



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

Vol 12, No. 10, 15 MAR. 2018

OPINION – Izumi Nakamitsu

The Women who have Shaped Policies on Nuclear Weapons

If all the recent talk about nuclear weapons in the news has been stressing you out, you are not alone. According to the Doomsday Clock — which shows the likelihood, at least from a symbolic standpoint, of a nuclear-weapons catastrophe — we are just “two minutes” away from a devastating nuclear crisis. That puts us as close to “doomsday” today as we were in 1953, at the height of the Cold War. The Doomsday Clock is a political and scientific report card from experts at the Bulletin of the Atomic Scientists, but you don’t have to be a nuclear physicist to notice the recent spike in global anxiety about a possible nuclear conflict. For people who grew up without the regular nuclear tests and duck-and-cover drills of the Cold War, nuclear fears are more intense now than at any other moment in their lives. The crisis on the Korean Peninsula and deteriorating relationships between nuclear-armed states, combined with escalating rhetoric and false alarms, have all contributed to the current environment of heightened uncertainty, fear, and risk.

Since World War II and the founding of the UN, governments have worked in large groups to prevent conflict by establishing international limits on what weapons they build and how those weapons can be tested, put in the field, and used against others. Disarmament and arms control are not Utopian dreams. Major military powers

CONTENTS

- ☛ OPINION
- ☛ NUCLEAR STRATEGY
- ☛ BALLISTIC MISSILE DEFENCE
- ☛ NUCLEAR ENERGY
- ☛ NUCLEAR COOPERATION
- ☛ URANIUM PRODUCTION
- ☛ NUCLEAR PROLIFERATION
- ☛ NUCLEAR NON-PROLIFERATION
- ☛ NUCLEAR DISARMAMENT
- ☛ NUCLEAR TERRORISM
- ☛ NUCLEAR SAFETY
- ☛ NUCLEAR SECURITY
- ☛ NUCLEAR WASTE MANAGEMENT

always remain engaged in these negotiations because the incremental progress helps their national security and the security of citizens.

Women have proven that they can be powerful agents for peace. During the Cold War, woman peace activists were instrumental in making negotiations of a partial nuclear test ban treaty a reality. More recently, political pressure from women’s groups helped establish an international ban on land mines, and we can thank woman activists for seeking measures against gender-based violence in the first international arms trade treaty. Women are leaders at every level of the International Campaign to Abolish Nuclear Weapons, which received the 2017 Nobel Peace Prize for its groundbreaking campaign that led to a treaty prohibiting nuclear weapons. In each of these campaigns, women challenged established

patterns of power, defied the entrenched association of weapons with men, and offered critical contributions to the debate on how to advance the disarmament agenda.

Yet when it comes to negotiations between governments, women have been consistently absent.... Women remain severely underrepresented in disarmament negotiations on nuclear and other weapons. In typical talks of this kind, only one of every four delegates is a woman, and half of the participating countries send no woman diplomats at all.

Though these figures are better than in past decades, gender parity still won't be reached for decades at the current rate.... Although past agreements have helped turn back the Doomsday Clock by banning biological and chemical weapons and stigmatizing nuclear tests, enduring disagreements have resulted in a diplomatic paralysis that intensifies our current perilous moment. Weapons are evolving to include cybertools, drones, and artificial intelligence in ways that are difficult to predict, raising the risk of a misunderstanding that leads to war. The stakes could hardly be higher, and the need to resuscitate our disarmament dialogue is greater than ever.

Breaking the diplomatic deadlock demands creativity and passion. With women's proven potential to upend the status quo, their continued marginalization in nuclear negotiations is a loss for the entire world. Involving more women will revitalize these talks and advance our collective effort to create a safer and more secure future.... Tackling the peril of nuclear weapons will require the best

contributions of everyone — not just men. All women and their allies must raise their voices and insist not just on a seat at the table in the disarmament debate, but full and equal

representation. It all begins by recognizing that your own thoughts and actions count. You don't need to be an elected official or celebrity to shift the needle on nuclear weapons.... At two minutes to midnight, we cannot wait another 35 years to achieve an equal voice in disarmament.

Source: Izumi Nakamitsu is the UN Under-Secretary-General and High Representative for Disarmament Affairs. www.teenvogue.com, 08 March 2018.

In each of these campaigns, women challenged established patterns of power, defied the entrenched association of weapons with men, and offered critical contributions to the debate on how to advance the disarmament agenda. Yet when it comes to negotiations between governments, women have been consistently absent.... Women remain severely underrepresented in disarmament negotiations on nuclear and other weapons.

