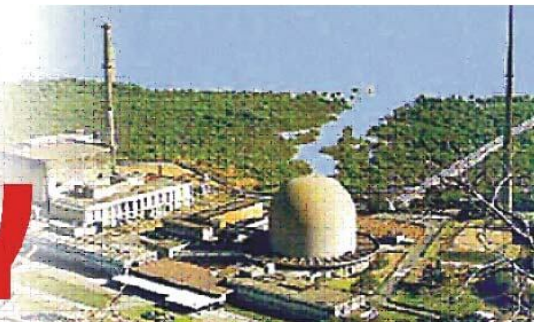
NUCLEAR SECURITY



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

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OPINION – William J. Perry, James E. Cartwright

Spending Less on Nuclear Weapons Could Actually Make US Safer

The US plans to spend $1.7 trillion over the next three decades to replace its nuclear arsenal. This is a lot of money, more annually than the country spends on the entire State Department. Even so, if we thought this level of spending were required to ensure US national security, we would support it. It is not. The nation can spend much less and still be safe. In fact, safer. This may sound counterintuitive, but if we scale back plans to replace the nuclear arsenal, we will actually improve our security. And we will save hundreds of billions of dollars.

How can this be? Current plans call for building new nuclear weapons as if the Cold War had never ended. This is dangerous. In the past, we lived with great risks that, at the time, we thought were justified. No longer. It is time to take a hard look at the arsenal and replace the weapons we need for today's threats — and forgo the rest. We support a strong US nuclear deterrent as long as nuclear weapons are held by other nations. But we do not support replacing every weapon in the arsenal. At a time of tight defense budgets, a dollar spent on nuclear weapons is a dollar taken away from other military needs, such as sustaining conventional forces and countering terrorism and cyber attacks. The United States cannot afford to do it all.

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During the Cold War, the greatest danger to the US was a "bolt from the blue" from the Soviet Union — a massive surprise nuclear attack. We armed ourselves to the teeth to prevent this. Thankfully, those days are over. The Soviet Union disappeared 25 years ago. Current Russian belligerence, although worrisome, does not constitute a renewed Cold War.

Today, the greatest danger is not a Russian bolt but a US blunder — that we might accidentally

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stumble into nuclear war. As we make decisions about which weapons to buy, we should use this simple rule: If a nuclear weapon increases the risk of accidental war and is not needed to deter an intentional attack, we should not build it.

The Cold War arsenal includes ICBMs, submarines, long-range bombers, cruise missiles and the nuclear warheads they carry. Last month (October), the CBO estimated that maintaining and replacing the arsenal over 30 years would cost $1.2 trillion in constant dollars, or $1.7 trillion with inflation. The CBO's new cost estimate is much higher than previous ones and should be a wake-up call that current plans must be rethought.

We support building an appropriate number of new nuclear-armed submarines as the most survivable leg of the deterrent. No adversary could believe that a surprise attack would destroy all of our at-sea submarines. And any one of them (carrying as many as 192 thermonuclear warheads) is capable of inflicting unacceptable damage on that adversary. Thus our submarines alone give us an assured deterrence.

Because the submarines are not vulnerable to a first strike, there is no reason to launch their missiles under warning of attack. This avoids serious concerns about accidental war that are inherent to ICBMs, which certainly would be the first targets of any surprise attack and cannot be recalled should they be launched in response to what turns out to be a false alarm.

Moreover, because the submarines are not vulnerable to a first strike, there is no reason to launch their missiles under warning of attack. This avoids serious concerns about accidental war that are inherent to ICBMs, which certainly would be the first targets of any surprise attack and cannot be recalled should they be launched in response to what turns out to be a false alarm. This is not a theoretical problem. We had three false alarms during the Cold War, and on one of those, we narrowly averted a nuclear catastrophe.

As an insurance policy in case submarine survivability becomes threatened, we also support an appropriate number of new stealth bombers, which would be used primarily for conventional missions but could also be armed with nuclear gravity bombs now being rebuilt. Bombers could be sent into the air in a crisis, and, once there, could loiter for many hours, allowing them to wait out an alarm while airborne.

It is time to step back and take a fresh look. The United States does not need to arm its bombers with a new generation of nuclear-armed cruise missiles. We should no longer run the risk that a conventionally armed cruise missile might be mistaken for one with a nuclear warhead, thus starting a nuclear war by mistake. According to the CBO, canceling this weapon would save $30 billion. Similarly, the United States should cancel plans to replace its ground-based ICBMs, which would save $149 billion.

We should consider all aspects of our nuclear posture and our conventional forces' needs before rushing headlong into these expensive and contentious development programs. We believe, too, that taking a more prudent course in rebuilding our deterrent systems could help avoid a new arms race with Russia that neither side should want.

Certain nuclear weapons, such as the cruise missile and the ICBM, carry higher risks of accidental war that, fortunately, we no longer need to bear. We are safer without these expensive weapons, and it would be foolish to replace them. With nuclear weapons, as with all things, sometimes less is more.

Source: https://www.washingtonpost.com/, 16 November 2017.

OPINION – John H. Bunzel

Take First Strike Off Table to Prevent a Nuclear Showdown

Tensions are so high on the Korean peninsula that a nuclear horror — what the Republican essayist Michael Gerson has called "apocalyptic danger" — is beyond rational comprehension. More serious still is the sober realization that the power to

prevent the military option of using hydrogen bombs is in the hands of two narcissistic heads of state. It would be foolish to minimize the lunacy and self-induced paranoia of Kim Jung Un, whose publicly announced end game is the rapid development and testing of intercontinental ballistic missiles now proceeding at an alarming rate.

President Trump has intensified the confrontation by declaring we are in a war and that "things North Korea never thought possible" will happen if it continues to use purposeful and inflammatory verbal threats against us and our allies. Some observers have been thinking creatively about a diplomatic way out of this seemingly intractable problem. Endorsing a plan proposed by Thomas Friedman of *The NYT*, they would pledge publicly to North Korea and the entire world that the US never would be the first nation to launch a unilateral pre-emptive strike against another country. This would be rejected by Kim Jung Un with yet another round of denunciations of American aggression. But around the world, America's willingness to abandon its first strike capacity to use nuclear weapons would be seen as a serious step toward a peaceful resolution of a menacing problem.

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This is a bold plan, far superior to any others proposed. However, it is based on a major condition that neither strengthens our position against North Korea nor deters that country's military leaders from solidifying their single goal of remaining an increasingly expanding nuclear power. Kim Jung Un knows an attack on the US or any other allied nation, by design or by mistake, would lead to a massive military assault on his country. Nevertheless, he has stated repeatedly and unequivocally that he will not negotiate any plan with the US that would require him to demilitarize and dismantle his missile program. Any such plan, he has insisted, is non-negotiable.

What else can be done to avert the unimaginable? We need a new beginning. I would start by telling North Korea's leaders that they may continue to build their nuclear state without any military interference from the US — "no conditions attached." If that is the society they want, they can have it. We will not try to stop them. They need only be fully aware of the consequences if their plans go awry. Many will immediately call this weakness or appeasement on our part. "We must destroy their nuclear arsenal before they are in a position to attack us wherever and whenever they choose," they would say. The truth is, they already have more than enough destructive power to do irreparable damage to us now.

While President Trump cannot stop North Korea solely for its continued bluster and oral fits of anger, he can take the political and diplomatic initiative by working closely with China and South Korea and announce that the US will implement a policy of "patient deterrence and containment" that is least likely to lead to the loss of life. He should declare — again — that we have no interest in "regime change," and restate our readiness to take the first-strike military option off the table — unless we are attacked first, in which case we would immediately assess the situation and retaliate appropriately. He should then urge President Kim to work with us in an open-ended, step-by-step process that would be non-threatening to either nation.

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It is a virtually impossible task for us to offer North Korea a plan it would agree to negotiate. A major

reason the differences are especially difficult to settle is because there are no democratic politics in North Korea. Having disallowed any dissent or disagreement at all, President Kim has substituted one-man, top-down power for democratic leadership. Only in such a closed society, where the people are accustomed to being told what is "good" for them, is the distinctive context of politics totally missing. There are no doubts, only certitude. There are no partial answers, just total solutions.

Not so here at home. Politics in a free society deals with the contingent and the unknown. Politics as Americans have experienced it is the civilizing process of conciliation and compromise. North Koreans are not free and will not be free until they and their differing interests can claim a share of political power. That is what democratic politics is all about.

In ruling out the use of military force, we are saying to President Kim: Keep your nuclear-based society if that is not open to negotiation, but join us in trying to turn unreconciled differences into some kind of agreement that might persist for some period of time. He will turn us down, of course, but in doing so he will only have further isolated his country from the rest of the world.

I support Friedman and others who want to bombard the people of North Korea with millions of "democracy fliers" or leaflets that will give them some idea of how an open democracy differs from their closed society. I would especially target young people who cannot express publicly their own views but, who we know (from the little intelligence we have), are privately looking for every possibly way to learn how a free society works.

The most difficult problem between US and North Korea is one in which neither side would provoke hostile conflict that could lead to war. President Trump needs to be persuaded that the worst possible outcome is having North Korea become a failed state. To date, however, nothing he has said would lead anyone to believe he thinks this to be true. Quite the opposite; he talks as if only "might is right." But China and South Korea both have warned that first-strike military action would quickly turn the peninsula into a horrific war zone. They strongly believe that what is urgently needed is deterrence and containment, along with tougher sanctions on North Korea and a vigorous diplomatic peace initiative — which they have long maintained is the only realistic option.

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Like it or not, President Trump is the key player in keeping the Korean peninsula free of nuclear war. We made him our president, and now he must act like a political leader who can be a bargainer, a negotiator, and a conciliator who understands the relationship of "means to ends," where violation of the former becomes an act of political death — and the inability to fulfill the latter can cause political extinction. Mr. Trump has often said he relies on his "gut instinct" to do the right thing. Who knows — does he know? — Where his gut would lead us?

John H. Bunzel is a political scientist on the faculty at Stanford University. He was president of San Jose State University in the 1970s, served on the US Commission on Civil Rights from 1983-1986, and in 1990 received the Hubert Humphrey Award as "an outstanding public policy practitioner." He resides in Mount Pleasant.

Source: http://www.postandcourier.com/, 27 November 2017.

OPINION – Garimella Subramaniam

An Unsafe World

The IAEA task at 60 — to balance the benefits of nuclear technology for human development against the irreversible risks to the planet's survival — could not be greater. In the historic

1953 Atoms for Peace address to the UNGA, US President Dwight Eisenhower proposed the establishment of the agency to harness nuclear science for peace. Eisenhower was apt to appreciate the rapid end to US nuclear monopoly and underscore that the notion of mutual deterrence was a dangerous delusion. Nevertheless, the history of the Cold War and subsequent developments illustrate that global instability from proliferation and weaponisation may well be a reality, at least in the near future.

