of installed nuclear power capacity by 2032. In order to meet this objective, the government had approved the indigenous construction of ten new nuclear reactors a couple of years ago. As a part of this continuing effort, three of the new fleet of 700 MWe reactors are to be commissioned; one every year, starting this year. As these become operational, there will be a steady increase in the country's nuclear power capacity from where it stands at 6780 MWe today. Apart from this indigenous fleet, hopes are also pinned on reactors that are to be built with international cooperation and are at various stages of negotiations. Kudankulam 3 and 4, which are being built with Russian help, will perhaps be the first among the foreign ones to become operational. Negotiations with France and the US have not yet reached the stage of start of construction.

Given that the Indian nuclear reactors have now graduated to 700 MW, is there a need for foreign reactors at all? The answer to this should be yes for two reasons. One, imported nuclear power

plants of a capacity higher than 700 MW would help India rapidly meet its electricity requirements. It must be remembered that India still only

provides for a per capita electricity consumption of less than 1000kWh (even China is above 4000kWh today), and many areas are still electricity-deficient. Secondly, rapid induction of nuclear energy would help wean India away from coal-fired plants, which still cater for 60 per cent of the country's electricity, and contribute significantly to greenhouse gas emissions. If the country has to meet its international

environment commitments, then the use of coal must reduce. While India is progressing well on the use of renewables, their share having shot up to 16 per cent of the sector. However, it is not enough, by itself, to either meet climate change goals or provide reliable baseload electricity.

Nuclear energy, therefore, will have to remain a part of the country's electricity mix. Fortunately for India, its nuclear programme is mature and the industry well geared to perform this role. For the future, a three-pronged approach is recommended to move India up the nuclear ladder: the government's steadfast commitment and support; continued safe operations and rapid induction of reactors by the nuclear operator; and proactive public outreach by the DAE to help understand the focus on nuclear safety, and to ensure that nuclear energy can play a safe role along with, and not versus, other sources of electricity. India needs every watt it can get from all safe, secure, and sustainable sources.

Given that the Indian nuclear reactors have now graduated to 700 MW, is there a need for foreign reactors at all? The answer to this should be yes for two reasons. One, imported nuclear power plants of a capacity higher than 700 MW would help India rapidly meet its electricity requirements.

Source: http://www.ipcs.org/comm_select.php?articleNo=5644, 20 January 2020.

OPINION – Sawraj Singh

India Should Join Russia and China to Save the Iran Nuclear Deal

Iran feels that the three European countries; UK, France and Germany have betrayed it and sold out to America to kill the Iran Nuclear deal. The United States announced its withdrawal from the deal (Joint Comprehensive Plan of Action) on May 8, 2018. However, the European Union had insisted that Iran was compliant with the deal and the European countries want to save the deal. The deal (JCPOA) was signed was signed on July 14, 2015 between Iran and the P5+1 (the five permanent members of the United Nations Security Council- China, France, Russia, United Kingdom, United States plus Germany) together with the European Union. In May 2019 the IAEA (International Atomic Energy Agency) certified that Iran was abiding by the main terms of the deal.

The European countries, particularly France and Germany are trying to assert their independence from the US. Their stand on the Iran Nuclear deal will send exactly the opposite message. Russia, China and India should encourage the European countries to take independent stands of the US.

It seems that Europe is now helping Trump to finish the job of killing the Iran Nuclear deal. On January 5, 2020, Iran announced that it will not comply with its obligations under the deal in response to the withdrawal of the US from the deal and the re-imposition of economic sanctions by the US which had been lifted when the deal came into force. Instead of convincing the US to salvage the deal, the European countries are now becoming a party in killing the deal. When the US withdrew from the deal then in a joint statement France, Germany and the United Kingdom stated that they wanted the deal salvaged. However, now they are helping the USA to kill the deal by inappropriately triggering its dispute resolution mechanism (DRM).

It is in the interest of Russia, China and India to try to save the Iran Nuclear deal. These countries have good relations with Iran. Russia and China just conducted joint naval exercises with Iran. This was seen as a challenge by the Western countries

and their Mid Eastern allies. The change of stand by the European countries could have something to do with this. They might be concerned with the emerging Russia- China-Iran axis. However, their stand puts them in a position of subservience to the US. The European countries, particularly France and Germany are trying to assert their independence from the US. Their stand on the Iran Nuclear deal will send exactly the opposite message. Russia, China and India should encourage the European countries to take independent stands of the US.

India has a special relationship with Iran. There are historical, cultural, political and economic relations between the two countries. Iran is a major supplier of oil to India. India gets this oil at a cheap rate. If India has to replace this oil then it will cost much more. This can further slow down the growth of the Indian economy. Already the Indian economy grew at much slower rate (about

5%) than the predictions of about 8% in the past year. India is helping Iran to develop the Chabahar port and has invested significantly there. India also has one of the largest Shia populations. Politically, Iran has taken many stands which were helpful for India.

If Russia, China and India can help to save the Iran Nuclear treaty then it will be considered a big step toward a multipolar world from the present US led unipolar world. The US is desperately trying to maintain its hegemony in the world in the form of a unipolar world order. However, it is in the interest of Russia, China and India as well as the European countries to end the American hegemony. American hegemony increases the chances of a military confrontation in the region which can be detrimental for the European countries also. A multipolar world is in the larger interest of the people of the world.

Source: <http://thelinkpaper.ca/?p=78758>, 18 January 2020.

NUCLEAR STRATEGY

CHINA

Beijing Builds Up Arsenal

The Chinese PLA Rocket Force has conducted a nuclear attack survival exercise where troops in an underground missile facility had to endure extreme conditions and make sure they could still launch nuclear counterattacks. During the undated exercise, a Rocket Force brigade mobilized into the launch bunker at an undisclosed location and completely sealed themselves off from the outside world, as the troops readied for combat, China Central Television (CCTV) reported.

The bunker was then struck by a mock hostile nuclear attack as the troops inside, fully dressed in protection suits, carried out contingency plans and operated missiles for upcoming counterattacks, according to the report. They also simulated a situation where missile fuel leaked after a hostile strike and a troubleshooting team was immediately deployed to repair. Tactics, including a fast missile condition check, rapid logistics, bunker defense and hasty launch, were also practised, CCTV reported.

While China is one of a few countries in the world that operate nuclear weapons, it has promised no first use, a military expert who asked not to be named told the Global Times ... It was crucial the force survive an initial hostile strike to launch a counterattack, the expert noted. Such exercises ensure that capability and contribute to China's nuclear deterrence, the expert said.

China has a series of defense facilities located deep under mountains dubbed the "Underground Steel Great Wall," which "guarantee the security of the country's strategic arsenal" against potential attacks, including those from hypersonic weapons, Qian Qihu, a key architect of the fortifications who

won China's highest science and technology award of 2018, told the Global Times in a previous interview.

At the National Day military parade on 01 October 2019 last year, China displayed the DF-5B silo-based nuclear-armed intercontinental ballistic missile. The parade also showcased the DF-31AG and DF-41 road-mobile ICBM, DF-26 nuclear/conventional intermediate-range ballistic missiles and JL-2 submarine-launched ballistic missile. China will also increase the frequency of its military recruitment and retirement to twice a year, up from once, starting 2020, to maintain a smooth flow of troops, the military's high vigilance and to better train new recruits.

The Chinese PLA Rocket Force has conducted a nuclear attack survival exercise where troops in an underground missile facility had to endure extreme conditions and make sure they could still launch nuclear counterattacks. During the undated exercise, a Rocket Force brigade mobilized into the launch bunker at an undisclosed location and completely sealed themselves off from the outside world.