OPINION – Sitakanta Mishra

'Nuclear Cheerleaders' for India

While the global nuclear industry seems entering an era of nuclear decommissioning, India is gearing for a mini-renaissance. There are many in India who believe that the next decade is going to

be historic, as significant augmentation of nuclear power generation capacity will be achieved through the construction of 10 units of indigenous PHWR; ascending nuclear fuel production; reduction of reactor construction time; largest production of heavy water and success in Fast Breeder Reactor. Besides, additional 6700 MWs of nuclear power is expected

to come on stream by 2021-22 through projects under construction; many more reactors are planned and, India's domestic private industry is gearing up for partnerships.

Meanwhile, the National Green Tribunal (NGT) has

Tackling the peril of nuclear weapons will require the best contributions of everyone — not just men. All women and their allies must raise their voices and insist not just on a seat at the table in the disarmament debate, but full and equal representation. It all begins by recognizing that your own thoughts and actions count. You don't need to be an elected official or celebrity to shift the needle on nuclear weapons.

confirmed that the nuclear power plant project at Mithivirdi village (Bhavnagar district of Gujarat) is being shifted to Kovvada, Andhra Pradesh due to delay in land acquisition at Chhaya-Mithivirdi site owing to strong public opposition. In March 2013, public hearing on the proposed project was organized and several farmers groups, NGOs, and anti-nuclear activists opposed to the project attended the hearing on the assumption that “the project will not only damage the environment but snatch away the livelihood of farmers. It will also be a permanent threat to the people.”

In September 2013, villagers from Jaspara organised a massive rally protesting the nuclear power plant. With massive turnout of women and children shouting slogans like ‘*maut nu karkhano band karo*’ (shut down factory of death), ‘*anu bijli sasti nathi salamat nathi*’ (electricity generated from atomic energy is neither cheap nor safe), ‘we will give our lives not land’ and ‘not here not in our land’ were heard. These provide one glimpse of the popular understanding/misunderstanding regarding nuclear energy prevailing in Indian society, which shackles India’s nuclear energy programme.

Science cannot change anything if people do not pay heed. Societal taboo over invisible radiation, delay in reaching the benefits of the atom to the grassroots, its high-technology nature that is beyond the comprehension of common man, out of proportion portrayal of sporadic disasters, etc. have contributed in shaping the negative societal perception regarding nuclear projects. Apparently, there is no ‘green politics’ in India yet and no political party has

subscribed to the anti-nuclear ideology. The intermittent support and sympathy extended by some parties to opposition groups seems to be part of ‘vote bank’ politics.

Science cannot change anything if people do not pay heed. Societal taboo over invisible radiation, delay in reaching the benefits of the atom to the grassroots, its high-technology nature that is beyond the comprehension of common man, out of proportion portrayal of sporadic disasters, etc. have contributed in shaping the negative societal perception regarding nuclear projects.

from global wave of anti-nuclear activism? Popular opposition to nuclear projects in Gujarat – normally portrayed as a model state for India’s economic growth – likely to reverberate in other parts of the country. Reportedly, “the villagers in Mithivirdi are now willing to help in the fight against the power plant in Kovvada” too.

All nuclear power projects commence with examination of the economic, technical and scientific feasibility in order to develop confidence on the safety and security of the reactors. But establishing scientific confidence does not by itself address public concern fully, not safety-security of the plant either. Imposition or unilateral decisions for nuclear projects have definite safety-security implications. Greater local/public acceptance and support help ensuring greater safety-security of nuclear installations. Often socio-political problems surrounding nuclear energy are overlooked as they are unanticipated and not fully understood. After a long stride, India with the help of Indo-US nuclear deal unshackled itself from the restrictive multilateral technology denial regimes. But, its nuclear programme seems shackled from

Establishing scientific confidence does not by itself address public concern fully, not safety-security of the plant either. Imposition or unilateral decisions for nuclear projects have definite safety-security implications. Greater local/public acceptance and support help ensuring greater safety-security of nuclear installations. Often socio-political problems surrounding nuclear energy are overlooked as they are unanticipated and not fully understood.

within because of the domestic resistance. This seems to be an outcome of the lopsided management of nuclear knowledge within India.

To achieve the projected nuclear energy production, beside material resources, there is a requirement of huge skilled manpower/scientists for which India need not worry. India's domestic educational institutions – the Homi Bhabha National Institute (HBNI) and its ten constituent institutions, and other twenty-plus universities/institutions – imparting nuclear-related courses cater not only to the domestic demand but also to the global requirements effectively. As per HBNI, during 2014-15 only, 164 Ph.D and 108 M.Tech. degrees have been awarded while 762 students are enrolled during the same period in various courses. According to R.B. Grover, former Vice-Chancellor of HBNI, "academic regour in the doctoral programme has been introduced", number of engineers enrollment in PhD programme has increased, new courses like nuclear medicine, MSc. in nursing, clinical research, and fusion imaging have been introduced.