As the world's NWSs continue to flout their disarmament obligations with impunity, countries outside this elite club have felt encouraged to nurture their own big ambitions. The possession of the deadly bomb by four other countries, besides the five nations that founded the nuclear NPT, testifies to the impediments to restrict the use of nuclear energy for civilian purposes. North Korean leader Kim Jong-un's defiance to expand the country's weaponisation programme is only the latest instance of erosion of the NPT's authority.

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Rather than engage diplomatically with Pyongyang, US President Trump is bent on ripping apart the 2015 agreement that the five permanent members of the UNSC and Germany brokered with Iran. Against this backdrop, the prospects are remote that the 2017 treaty to legally ban nuclear weapons could win support from the NWS. The IAEA Director General, Yukiya Amano, told the UN in the second week of November that lessons from the 2011 accident at Japan's Fukushima Daiichi nuclear power plant have been incorporated into safety plans. But Mr. Amano also emphasised earlier in 2017 that countries could not outsource the safety and security framework on the deployment of nuclear technology.

That cautionary remark should not be taken lightly across the developing world, where a culture of safety and public accountability is lacking. This is especially critical since the share of nuclear power is expected to increase as part of attempts to reduce countries' dependence on fossil fuels. Equally, the emphasis on nuclear science to promote the 2030 Sustainable Development Goals would be subject to the safety frameworks in place.

IAEA member states have evidently been slow to adopt measures to enhance the safety (from terrorist threats) of nuclear material transferred within and across national borders. For instance, an amendment to the Convention on the Physical Protection of Nuclear Material came into force only in 2016. The Fukushima disaster has brought into sharp focus major concerns over the management of nuclear waste, with potentially dangerous consequences for human civilisation and the environment over the long term. The issue will pose questions on the merits and sustainability of nuclear technology as a credible source of energy. Governments ought to be more transparent on these matters.

Source: http://www.thehindu.com/, 17 November 2017.

OPINION – Michael T. Klare

Normalizing Nukes

Maybe you thought America's nuclear arsenal, with its thousands of city-busting, potentially civilization-destroying thermonuclear warheads, was plenty big enough to deter any imaginable adversary from attacking the US with nukes of their own. Well, it turns out you were wrong. The Pentagon has been fretting that the arsenal is insufficiently intimidating. After all — so the argument goes — it's filled with old (possibly unreliable) weapons of such catastrophically destructive power that maybe, just maybe, even President

Trump might be reluctant to use them if an enemy employed smaller, less catastrophic nukes on

some future battlefield. Accordingly, US war planners and weapons manufacturers have set out to make that arsenal more "usable" in order to give the president additional nuclear "options" on any future battlefield. (If you're not already feeling a little tingle of anxiety at this point, you should be.) While it's claimed that this will make such assaults less likely, it's all too easy to imagine how such new armaments and launch plans could actually increase the risk of an early resort to nuclear weaponry in a moment of conflict, followed by calamitous escalation.

That President Trump would be all-in on making the American nuclear arsenal more usable should come as no surprise, given his obvious infatuation with displays of overwhelming military strength. (He was thrilled when, last April, one of his generals ordered, for the first time, the most powerful nonnuclear weapon the US possesses dropped in Afghanistan.) Under existing nuclear doctrine, as imagined by the Obama administration back in 2010, this country was to use nuclear weapons only "in extreme circumstances" to defend the vital interests of the country or of its allies.

Prohibited was the possibility of using them as a political instrument to bludgeon weaker countries into line. However, for Trump, a man who has already threatened to unleash on North Korea "fire and fury like the world has never seen," such an approach is proving far too restrictive. He and his advisers, it seems, want nukes that can be employed at any potential level of great-power conflict or brandished as the apocalyptic equivalent of a giant club to intimidate lesser rivals.

Making the US arsenal more usable requires two kinds of changes in nuclear policy: altering existing doctrine to eliminate conceptional restraints on how such weapons may be deployed in wartime and authorizing the development and production of new generations of nuclear munitions capable, among other things, of tactical battlefield strikes.

Making the US arsenal more usable requires two kinds of changes in nuclear policy: altering existing doctrine to eliminate conceptional restraints on how such weapons may be deployed in wartime and authorizing the development and production of new generations of nuclear munitions capable, among other things, of tactical battlefield strikes. All of this is expected to be incorporated into the administration's first NPR, to be released by the end of 2017 or early in 2018.

Its exact contents won't be known until then — and even then, the American public will only gain access to the most limited version of a largely classified document. Still, some of the NPR's features are already obvious from comments made by the president and his top generals. And one thing is clear: restraints on the use of such weaponry in the face of a possible weapon of mass destruction of any sort, no matter its level of destructiveness, will be eliminated and the planet's most powerful nuclear arsenal will be made ever more so.

The strategic guidance provided by the administration's new NPR is likely to have far-reaching consequences. As John Wolfsthal, former NSC director for arms control and non-proliferation, put it in a recent issue of *Arms Control Today*, the document will affect "how the US, its president, and its nuclear capabilities are seen by allies and adversaries alike.

Altering the Nuclear Mindset: The strategic guidance provided by the administration's new NPR is likely to have far-reaching consequences. As John Wolfsthal, former NSC director for arms control and non-proliferation, put it in a recent issue of *Arms Control Today*, the document will affect "how the US, its president, and its nuclear capabilities are seen by allies and adversaries alike. More importantly, the review establishes a guide for decisions that underpin the

management, maintenance, and modernization of the nuclear arsenal and influences how Congress views and funds the nuclear forces."

With this in mind, consider the guidance provided by that Obama-era nuclear posture review. Released at a moment when the White House was eager to restore America's global prestige in the wake of George W. Bush's widely condemned invasion of Iraq and just six months after the president had won the Nobel Prize for his stated determination to abolish such weaponry, it made nonproliferation the top priority. In the process, it downplayed the utility of nuclear weapons under just about any circumstances on just about any imaginable battlefield. Its principal objective, it claimed, was to reduce "the role of US nuclear weapons in US national security."

As the document pointed out, it had once been American policy to contemplate using nuclear weapons against Soviet tank formations, for example, in a major European conflict (a situation in which the USSR was believed to possess an advantage in conventional, non-nuclear forces). By 2010, of course, those days were long gone, as was the Soviet Union. Washington, as the NPR noted, now possessed an overwhelming advantage in conventional weaponry as well. "Accordingly," it concluded, "the US will continue to strengthen conventional capabilities and reduce the role of nuclear weapons in deterring non-nuclear attacks."

A nuclear strategy aimed exclusively at deterring a first strike against this country or its allies hardly requires a mammoth stockpile of weaponry. As a result, such an approach opened the way for potential further reductions in the arsenal's size and led in 2010 to the signing of the New Start treaty with the Russians, mandating a sharp reduction in nuclear warheads and delivery systems for both countries. Each side was to be limited to 1,550 warheads and some combination of 700 delivery systems, including ICBMs, SLBMs, and heavy bombers.

Such an approach, however, never sat well with some in the military establishment and conservative think tanks. Critics of that sort have often pointed to supposed shifts in Russian military doctrine that suggest a greater inclination to employ nuclear weapons in a major war with NATO, if it began to go badly for their side. Such "strategic deterrence" (a phrase which has a different meaning for the Russians than for Western strategists) could result in the use of low-yield "tactical" nuclear munitions against enemy strongpoints, if Russia's forces in Europe appeared on the verge of defeat. To what degree this doctrine actually governs Russian military thinking no one actually knows. It is nevertheless cited regularly by those in the West who believe that Obama's nuclear strategy is now dangerously outmoded and invites Moscow to increase its reliance on nuclear weaponry.

Such complaints were typically aired in "Seven Defense Priorities for the New Administration," a December 2016 report by the DSB, a Pentagon-funded advisory group that reports to the secretary of defence. "The DSB remains unconvinced," it concluded, "that downplaying the nation's nuclear deterrent would lead other nations to do the same." It then pointed to the supposed Russian strategy of threatening to use low-yield tactical nuclear strikes to deter a NATO onslaught. While many Western analysts have questioned the authenticity of such claims, the DSB insisted that the US must develop similar weaponry and be on record as prepared to use them. As that report put it, Washington needs "a more flexible nuclear enterprise that could produce, if needed, a rapid, tailored nuclear option for limited use should existing non-nuclear or nuclear options prove insufficient."

This sort of thinking now appears to be animating the Trump administration's approach to nuclear weapons and is reflected in the president's periodic tweets on the subject. Last December 22nd, for example, he tweeted, "The US must greatly strengthen and expand its nuclear capability until such time as the world comes to its senses regarding nukes." Although he didn't elaborate — it was Twitter, after all — his approach clearly reflected both the DSB position and what his advisers were undoubtedly telling him.

Soon after, as the newly-installed commander-in-chief, Trump signed a presidential memorandum instructing the secretary of defense to undertake a nuclear posture review ensuring "that the US nuclear deterrent is modern, robust, flexible, resilient, ready, and appropriately tailored to deter 21st-century threats and reassure our allies."

Of course, we don't yet know the details of the coming Trumpian NPR. It will, however, certainly throw the Obama approach to the sharks and promote a far more robust role for nuclear weapons, as well as the construction of that more "flexible" arsenal, capable of providing the president with multiple attack options, including low-yield strikes.

Enhancing the Arsenal: The Trumpian NPR will certainly promote new nuclear weapons systems that are billed as providing future chief executives with a greater "range" of strike options. In particular, the administration is thought to favor the acquisition of "low-yield tactical nuclear munitions" and yet more delivery systems to go with them, including air- and ground-launched cruise missiles. The argument will predictably be made that munitions of this sort are needed to match Russian advances in the field.

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Under consideration, according to those with inside knowledge, is the development of the sort of tactical munitions that could, say, wipe out a major port or military installation, rather than a whole city, Hiroshima-style. As one anonymous government official put it to *Politico*, "This capability is very warranted." Another added, "The [NPR] has to credibly ask the military what they need to deter enemies" and whether current weapons are "going to be useful in all the scenarios we see."

Keep in mind that, under the Obama administration (for all its talk of nuclear abolition), planning and initial design work for a multi-decade, trillion-dollar-plus "modernization" of America's nuclear arsenal had already been agreed upon. So, in terms of actual weaponry, Trump's version of the nuclear era was already well underway before he entered the Oval Office. And of course, the US already possesses several types of nuclear weapons, including the B61 "gravity bomb" and the W80 missile warhead that can be modified — the term of trade is "dialed down" — to produce a blast as low as a few kts (less powerful, that is, than the bombs that in August 1945 destroyed Hiroshima and Nagasaki). That, however, is proving anything but enough for the proponents of "tailored" nuclear munitions.