The parade also showcased the DF-31AG and DF-41 road-mobile ICBM, DF-26 nuclear/conventional intermediate-range ballistic missiles and JL-2 submarine-launched ballistic missile. China will also increase the frequency of its military recruitment and retirement to twice a year, up from once, starting 2020, to maintain a smooth flow of troops, the military's high vigilance and to better train new recruits.

The change was announced in a statement on the recruitment work joint released by the State Council and the Central Military Commission in Beijing, the Xinhua News Agency reported. The first recruitment will be held from mid-February 2020 to the end of March 2020, and the second from mid-August 2020 to the end of September 2020, Xinhua reported, noting that

retirement for military personnel will also change to twice a year.

Ren Guoqiang, a spokesman at the Ministry of National Defense, said... that while the total number of annual recruits would remain stable compared with previous years, the increased frequency will allow a smooth flow of troops and

maintain the military's high vigilance. This would further improve the quality of recruits and the recruitment training programs, which would contribute to combat capability development, Ren said....

Source: <https://www.manilatimes.net/2020/01/18/news/world/beijing-builds-up-arsenal/675300/>, 18 January 2020. (Originally published in *The Global Times*)

Once inducted, these missiles will be the mainstay of the Arihant class of indigenous ballistic missile nuclear submarines (SSBN) and will give India the stand off capability to launch nuclear weapons submerged in Indian waters. INS Arihant, the first and only operational SSBN, is armed with K-15 Sagarika missiles with a range of 750 km.

INDIA

India Successfully Test-Fires 3,500-Km Range Submarine-Launched Ballistic Missile K-4

India on 26 January 2020 successfully test-fired the 3,500-km range submarine-launched ballistic missile, K-4, official sources confirmed. The test was carried out by the DRDO from a submerged pontoon off the Visakhapatnam coast around noon. "The test was conducted from a submerged pontoon and has met the desired parameters. A pontoon simulates the situation of a launch from a submarine," an official source said on condition of anonymity.

The missile has been tested several times earlier as part of developmental trials to validate different parameters, the source said. "The missile ejecting from a submerged platform to the surface [sea] is the toughest part." There are very few countries which have managed to achieve this technological breakthrough, a second official source said. "Our Circular Error Probability (CEP) is much more sophisticated than Chinese missiles," the source said. The CEP determines the accuracy of a missile. The lower the CEP, the more accurate the missile is.

Once inducted, these missiles will be the mainstay of the Arihant class of indigenous ballistic missile nuclear submarines (SSBN) and will give India the stand off capability to launch

nuclear weapons submerged in Indian waters. INS Arihant, the first and only operational SSBN, is armed with K-15 Sagarika missiles with a range of 750 km.

This means the submarine has to venture far way from the Indian waters and move closer to the adversary's coast to launch the missile. The K-4 will do away with that need. In November 2019, India formally declared its nuclear triad stated in its nuclear doctrine

operational after INS Arihant completed its first deterrence patrol which means Arihant has begun prowling the deep seas carrying ballistic missiles equipped with nuclear warheads. As reported by *The Hindu* earlier, it was quietly commissioned into service in August 2016 and its induction was not officially acknowledged. It has a displacement of 6,000 tonnes and is powered by an 83 MW pressurised light-water reactor with enriched uranium.

Given India's position of NFU in launching nuclear weapons, the SSBN is the most dependable platform for a second-strike. Because they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the adversary detecting it. The other two platforms — land based and air launched are far easier to detect.

Given India's position of NFU in launching nuclear weapons, the SSBN is the most dependable platform for a second-strike. Because they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the adversary detecting it.

The Advanced Technology Project (ATV) began in the 1980s and the first of them, Arihant, was launched in 2009 by then PM Manmohan Singh. Since then it underwent extensive sea trials and the reactor on board went critical in 2013. In 1998, India conducted nuclear tests under Phokran-II and in 2003, declared its nuclear doctrine based on credible minimum deterrence and an NFU policy while reserving the right of massive retaliation if struck with nuclear weapons first.

Source: *The Hindu*, 19 January 2020.

PAKISTAN

Pakistan Successfully Conducts Surface-to-Surface Training Launch of Missile Ghaznavi

Pakistan on 23 January 2020, conducted a successful training launch of surface to surface ballistic missile (SSBM) Ghaznavi, a press release from ISPR. According to the press release, this launch was carried out as part of a training exercise of Army Strategic Forces Command "aimed at rehearsing operational readiness procedures during day and night."

Director General SPD Lieutenant General Nadeem Zaki Manj appreciated the operational preparedness of the Army Strategic Forces Command.

He commended them for displaying a very high standard of proficiency in handling and operating the weapon system. "Troops displayed full confidence in the robust strategic command and control system," said Director General SPD, was quoted as saying by ISPR. The

president, prime minister, chairman joint chiefs of staff committee and services chiefs have congratulated the nation on this landmark achievement. As per the military's media wing, missile Ghaznavi is capable of delivering multiple types of warheads up to a range of 290 kilometres....

Source: Dawn, 23 January 2020.

USA

US Military Leader Expresses Full Confidence in Ability to Defend Against New N.K. Missiles

The vice chairman of the U.S. Joint Chiefs of Staff said...that he has "100 percent confidence" in the U.S. ability to defend itself from new North Korean missiles. Air Force Gen. John Hyten made the remark during a seminar at the Center for Strategic and International Studies, noting that North Korea has made significant strides in its missile development.

"I don't say 100 percent very often. I have 100

percent confidence in those capabilities against North Korea," he said, referring to U.S. missile defense systems....At the same time, Hyten said, North Korea has developed a ballistic missile program that can threaten the U.S. despite being one of the poorest countries in the world. "You want to know what's different about North Korea? They learned how to go fast," he said, citing the increase in missile tests under current leader Kim Jong-un. Unlike his grandfather and father, previous leaders of North Korea who according to Hyten conducted nine and 22 tests each, Kim has launched 67 missiles, the vice chairman said.

"If you want to go fast in the missile business, you need to test fast, fly fast, learn fast," he said. "That is what North Korea has been doing and North Korea has been building new missiles, new capabilities, new weapons as fast as anybody on the planet with the 115th most powerful economy in the world." Hyten went on to lament the lack of speed in the U.S....

You want to know what's different about North Korea? They learned how to go fast," he said, citing the increase in missile tests under current leader Kim Jong-un. Unlike his grandfather and father, previous leaders of North Korea who according to Hyten conducted nine and 22 tests each, Kim has launched 67 missiles, the vice chairman said.

Source: Yohnap News Agency, <https://en.yna.co.kr/>, 18 January 2020. .

US Urges China to Join Nuclear Arms Talks with Russia

The United States urged China... to join trilateral nuclear arms talks with Moscow, calling Beijing's secrecy around growing stockpiles a "serious threat to strategic stability". U.S. President Donald Trump said last year (2019) he had discussed a new accord on limiting nuclear arms with Russian President Vladimir Putin and hoped to extend that to China in what would be a major deal between the globe's top three atomic powers. But China has so far refused to take part.

"We think, given the fact that China's nuclear stockpile is estimated to double over the next ten years, now is the time to have that trilateral discussion," Robert Wood, U.S. disarmament ambassador, told reporters on the opening day of the U.N.-backed Conference on Disarmament in

Geneva. He said that Washington had discussed the potential trilateral talks in a security meeting with Russia and had reached an "understanding" about pursuing them. "We cannot afford to wait," he added.