All these though sound impressive, our institutions produce only scientists or technocrats, who are ultimately absorbed by the nuclear industry and corporate; oblivious of the fact that 'nuclear' involves sociology, psychology and politics beside physics, chemistry, or metallurgy and other aspects. They do not produce "nuclear cheerleaders" who need not be technocrats but can be integral to the nuclear knowledge management (NKM) strategy in the country propagating the positive utility of nuclear energy to the public. Like it or not, nuclear energy debate is not technology vs. technology in India. Nuclear industry must learn from cricket

league idea and how cheerleaders add charm and value to the entire process.

In a way, Homi Bhabha and Jawaharlal Nehru were the early cheerleaders of nuclear programme in India and their charisma smoothed laying down of country-wide nuclear infrastructure unopposed. This Trust-based-Optimism phase (1947 to 1970s) marks popular trust in stalwart nuclear scientists and political leaders during which nuclear projects were viewed as symbols of modernity and prestige. In the subsequent Doubt based-Pessimism phase (1980s to 2000), one can mark the protest against Kaiga project in October 1988, criticism for not producing the targeted energy, and disastrous incidents both within and outside India. As a result, domestic nuclear industry drew negative remarks and buckled.

The current phase (from 2001 onwards) can be the Post material-Support-Oppose phase where issues like environment, energy security, displacement, rehabilitation, safety-security issues are linked to support or opposition of nuclear projects. We do not see any charismatic personality with popular appeal cheerleading for nuclear projects in India especially in the post Bhabha-Nehru period. Undoubtedly, APJ Abdul Kalam had mass appeal and advocated in support of nuclear energy and Kudankulam project, he was generally regarded as the 'missile man', not nuclear man, by Indian people.

This does not mean that India is lacking visionary political or scientific leadership in the country. Rather, there seems to be a disjointed growth of science, society and technology in the country sometime stumbling in each others' way. What needed is a concerted effort to prepare a pool of

To achieve the projected nuclear energy production, beside material resources, there is a requirement of huge skilled manpower/scientists for which India need not worry. India's domestic educational institutions – the Homi Bhabha National Institute (HBNI) and its ten constituent institutions, and other twenty-plus universities/institutions – imparting nuclear-related courses cater not only to the domestic demand but also to the global requirements effectively.

One need only think of the case of the American RQ-170 Sentinel stealth drone captured by Iran in 2011, as an example of what could happen if a nuclear-propelled drone were to fall into the hands of a hostile nation or terrorist organization. Iran reverse-engineered a similar system based on the US captured system.

'nuclear cheerleaders' alongside the production of skilled manpower in all these institutions. Non-technical courses for social science students like Nuclear Knowledge Management, Nuclear Psychology, Nuclear Language and Societal Perception, Nuclear-Safety-Security-Safeguards, etc., both at Diploma and Post-Graduation level should be offered either through regular basis or distance learning. To make the courses attractive, after successful completion of study, they must be absorbed thereby increasing the employability of nuclear industry for social scientists which will effectively help addressing the societal concerns involving nuclear projects.

Moreover, the nuclear establishment may consider establishment of a nuclear energy Think Tank to generate, address, and attend to nuclear related issues in the country through a pool of social and nuclear scientists as part of the nuclear knowledge management strategy. This would also help reducing burden of the scientific community in dealing with the public and spend their precious time for expediting the nuclear projects.

Lastly, it would not be far when the 'green politics' in other parts of the world will spill over to India and exploit pockets of anti-nuclear sentiment to form a pan-Indian movement. To attain nuclear energy renaissance for which India is gearing, it urgently needs revolutionary nuclear cheerleaders with mass appeal and pro-nuclear ideology to uplift popular sentiments in favour of nuclear projects, and work as steroids against anti-nuclear movement that likely to unfold in near future.

Source: <http://www.nuclearasia.com>, 08 March 2018.

OPINION – Daniel M Gerstein

Putin's Nuclear Ambitions Raise Serious Proliferation Questions

President Putin's state of the nation address in which he described new emerging nuclear capabilities for use as delivery systems could

represent an erosion of international nonproliferation mechanisms and a new destabilizing arms race. This comes on the heels of other recent warnings about Russian intentions to increase reliance on nuclear weapons in deterrence and warfighting and its withdrawal from a bilateral treaty with the US on plutonium stockpiles. In his address, Putin highlighted testing of a nuclear-powered cruise missile and a multiyear program for development of a nuclear-powered underwater drone. Such systems would likely have unlimited ranges and long operational timelines. They would also represent major changes in how nuclear capabilities could be employed and increase the risk of dangerous proliferation.