A typical delivery system for such future nukes likely to receive expedited approval is the LRSO, an advanced, stealthy air-launched cruise missile intended to be carried by B-2 bombers, their older cousins the B-52s, or the future B-21. As currently envisioned, the LRSO will be capable of carrying either a nuclear or a conventional warhead. In August, the Air Force awarded both Raytheon and Lockheed Martin $900 million for initial design work on prototypes of that delivery system, with one of them likely to be chosen for full-scale development, an undertaking expected to cost many billions of dollars.

Critics of the proposed missile, including former Secretary of Defense William Perry, argue that the US already possesses more than enough nuclear firepower to deter enemy attacks without it. In addition, as he points out, if the LRSO were to be launched with a conventional warhead in the early stages of a conflict, an adversary might assume it was under nuclear attack and retaliate accordingly, igniting an escalatory spiral leading to all-out thermonuclear war. Proponents, however, swear that "older" cruise missiles must be replaced in order to give the president more flexibility with such weaponry, a rationale Trump and his advisers are sure to embrace.

A Nuclear-Ready World: The release of the next nuclear posture review will undoubtedly ignite a debate over whether the country with a nuclear arsenal large enough to destroy several Earth-sized planets actually needs new nukes, which could, among other dangers, spark a future global arms race. In November, the CBO released a report indicating that the likely cost of replacing all three legs of the US nuclear triad over a 30-year period will reach a minimum of $1.2 trillion, not including inflation or the usual cost overruns, which are likely to push that figure to $1.7 trillion or beyond.

The release of the next nuclear posture review will undoubtedly ignite a debate over whether the country with a nuclear arsenal large enough to destroy several Earth-sized planets actually needs new nukes, which could, among other dangers, spark a future global arms race.

Raising questions about the need for all these new weapons and their phenomenal costs couldn't be more important. After all, one thing is guaranteed: any decision to procure such weaponry will, in the long term, mean budget cuts elsewhere, whether in health, education, infrastructure, or fighting the opioid epidemic.

The new missile — the DF-41 — also has a speed of more than Mach 10 and can use decoy devices and chaff to pierce its way through the enemy's missile warning and defence systems.

And yet questions of cost and utility are the lesser parts of the new nuclear conundrum. At its heart is the very idea of "usability." When President Obama insisted that nuclear weapons had no battlefield use, he was speaking not just to this country, but to all nations. "To put an end to Cold War thinking," he declared in Prague in April 2009, "we will reduce the role of nuclear weapons in our national security strategy and urge others to do the same."

If, however, the Trump White House embraces a doctrine that closes the distance between nuclear weapons and ordinary ones, transforming them into more usable instruments of coercion and war, it will also make the likelihood of escalation to all-out thermonuclear extermination more imaginable for the first time in decades. There is little question, for instance, that such a stance would encourage other nuclear-armed nations, including Russia, China, India, Israel, Pakistan, and North Korea, to plan for the early use of such weaponry in future conflicts. It might even encourage countries that don't now have such weaponry to consider producing them.

The world imagined by President Obama in which nukes would be a true weapon of last resort was certainly a more reassuring one. His vision represented a radical break from Cold War thinking in which the possibility of a thermonuclear holocaust between the planet's two superpowers seemed like an ever-present possibility and millions of people responded by engaging in antinuclear protest movements.

Without the daily threat of Armageddon, concern over nukes largely evaporated and those protests came to an end. Unfortunately, the weaponry and the companies that built them didn't. Now, as the seemingly threat-free zone of a post-nuclear era is drawing to a close, the possible use of nuclear weapons — barely conceivable even in the Cold War era — is about to be normalized. Or at least that will be the case if, once again, the citizens of this planet don't take to the streets to protest a future in which cities could lie in smoldering ruins while millions of people die from hunger and radiation sickness.

Source: https://lobelog.com/, 26 November 2017.

NUCLEAR STRATEGY

CHINA

China's Multi Nuclear Warhead ICBM may be Inducted into PLA in Early 2018

China's next-generation multi-nuclear warhead ICBM with a proclaimed ability to hit targets "anywhere in the world" may be inducted into the PLA early in 2018, a media report said on 20 November. The new missile — the DF-41 — also has a speed of more than Mach 10 and can use decoy devices and chaff to pierce its way through the enemy's missile warning and defence systems. The missile which underwent another test — the

eighth since it was first announced in 2012 — could be in the People Liberation Army's line-up as early as the first half of 2018, state-run *Global Times* said.

The missile must have matured considerably if it is to start serving in the PLA, Xu Guangyu, a senior adviser of the China Arms Control and Disarmament Association said. The DF-41 is a three-stage solid-fuel missile with a range of at least 12,000 kms, meaning it could strike anywhere in the world from a mainland site, Xu told *Global Times*, adding that, "it can carry up to 10 nuclear warheads, each of which can target separately." *The South China Morning Post* reported that China had possibly tested the ICBM in its Western desert area in early November, but it did not give the exact location or date of the test.

Another report on the seventh test-firing of the DF-41 came from a US satellite tracking system and appeared in the Washington Free Beacon in April 2016. Song Zhongping, a *Phoenix TV* commentator and former member of the PLA's Second Artillery Corps (Rocket Force), is of the view that the DF-41 is very likely already in service, since tests and other checks Fof missiles can be conducted after deployment as well. Song said that the deployment of the missile certainly demonstrates China's nuclear deterrence abilities.

"Once the DF-41 goes into service, China's ability to protect its own safety and to prevent wars would greatly increase," Xu said. Russian experts feel that the missile deployment aimed at the US as they could reach most of America and Europe. A commentary in *Global Times* at that time said the deployment of the DF-41 was a "strategic deterrence tool" and Beijing would "ready itself for pressures" imposed by the new US government headed by President Trump. PLA Rocket Force showed five models of China's homemade conventional and nuclear missiles. China has a range of missiles which included the DF-26 ballistic missile, the DF-21D land-based anti-ship ballistic missile described as a "carrier killer," and the DF-16G conventional missile designed for precision strikes against key enemy targets.

Source: http://www.firstpost.com/, 20 November 2017.

JAPAN

Japan Held Drills with Nuclear-Capable US B-52 Strategic Bomber in August

The US flew two B-52 strategic bombers capable of carrying nuclear weapons for a rare joint mission with JASDF in the skies near North Korea in August, the US Air Force confirmed on 22 November. "Two US Air Force B-52 Stratofortress' assigned to 2nd Bomb Wing, Barksdale Air Force Base, Louisiana, flew from Barksdale to conduct training with two Koku-Jieitai (Air Self-Defense Force) F-15 fighter jets over the Sea of Japan, Aug. 22, 2017," US Pacific Air Forces spokeswoman Lt. Col. Lori Hodge told *The Japan Times* in an email. The US military said that while it does not maintain log records of past B-52 training operations, the August mission was the first in the 2016.

The timing of the mission would put it as North Korea's ramped-up schedule of missile tests hit a crescendo with two launches over Japan and a sixth nuclear test, which was its most powerful. "The real-time training of these flights enables our bomber force to stay proficient and ready while strengthening integration with other US or coalition forces," Hodge said. "This mission was closely planned with our allies to ensure maximum training and integration opportunities as well as compliance with all national and international requirements and protocols."

Japanese media reports citing anonymous government officials had earlier reported the rare flight, saying that the B-52s had flown from the Pacific Ocean side of Japan over the Tohoku region to link up with F-15 fighters based at the ASDF's Komatsu Airbase in Ishikawa Prefecture. In order to adhere to Japan's three non-nuclear principles of not possessing, producing or allowing the introduction of atomic weapons into the country, the government reportedly confirmed prior to the drill that the B-52s were not armed with nuclear weapons.

...The ASDF has trained regularly with US B-1B bombers in Japanese airspace. The B-1B, originally developed to carry atomic weapons, was converted to its exclusively conventional combat role in the mid-1990s to adhere to NPT, and is no longer nuclear-capable. It can, however, carry the largest payload of both guided and unguided weapons in the US Air Force's inventory.

The SDF and US military have stepped up their joint training amid North Korea's nuclear saber-rattling in recent months, including a massive show of naval force in the waters near North Korea earlier this month that involved three US aircraft carriers.

The SDF and US military have stepped up their joint training amid North Korea's nuclear saber-rattling in recent months, including a massive show of naval force in the waters near North Korea earlier this month that involved three US aircraft carriers.

Source: https://www. japantimes. co.jp/, 23 November 2017.

NORTH KOREA

Images Show North Korea's 'Submarine Ballistic Missile Programme'

North Korea is on "an aggressive schedule to build and deploy its first operational SSBN", according to an analysis of new satellite images by the expert website 38 North. The images represent a powerful reminder that, as well as developing ICBMs launched from land, North Korea has for several years been pursuing a programme to launch a long-range missile from a submarine. It already has a prototype sub and a submersible launching barge, from which it has carried out a number of test firings. But the new images show that significant work is under way at the Sinpo shipyard on North Korea's eastern coast to expand its construction facilities, and there are hints that another missile-carrying submarine may be under construction.

North Korea is on "an aggressive schedule to build and deploy its first operational SSBN", according to an analysis of new satellite images by the expert website 38 North. The images represent a powerful reminder that, as well as developing ICBMs launched from land, North Korea has for several years been pursuing a programme to launch a long-range missile from a submarine.

The imagery shows two large circular objects that could be sections of a submarine's pressure hull. Size estimates suggest the objects could be for a follow on vessel to the existing prototype SINPO-class boat. Satellite images show a continued movement throughout 2017 of parts and components into and out of yards adjacent to the shipyard's large construction halls. Gantry and tower cranes have been regularly moved, all suggesting a "prolonged and active ship-building programme", according to 38 North. Work has also been under way at a missile test stand that is apparently used to replicate the ejection of a missile from a submarine's hull.

... So far, the North Korea has only used a submersible testing barge, and its sea-borne missile programme remains far from operational. But the programme is a measure of Pyongyang's strategic ambitions, and another indication that it is unlikely to give up its nuclear arsenal any time soon.

Source: http://www. bbc.com/, 19 November 2017.

BALLISTIC MISSILE DEFENCE

USA

US Scramble to Assemble Space-Based Missile Defense System

The latest version of the US' fiscal year 2018 appropriations bill designates more funding to a space-based BMD capability, according to a new report. Lawmakers envision developing a space-based sensor layer to detect incoming ICBMs as well as an interceptor to neutralize threats, C4ISRNet reported November 16. The intercept layer needs to achieve operational capability "at the earliest practicable

date," the bill states.

The US MDA would be tasked with producing "a highly reliable and cost-effective" sensor architecture capable of "precision tracking of threat missiles," "discrimination of warheads" and "effective kill assessments," the appropriations measure states. Actionable steps for the program plan would need to be delivered within 12 months of the bill's enactment. Furthermore, the new missile defense structure must fully integrate with existing BMD layers: Patriot missile defense, the THAAD system, and the sea-based Aegis system.