Asked how to go about pressuring Beijing to join, Wood said that he hoped Russia, and others, would help. "Hopefully over time and through the influence of others besides the United States, they (China) will come to the table. We think it's imperative for global security that the Chinese do that."

Russian Foreign Minister Sergei Lavrov said ...that Russia would take part in potential trilateral talks but that he "won't force China to change" its current position. China has previously said its weapons were the "lowest level" of its national security needs and not comparable to those of Russia and the United States.

...However, Wood said this was not the right framework for nuclear arms talks with Beijing. In his speech, China's disarmament Ambassador Li Song did not refer to its own nuclear stockpiles but called for cooperation among nuclear powers and made a thinly-veiled swipe at the Trump administration.

Li called for a commitment to multilateralism, "with no exceptions, least of all the big power which shoulders a special responsibility for international peace and security and who is not expected to play the role of a 'spoiler' to our collective efforts and to withdraw from treaties".

Source: Reuters, Additional reporting by Stephanie Nebehay and Maria Kiselyova in Moscow; editing by Mark Heinrich, 21 January 2020.

BALLISTIC MISSILE DEFENCE

IRAN

Iran Likely to Field Nuclear Ballistic Missile in 2 Years: Israeli Intelligence

Israeli Defense Forces (IDF) intelligence says Iran is two years from a capability to equip one of its ballistic missiles with nuclear warhead. Such a development would constitute a red line, an Israeli official says: "The clock ticks toward this point, and Israel will know exactly when the foot will be put on the red line or very near to it."

However, Iran has not yet built a nuclear weapon. And reducing a nuclear

weapon to the size and weight allowing it to be carried on a ballistic missile is challenging, though Iran has demonstrated impressive engineering chops in some of its nuclear work. Once Iran builds such a warhead, all Iranian ballistic missiles with at least a diameter of 4.1 feet can be fitted to carry one. An example is the Shahab-3, a medium-range ballistic missile developed by Iran and based on the North Korean Nodong-1. The Shahab-3 has a range of 620 miles.

...According to foreign sources, Israel's intelligence apparatus is focused on the Iranian nuclear plan and does not need the data released from time to time by the UN officials that are supposed to monitor the country's capabilities. All signs indicate that Israel has been preparing a major

plan if Iran attacks or gets to this red line. Two nights ago, for example, "an unknown force" attacked an Iranian missile shipment at the largest Syrian air base, known as T-4, sources here say. So, while hostilities may get much hotter should Iran cross the red line, hostilities appear to be already playing out across the region almost day by day....

Source: Arie Egozi, (Excerpted from) <https://breakingdefense.com/>, 17 January 2020.

Russian Foreign Minister Sergei Lavrov said ...that Russia would take part in potential trilateral talks but that he "won't force China to change" its current position. China has previously said its weapons were the "lowest level" of its national security needs and not comparable to those of Russia and the United States.

Iran has not yet built a nuclear weapon. And reducing a nuclear weapon to the size and weight allowing it to be carried on a ballistic missile is challenging, though Iran has demonstrated impressive engineering chops in some of its nuclear work.

URANIUM PRODUCTION

AUSTRALIA

Boss Resources will be Australia's Next Uranium Producer, Says CEO

Boss Resources' Honeymoon uranium project is one of the world's most advanced uranium development projects that can be fast-tracked to resume production, according to a feasibility study. Boss says the study is the "final independent validation" for the South Australian in-situ leach (ISL) project's restart.

It provides a base case to restart uranium production from the Honeymoon Restart Area of 2 million pounds U3O8 equivalent (769 tU) per year over a 12-year life-of-mine (LOM). This is from only 35.9 million pounds of the project's JORC-compliant global mineral resource of 71.6 million pounds. The project is fully permitted to export 3.3 million pounds per year of U3O8 equivalent, and can be fast-tracked into production within 12 months using existing plant which previously produced and exported uranium, the company said.

The feasibility study base case results "confirm we will be Australia's next uranium producer", Boss Managing Director and CEO Duncan Craib said... Reflecting a "conservative base case" uranium price of USD50 per pound U3O8 over LOM, he said the study showed the project could "rapidly respond to a market rally, given the low capital barrier". ...

Source: *World Nuclear News*, 21 January 2020.

NUCLEAR ENERGY

CHINA

China Nuclear Power Plant Hits Record High Electricity Generation

The electricity generation by Hongyanhe Nuclear Power Station, the first nuclear power plant in northeast China, reached a record high of over 30 billion kWh in 2019. Based in Liaoning Province,

the Hongyanhe Nuclear Power Co., Ltd. said... that it generated 30.76 billion kWh of electricity for the power grid last year, up 8.82 percent year on year.

Compared with coal-fired power plants, the power generated by the nuclear power station last year saved 9.48 million tonnes of coal consumption and reduced carbon dioxide emissions by 25.87 million tonnes. No abnormalities of the power generation units or radiation were reported last year, according to the company.

With an investment of 80 billion yuan (around 11.6 billion U.S. dollars), the first phase saw four generating units completed and put into use in 2016. So far, the second phase of the project is 85 percent completed. Two other generating units are expected to start operation

in 2021 and 2022, respectively.

Source: <http://www.china.org.cn/>, 17 January 2020.

EU

EU Climate Action Financing Excludes Nuclear Power

The European Commission's plan for at least EUR 1000 billion investment in 'sustainable' energy projects over the next decade excludes nuclear power from its main financial component, though nuclear already provides more than half of the

EU's low-carbon electricity output. The use of nuclear energy in the EU, from 126 reactors, avoids the emission of 700 million tonnes of CO2 each year. The European Green Deal Investment Plan (EGDIP), also known as the Sustainable Europe Investment Plan, is

designed to mobilise public investment from the EU and the national public sector and help to unlock private funds through EU financial instruments, notably InvestEU.

EU industry association Foratom notes that a

Boss Resources' Honeymoon uranium project is one of the world's most advanced uranium development projects that can be fast-tracked to resume production, according to a feasibility study. Boss says the study is the "final independent validation" for the South Australian in-situ leach (ISL) project's restart.

The use of nuclear energy in the EU, from 126 reactors, avoids the emission of 700 million tonnes of CO2 each year. The European Green Deal Investment Plan (EGDIP), also known as the Sustainable Europe Investment Plan, is designed to mobilise public investment from the EU.

number of reports published over the last 18 months - such as by the IPCC, the International Energy Agency (IEA) and even the European Commission itself - had highlighted that nuclear power is an essential component of a low-carbon economy. In addition, at the end of last year, several EU Member States made it clear that in order to commit to the 2050 decarbonisation targets then they must be allowed to invest in nuclear power. "The benefits of transitioning workers from the coal into the nuclear industry have already been demonstrated in both France and the UK", Foratom noted.

In the light of EU failure to strongly endorse nuclear power, the Visegrad group comprising Poland, Slovakia, the Czech Republic and Hungary, which are all keen to reduce reliance on Russian gas imports and cooperate closely on nuclear power issues, have reiterated their support for increased nuclear supply despite neighbouring Austria's antipathy.

Source: World Nuclear News, 17 January 2020.

GENERAL

2019: The Year in Nuclear

From Hitachi scrapping a £16bn nuclear power station project in Wales, to revelations that the UK's Hinckley point C is now running almost £3bn over budget, we track the headlines to create a picture for nuclear in 2019.