One need only think of the case of the American RQ-170 Sentinel stealth drone captured by Iran in 2011, as an example of what could happen if a nuclear-propelled drone were to fall into the hands of a hostile nation or terrorist organization. Iran reverse-engineered a similar system based on the US captured system.

While the US and Russia have had nuclear-powered submarines and ships for decades, the use of an unmanned nuclear-powered system could set a dangerous precedent. With manned systems, the crew serves as the security against the proliferation of the nuclear power plant.

However, using unmanned systems removes this layer of security, should a deployed nuclear-powered system fall into foreign hands. One need only think of the case of the American RQ-170 Sentinel stealth drone captured by Iran in 2011, as an example of what could happen if a nuclear-propelled drone were to fall into the hands of a hostile nation or terrorist organization. Iran reverse-engineered a similar system based on the US captured system.

Imagine though if a Russian nuclear-propelled drone were to be hacked and brought down. Such a scenario could allow the capturing nation to reverse-engineer its own nuclear-powered system, and/or the nuclear material used for propulsion could be reprocessed to create a nuclear weapon. The use of nuclear capabilities for propulsion also calls into question the applicability of the NPT. The NPT certainly pertains to nuclear weapons, while unambiguously supporting the use of nuclear capabilities for peaceful purposes. It requires nuclear-weapons states not to transfer, assist, encourage or induce

any non-nuclear-weapons state to manufacture or acquire explosive devices, while requiring that non-nuclear-weapons states do not receive or manufacture nuclear weapons.

If these new types of nuclear-powered drone systems are considered "nuclear weapons," any transfer to a non-nuclear state would violate the NPT. However, if nuclear propulsion systems without nuclear payloads are not considered to be weapons, the outcome is potentially more dangerous, as the international nuclear nonproliferation foundation, the NPT, would not apply.

This could open new possibilities for the proliferation of nuclear and radiological material. Global nonproliferation efforts, established through the NPT, have served as important foundations for keeping dangerous material out of the hands of dangerous state and non-state actors.

Putin has linked the development of these new weapons capabilities to the US refusal to collaborate with Russia on arms control. Perhaps before Russia goes down this path, another attempt at dialogue would be beneficial as both nations have expressed a shared interest in limiting nuclear proliferation. Incorporating nuclear capabilities into more weapons systems could threaten these shared nonproliferation goals.

Source: <http://thehill.com>, 06 March 2018.

OPINION – Mark Lander

With US and North Korea, a Repeated History of Hope and Disappointment

Diplomacy between the US and North Korea has gone through familiar cycles of long stagnation, followed by brief bursts of hope and then inevitable disappointment, typically after North

Korea reneged. President Trump's three predecessors each went through the cycle. In October 1994, Clinton concluded what was perhaps the most ambitious nuclear agreement ever reached between Washington and Pyongyang – called, appropriately, the Agreed Framework. Under the deal, North Korea agreed

to halt construction of two nuclear reactors that the US believed would be used to produce fuel for a nuclear bomb. In return, the White House pledged to give North Korea two alternative nuclear power reactors that could not be used in a weapons program – as well as fuel

to tide it over before the new reactors were ready.

The agreement headed off a threat by North Korea to withdraw from the NPT, and eased what had been one of the tensest periods on the Korean Peninsula since the armistice that ended the Korean War. The Clinton administration tried to expand the scope of the Agreed Framework after North Korea began testing ballistic missiles in 1998. That effort culminated with a trip to

Pyongyang by Secretary of State Albright in 2000, and what another American official, Sherman, later wrote were negotiations that came "tantalizingly close" to a broader agreement. But no deal was consummated before President Bush took office, and Mr. Bush initiated his

own policy review. The disclosure that North Korea was developing a capability to enrich uranium led the Bush administration to conclude that the Agreed Framework was not worth upholding, and construction on the new reactors was suspended.

At the end of 2002, North Korea expelled inspectors from the IAEA, restarted its nuclear facilities and announced it was withdrawing from the nonproliferation treaty. The Agreed Framework was dead. From then on, negotiations occurred within a framework of six parties: North Korea, the US, South Korea, China, Russia and Japan.

Perhaps before Russia goes down this path, another attempt at dialogue would be beneficial as both nations have expressed a shared interest in limiting nuclear proliferation. Incorporating nuclear capabilities into more weapons systems could threaten these shared nonproliferation goals.

Diplomacy between the US and North Korea has gone through familiar cycles of long stagnation, followed by brief bursts of hope and then inevitable disappointment, typically after North Korea reneged. President Trump's three predecessors each went through the cycle.