The congressional conference report for the FY 2018 *National Defense Authorization Act* also directs the Missile Defense Agency to build a space-based ballistic missile intercept layer and a space-based sensor architecture as well as speed up the development and deployment of defense capabilities as prioritized in the review.

Weaponization in space has long been a source of tension in the international community. The international Outer Space Treaty of 1967 sought to create a legal framework around arms control in space. The main arms control provisions prohibit placing weapons of mass destruction in Earth's orbit and installing military assets on the moon or other celestial bodies. The treaty does not, however, explicitly outlaw placing conventional weapons in orbit, such as kinetic interceptors. It's not clear what kind of interceptors the US would add to the space-based missile defense layer.

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The government is currently only funded until December 8 under a continuing resolution — basically a temporary funding measure. If the fiscal appropriations measures aren't signed by December 8, the US government will have to shut down.

Source: https://sputniknews.com/, 17 November 2017.

Congress Backs DoD's Ongoing Ballistic Missile Defense Review

Congress has called on the Defense Department secretary to use the BMD review to assess ways on how to advance the development of technology platforms designed to increase the capability of the ballistic missile defense system's ground-based midcourse element, Defense News reported. Lawmakers made the call through the fiscal 2018 defense spending bill's conference report. DoD is set to release by the end of the year the findings of the review that aims to shed light on the state of the US ballistic missile defense against threats posed by Iran and North Korea.

The congressional conference report for the FY 2018 *National Defense Authorization Act* also directs the Missile Defense Agency to build a space-based ballistic missile intercept layer and a space-based sensor architecture as well as speed up the development and deployment of defense capabilities as prioritized in the review. Those capabilities include the multi-object and redesigned kill vehicles, space-based sensor layer, ground-based interceptors, boost phase sensor and the C3 booster. The BMD review is likely to include plans related to space-based missile defense capability, the report added. The House passed a conferenced version of the NDAA that would authorize $692 billion in defense spending for fiscal 2018.

Source: http://www.executivegov.com/, 17 November 2017.

NUCLEAR ENERGY

FRANCE

French Nuclear Output Hits 48 GW as EDF Returns More Reactors

French nuclear output continues to rise reaching 48 GW on Monday (27 Nov), up over 5 GW from last Monday (20 Nov), as EDF returned three more

reactors over the weekend ahead of a cold spell set to lift demand above 80 GW for the first time this winter, data from the grid and plant operators show.

The 1.3 GW Nogent-1, 0.9 GW St-Laurent-2 and 0.9 GW Cruas-1 were all restarted and are ramping up, according to EDF data.

However, EDF's 1.5 GW Chooz 2, 0.9 GW Chinon-3 and 0.9 GW Bugey-3 were delayed by a combined seven days, now all set for a provisional restart Wednesday (29 Nov) 23:00 local time, EDF said in short notes on its transparency website.

NOGENT-1 Ahead of Schedule: EDF has now returned the first five reactors in the regulator-requested review of documents relating to nuclear parts manufactured by the Le Creusot forge. The cumulative delays for the planned return of the first 12 reactors in this review – ignoring other operational maintenance issues – already amount to over 200 days so far, Platts calculations show.

Nogent-1, which actually returned Sunday (26 Nov) four days ahead of its originally planned return is the first not facing any delays. None of the findings so far have called into question the safe operation of the reactors, EDF said that it has clearance for another four reactors. EDF has cut its 2017 annual production target twice since September, mainly attributed to the temporary shutdown of the Tricastin NPP, with the lower range of its current target at 383 TWh.

Source: https://www.platts.com, 27 Nov 2017.

INDIA

India Inc's Nuclear Energy Dreams Get a Fillip

After almost a decade of lull, there's renewed enthusiasm and hype among the Indian corporate sector owing to the huge capacity additions in nuclear energy. Global nuclear specialists such as the Russian nuclear major Rosatom, France's EDF and India's sole commercial nuclear company, the public sector NPCIL, have started negotiations to rope in joint venture partners and vendors for the huge capacity addition, say sources.

Besides, the government would soon resolve issues related to progress of the 9,900-MW Jaitapur nuclear power plant, the largest nuclear power park to come up in coastal Maharashtra. ... In May, the Union Cabinet had approved fast-tracking India's domestic nuclear power programme by giving approval for construction of 10 units of India's indigenous PHWR with a total installed capacity of 7,000 MW. These Indian made reactors are likely to translate to manufacturing orders of close to Rs 70,000 crore and generate more than 33,400 jobs in direct and indirect employment. India has a current installed nuclear power capacity of 6,780 MW from 22 operational plants. Another 6,700 MWs of nuclear power is expected to come on-stream by 2021-22 through projects currently under construction. India's plan is to have 63,000 MW of nuclear capacity by 2032.

In May, the Union Cabinet had approved fast-tracking India's domestic nuclear power programme by giving approval for construction of 10 units of India's indigenous PHWR with a total installed capacity of 7,000 MW. These Indian made reactors are likely to translate to manufacturing orders of close to Rs 70,000 crore and generate more than 33,400 jobs in direct and indirect employment.

Sources say that the 10 PHWRs of 700-MW each are likely to come up at Chutka in Madhya Pradesh (2), Mahi Banswara in Rajasthan (4), Gorakhpur in UP (2) and Kaiga in Karnataka (2). These PHWRs are estimated to cost around Rs 1,05,000 crore. Construction at Chutka, the first of these ten, is expected to start within two years.

"Now fuel availability is not an issue for our capacity addition plans". Between 2005 and 2012, many Indian corporates like L&T, Reliance Power and Godrej had invested in creating manpower and infrastructure capacities eyeing the nuclear opportunity. Then the Indian government was planning to have four to five large nuclear parks in coastal areas. Since Japan's Fukushima nuclear

tragedy in 2011, which was followed by an earthquake and tsunami, the country has been witnessing stiff opposition against nuclear power plants. Local resistance against land acquisition, like at Jaitapur, was also delaying projects. Meanwhile, Areva, entrusted with setting up the Jaitapur plant, got into near bankruptcy, and the French energy major EDF took over the reactor unit. Following that, EDF was forced to make a fresh proposal to NPCIL 2016; negotiations are still going on.

"We hope to resolve the liability and cost issues soon. It is natural to have such issues for any project of this gigantic size," said Alexandre Zielgler, Ambassador of France to India, at the nuclear conference. EDF is to build six reactors, each with a capacity of 1,650 MW, using EPR technology, which is yet to be commissioned anywhere in the world. NPCIL and EDF are expected to sign the GFA by the end of the year, say sources.

Following the Indo-US nuclear deal in 2008, the US-based Westinghouse was supposed to get a $20 billion contract for six Westinghouse Electric AP-1000 nuclear reactors to be built in Andhra Pradesh. However, Westinghouse, a unit of Japan's Toshiba Corp, filed for bankruptcy in March. Now the Indian government is re-negotiating the deal with Westinghouse as it will remain as a design and consultant partner. Plans are to entrust manufacturing to Indian companies, which will be a huge business opportunity for them.

Apart from this, the Kudankulam nuclear power plant in Tamil Nadu, with two 1,000-MW units commissioned, is likely to see one 1,000-MW nuclear power unit each getting commissioned every year between 2023 and 2026. In the first week of November, NPCIL opened bids for the EPC order for the third and fourth units and Reliance Infra was the lowest bidder for the Rs 1,000-crore order, beating L&T and Tata Projects.

Nikita Mazien, Vice President of Rosatom, says his company is open for joint ventures with Indian partners and the JVs can look at projects in surrounding countries as well. Kaustubh Shukla, COO, Industrial Products division of Godrej & Boyce, urges the industry to tread with caution. "It is true that many of us have invested a lot in nuclear, and were waiting for many years, but we need to be cautious while bidding," he says.

Source: http://www.businesstoday.in/, 14 November 2017.

JAPAN

Japan Approves Restart of Two Nuclear Reactors at Ohi Power Plant Near Kyoto

A local Japanese governor approved the restart of two nuclear reactors near Kyoto, officials said on 27 November, clearing the final regulatory hurdle for the revival of the power plants early next year. Fukui Province governor Issei Nishikawa gave the green light to operator Kansai Electric, which plans to restart reactors three and four of the Ohi nuclear plant. The decision comes in spite of long-running opposition to atomic activity in the country. ...

The Ohi plant, located on the Sea of Japan coast, is about 60 kilometers north of Kyoto, the former Imperial capital of Japan. Its reactors three and four were taken offline in 2011, and briefly restarted in 2012, but have not been used in years. For a while they were the only nuclear reactors operating in the country.

... Residents in the local prefectures of Kyoto and Shiga have repeatedly expressed opposition to the restart of the reactors. Shiga province governor Taizo Mikazuki raised objections to the reboot of the reactors, Japanese media reported on 26 November, citing concerns about contingency plans. ...

Source: http://www.dw.com, 27 November 2017.

RUSSIA

Nuclear Energy for the Arctic: Solutions from Russian Engineers

Nuclear technologies may offer solutions for the energy problems the Arctic compounds are facing. Rosatom's design bureaus have been working on technical options. They suggest using a line of small NPP to satisfy the energy deficit in the

northern regions' isolated energy systems - in the Far East's Chukotka, Magadan region and in Yakutia. TASS correspondents discussed future of those projects with regional and federal experts.

Engineers suggest building in the north small NPPs of super-low capacity of up to nine megawatts. The designers told TASS they offer power plants of various forms - from fixed, to floating or even underwater - depending on where they would be installed.

Energy for the Russian North: Engineers suggest building in the north small NPPs of super-low capacity of up to nine megawatts. The designers told TASS they offer power plants of various forms - from fixed, to floating or even underwater - depending on where they would be installed. "The small-and medium-capacity nuclear energy blocks may be good for remote regions - at natural resources' fields, or at sites of big industrial or infrastructural construction," the designers told TASS. "Producing energy for small compounds is also possible, though here it is worth considering the economic component and the final cost of produced energy."

The Main Advantage of this Variant is Mobility: "Once you finish developing a region, this plant may be relocated to another venue. The payback is good, the service terms are long. The less often you reload the block, the longer and better it is working," the experts said. Mini-NPPs are a good solution for isolated energy systems in the northern areas of the Far East - Chukotka, the Magadan region, northern Yakutia, experts said. "In the North, most electric energy is generated at diesel and coal plants, which use the expensive fuel, brought in from the mainland," Sergei Kondratyev of the Institute of Energy and Finance said.