Hitachi Scraps £16bn UK Nuclear Power Station Project: In January 2020, Hitachi found itself having to abandon a £16bn nuclear power station project in Wales. The tech giant lost the opportunity to build a nuclear plant at Wylfa on the Welsh island of Anglesey, as well as another planned project in Oldbury, Gloucestershire, after it failed to reach a financing deal with the government.

According to the Confederation of British Industry, the failure of the Wylfa plan was a "significant

blow" to the UK's future energy supply as it was meant to be the next in line of new-build nuclear plants following Hinkley Point C.

Action Begins to Remove Fukushima's Nuclear Fuel Rods: On 15 April 2019, after a four-year delay due to equipment malfunctions and high radiation, work began to remove nuclear fuel rods at the Fukushima Daiichi nuclear plant. There were 566 spent and unspent fuel rods in the cooling pool near the reactor building, which was left undamaged after an earthquake and tsunami caused a major meltdown in 2011. The rods are currently being removed underwater by a remotely-operated crane, which will then place them in a protective cask. According to plant operator Tokyo Electric Power, the removal of the rods will be fully completed in March 2021.

The US Department of Energy estimated that the VTR research could cost between \$3.9bn and \$6bn, 40% more than the original \$3.5bn estimate given by Idaho National Laboratory head Kemal Pasamehmetoglu during the planning stage.

US Senate Introduces bill to Disclose Nuclear Information Sharing: On 10 April 2019, US Senators introduced legislation directing executive branches to disclose which companies will be allowed to share nuclear information with countries wanting to build nuclear reactors. The bill was introduced by Republican Senators Marco Rubio and Todd Young, with Democrats Tim Kaine and Edward Markey, as a response to the Trump administration issuing Part 810 authorisations for any company to share nuclear information with Saudi Arabia. The main concern for senators was to safeguard against a potential Saudi nuclear programme and avoid a nuclear arms race in the Middle East. If passed, the bill would amend the 1954 Atomic Energy Act and force the Department of Energy to hand over the existing 810 applications.

US Nuclear Research Programme Runs 40% over Budget: As part of the Trump administration's policy to revitalise the US nuclear industry, the country planned the launch of a new nuclear versatile test reactor (VTR) research programme in February 2018. ... The US Department of Energy estimated that the VTR research could cost between \$3.9bn and \$6bn, 40% more than the

original \$3.5bn estimate given by Idaho National Laboratory head Kemal Pasamehmetoglu during the planning stage. The new estimate comes via a freedom of information request placed by the non-governmental organisation Union of Concerned Scientists.

It would also be the first of a number of fast reactors, which breed their own fuel and increase the amount of energy produced from uranium compared with light water reactors, and is expected to be finished by 2025. Toshiba and AECOM partner for nuclear decommissioning in Japan

In June 2019, Toshiba signed an alliance agreement with US-based engineering firm AECOM for a partnership in nuclear-decommissioning services taking place in Japan.

The companies aim to offer comprehensive services to Japanese government organisations and commercial power utilities planning to decommission their reactors and nuclear facilities. The Japan government currently plans to decommission 24 commercial reactors. AECOM has already completed reactor decommissioning for the US Department of Energy and the UK's Nuclear Decommissioning Authority.

August Data Shows Nuclear Power Tenders up by 40%: In August 2019, the GlobalData power industry tenders database found that global nuclear power industry tenders in Q2 2019 had risen by 40%. The tenders activity in Q2 2019 saw 21 new tenders announced, in comparison to the last four-quarter average of 15, according to GlobalData. In terms of territorial allocation, Europe led nuclear tenders activity for the second quarter, with 16 tenders and a share of 76.2%; it was followed by Asia-Pacific, with three tenders and a 14.3% share, and Middle East and Africa with one tender and a 4.8% share. Focussing on global power tenders activity by the type of technology during the same period, nuclear held fifth position in terms of number of tenders with

a 1.7% share.

Rosatom Launches the First Floating Nuclear Plant:

In September 2019, after more than a decade of planning, Russian nuclear company Rosatom announced the arrival of the world's first dedicated floating nuclear power plant, Akademik Lomonosov, which was docked at the port of its permanent location in Chukotka, Russia. The 144m-long and 30m-wide vessel has a displacement of 21,000t and is expected to be commissioned in 2020. The plant unit is the first floating vessel equipped with two KLT-40C small modular reactors with 35MW capacity each.

The new power plant was designed by Rosatom and will be part of its Floating Nuclear Thermal Power Plant project.

UK's Hinkley Point C Nuclear Project to Run £2.9bn over Budget:

Also in September 2019, French energy company EDF announced that the construction of the Hinkley Point C nuclear power plant in Somerset, England, the UK's first nuclear plant for 30 years, will cost between £1.9bn and £2.9bn more than previously estimated. The rise in costs was due to challenging ground conditions that made earthworks more expensive than expected.

This increases the overall project cost to between £21.5bn and £22.5bn, depending on the "effectiveness of action plans" in partnership with contractors. Furthermore, EDF stated that there was a higher risk of a delay in delivering the project's milestones on time, although the aim to generate first electricity in 2025 remains unchanged.

The plant has a planned capacity of 3,200MW and is expected to provide around 7% of the UK's power needs. World Nuclear Industry declares nuclear power not efficient enough. On 24 September 2019, the annual World Nuclear Industry Status Report concluded that nuclear energy is being outcompeted by renewable energy sources, calling its own industry "too expensive and slow to save the climate."

The tenders activity in Q2 2019 saw 21 new tenders announced, in comparison to the last four-quarter average of 15, according to GlobalData. In terms of territorial allocation, Europe led nuclear tenders activity for the second quarter, with 16 tenders and a share of 76.2%.

According to the report, nuclear energy's share of the global gross energy mix has dropped from its 17.46% peak in 1996 to 10.15% in 2018, despite an increase in global nuclear operating capacity to 370 GW. The lead author of the report, Mycle Scheider, explained that stabilising the climate is urgent and nuclear power is too slow.

UK Research and Innovation to Fund Compact Nuclear Power Station: In November, UK Research and Innovation announced that it has provided initial match funding of £18m for a consortium of companies to design a compact nuclear power station. The project is led by Rolls-Royce and involves BAM Nuttal and Nuclear AMRC.

The group has been working on the plants for four years and it plans to produce all the components in the UK, transport them to the sites and assemble them under a weatherproof canopy. Rolls-Royce estimates that the first five of the compact nuclear power stations will be ready by the 2030's, have a capacity of 440MW and cost £1.8bn each. They will be able to produce power for 60 years after being licensed.

Source: Yoana Cholteeva, <https://www.power-technology.com/>, 22 January 2020.

USA

GE Hitachi Nuclear Energy and TerraPower Announce Collaboration to Support Versatile Test Reactor Program

GE Hitachi Nuclear Energy (GEH) and TerraPower have announced a collaboration to pursue a Public Private Partnership to design and construct the Versatile Test Reactor (VTR) for the U.S. Department of Energy (DOE). "To achieve nuclear energy's full potential, business and government must work together to invest in both testing new materials and demonstrating advanced technologies"

The two companies recently submitted a joint response to an Expression of Interest issued by the Battelle Energy Alliance (BEA) on behalf of the DOE which seeks stakeholders interested in forming a partnership for a cost sharing

arrangement to design and construct the VTR utilizing sodium fast reactor technology.

"This collaboration brings together a strong team of engineers and scientists which has considerable expertise in sodium reactor technology," said Jay Wileman, President & CEO of GEH. "The combined team has complementary and unique experience with the credibility to lead the VTR design, procurement and construction effort. We are excited to work with TerraPower on such an important project."