Those talks, led on the American side by Hill, went on fitfully from 2002 to 2005, when North Korea promised to “abandon nuclear weapons and existing nuclear programs.”

After years of haggling over how to verify the North Korean pledge, the six-party talks broke down in 2009, leaving President Obama to deal with a North Korea that had made progress in its nuclear program and remained opaque and suspicious of the outside world. The Obama administration showed little appetite for reviving the Six-Party process, and instead embarked on a policy of steadily tightening economic pressure on North Korea. But American diplomats began quietly meeting with their North Korean counterparts.

On Feb. 29, 2012, the two sides announced a deal — the so-called Leap Day Agreement — under which North Korea would halt operations at its Yongbyon nuclear reactor and allow in inspectors to verify its suspension of nuclear and missile testing. In return, the US pledged to offer food aid to North Korea. Within a month North Korea was threatening to launch a satellite, effectively nullifying the deal.

Source: www.nytimes.com, 06 March 2018.

OPINION — Matt Drozd

Nuclear Saber Rattling Could Lead to Mass Destruction

The recent speech by Russia’s President Putin referencing new nuclear threats is best rebuked by comments from a former leader of the Soviet Union, Gorbachev in 2017. “Politicians and military leaders sound increasingly belligerent and defense doctrines more dangerous. ... It all looks as if the world is preparing for war.” Mr. Gorbachev also said, “While state budgets are struggling to fund people’s essential social needs, military spending is growing. Money is easily found for sophisticated weapons whose destructive power is comparable to that of the

weapons of mass destruction.”

Nine countries possess more than 15,000 nuclear weapons and the US and Russia possess approximately 93 percent which could be quickly launched. Each is far more powerful than the bomb dropped on Japan, which killed approximately 140,000 innocent people. Our country alone has spent more than \$20 billion per year on nuclear weapons. If only 1 percent of the nuclear arsenals were launched, over 21 million people would perish as well as the environment of any survivors.

As one who served at the highest level of the military at the Pentagon during 9/ 11, I know all too well what the end result can be if world leaders

continue to rattle their sabers. Such irresponsible rhetoric could at least lead to “boots on the ground.” We need to ask ourselves if we are prepared to put our loved ones in those boots and to continue this frivolous spending on weapons of mass destruction, ignoring so many other pressing needs of our people. A quote by former President Truman could best sum up what the end result could be if we

continue down this path of nuclear proliferation and the unnecessary build-up of the world’s military — “If we do not abolish war on this earth, then surely one day, war will abolish us from the earth.”

Source: http://www.post-gazette.com, 12 March 2018.

OPINION – Jarret Adams

Five Reasons Nuclear Energy will Rebound in 2018

Nuclear energy has faced serious challenges in recent years because of several factors: competition from low gas prices, subsidised renewables and slow growth in electricity demand in certain markets. But because of several powerful forces we are seeing signs that this year nuclear energy will come roaring back... Several nuclear plants have closed prematurely in the US, and other

shutdowns have been announced. But in every instance, the nuclear plant closures have led to higher emissions and electricity prices, pointing out a difficult truth. Experts say it is virtually impossible for a major economy to have a reliable, low-carbon grid without nuclear energy. The Germans are learning this lesson the hard way.

Wave of New Plants on the Horizon: With more than 50 nuclear plants under construction today and 150 more planned, the pace of construction is faster than at any time since the 1990s. This 2018 we expect to see 14 new plants come online, with some key new-generation plants, such as Westinghouse's AP1000 and Framatome's EPR, both in China, expected at or near completion. The first of four APR1400 reactors in the UAE, built by Korea's Kepco, is nearing completion largely on time and on budget. This clearly demonstrates there is nothing inherent about nuclear that prevents this technology from being built economically and on a predictable timeline.

Nuclear Giants Reorganising: Meanwhile some of the biggest players in the nuclear sector have reorganised to come out leaner and meaner to tackle the global market.

- The restructuring of the former Areva into Framatome and Orano is complete, with the world's largest nuclear plant operator EDF taking ownership of Framatome, which focuses on reactors, fuel fabrication and services. With new international partners and French government investment, Orano is in a stronger position to keep its focus on uranium mining, enrichment, recycling and decommissioning.
- Brookfield Asset Partners of Canada has agreed to buy Westinghouse Electric Company, which

analysts say will help the company finalise some of the international deals it has been pursuing.

- Meanwhile, the CNNC, China's second largest reactor owner, merged with CNEC to create another powerhouse with 100,000 employees-strong aimed at the export market.

With the reorganisation of these companies behind them, we can expect to see some major nuclear energy agreements this year.