Based on prices on such systems in the US, the cost of having one mini-NPP in Yakutia could be worth 14.3 billion rubles ($242 million). If a system of the kind is installed in a settlement of Yakutia's Tiksi, where about 5,000 live, the expenses would be 2.8-2.9 million rubles per capita

Solving Old Problems: Nowadays, energy systems of the remote districts in the Far East's north depend fully on deliveries during the summer navigation of diesel, oil products and coal for electric energy plants and heating stations. For example, in Yakutia, because of the Lena River's shallow riverbed, a part of the fuel was delivered not only along the Arctic rivers, but also along the Northern Sea Route and by railroads. In Yakutia only, the local energy company, Yakutskenergo, and its branches had to bring in 73.3 thousand tonnes of light oil products, 85.5 thousand tonnes of coal and 4.5 thousand tonnes of raw oil. From the reloading bases to the final destinations, they transported along the Arctic rivers 10.5 thousand tonnes of diesel, 22.6 thousand tonnes of coal and 3.8 thousand tonnes of raw oil.

Yakutia's legislator Viktor Fedorov says small NPPs could cut dependence of the remote regions' energy sector on bringing in the fuel. "Small NPPs are optimal for the republic's northern districts. Just bring in an NPP for the term of five years, and be relaxed. Our main expenses in the energy are the transportation costs. This could be a most effective solution," he said.

A Matter of Price: Nuclear energy is a money-consuming sector, Professor of the North-Eastern Federal University Tuyara Gavrilyeva says. According to her calculations, based on prices on such systems in the US, the cost of having one mini-NPP in Yakutia could be worth 14.3 billion rubles ($242 million). If a system of the kind is installed in a settlement of Yakutia's Tiksi, where about 5,000 live, the expenses would be 2.8-2.9 million rubles per capita ($47-49 thousand), the expert said. "In other Arctic settlements, where the density is even lower, the expenses per capita would be even higher," *she said.*

Yakutia's authorities recognize long-term benefits from using NPPs in the northern districts. The republic's minister of housing and energy

Danil Savvinov could not specify to TASS when this project could be implemented. The local authorities are still looking into it, he said. "Until we have the project's studies, it is too early to speak about dates or profitability," the minister said. Designers explain the big investments in the beginning would payback with organization of an effective energy system. "It [nuclear energy - TASS] pays back and is ahead of competitors in a few years of working. If we calculate the entire life cycle, these systems will prove to be more economically effective," engineers said.

As the mini NPPs are produced in series, their cost will reduce greatly, Sergei Kondratyev said. "As markets for these NPPs we should consider not only the Russian Extreme North, but also countries in Asia and Africa, which have a demand for reliable energy supplies," he said.

Keeping the Arctic's Fragile Environmental System: The designers say use of nuclear power plants is optimal for the Arctic's fragile environmental system. "This is why a source of energy should be exclusively secure, which the nuclear industry is offering," they said. Experts agree with the engineers that mini NPPs do not cause high ecology risks for the Arctic environment. Unlike in burning coal, natural gas or oil products, the nuclear energy does not cause emissions of greenhouse gases, Gavrilyeva said. The reactors "produce heat energy, the blocks do not require much water for cooling, and expenses for the NPPs' construction and further service are minimal," she added.

Experts agree with the engineers that mini NPPs do not cause high ecology risks for the Arctic environment. Unlike in burning coal, natural gas or oil products, the nuclear energy does not cause emissions of greenhouse gases.

Human Resources for Nuclear Power Plants: The nuclear energy is a technologically complicated sector, and it requires sufficient personnel to service nuclear power plants. This explains the failure of a similar project to install the Toshiba 4S small reactor for energy supplies to Galena in Alaska (the US), where 500 people live, the expert continued.

"The calculations have proved diesel generation is more profitable. The reactor's small capacity (of ten MWs) does not mean it possible to cut the required personnel of about a hundred people," she said.

It would be necessary to invite specialists from other regions to work at first NPPs of the kind, Sergei Kondratyev said. According to the expert, further on, training of specialists for this project would be available at a Far Eastern university. ..

Source: http://tass.com/, 20 November 2017.

URANIUM PRODUCTION

GENERAL

Uranium Production Cuts 'Very Positive' for Market

Cameco Corp intends to halt uranium production at its McArthur River and Key Lake operations for 10 months beginning in February 2018, Chang reported in a Nov. 8 research note. He indicated this "major production cut" will drop total estimated 2018 uranium production by about 9%, which equals about 13.7 Mlb. As for the overall effect this could have on the market, Chang concluded, "We expect strength in uranium prices and equities on the back of this news. This is the type of supply shock that will spur strength in the spot U3O8 price as a significant amount of expected production for 2018 is removed."

The analyst qualified those statements, however, noting the change may be slow to take effect for three primary reasons:

1. The market is "less efficient" due to the limited number of existing, qualified uranium purchasers, Chang wrote.

2. Utilities are not under pressure to buy uranium soon, the analyst noted. They have "shored up what were once large shortages through spot purchases or short contracts," leaving an estimated under 10% of total uranium demand for 2018 and 2019 "uncovered."

3. Current inventory levels could "dampen" the expected price movement, said Chang. "We estimate that there are 800–1,200 Mlb of total above-ground inventory of which about 700–800 Mlb are held by utilities." However, not all of that supply is available for purchase, as significant portions are held for strategic purposes and necessary utility needs."

Source: https://www.streetwisereports.com/, 13 November 2017.

NUCLEAR COOPERATION

INDIA–FRANCE

Civil Nuclear Cooperation 'Important Pillar' of India-France Engagement: Sushma Swaraj

External Affairs Minister Sushma Swaraj said that civil nuclear cooperation was an "important pillar" of India's engagement with France and the two countries have discussed "concrete ways" to expeditiously implement the 9,900 MW JNPP. Addressing a joint press event with her French counterpart Jean-Yves Le Drian, Swaraj said that apart from atomic energy, cooperation in defence and space constitute the principal pillars of the bilateral strategic partnership. For India, France was one of the first countries to have a high degree of cooperation in the strategic area.

French firm EDF will build the six reactors of the long- pending JNPP, with the NPCIL as its operator. Swaraj also said that France has provided a "consistent support" to India's candidature for the membership of multilateral export control regimes, including the NSG, the Wassennar Arrangement, and the Australia Group.

It was also the first country to have signed the civil nuclear cooperation agreement in 2008 - even before the US – after the NSG gave a unique waiver to India despite New Delhi not being a signatory to the NPT. "The civil nuclear cooperation is an important pillar of our bilateral engagement. Both sides discussed concrete ways to expeditiously implement the Jaitapur project," Swaraj said. As part of the nuclear cooperation agreement India and France signed in 2008, Paris is to help New Delhi build six atomic power reactors of 1,650 MW each at Jaitapur, some 500 kms south of Mumbai. French firm EDF will build the six reactors of the long- pending JNPP, with the NPCIL as its operator. Swaraj also said that France has provided a "consistent support" to India's candidature for the membership of multilateral export control regimes, including the NSG, the Wassennar Arrangement, and the Australia Group. "France's support was vital in India's accession to the The MTCR in June 2016," Swaraj noted. ...

Source: https://economictimes.indiatimes.com/, 17 November 2017.

IRAN–EU

Iran Keen to Boost Nuclear Cooperation with EU

Iran is determined to gradually enhance international cooperation with the EU in the nuclear industry according to the JCPOA, the nuclear agreement between Tehran and the Group 5+1, Behrouz Kamalvandi said in the central city of Isfahan on 21 November. He made the comments during a new round of negotiations between Iran and the EU to boost cooperation in the field of peaceful nuclear technology. The talks, focusing on "nuclear cooperation, achievements and prospects", began in Tehran on 20 November and is proceeding in Isfahan.

Elsewhere in his comments, Kamalvandi stressed the need for the international community to protect the JCPOA, saying that Iran will keep honoring the deal as long as the other parties comply with the obligations in the text and spirit of the nuclear accord. In October, delegations from Iran and the EU held a 2-day round of talks in Brussels on a second joint project to grow bilateral nuclear safety cooperation. The two sides had launched their first cooperation project of 2.5 million euro in the field of nuclear safety in July.

The first project had been signed back in April within the framework of the JCPOA. The interaction is part of a five-million-euro package

approved in 2016 with regard to Iran-EU cooperation on nuclear safety, according to which the EU helps the implementation of Annex III of the JCPOA.

Source: https://www.tasnimnews.com/, 21 November 2017.

RUSSIA–PHILIPPINES

Russia and Philippines Agree to Nuclear Cooperation

Russia is to assist the Philippines in developing national policies for the development of nuclear energy through a MoC signed on 13 November. The cooperation will include feasibility studies on the construction of SMRs. The cooperation agreement was signed between the DoE of the Philippines and Russian state nuclear corporation Rosatom in Manila on the sidelines of the *12th East Asia Summit*. It was signed by Philippine Energy Secretary Alfonso Cusi and Rosatom Deputy Director General Nikolay Spassky. The exchange of the signed documents was witnessed by Philippine President Rodrigo Duterte and Russian PM Dmitry Medvedev.

Through the MoC, Russia and the Philippines will cooperate in several areas, including carrying out nuclear infrastructure studies towards national energy policy development and nuclear energy programme implementation in the Philippines. The two parties will also conduct an audit and assessment of the technical condition of the mothballed Bataan NPP.

Through the MoC, Russia and the Philippines will cooperate in several areas, including carrying out nuclear infrastructure studies towards national energy policy development and nuclear energy programme implementation in the Philippines. The two parties will also conduct an audit and assessment of the technical condition of the mothballed Bataan NPP, "including the option of its rehabilitation". The first 620 MWe unit of the plant was completed in 1984 but was never fuelled or operated.

Russia will also assist the Philippines in carrying out feasibility studies on the construction of SMRs, either onshore or offshore. The Philippines DoE said these studies will "not be limited to analysis of technical, commercial, financial and legal aspects". Feasibility studies on the construction of conventional nuclear power plants may also be carried out, "as may be deemed necessary and consistent with national energy development plans and policies of the Philippines". The cooperation will be implemented in the form of joint working groups that will undertake specific projects and tasks; the exchange of experts; workshops; training and education of personnel; and sharing of technical information. The MoC will run for five years, but can be extended for a further five years. ...

In June, during the *IX AtomExpo International Forum* in Moscow, Rosatom subsidiary Rusatom International Network signed a memorandum of understanding with Philippine firm A Brown Company Inc. The parties plan to develop economic, scientific and technical cooperation in the field of the peaceful uses of atomic energy, as well as jointly explore applications of radiation technologies in industry, medicine and agriculture. They also plan to hold a series of events to raise public awareness about nuclear technologies and their application in the Philippines.

Source: http://www.world-nuclear-news.org/, 15 November 2017.

NUCLEAR PROLIFERATION

GENERAL

Exporting Power Reactors: No Way to Fight Proliferation

In an August 2017 report, former Energy Secretary Ernest Moniz argues for federal subsidies to prop up the US nuclear power industry on the novel grounds that the industry is vital to our national security. One of his principal conclusions is that to have an effective nonproliferation policy we need to be selling lots of reactors internationally. The conclusion is dead wrong but, unfortunately,

it's also influential. The current energy secretary, Rick Perry, picked up the argument. In October 12 testimony, he told Congress that "we have to support this industry," because, among other things, it is important to the success of our nonproliferation policy.