"To achieve nuclear energy's full potential, business and government must work together to invest in both testing new materials and demonstrating advanced technologies," said Chris Levesque, TerraPower CEO. "America's nuclear workforce is ready to build next generation nuclear technology to deliver affordable, clean energy, and to reestablish American leadership in nuclear technology. The VTR offers a domestic platform for innovation that promotes American economic and national security."

Nuclear energy's share of the global gross energy mix has dropped from its 17.46% peak in 1996 to 10.15% in 2018, despite an increase in global nuclear operating capacity to 370 GW.

Energy Northwest, a utility consortium with nuclear power plant operating experience, will support the joint GEH-TerraPower effort. Additional companies and investors have expressed interest in being part of this effort and, if brought on board, will be named later.

The U.S. Department of Energy Office of Nuclear Energy established the VTR program to introduce fast neutron spectrum technology that does not currently exist in the U.S. and to support accelerated development of nuclear fuels and materials for advanced reactors.

In November 2018, BEA selected GEH and its PRISM technology to support the VTR program. Since then GEH has been actively engaged in development of the VTR conceptual design. TerraPower has supported the VTR program by making enhancements to the VTR's design and has invested ten years of sodium technology development into its traveling wave reactor.

Source: <https://www.businesswire.com/news/home/>, 21 January 2020.

NUCLEAR COOPERATION

RUSSIA–GHANA

Russia and Ghana Launch Cooperation in Nuclear Education

In 2020, three key Ghana universities and Tomsk Polytechnic University (TPU) will start working together to help Ghanaian upcoming engineers, physicists, doctors and researchers. They will receive world-class masters and postgraduate education in nuclear subjects in Russia.

The tuition fees for the full duration of education will be funded by the Russian Ministry of Higher Education and Science. The nuclear education programs are supported by State Atomic Energy Corporation ROSATOM, the company behind the Centre of Nuclear Science and Technology under construction in Chongwe, Zambia.

Valery Karezin, Director of Educational Projects and the HR Service at ROSATOM, noted on the occasion:

“About 300 students from more than 15 African countries are already studying nuclear specialties in Russia. We also contribute to the development of higher education in the field, strengthening cooperation between higher education institutions in Russia and Africa”.

The framework for the cooperation is the Memorandum of Cooperation in the field of training specialists for the national nuclear industry between Ghana Atomic Energy Commission (GAEC) and TPU. It was signed by Professor Benjamin Nyarka, Director General of GAEC and Oleg Dolmatov, Director of School of Nuclear Science & Engineering of TPU on 11 December 2019.

...To the date, nine students are studying at TPU nuclear subjects at masters and postgraduate level. In his speech at the signing ceremony, Professor Nyarko noted the interest of Ghana to cooperate with the State Atomic Energy Corporation Rosatom both in training personnel and developing human resources, as well as in joint projects to ensure public acceptability of nuclear projects in

Ghana, conducting joint research and implementing joint infrastructure projects. Ryan Collyer, interim CEO of Rosatom Central and Southern Africa, noted on the occasion:

“The goal of the scholarships is to support interest in nuclear research and capabilities among young African scientists and engineers, and contribute to solving some of the world’s most critical issues in the nearest future, allowing for the continent to industrialize, boost its economy and become self-sufficient”. TPU is the only Russian university equipped with a IRT-T nuclear research reactor available for foreign students to conduct research and experiments.

In over 60 years, more than 12 000 specialists graduated from TPU, including 8 000 trained in nuclear engineering and research. TPU offers Bachelor’s Degrees in Nuclear Physics and Technology; a Master’s Degree in Nuclear Power Installations Operation, Nuclear Medicine; and a Postgraduate Degree in Nuclear, Thermal and Renewable Energy and Related Technologies, all conducted in English language.

Source: <https://www.miningreview.com/>, 13 January 2020.

USA–UAE

UAE Delegation Meets with Senior U.S. Government Officials in Washington to Commemorate Ten-Year Anniversary of Peaceful Civilian Nuclear Energy Cooperation

A senior delegation of officials from the Emirates Nuclear Energy Corporation (ENEC) in Abu Dhabi, United Arab Emirates, visited Washington, DC to highlight progress around the development of the country’s peaceful nuclear energy program. Their visit to the United States also coincided with the ten year anniversary of the signing of the U.S.-UAE Agreement for Peaceful Civilian Nuclear Energy Cooperation.

About 300 students from more than 15 African countries are already studying nuclear specialties in Russia. We also contribute to the development of higher education in the field, strengthening cooperation between higher education institutions in Russia and Africa.

Led by ENEC CEO H.E. Eng. Mohamed Al Hammadi, the delegation met with U.S. Under Secretary of Energy Mark Menezes, Under Secretary for Nuclear Security Lisa Gordon-Hagerty, and Assistant Secretary for the Office of International Affairs Theodore Garrish at the Department of Energy. The meetings were also attended by UAE Ambassador to the United States HE Yousef Al Otaiba

In separate meetings, H.E. Eng. Al Hammadi and the senior U.S. officials discussed the U.S. and UAE's shared commitment to driving advances in sustainability and clean energy technologies. The officials also commemorated the ten year anniversary of the signing of the bilateral 123 Agreement that established the legal framework required for the transfer of civilian nuclear energy technology between the UAE and U.S.

...H.E. Eng. Mohamed Al Hammadi, ENEC CEO, said: "The overarching principles of the UAE's 2008 policy on the peaceful uses of nuclear energy are founded on the Nation's commitments to the highest

standards of nuclear safety, security, transparency and non-proliferation. These same principles are reflected in the 123 Agreement, and we have delivered on these commitments continuously throughout the development of the UAE Peaceful Nuclear Energy Program, as we work to realize our mission to generate clean, safe and reliable electricity.

"The Barakah Nuclear Energy Plant will transform the UAE's energy mix, delivering baseload electricity to power the future growth of the Nation while producing virtually zero-carbon emissions and providing high-value jobs for decades to come. The progress of the Barakah plant and the wider UAE Program has been supported by the valuable exchange of experience enabled by the U.S.-UAE 123 Agreement, which has delivered significant benefits to both parties. This includes the 175 U.S. suppliers who have been awarded more than \$2.75 billion in contracts since the establishment of the UAE program," added H.E. Eng. Al Hammadi.

"The launch of our peaceful, safe, and clean

civilian nuclear energy program is a powerful statement and an affirmation of the UAE's strong relationship with the U.S.," said Ambassador Al Otaiba. "Together, we made the strongest possible commitment to nonproliferation, and created economic prosperity for both countries.

While in Washington, members of the UAE delegation also participated in roundtable events at the Atlantic Council, and the Nuclear Threat Initiative, meeting with experts to discuss the UAE Peaceful Nuclear Energy Program and the Barakah Nuclear Energy Plant.

Ambassador Thomas Graham, Jr. Chairman of the Board of Lightbridge, Member of the former International Advisory Board for the UAE Peaceful Nuclear Energy Program and former senior U.S. diplomat commented: "Nuclear energy is essential

The Barakah Nuclear Energy Plant will transform the UAE's energy mix, delivering baseload electricity to power the future growth of the Nation while producing virtually zero-carbon emissions and providing high-value jobs for decades to come.

for mitigating the risks of climate change resulting from increasing carbon emissions. The Barakah Nuclear Energy Plant is one of the most significant clean energy projects globally, and is being delivered to the highest international standards. It

is fitting that we celebrate the 10th anniversary of the 123 Agreement, which reinforces the clear commitments made by the UAE in 2008 to achieving the highest standards of safety, security, transparency and non-proliferation....