With more than 50 nuclear plants under construction today and 150 more planned, the pace of construction is faster than at any time since the 1990s. This 2018 we expect to see 14 new plants come online, with some key new-generation plants, such as Westinghouse's AP1000 and Framatome's EPR, both in China, expected at or near completion.

Nuclear's Climate Role becoming Impossible to Ignore:

Another driver is the increasing threat of climate change, which is motivating countries to invest in new nuclear projects or at least keep existing plants operating. Nuclear energy is the largest source of emission-free power in the

US, the EU, South Korea and other countries. Why are emissions per capita far lower in France than in neighboring Germany? One word: nuclear. While nuclear supplies about 75% of France's electricity, Germany has decided to shut down its nuclear plants. Thanks to its high concentrations of nuclear and hydro, Ontario, Canada has largely decarbonised its grid - and shut its last coal-fired plant in 2014. According to Hansen, one of the world's leading thinkers on climate, and three other experts: "Nuclear power paves the only viable path forward on climate change."

Decarbonizing the grid means all fossil generation will have to capture its emissions. Our growing reliance on gas, ramping up of exports and difficulty of pipeline construction raise other questions. Driven by increased domestic oil and gas production, the US expects to become a net energy exporter by 2022, which is expected to pay huge economic and geopolitical dividends.

Avoiding a Gas Bubble: The low price of natural gas has helped it replace coal as the largest source of power

generation in the US, which is good from an emissions perspective. But when gas plants replace nuclear ones, emissions go up. Decarbonizing the grid means all fossil generation will have to capture its emissions. Our growing reliance on gas, ramping up of exports and difficulty of pipeline construction

raise other questions. Driven by increased domestic oil and gas production, the US expects to become a net energy exporter by 2022, which is expected to pay huge economic and geopolitical dividends. Gas proponents say prices will stay low indefinitely, but price spikes have happened before. When you consider the next three largest gas producers after the US are Russia, Iran and Qatar, what could go wrong?

Advanced Nuclear: Innovation is helping nuclear energy become more competitive with other energy sources, such as advanced reactors or fuel designs. Advanced reactor plants use different technologies, such as molten salt or high-temperature gas, that will make them safer and less expensive to build. Whether they use alternative approaches or traditional light water designs, the trend is toward SMRs that suppliers can build in a factory and deliver to plant sites. Many more are flocking to this space – *Third Way* reports the number of North American advanced nuclear companies is up by 56% over the past three years. Whatever happens, rising demand for reliable, emission-free power is on the horizon. A lot depends on whether the nuclear energy sector can seize this opportunity.

Source: <http://www.world-nuclear-news.org>, 07 March 2018.

OPINION – Jim Green

‘Pro-Nuclear Environmentalists’ in Denial about Power/Weapons Connections

...Nuclear industry bodies (such as the US Nuclear Energy Institute) and supporters (such as former US energy secretary Moniz) are openly acknowledging the connections between nuclear power and weapons connections they have denied for decades. Those connections are evident in most of the weapons states, in numerous countries that have pursued but not built weapons, and in potential future weapons states such as Saudi Arabia. Ideally, acknowledgement of power/weapons connections would lead to redoubled efforts to build a firewall between civilian and military nuclear programs strengthened safeguards, curbs on enrichment

and reprocessing, and so on.

But that’s not how this debate is playing out. Industry insiders and supporters drawing attention to the connections are quite comfortable about them – they just want increased subsidies and support for their ailing civilian nuclear industries and argue that ‘national security’ and ‘national defense’ will be undermined if that support is not forthcoming. Some continue to deny the power/weapons connections even though the connections are plain for all to see and are now being acknowledged by a growing number of nuclear insiders and supporters. The most prominent of these are self-styled ‘pro-nuclear environmentalists’.

One such person is Heard from the Australian pro-nuclear lobby group ‘Bright New World’. Heard claims that nuclear power promotes peace and uses the two Koreas to illustrate his argument: “The South is a user and exporter of nuclear power, signatory to the NPT, and possesses zero nuclear warheads. The North has zero nuclear power reactors, is not a signatory to the NPT, and is developing and testing nuclear weapons.” Likewise, Michael, founder of the U.S. pro-nuclear lobby group ‘Environmental Progress’, claims that: “One of [Friends of the Earth]-Greenpeace’s biggest lies about nuclear energy is that it leads to weapons. Korea demonstrates that the opposite is true: North Korea has a nuclear bomb and no nuclear energy, while South Korea has nuclear energy and no bomb.”