The trouble is that power programs based on the most common type of nuclear power plant, the light water reactor, give a country a large leg up on creating a nuclear weapons option if that is what it wants. As a result, more nuclear reactors in more countries increase proliferation risks.

What kind of reactor exports might this entail? The Energy Department's acting assistant secretary for nuclear energy, Edward McGinnis, told an IAEA conference in Abu Dhabi on November 1 that the US wants "to spur exports of nuclear energy plants and equipment, including to the conference's host nation UAE *and Saudi Arabia*." That, after all, is where the export opportunities are—in the Middle East, Asia, and Africa, among countries taking their first steps into nuclear energy. Most don't have the required financial resources and would need massive loans. Some, like Saudi Arabia, or perhaps Turkey, appear to have more on their mind than electricity generation.

The trouble is that power programs based on the most common type of nuclear power plant, the light water reactor, give a country a large leg up on creating a nuclear weapons option if that is what it wants. As a result, more nuclear reactors in more countries increase proliferation risks. Whatever the advantages of this technology, non-proliferation is not one of them. Unfortunately, the IAEA, the putative non-proliferation watchdog at whose conference McGinnis announced the intent to ramp up US nuclear exports, is eager to see an expanding commitment to nuclear energy. The IAEA performs a vital service by conducting international inspections, but judging from the director general's speeches, its heart is in promoting nuclear power, especially in developing countries. From a non-proliferation point of view, that is unhelpful.

The IAEA has for years presented overblown nuclear power growth estimates. These, in turn, have been used by US nuclear export promoters in and outside the Energy and State departments to paint a picture of vast nuclear export opportunities for US industry. Rather than producing tighter export controls, as Moniz suggests, they became arguments for loosening the export rules, so US vendors can compete more easily with foreign ones. Exaggerated estimates of future nuclear capacity also feed the notion that worldwide growth of nuclear power is inevitable, and that, realistically, non-proliferation policy can only moderate the further spread of nuclear weapons at the margin. But if this was ever true, it is no longer so. There is nothing inevitable about the pace of nuclear expansion. World energy economics is in flux. A number of advanced European countries have rejected nuclear power. Japan's program has been sharply curtailed in the wake of the Fukushima accident. Both Taiwan and South Korea have pledged to phase out their nuclear programs. And, after the cost of new US construction has soared out of sight, there are not going to be any large nuclear plants ordered in the US. It looks as if nuclear power's best days have come and gone.

But non-proliferation policy does not have to be limited to fighting a rear-guard action to slow down the spread of nuclear weapons. Instead of relying on tenuous arguments to spread problematic nuclear plants, say in the Middle East, we should be guiding these countries to modern, non-nuclear energy solutions.

Regrettably, almost all academics and nongovernmental organizations in the field still buy into the "inevitable" thesis, and accept the Atoms-for-Peace mantra that has guided US policy on nuclear power expansion for decades. But non-proliferation policy does not have to be limited to fighting a rear-guard action to slow down the spread of nuclear weapons. Instead of relying on tenuous arguments to spread problematic nuclear plants, say in the Middle East, we should be guiding these countries to modern, non-nuclear

energy solutions. The notion of nuclear energy as the preferred form and the gateway to national development, as enshrined in the NPT and supported by the IAEA, is an archaism.

As for the seriousness of the current national security arguments to prop up nuclear industry, it is telling that the proponents don't suggest that the subsidies to protect national security should come from the defense sector. Not much in the way of American manufacture can come of the arguments on increasing our exports of nuclear power plants as there are effectively no longer any American nuclear reactor exporters. Westinghouse, now bankrupt, is owned by Toshiba. GE's nuclear export business is in partnership with Hitachi, which has the controlling share. But our government's, and specifically our Energy Department's, continued proselytizing in favor of a worldwide commitment to nuclear power not only does not contribute to the success our non-proliferation policy, it undermines it.

Source: https://thebulletin.org/, 16 November 2017.

NORTH KOREA

Dialogue Seen as Crucial to Defusing North Korea Nuclear Crisis

As US President Donald J. Trump grapples with the North Korean nuclear crisis, two former US officials have some words of advice: attempt dialogue before pre-emptive military strikes, and broaden the scope of that discussion to include the security needs of the region, including North Korea's. Ernest Moniz, who served as energy secretary in Obama's administration, said heaping sanctions on North Korea alone cannot produce results and that this approach will only "spin wheels."

R. Nicholas Burns, who served as undersecretary of state for political affairs in George W. Bush's administration, said exhausting the diplomatic option before considering the military one is the "wisdom" gleaned from the first nuclear age. "Kim Jong-un is not a more deadly rival of the US than Stalin was or Khrushchev was in the 50s and 60s," he said.

Trump's "appalling lack of attention to diplomacy," his weakening of the US Department of State, and disparagement of US Secretary of State Rex Tillerson's support for negotiations to resolve the North Korea crisis is "irresponsible for the American leader to think that only military force applies," Burns said.

... North Korea dominated the agenda of Trump's visit to Asia early in November. The trip included stops in South Korea, Japan, and China—three nations that are increasingly anxious about North Korea's succession of nuclear and ICBM tests. Moniz, who was a key member of the US team that negotiated the nuclear deal with Iran in 2015, said: "In the Iranian case, a focus exclusively on the nuclear issue was the right choice...in North Korea, the nearly exclusive focus on North Korean nuclear weapons is the wrong choice to make."

North Korea dominated the agenda of Trump's visit to Asia early in November. The trip included stops in South Korea, Japan, and China—three nations that are increasingly anxious about North Korea's succession of nuclear and ICBM tests.

Noting that North Korea, unlike Iran, has nuclear weapons, Moniz suggested that there is a need to enlarge the discussion to include the overall security requirements not just of the US, but of North Korea and its neighbours as well. "This is a classic case where you have to enlarge the problem in order to have any chance of a solution," he said. "The solution includes the ultimate denuclearization of the Korean Peninsula, but we can't be Pollyannaish and expect anything of that type to happen anytime soon."

China, the main supporter of North Korean leader Kim Jong-un's regime, is particularly concerned about instability on the Korean Peninsula that could send refugees streaming north. The South Korean government, meanwhile, is worried about Trump conducting a military strike without consulting Seoul.

Moniz, a member of the Atlantic Council's International Advisory Board, said that while Japan and South Korea are important, discussions on resolving the crisis should start with China. These discussions should cover the question of reunification of the Korean Peninsula, the US' military posture in Asia, joint military exercises, and missile defense, he said. While acknowledging that this agenda would produce "inconvenient discussions," Moniz said: "Until we start to honestly face those and at least start with a general framework to be able to approach North Korea for initial discussions, I don't see how this does anything except spin wheels."

Importance of Allies: Burns, who is an Atlantic Council board member, said it is important for the Trump administration to be "stable, strong, and reassuring" toward Japan and South Korea—both US allies. "We don't want a dynamic where either South Korea or Japan at some point in the future could think that their security could be best assured by becoming nuclear weapons powers themselves," he said. In the midst of the nuclear crisis with North Korea, Trump looked into the possibility of withdrawing from a trade deal with South Korea, a development that caused some unease in Seoul.

Defense experts do say we are in a second nuclear age defined by an unstable, multipolar nuclear order in contrast to the clearer calculations driven by the US and Russia that ordered the Cold War years.

Burns said Trump should embrace South Korea's leadership, but acknowledged that the president had done well to push China to take a tougher stand on North Korea—a shift marked by Beijing's support for sanctions. In a discussion with Manish Tewari, a distinguished senior fellow in the Atlantic Council's South Asia Center, Burns described North Korea as a "nuclear brigand."

US Role in a Second Nuclear Age: Analysts describe the post-Cold War nuclear buildup in the Indo-Pacific region as the dawn of the second nuclear age. Frederick Kempe, president and chief executive officer of the Atlantic Council, noted that this period is marked by "great powers establishing patterns of provocations and demonstrating a willingness to violate international treaties and agreements; rogue nations with a penchant for proliferation are not just turning to nuclear but also chemical, biological, cyber."

"Defense experts do say we are in a second nuclear age defined by an unstable, multipolar nuclear order in contrast to the clearer calculations driven by the US and Russia that ordered the Cold War years," he added. Outlining a key challenge of the second nuclear age, Burns cited Russian President Putin's aggression in Russia's neighborhood and his strategy of seeking strategic depth south and west of its borders.

"I don't believe it elevates the probability of a nuclear conflict in Europe, but it reintroduces the competition," he said. In Middle East, Burns listed the sharpening rivalries between Saudi Arabia and Iran as a negative strategic development. This is why, Burns contended, US leadership in the second nuclear age akin to that in the first nuclear age will be vital in reassuring its allies. In the first nuclear age, "it was the solidity of the American commitment" to its allies in Europe and Asia that minimized nuclear proliferation, he said.

He worried that in the second nuclear age the issue of the safety and security of nuclear weapons has not been a high enough priority for Trump's administration. Obama, in comparison, led by example and started the NSS, he pointed out. "I don't see at the dawn of the second nuclear age the same commitment yet from our government that we saw from every American government—Truman through Obama; Republican and Democrat," Burns said. "The big issue here is...is the US going to think of itself as a purposeful world leader?" he added.

The Iran Nuclear Deal: Though Trump has been critical of the nuclear deal with Iran, Moniz said the agreement achieved a "substantial rollback" of Iran's nuclear activities. Noting criticism of the deal's sunset clauses—that restrictions imposed

on Iran would be lifted in ten to fifteen years—Moniz said the verification and transparency measures are, in fact, the agreement's biggest achievement. They do not lapse, and are ultimately the key for the agreement.

Trump decided in October not to certify Iran's compliance with the terms of the agreement, kicking the issue over to the US Congress to decide on whether to reimpose sanctions on the Islamic Republic. Both Moniz and Burns said it would be a "disaster" for the US to walk away from the deal while Iran is in compliance. The other signatories to the deal—the United Kingdom, France, Germany, Russia, and China—have affirmed their continuing commitment to the deal.

"There is every indication that Congress has heard loud and clear the statement of our European allies, in particular, about the importance of staying in the deal, and they will not create space in their actions between us and the Europeans," said Moniz. Burns, who was the lead negotiator on Iran's nuclear program in second term of Bush's presidency, said it would be a "major strategic mistake" for the US to walk away from the deal because "the British, French, Germans, Chinese, and Russians will not walk away with us."

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Pakistan: The 'Weak Link': Burns, who also played a key role negotiating the US-India civil nuclear agreement in the Bush administration, said he worries about the prospect of an "accident or a miscalculation in the heat of an India-Pakistan crisis that could escalate to the use of nuclear weapons." The Bush administration refused to strike a similar nuclear deal with India's western neighbor, Pakistan, citing the country's record of nuclear proliferation. Burns said he still stood by that decision while calling Pakistan the "weak link" in nuclear security in South Asia.