Located in the Al Dhafra Region of Abu Dhabi Emirate, UAE, the Barakah Nuclear Energy Plant is the first constructed nuclear energy plant in the Arab World and is being developed by ENEC as the cornerstone of the UAE Peaceful Nuclear Energy Program.

...The Barakah plant consists of four APR1400 nuclear reactors, with a total generating capacity of up to 5,600MW. When the four units are fully operational, they will produce up to 25% of the UAE's electricity demand, while preventing the release of 21 million tons of carbon emissions annually.

Source: <https://www.prnewswire.com/>, 23 January 2020.

NUCLEAR NON-PROLIFERATION

IRAN

European States Trigger Dispute Mechanism in Iran Nuclear Deal

Britain, France and Germany have kickstarted a process that could lead to UN sanctions being reimposed on Iran and the collapse of the 2015 nuclear deal, after triggering the deal's dispute resolution mechanism.

Officials described the move as one taken more in sorrow than anger and said it was in part prompted by fears Iran might be less than a year away from possessing the capacity to develop a nuclear bomb. Concern was most acute that Iran will be learning about centrifuge enrichment in an irreversible way. "The concern is they are going to learn something that it is not possible for them to unlearn," one senior official said. The three nations said they rejected Tehran's argument that Iran was justified in violating the deal because the US broke the 2015 agreement by pulling out unilaterally in 2018.

"We have therefore been left with no choice, given Iran's actions, but to register today our concerns that Iran is not meeting its commitments," the countries said in a joint statement. They added the move did not mean the EU was joining the Trump administration's campaign of maximum economic pressure on Iran. The decision was taken in principle before Christmas by the three European powers, and not prompted by the recent Iranian attack on US bases in Iraq, or the Iranians' accidental downing of the Ukrainian airliner.

The Iranian foreign ministry issued a relatively mild response saying: "If Europeans, instead of keeping to their commitments and making Iran benefit

from the lifting of the sanctions, misuse the dispute resolution mechanism, they'll need to be prepared for the consequences that they have been informed about earlier."

...Germany's foreign minister, Heiko Maas, said the three European countries "could no longer leave the growing Iranian violations of the nuclear agreement unanswered"...Iran's foreign ministry warned of a "serious and strong response".

Foreign ministry spokesman Abbas Mousavi added, however, that Iran was "fully ready to answer any good will and constructive effort" that preserves the deal.

Under the dispute resolution mechanism, countries have 30 days to resolve their problem, though that can be extended. If it cannot be solved, the matter could be

brought before the UN Security Council and could then result in the snapback of sanctions that had been lifted under the deal.

Officials said the practical impact of reimposed sanctions would be low due to the swingeing nature of existing US sanctions. It would, however, represent a severe blow to the cause of

multilateral nuclear non-proliferation... Donald Trump has been pressing Europe to leave the nuclear deal ever since he unilaterally took the US out of deal in May 2018. In response, Iran has rolled back its commitments in stages to try and pressure the other countries involved to provide

economic incentives to offset the American sanctions, but efforts from them so far have been insufficient.

...In his strongest call yet from Europe for a new agreement to replace the 2015 deal, the British prime minister, Boris Johnson, said the way

Concern was most acute that Iran will be learning about centrifuge enrichment in an irreversible way. "The concern is they are going to learn something that it is not possible for them to unlearn," one senior official said. The three nations said they rejected Tehran's argument that Iran was justified in violating the deal because the US broke the 2015 agreement by pulling out unilaterally in 2018.

Under the dispute resolution mechanism, countries have 30 days to resolve their problem, though that can be extended. If it cannot be solved, the matter could be brought before the UN Security Council and could then result in the snapback of sanctions that had been lifted under the deal.

forward was to agree what he called a "Trump deal". "If we're going to get rid of it, let's replace it and let's replace it with the Trump deal ... President Trump is a great dealmaker, by his own account," he said.

Iran has taken its five successive steps away from the deal because it says the EU has not fulfilled its commitment to boost trade. The US has imposed extra-territorial sanctions making it nearly impossible for European firms to trade with Iran and not risk swingeing US fines. A mechanism designed to circumvent the sanctions set up by the EU has so far failed to facilitate a single transaction between European firms and Iran.

Iran has taken its five successive steps away from the deal because it says the EU has not fulfilled its commitment to boost trade. The US has imposed extra-territorial sanctions making it nearly impossible for European firms to trade with Iran and not risk swingeing US fines.

European diplomats stressed the move was not being taken to reimpose sanctions, but to try to find some way to press Iran to come back into compliance with the deal. Josep Borrell, the EU's foreign affairs high representative, even went so far as to say that preserving the nuclear deal "is more important than ever". Iran says it no longer feels bound to comply with aspects of the deal except allowing UN inspectors into its sites.

Iran said ... it could quit the global nuclear NPT if European countries refer it to the UNSC over a nuclear agreement, a move that would overturn diplomacy in its confrontation with the West.

The EU, following long talks with Russia and China about its plan, said it was hopeful that Tehran would not react by banning the UN inspectors. European diplomats remain sceptical that Trump's policy of maximum economic pressure will persuade Iran to renegotiate the deal, and fear it will instead strengthen the position of hardliners in Tehran. The street protests in Tehran have not changed that EU judgment.

Source: The Guardian, 14 January 2020.

Iran FM Rules out Negotiation Over New Nuke Deal

Iranian Foreign Minister Mohammad Javad Zarif ruled out the possibility of any negotiation over a new nuclear deal, Tehran Times daily reported... "We will never negotiate a new deal," Zarif said ... during his visit to India's Mumbai to attend a meeting organized by All India Association

of Industries. Under the 2015 nuclear deal, formally known as the Joint Comprehensive Plan of Action, Iran agreed to restrict its nuclear activities in exchange for the termination of Western and UN sanctions. However, U.S. President Donald Trump pulled Washington out of the deal in May 2018 and slapped full sanctions against Iran. Trump has been urging a new deal with the aim of more limits on Iran's nuclear program. ...Zarif called for the Indian government to persuade the U.S. government to return to the deal.

Source: http://www.china.org.cn/world/Off_the_Wire/2020-01/19/content_75627397.htm, 19 January 2020.

Iran Says it will Quit Global Nuclear Treaty if Case Goes to UN

Iran said ... it could quit the global nuclear NPT if European countries refer it to the UNSC over a nuclear agreement, a move that would overturn diplomacy in its confrontation with the West. ...The fate of the 2015 pact has been in doubt since U.S. President Donald Trump pulled the United States out of it and reimposed sanctions. Iran has responded by scaling back its commitments, although it says it wants the pact to survive.

Britain, France and Germany declared Iran in violation of the 2015 pact and have launched a dispute mechanism that could eventually see the matter referred back to the Security Council and the reimposition of U.N. sanctions. "If the Europeans continue their improper behavior or send Iran's file to the Security Council, we will withdraw from the NPT," Iranian Foreign Minister Javad Zarif said, according to comments carried by IRNA and other Iranian news agencies.

He also said Iran could take other steps before withdrawing from the NPT, although he did not specify them. The nuclear dispute has been at the heart of an escalation between Washington

and Tehran which blew up into military confrontation in recent weeks.

...The only country ever to declare its withdrawal from the NPT was North Korea, which expelled nuclear inspectors and openly tested atomic weapons. Nuclear-armed India and Pakistan never signed up, nor did Israel, which does not say whether it has nuclear weapons but is widely presumed to have them.