Heard and Shellenberger ignore the fact that North Korea uses what is called an ‘experimental power reactor’ (based on the UK Magnox power reactor design) to produce plutonium for weapons. They ignore the fact that North Korea acquired enrichment technology from Pakistan’s Khan network, who stole the blueprints from URENCO, the consortium that provides enrichment services for the nuclear power industry. They ignore the fact that North Korea’s reprocessing plant is based on the design of the Eurochemic plant in Belgium, which provided reprocessing services for the nuclear power industry.

Heard and Shellenberger also ignore South Korea’s history of covertly pursuing nuclear weapons, a

history entwined with the country's development of nuclear power. For example, the nuclear power program provided (and still provides) a rationale for South Korea's pursuit of reprocessing technology.

Nicholas Miller's Article in International Security: Echoing Shellenberger's claim that

"nuclear energy prevents the spread of nuclear weapons", Heard writes: "Peace is furthered when a nation embraces nuclear power, because it makes that nation empirically less likely to embark on a nuclear weapons program. That is the finding of a 2017 study published in the peer-reviewed journal *International Security*." However, the claim isn't true, and it isn't supported by the *International Security* journal article, written by Miller from Dartmouth College. Miller's article does however downplay the power/weapons connections. He writes: "In contrast to the conventional wisdom, this article argues that the link between nuclear energy programs and proliferation is overstated. Although such programs increase the technical capacity of a state to build nuclear weapons, they also have important countervailing political effects that limit the odds of proliferation.

Specifically, nuclear energy programs (1) increase the likelihood that a parallel nuclear weapons program is detected and attracts outside non-proliferation pressures, and (2) increase the costliness of nonproliferation sanctions." However, much of the information in Miller's article undermines his argument. In Miller's own words, "more countries pursued nuclear weapons in the presence of a nuclear energy program than without one"; "the annual probability of starting

Peace is furthered when a nation embraces nuclear power, because it makes that nation empirically less likely to embark on a nuclear weapons program. That is the finding of a 2017 study published in the peer-reviewed journal *International Security*."

More countries pursued nuclear weapons in the presence of a nuclear energy program than without one"; "the annual probability of starting a weapons program is more than twice as high in countries with nuclear energy programs, if one defines an energy program as having an operating power reactor or one under construction"; and countries that pursued nuclear weapons while they had a nuclear energy program were "marginally more likely" to acquire nuclear weapons.

a weapons program is more than twice as high in countries with nuclear energy programs, if one defines an energy program as having an operating power reactor or one under construction"; and countries that pursued nuclear weapons while they had a nuclear energy program were "marginally more likely" to acquire nuclear weapons almost twice as likely if North Korea is considered to have had a nuclear energy program while it pursued weapons.

Miller notes that France, South Africa, India, and Pakistan all acquired nuclear weapons while

their nuclear energy programs were ongoing, and he notes that Argentina, Brazil, India, Iran and Pakistan began pursuing nuclear weapons after a nuclear energy program had already been initiated. Miller cites recent studies that find that "states are more likely to pursue or acquire nuclear weapons when they have greater numbers of peaceful nuclear cooperation agreements with other states (including agreements related to nuclear energy production), receive sensitive nuclear assistance, are recipients of technical aid on the fuel cycle from the IAEA, or have greater latent nuclear capacity (e.g., uranium deposits,

nuclear scientists, and chemical engineers)." Leaving aside Miller's questionable arguments, his article is a reasonable primer on the manifold and repeatedly-demonstrated connections between nuclear power and weapons.

Miller's focus is on the pursuit of nuclear weapons so he is silent about the ongoing connections between power and existing weapons states

connections such as those loudly trumpeted by nuclear advocates in the US and the UK in their

recent efforts to secure further support for ailing civilian nuclear industries; or India's refusal to put much of its 'civilian' nuclear industry under IAEA safeguards. Miller also has little to say about research reactor programs and their connections to both nuclear power and weapons. Yet that is an important part of the story. To give one example: India's first nuclear weapon test used plutonium produced in the CIRUS research reactor and that plutonium was ostensibly separated for India's fast breeder power program.

Australia's pursuit of weapons was closely linked to the pursuit of nuclear power. At various stages Iraq pursued all three pathways to weapons: a research reactor program (disrupted by repeated military strikes on its research reactors to prevent weapons proliferation); real or feigned interest in nuclear power; and a secret weapons program.