Source: http://www.atlanticcouncil.org/, 22 November 2017.

NUCEAR SECURITY

GENERAL

Experts Share Ideas to Strengthen Physical Protection of Nuclear Material at IAEA Conference

In the second week, some 700 participants shared ideas, experiences and best practices to further enhance the physical protection of nuclear material and facilities against theft or sabotage. The IAEA plans to reflect the ideas in future guidance, IAEA Director General Yukiya Amano said at the closing of the conference in Vienna. "Physical protection of nuclear material and nuclear facilities is a key element of national nuclear security regimes," Mr Amano said. "All countries, and organizations such as the IAEA, must work together to ensure that physical protection is sufficient to meet evolving threats."

The IAEA is the global platform through which countries cooperate to minimize the risk of nuclear and other radioactive material being used in a malicious way, Mr Amano said, adding that the International Conference on the Physical Protection of Nuclear Material and Nuclear Facilities was an excellent example of this cooperation. "I am grateful to all of you for being part of this effort to strengthen nuclear security."

Mr Amano highlighted the support Member States can obtain from the IAEA under the *IAEA Nuclear* Security Plan 2018-2021, adopted by the Board of Governors in September. This includes comprehensive guidance on nuclear security, physical protection upgrade assistance, peer review and advisory missions, and training and education on nuclear security to its Member States. Participants also discussed the status of the CPPNM and its Amendment, which entered into force 2016, and which expands the original Convention, adopted in 1979, to cover the

protection of nuclear facilities and nuclear material in domestic use, storage and transport. Of the 155 signatories of the CPPNM, 115 have so far adhered to the Amendment. "I encourage all countries that have not yet done so to adhere to it," Mr Amano said.

Besides the lectures and discussions, on the sidelines of the conference several institutions presented innovative equipment including safety masks and radiation detection devices. The conference also featured digital interactive content presentations which allowed participants to learn about different nuclear security areas using touch-screen displays. A 3D virtual reality tool offered participants an opportunity to jump into the shoes of a fictitious criminal and allowed them to simulate an attempt to break into a nuclear power plant.

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"The idea of this tool is to train people about the interaction between physical and cyber security," said Scott Godwin, general manager of the National Security Directorate at the Pacific Northwest National Laboratory, where the new Immersive Training Platform was developed. "It allows you to go through the different security barriers, both physical and digital, in a realistic environment, and explore weaknesses that might exist in the security regime. During the experience, we are able to pause the virtual reality training and outline common defensive mechanisms to stop the threat." The Conference was held in cooperation with the INTERPOL, the WNTI and the World Institute for Nuclear Security.

Source: https://www.iaea.org/, 20 November 2017.

NUCLEAR SAFETY

RUSSIA

Russian Nuclear Facility Denies it is Source of High Radioactivity Levels

A secretive Russian nuclear facility has denied it was behind high atmospheric concentrations of the radioactive isotope ruthenium-106, after Russia's meteorological service confirmed levels several hundred times the norm were found in several locations in the country during tests in late September. Greenpeace has called for an investigation into a potential cover-up of a nuclear accident after Russia's nuclear agency had denied European reports of increased ruthenium-106 levels. Rosgidromet, the weather monitoring service, released test data showed levels were indeed much higher than normal. The most potent site was Argayash in the south Urals, where levels were 986 times the norm.

Argayash is about 20 miles from Mayak, a facility that reprocesses spent nuclear fuel. The plant facility issued a denial on 21 November. "The contamination of the atmosphere with ruthenium-106 isotope registered by Rosgidromet is not linked to the activity of Mayak," a statement said. It went on to reassure people that the measurements were well below dangerous levels: "The measurements which Rosgidromet has released suggest that the dose people might have received is 20,000 times less than the allowed annual dose and presents no threat at all to health."

Nuclear experts also said there was no evidence to suggest the leak posed a significant hazard to human health or the environment. A report this month from France's IRSN said ruthenium-106 had been detected in France between 27 September and 13 October.

Nuclear experts also said there was no evidence to suggest the leak posed a significant hazard to human health or the environment. A report this month from France's IRSN said ruthenium-106 had been detected in France between 27 September and 13 October. In mid-October, the state nuclear agency Rosatom issued a statement saying that samples from across Russia during the same period showed no trace of ruthenium-106 after

European agencies had reported levels that were higher than usual.

Where did the Radiation Leak Originate?

Greenpeace Russia called on Rosatom to open "an in-depth inquiry and publish the results about the incidents at Mayak", and the group also said it would ask prosecutors to look into the potential concealment of a nuclear incident. Later on 21 November, Rosatom released a statement saying the scare had been down to a "misreading" of the data. "Rosatom categorically confirms there have been no unreported accidents or reportable events on any of its nuclear sites. It also confirms that the recent Ru-106 emission which is being reported is not linked to any Rosatom site," the nuclear agency said.

In 1957 Mayak was the site of one of the worst nuclear disasters in history, which at the time was covered up by the Soviet regime. This year shipments of spent nuclear submarine fuel that had been left at an Arctic naval base since the Soviet period began to be shipped to Mayak, where it will be reprocessed and repurposed for use in civilian nuclear reactors. Much of the plant's operations remain shrouded in secrecy.

Rosatom said the high readings in Argayash were still lower than those taken elsewhere in Europe, such as in Bucharest, suggesting the emission did not take place on Russian territory. Neil Hyatt, professor of nuclear materials chemistry at the University of Sheffield, said: "This isotope comes from recycling of nuclear fuel or medical isotope targets. It's quite short-lived so that means it must be relatively young fuel. It must have come out of a reactor recently and been reprocessed recently."

... Evgeny Savchenko, the top health and safety official in Chelyabinsk region, where the Mayak facility is located, dismissed health fears as "hysteria" and said the fact that the information came from abroad was suspicious, noting that France also has a nuclear fuel processing site "that competes with our Mayak". Savchenko said there was absolutely no reason for the population to fear health effects. "Note that officials and their families don't have injections against radiation ... so you'd have to be a total fool to hide dangerous information and not take steps to save people," he said.

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Source: https://www. theguardian. com/, 21 November 2017.

USA

How Artificial Intelligence is Making Nuclear Reactors Safe

"Naïve" Neural Networks: Engineers at Purdue University in Lafayette, Indiana are developing a new system for keeping nuclear reactors safe with AI. In the paper published in the IEEE Transactions on Industrial Electronics journal, the researchers introduced a deep learning framework called a naïve Bayes-convolutional neural network that can effectively identify cracks in reactors by analyzing individual video frames. The method could potentially make safety inspections safer.

Trained using a dataset of some 300,000 crack and non-crack patches, Purdue's AI works by viewing video images of the reactors, which are often submerged under water to keep them cool, making them even more difficult to inspect manually. The AI scans each and detects cracks in overlapping "patches" of the video frames. Each crack is tracked from one frame to another using a data fusion algorithm.

"Regular inspection of nuclear power plant components is important to guarantee safe operations," Mohammad Jahanshahi, an assistant professor at Purdue's Lyles School of Civil Engineering, said in a press release. "However, current practice is time-consuming, tedious, and subjective and involves human technicians reviewing inspection videos to identify cracks in reactors." Trained using a dataset of some 300,000 crack and non-crack patches, Purdue's AI

works by viewing video images of the reactors, which are often submerged under water to keep them cool, making them even more difficult to inspect manually. The AI scans each and detects cracks in overlapping "patches" of the video frames. Each crack is tracked from one frame to another using a data fusion algorithm. ...

The "Holy Grail" of Renewable Energy: As the world continues to shift towards more renewable sources of energy, nuclear has presented itself as an option. One reason there's increasing interest in nuclear as an alternative energy source is that it's devoid of the usual limitations of solar and wind, which depend on the right conditions to generate power. The ultimate goal as many see it, however, is to harness the so-called "holy grail" of renewable energy: nuclear fusion.

While researchers have achieved considerable success in stabilizing and sustaining a fusion reaction, it will be some time yet before we can safely rely on it for our daily energy needs. The viable type of nuclear power currently available to us come in the form of nuclear *fission,* which researchers around the world are working to improve. Experts are already making headway using molten-salt nuclear reactors; advanced nuclear reactors that use fluid rather than solids, meaning the salt can function as both the fuel *and* the coolant.

The safety system developed at Purdue could help bolster public support, which would ideally keep the nuclear option for alternative energy open. Since the Chernobyl disaster in 1986, 56 of the 99 major nuclear power accidents have occurred on US soil (a nation where nuclear power accounts for 20 percent of the electricity generated). ...

Keeping nuclear energy safe is, therefore, an important step in guaranteeing a wider adoption of what is, essentially, the most renewable energy source we have at our disposal. As such, nuclear energy would contribute a significant blow to the threat of climate change and global warming.

Source: https://futurism.com/, 23 November 2017.

NUCLEAR WASTE MANAGEMENT

JAPAN

Japan Urged to Dump Radioactive Waste in Pacific Ocean by Nuclear Experts

More than six years after a tsunami overwhelmed the Fukushima nuclear power plant, Japan has yet to reach consensus on what to do with a million tonnes of radioactive water, stored on site in around 900 large and densely packed tanks that could spill should another major earthquake or tsunami strike. The stalemate is rooted in a fundamental conflict between science and human nature. Experts advising the government have urged a gradual release to the nearby Pacific Ocean. Treatment has removed all the radioactive elements except tritium, which they say is safe in small amounts. Conversely, if the tanks break, their contents could slosh out in an uncontrolled way.

Experts advising the government have urged a gradual release to the nearby Pacific Ocean. Treatment has removed all the radioactive elements except tritium, which they say is safe in small amounts. Conversely, if the tanks break, their contents could slosh out in an uncontrolled way.

Local fishermen are baulking. The water, no matter how clean, has a dirty image for consumers, they say. Despite repeated tests showing most types of fish caught off Fukushima are safe to eat, diners remain hesitant. The fishermen fear any release would sound the death knell for their nascent and still fragile recovery. "People would shun Fukushima fish again as soon as the water is released," said Fumio Haga, a drag-net fisherman from Iwaki, a city about 50 kM down the coast from the nuclear plant.

And so the tanks remain. Fall is high season for saury and flounder, among Fukushima's signature fish. It was once a busy time of year when coastal fishermen were out every morning. Then came 11 March 2011. A 9 magnitude offshore earthquake triggered a tsunami that killed more than 18,000 people along Japan's northeast coast. The quake

and massive flooding knocked out power for the cooling systems at the Fukushima nuclear plant. Three of the six reactors had partial meltdowns. Radiation spewed into the air, and highly contaminated water ran into the Pacific.