The West has long accused Iran of seeking to develop nuclear arms. Tehran denies this and says its goal is to master the whole process of generating electricity from nuclear energy. A steady escalation over Iran's nuclear plans flared into tit-for-tat military action this month, with Trump ordering a drone strike that killed a top Iranian general, prompting Iran to fire missiles at U.S. targets in Iraq. During a state of alert, Iran shot down a Ukrainian airliner in error.

Amid that escalation - one of the biggest since Iran's 1979 revolution - Tehran has faced mounting pressure from European states which say they want to save the 2015 nuclear deal. They have also indicated a readiness to back Trump's call for a broader deal with Iran that goes beyond its nuclear plans. "Despite the ill will that we see from some European countries the door of negotiations with them has not been closed and the ball is in the court of these countries," Iranian Foreign Ministry spokesman Abbas Mousavi said. But he also told a news conference: "I don't think Iran is ready to negotiate under the conditions they have in mind."

Since Washington withdrew from the deal, Trump began a policy of "maximum pressure", saying a broader deal should be negotiated on nuclear issues, Iran's missile program and Iranian activities in the Middle East. US sanctions have crippled Iran's economy, slashing its oil exports. Iran has long said it would not negotiate with Washington while sanctions are in place.

Tehran has repeatedly held talks with European officials to find ways to keep the nuclear agreement alive, but has blamed the Europeans for failing to guarantee economic benefits that Iran was meant to receive in return for curbing nuclear work. "The European powers' claims about Iran violating the deal are unfounded," Mousavi said. "Whether Iran will further decrease its nuclear commitments will depend on other

parties and whether Iran's interests are secured under the deal."

In a report on a parliamentary website, Iran's foreign minister said steps to scale back its commitments under the nuclear deal were now over. Britain has said a "Trump deal" could replace the 2015 deal, and France has called for broad talks to end the crisis. Iran says it cannot negotiate with Trump, who broke promises by repudiating the deal reached under his predecessor Barack Obama. Mousavi repeated Iran's rejection of a "Trump deal". "The fact that a person's name is put on an agreement shows they're not familiar with the conditions. An agreement with a person doesn't mean anything," he said.

Source: Reporting by Parisa Hafezi and Babak Dehghanpisheh; Writing by Edmund Blair; Editing by Peter Graff, 20 January 2020.

NUCLEAR PROLIFERATION

IRAN

Iranian President Says Iran Currently Enriches More Uranium Than Before

Iranian President Hassan Rouhani said... current uranium enrichment of the Islamic republic is more than that of the time Iran clinched nuclear deal with the powers in 2015, according to official IRNA news agency. "Today ... we have no limits in (working on) nuclear energy industry. That is, our nuclear technology condition is much better than the time nuclear deal was signed," Rouhani said in a meeting of Central Bank of Iran officials.

"Today, Iran produces more enriched uranium than the time we had not sealed the deal" in 2015, he was quoted as saying. Iran reduced its nuclear commitments in retaliation for the U.S. withdrawal from the deal and the Europeans "failure" to adhere to their respective obligations, he said. ...

Source: <http://www.china.org.cn/>, 16 January 2020.

NORTH KOREA

North Korea Abandons Nuclear Freeze Pledge, Blames 'Brutal' US Sanctions

North Korea said recently it was no longer bound by commitments to halt nuclear and missile testing, blaming the United States' failure to meet a year-end deadline for nuclear talks and "brutal

and inhumane” U.S. sanctions.

North Korean leader Kim Jong Un set an end-December 2019 deadline for denuclearization talks with the United States and White House national security adviser Robert O’Brien said at the time the United States had opened channels of communication. O’Brien said then he hoped Kim would follow through on denuclearization commitments he made at summits with U.S. President Donald Trump.

Ju Yong Chol, a counselor at North Korea’s mission to the UN in Geneva, said that over the past two years, his country had halted nuclear tests and test firing of inter-continental ballistic missiles “in order to build confidence with the United States”.

But the United States had responded by conducting dozens of joint military exercises with South Korea on the divided peninsula and by imposing sanctions, he said. “As it became clear now that the US remains unchanged in its ambition to block the development of the DPRK and stifle its political system, we found no reason to be unilaterally bound any longer by the commitment that the other party fails to honor” Ju told the UN-backed Conference on Disarmament.

Speaking as the envoy from the DPRK, North Korea’s official name, Ju accused the United States of applying “the most brutal and inhumane sanctions”.

“If the U.S. persists in such hostile policy towards the DPRK there will never be the denuclearization of the Korean peninsula,” he said. “If the United States tries to enforce unilateral demands and persists in imposing sanctions, North Korea may be compelled to seek a new path.” U.S. military commanders said any new path could include the testing of a long-range missile, which North Korea has suspended since 2017, along with nuclear

warhead tests.

U.S. disarmament ambassador Robert Wood voiced concern at Pyongyang’s remarks and said Washington hoped the North would return to the negotiating table. “What we hope is that they will do the right thing and come back to the table and try to work out an arrangement where by we can fulfill that pledge that was made by President Trump and Chairman Kim to denuclearize,” he said.

South Korean Ambassador Jang-keun Lee said there must be substantial progress in

denuclearization to “maintain and build upon the hard-won momentum for dialogue”. “Therefore, early resumption of negotiations between the United States and the DPRK is critical,” he said. Anne Kemppainen, head of the European Union’s disarmament section, also called on North Korea to stick to the talks.

Pyongyang, slapped with multiple Security Council resolutions and sanctions, has rejected unilateral disarmament and given no indication that it is willing to go beyond statements of broad support for the concept of universal denuclearization. North

Korea has said in previous, failed talks that it could consider giving up its arsenal if the United States provided security guarantees by removing its troops from South Korea and withdrew its so-called nuclear umbrella of deterrence from South Korea and Japan.

Impoverished North Korea and the rich, democratic South are technically still at war because their 1950-53 conflict ended in a truce, not a peace treaty. The North regularly used to threaten to destroy the South’s main ally, the United States, before rapprochement began after the 2018 Winter Olympics in South Korea.

Source: Reporting by Stephanie Nebehay; Editing by Jon Boyle and Nick Macfie, 21 January 2020.

North Korea said recently it was no longer bound by commitments to halt nuclear and missile testing, blaming the United States’ failure to meet a year-end deadline for nuclear talks and “brutal and inhumane” U.S. sanctions.

As it became clear now that the US remains unchanged in its ambition to block the development of the DPRK and stifle its political system, we found no reason to be unilaterally bound any longer by the commitment that the other party fails to honor.

Efforts to Denuclearize North Korea will Continue Despite Hard-Line Minister, US Says

Efforts to denuclearize North Korea will continue despite a new foreign minister in Pyongyang who is seen as a hard-liner and could take a tougher stance in stalled negotiations, a senior State Department official said ...The official would not forecast how the new foreign minister, Ri Son-gwon, who succeeds Ri Yong-ho, might approach negotiations with the United States over removing nuclear weapons from the Korean Peninsula.

The official, citing diplomatic protocol to speak on the condition of anonymity, predicted the talks would restart, given what he said was a shared desire for progress on the part of President Trump and the North Korean leader, Kim Jong-un. Despite frequent setbacks in the past year, Trump administration officials have publicly said they intend to continue with negotiations to settle on a denuclearization process, echoing Mr. Trump's line.

Privately, though, some officials acknowledge that the administration has gotten nowhere, and that there is no sign the North will give up its nuclear weapons. Ri Yong-ho's removal was first reported...by NK News, based in Seoul. The move was interpreted as a sign of further turmoil among the ranks of North Korean officials responsible for negotiating with the Trump administration and getting the Americans to lift sanctions.

Mr. Kim and Mr. Trump opened the talks in 2018 in Singapore. But those fell apart after the two leaders met again in February 2019, in Hanoi, Vietnam, prompting Mr. Kim to dismiss his negotiating team. Among those sidelined was Kim Yong-chol, a former spy chief and top party official who was seen as the counterpart to Secretary of State Mike Pompeo and oversaw the North's negotiating team in Hanoi. Kim Yong-chol also had

clashed with Mr. Pompeo in several meetings. In July 2018, North Korea said the United States had made a "gangsterlike demand" for denuclearization when the top American diplomat visited Pyongyang.

...Ri Son-gwon, the incoming foreign minister who has served as an Army colonel, was an aide to

Kim Yong-chol years ago. In another shift of senior leadership, North Korea has replaced the defense minister, according to a report in Rodong Sinmun, an official newspaper of the Workers' Party of Korea. The new official, Kim Jong-gwan, is an Army general.

North Korea has said in previous, failed talks that it could consider giving up its arsenal if the United States provided security guarantees by removing its troops from South Korea and withdrew its so-called nuclear umbrella of deterrence from South Korea and Japan.

"They come and go, so it's pretty hard to put a lot of analytical freight on the new appointment," said Robert Carlin, a former C.I.A. and State Department analyst on North Korea. Mr. Carlin said the calculus of the United States in negotiations was still the same. And he noted that much depended on the next steps that the North's leader takes, in particular whether he carries out another nuclear test or an intercontinental ballistic missile test.

Mr. Kim had given the Americans until the end of last year (2019) to make what he would consider a genuine offer that would

result in the lifting of sanctions. However, instead of a weapons test, he warned that North Korea was developing a new strategic weapon. Mr. Kim also ridiculed the impasse that he said would result in the United States becoming "more helpless" against the North.

...An earlier round of talks Mr. Biegun had with North Korean officials in Stockholm in October ended badly after the North Koreans read from a long, prewritten letter berating the Americans. The North then said it had no desire to continue what it called "sickening negotiations."

Source: The New York Times, 22 January 2020.

NUCLEAR SAFETY

GENERAL

Enhancing Nuclear Safety: Technical Safety Review Service Streamlined

Recently published guidelines for the Technical Safety Review (TSR), an IAEA peer review service, aim to streamline, harmonize and formalize the process of conducting the service, which provides an independent evaluation of safety assessment and design documentation. The updated TSR service guidelines are designed to help regulatory bodies, nuclear power plant operators, designers and technical support organizations further enhance the safety of nuclear power plants around the world.

“Since 1988, the IAEA has been providing safety review services on technical subject areas, though the services had different names over the years,” said Cornelia Spitzer, Head of the IAEA Safety Assessment Section. “The updated TSR Service Guidelines provide a concise description of the methodology, how a party can request a TSR, what to expect throughout a review and the major outcome. It also brings the different technical areas which can be peer reviewed under one uniform approach and is useful for Member States considering requesting a TSR.”

This service includes review of national requirements along with recommendations for improvement and covers six different technical subject areas: design safety, generic reactor safety, national safety requirements, probabilistic safety assessment, accident management and periodic safety review. While some IAEA services address technical areas in a high-level process-oriented approach, the TSRs focus on the content, reviewing in-depth the specific technical subject and providing concrete details of improvements needed in terms of the quality, completeness and consistency with the IAEA Safety Standards. To date, the IAEA has conducted 112 reviews in 27 countries, with additional reviews underway.

The peer reviews are conducted by a technical

team of external experts led by the IAEA. A typical TSR takes between three and nine months to complete, depending on the country's needs and the selected topics. The basis of the review is documentation provided by the country, which is reviewed against IAEA Safety Standards.

“National safety requirements vary by country, so it is important to review documents against the same set of requirements from review to review,” said Paul Amico, principal consultant at Jensen Hughes and an expert who has participated in TSRs. “The guidelines help to streamline the implementation of a TSR and to provide a consistent level of rigor in the review against IAEA Safety Standards, which represent the consensus among IAEA Member States.”

The scope of each TSR is tailored to a country's needs at most stages of development and implementation of a nuclear power programme, including conceptual design, pre-licensing and

licensing stages, nuclear power plant construction, operation and plant modifications including periodic safety reviews and lifetime extension. For example, a country embarking on a nuclear power programme may request a TSR to evaluate its national safety requirements being developed in the country.

“In anticipation of Hungary's plan to construct an

additional nuclear power plant at the Paks site, we have requested a TSR on design safety focused on the preliminary safety analysis report,” said Gyula Fichtinger, Director General of the Hungarian Atomic Energy Authority. “We firmly believe that the future TSR on design safety would contribute to adhering to the IAEA Fundamental Safety Principles and the relevant IAEA Safety Requirements.”

“Nuclear safety remains the responsibility of individual countries. The TSR services, however, can help Member States implement a sustainable and successful nuclear power programme through insights on maintaining and improving all aspects of their nuclear safety framework,” said Greg Rzentkowski, Director of Nuclear Installation Safety Division, noting that TSRs do not constitute

While some IAEA services address technical areas in a high-level process-oriented approach, the TSRs focus on the content, reviewing in-depth the specific technical subject and providing concrete details of improvements needed in terms of the quality, completeness and consistency with the IAEA Safety Standards. To date, the IAEA has conducted 112 reviews in 27 countries, with additional reviews underway.

a design certification or licensing activity. TSRs on generic aspects of reactor safety have been completed for several conventional nuclear reactor designs as well as for a small modular reactor.

Source: <https://www.iaea.org/newscenter/>, 20 January 2020.

NUCLEAR WASTE MANAGEMENT

CANADA

Nuclear Waste Site One Step Closer in South Bruce

There's now a specific site northwest of Teeswater, Ont. that could be home to Canada's most radioactive nuclear waste. Enough landowners have agreed to option, lease or sell their land to the Nuclear Waste Management Organization (NWMO) to move South Bruce to the front of the line in terms of hosting all of Canada's used nuclear fuel. About 1,300 acres of land has been optioned by the NWMO so far, allowing for detailed borehole drilling and environmental studies.

...Darren Ireland is one of the landowners whose agreed to have his land used for the project. "I was born and raised in this community, and my family and I are proud to call South Bruce home. We understand that this project has the potential to bring long-term benefits to the area."...

The only other community still in the running along with South Bruce, is the town of Ignace in Northern Ontario. The Township of Huron-Kinloss is no longer on the list of potential host communities. There are currently three million used nuclear fuel bundles to be buried as part of this project. That's enough to fill eight hockey rinks from the ice to the top of the boards.

Approximately 5.2 million bundles of high-level nuclear waste are expected to the proposed underground storage facility, upon completion. The used fuel bundles remain dangerously radioactive for tens of thousands of years. The NWMO wants to have a single site chosen by 2023.

Source: <https://london.ctvnews.ca/>, 24 January 2020.



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 K.K Nohwar, PVSM VM (Retd).

Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,

New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: capsnetdroff@gmail.com

Website: www.capsindia.org

Edited by: Director General, CAPS

Editorial Team: Dr. Sitakanta Mishra, Hina Pandey, Dr. Poonam Mann, Sreoshi Sinha, Zoya Akhter, Carl Jaison

Composed by: CAPS

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