Today, only about half of the region's 1,000 fishermen go out, and just twice a week because of reduced demand. They participate in a fish testing program. Lab technicians mince fish samples at Onahama port in Iwaki, pack them in a cup for inspection and record details such as who caught the fish and where. Packaged fish sold at supermarkets carry official "safe" stickers. Only three kinds of fish passed the test when the experiment began in mid-2012, 15 months after the tsunami. Over time, that number has increased to about 100.

The fish meet what is believed to be the world's most stringent requirement: less than half the radioactive cesium level allowed under Japan's national standard and one-twelfth of the US or EU limit, said Yoshiharu Nemoto, a senior researcher at the Onahama testing station. That message isn't reaching consumers. A survey by Japan's Consumer Agency in October found that nearly half of Japanese weren't aware of the tests, and that consumers are more likely to focus on alarming information about possible health impacts in extreme cases, rather than facts about radiation and safety standards.

Fewer Japanese consumers shun fish and other foods from Fukushima than before, but one in five still do, according to the survey. The coastal catch of 2,000 tonnes in 2016 was 8 percent of pre-disaster levels. The deep-sea catch was half of what it used to be, though scientists say there is no contamination risk that far out. ...

There, the volume of contaminated water grows, because it mixes with groundwater that has seeped in through cracks in the reactor buildings. After treatment, 210 tonnes is reused as cooling water, and the remaining 150 tonnes is sent to tank storage. During heavy rains, the groundwater inflow increases significantly, adding to the volume. The water is a costly headache for Tepco, the utility that owns the plant. To reduce the flow, it has dug dozens of wells to pump out groundwater before it reaches the reactor buildings and built an underground "ice wall" of questionable effectiveness by partially freezing the ground around the reactors.

Another government panel recommended in 2016 that the utility, known as Tepco, dilute the water up to about 50 times and release about 400 tonnes daily to the sea – a process that would take almost a decade to complete. Experts note that the release of radioactive tritium water is allowed at other nuclear plants. Tritium water from the 1979 Three Mile Island accident in the US was evaporated, but the amount was much smaller, and still required 10 years of preparation and three more years to complete.

A new chairman at Tepco, Takashi Kawamura, caused an uproar in the fishing community in April when he expressed support for moving ahead with the release of the water. The company quickly backpedalled, and now says it has no plans for an immediate release and can keep storing water through 2020. Tepco says the decision should be made by the government, because the public doesn't trust the utility. "Our recovery effort up until now would immediately collapse to zero if the water is released," Iwaki abalone farmer Yuichi Manome said.

Some experts have proposed moving the tanks to an intermediate storage area, or delaying the release until at least 2023, when half the tritium that was present at the time of the disaster will have disappeared naturally.

Source: http://www.independent.co.uk/, 27 November 2017.

Public Hearings on Nuclear Waste Need Rethink to Dispel Distrust

Selecting the site and method for the final disposal of high-level radioactive waste, which is derived from spent fuel from nuclear power reactors, represents a major conundrum. The government's public hearings on the issue should be fundamentally revamped to enable substantial discussions on a national level. The Agency for Natural Resources and Energy and the NUMO have been holding explanatory meetings on the matter, prefecture by prefecture, since October.

It was learned recently that students who

attended those meetings had been offered remuneration in cash and other items for their attendance. The finding concerns a total of 39 participants at five venues, including in Tokyo and Saitama Prefecture. Officials said a contractor commissioned with public relations for young audiences made the offer at its own discretion, which had no impact on the course of discussions at the meetings. But such a practice could hurt the fairness and trustworthiness of those public hearings.

NUMO has rightly opened investigations into the past practices and begun weighing measures to prevent a recurrence. At the same time, the organizers should also face up squarely to other problems that have emerged during the meetings that have been held to date. Each explanatory meeting is made up of two sessions. The first session is centered, among other things, on a presentation of the government's Nationwide Map of Scientific Features for Geological Disposal, which shows which parts of Japan are eligible for being candidate final disposal sites.

One participant at the Tokyo venue said that a video screened at the opening of the meeting was "inappropriate" because it presented the nuclear fuel recycling program, which is about extracting and reusing plutonium and uranium from reprocessed spent fuel, in a way that could be taken to imply as if the procedure had been established.

The participants split into smaller groups to exchange views during the second session. At most of the venues, the meeting turnout has failed to reach the maximum capacity of 100 participants. The turnout has been particularly poor during the second sessions, with only about 20 to 30 people attending. The public hearings are being held on weekday afternoons for reasons of availability for the organizers. That is apparently making it difficult for working citizens to attend. The organizers say they plan to cover all prefectures of Japan, except Fukushima Prefecture, during a six-month period. Holding the meetings in line with that predetermined timetable may have become an end in itself. The contractor, on its part, mobilized the students perhaps because in surmising the organizers' intent, it believed that small audiences, particularly with youths underrepresented, did not make for a good image.

Needless to say, the public hearings are not being held just to denote that they have been held. They are being organized to help the issues of spent nuclear fuel shared on a national level and enable substantial discussions on them. One participant at the Tokyo venue said that a video screened at the opening of the meeting was "inappropriate" because it presented the nuclear fuel recycling program, which is about extracting and reusing plutonium and uranium from reprocessed spent fuel, in a way that could be taken to imply as if the procedure had been established.

The nuclear fuel recycling program has evidently failed, as symbolized by the recent decision to decommission the Monju fast-breeder reactor. Direct disposal of nuclear waste, in which spent fuel is buried without being reprocessed, has become the mainstream method in countries other than Japan, not the least in Finland, where a final disposal site has been selected. The government and NUMO should convey information that may be inconvenient to them in lending their ears to a broad spectrum of opinions. As long as they stick to a stance of only allowing discussions premised on the continuation of the current nuclear power policy, which would only intensify distrust among the public and would do little in the way of gaining broader understanding toward the selection of a final disposal site.

Source: http://www.asahi.com/, 27 November 2017.

RUSSIA

Russia Taking Action to Address Nuclear Waste Hazards in Far North

Confronting one of the most hazardous environmental legacies of the Soviet era, Russian authorities are taking steps to clean up a decades-old problem posed by nuclear waste in Arctic areas. On October 31, officials sent a second shipment of spent fuel rods from Andreeva Bay near the Norwegian border to the Mayak

reprocessing plant in Ozersk, the closed city in Chelyabinsk Oblast that served as the cradle of the Soviet nuclear weapons program. The first delivery of nuclear waste occurred in June.

The cleanup has been partially funded by European countries and Japan, with Norway alone contributing $230 million since the mid-1990s.

The Problem is Vast: There are still 26,000 containers of waste in northern Russian locations waiting to be reprocessed, along with thousands of containers of nuclear waste, reactors, and decommissioned nuclear submarines offshore. Many storage facilities in the north have been in use long past their intended life spans, and leaks of radioactive material into the surrounding soil are well-documented. Two of the most dangerous hazards are two nuclear submarines - a K-27 and a K-159 - languishing in Arctic waters. Combined, the two subs contain nearly 900 kilograms of highly enriched uranium fuel.

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In addition to waste produced at home, the state-owned nuclear entity Rosatom has agreed to reprocess and store nuclear waste produced by plants they have constructed abroad. Rosatom has agreements with Egypt, Turkey, Belarus, Hungary and Finland and several other countries to manage nuclear waste repatriation.

Russia reprocesses nuclear waste to extract usable plutonium and uranium so it can be reused as fuel. But this presents additional risks from transporting and storing this fuel, which activists say has often been handled without sufficient care for the local population's well-being.

For officials, addressing Russia's nuclear waste issue has become an increasing priority in recent years – at least when it comes to their rhetoric. In 2014, for example, at the 58th General Conference of the IAEA, the then-director of Rosatom, Sergei Kiriyenko, stated that Russia planned to clean up its nuclear waste within 20 to 25 years. This fall, Rosatom and the Nuclear Safety Institute of the Russian Academy of Sciences announced the creation of a journal devoted to nuclear waste management.

Concrete action has been stymied by a lack of funding and ongoing disputes over who exactly is responsible for creating the problem. Under a plan approved in 2007, the Andreeva Bay area was supposed to have been cleaned up by 2017, yet the process began in earnest only this year, and funding for removing submerged nuclear materials from Arctic waters will not be available until at least 2020.

The Ozersk storage facilities can accommodate 200,000 cubic meters; besides that, a facility in Novouralsk that opened in late September can contain 53,000 cubic meters of waste, and one in Seversk in Tomsk Oblast can hold 150,000 cubic meters. Three more facilities that would roughly double this projected storage capacity are in the early planning stages.

With the cleanup process now gaining momentum, questions are starting to be asked about whether Russia's existing reprocessing and storage facilities in the Urals and Siberia can handle the growing volume of nuclear waste coming from the North. The Ozersk storage facilities can accommodate 200,000 cubic meters; besides that, a facility in Novouralsk that opened in late September can contain 53,000 cubic meters of waste, and one in Seversk in Tomsk Oblast can hold 150,000 cubic meters. Three more facilities that would roughly double this projected storage capacity are in the early planning stages.

Environmental activists have called for facilities in the North to be upgraded to deal with

reprocessing nuclear waste in order to reduce transportation risks. Nadezhda Kutepova, an activist who opposes the shipping of nuclear waste to Mayak, also contended in a recent interview with the Barents Observer that conditions at the Mayak plant pose a significant hazard to area residents. The facility was the scene of one of the worst nuclear accidents in history, when a storage facility exploded in 1957, spreading radioactive contamination over a wide area.

The Mayak facility also has been in the news recently, as European monitors believe it could be the potential source of a mysterious cloud of ruthenium-106, a radioactive isotope, detected in elevated concentrations over Europe. After weeks of denials, Russian authorities have acknowledged that elevated levels of ruthenium-106 had been detected in and around Ozersk. Mayak officials have denied that the plant is the source of the problem. Ruthenium-106 is found in spent nuclear fuel. Rosatom officials and Norwegian authorities supporting their work say that the safety situation at Mayak has improved significantly since the mid-20th century, and that Norway has overseen an overhaul of safety procedures at Mayak.

Source: http://www.eurasianet.org/node/86196, 27 November 2017.

USA

Safety Concerns Remain at Nuclear Waste Storage Site

A federal nuclear review panel still has some safety concerns about Los Alamos National Laboratory's new multimillion-dollar storage facility for radioactive waste. However, the Defense Nuclear Facilities Safety Board says in a recent report that limits placed on the amount of material and the types of containers allowed at the facility will provide adequate protection of public health and safety at least for the near term. The board said more reviews will be needed as operations ramp up.

The Transuranic Waste Facility was completed in early 2017 after several years of construction. The facility was designed to store and prepare for shipping newly generated waste from nuclear weapons research. That includes tools, clothing, gloves and other items that have come in contact with radioactive elements such as plutonium.

Source: https://www.usnews.com/, 27 November 2017.

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 Vinod Patney, SYSM PVSM AVSM VrC (Retd).

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