Downplaying the Connections: Miller's article includes a reasonable account of the troubling connections between nuclear power and weapons so how does he downplay the connections? He conducts a quantitative analysis concerning nuclear energy programs (reactors under construction or operating) and the pursuit of weapons. In so doing, much relevant information is cast overboard, such as real or feigned interest in nuclear power facilitating the pursuit of weapons even if construction of power reactors never began. Even so, much of his data contradicts his conclusions. His simple count of countries pursuing weapons with or without a nuclear energy program from 1954 to the present yields these results:

- Nuclear energy program during pursuit of weapons: 10 countries (59%)
- No nuclear energy program during pursuit of weapons: 7 countries (41%)

At least two countries listed in Miller's 'no nuclear energy program' category Australia and Iraq could be included in the other category in which case the 59:41 ratio becomes 71:29, a ratio of more than 2:1. Australia's pursuit of weapons was closely linked to the pursuit of nuclear power. At various stages Iraq pursued all three pathways to weapons: a research reactor program (disrupted

by repeated military strikes on its research reactors to prevent weapons proliferation); real or feigned interest in nuclear power; and a secret weapons program.

According to Hamza, a nuclear scientist involved in Iraq's weapons program: "In 1973, we decided to acquire a 40-megawatt research reactor, a fuel manufacturing plant, and nuclear fuel reprocessing facilities, all under cover of acquiring the expertise needed to eventually build and operate nuclear power plants and produce and recycle nuclear fuel."

(emphasis added). Another difficulty with Miller's quantitative analysis is that it yields contradictory and inexplicable results such as these:

- The annual probability of starting a weapons program is more than twice as high in countries with an operating power reactor or one under construction (a statistically-significant finding).
- The annual probability of starting a weapons program is somewhat lower in countries with operating power reactors compared to countries without them (a statistically non-significant finding).

...Miller produces a series of 'logistic regression models' to map the raw data against potentially confounding variables such as economic and industrial capacity. He concludes that "although statistical power may be an issue, the data at hand do not make a strong case for a large, positive effect of nuclear energy programs, as the conventional wisdom would predict." But within the findings, conventional wisdom can be found. The only statistically-significant finding arising from the models is a positive link between nuclear energy programs and the pursuit of weapons a problem Miller circumvents by momentarily adopting a stricter definition of statistical significance!

Countries that have Built Nuclear Weapons:

Miller finds that among 17 countries that pursued nuclear weapons from 1954 to the present (others put the number higher), they were more likely to actually build weapons if they had a nuclear energy program (defined as a power reactor in operation or under construction). For countries with a nuclear energy program, 44% developed weapons (4 out of 9 countries); for countries without a nuclear energy program, 37.5% developed weapons (3 out of 8 countries). Once again, there is a disconnect between Miller’s findings and his conclusions. And the disconnect is greater if North Korea is considered to have had a nuclear energy program while it pursued weapons. ...The Dartmouth College media release announcing the publication of Miller’s article asserts that “countries that pursued nuclear weapons under the cover of an energy program have not been significantly more likely to acquire nuclear weapons, when compared to countries that seek nuclear weapons without an energy program.”

Yet Miller’s own count finds an increase, rising to a near-doubling if North Korea is considered to have had a nuclear energy program. Once again it seems he is basing his conclusions on the findings he likes and downplaying those he doesn’t. Miller goes on to note that using different codings (country categorisations) “there is little support for the conventional wisdom” and he states that “the evidence that a nuclear energy program is associated with a higher success rate is inconsistent and sensitive at best.”....

As a counterfactual, how would nuclear weapons proliferation have unfolded if nuclear power had never existed? There would be far less fissile material in existence (several hundred thousand weapons-equivalents). Far fewer nuclear experts. The three pathways to weapons (power, research,

or secret programs) would be reduced to two (and the remaining two pathways would be more difficult to pursue because, amongst other reasons, fewer nuclear experts would be available). There would be far fewer latent nuclear weapons states. There would be fewer nuclear weapons states. There would be fewer nuclear weapons.

Conversely, let’s imagine a significant expansion of nuclear power. Former US Vice President Al Gore said during a 2006 interview: “For eight years in the White House, every weapons-proliferation problem we dealt with was connected to a civilian reactor program. And if we ever got to the point where we wanted to use nuclear reactors to back out a lot of coal ... then we’d have to put them in so many places we’d run that proliferation risk right off the reasonability scale. And we’d run short of uranium, unless they went to a breeder cycle or something like it, which would increase the risk of weapons-grade material being available.”

Source: <http://www.theenergycollective.com/>, 06 March 2018.

The three pathways to weapons (power, research, or secret programs) would be reduced to two (and the remaining two pathways would be more difficult to pursue because, amongst other reasons, fewer nuclear experts would be available). There would be far fewer latent nuclear weapons states. There would be fewer nuclear weapons states. There would be fewer nuclear weapons.

NUCLEAR STRATEGY

RUSSIA

Russia has Tested an ‘Invincible’ Nuclear Missile

Russia has tested an “invincible” nuclear cruise missile that cannot be intercepted by enemy measures, claimed the country’s president Putin. The head of state said the move is part of a new range of powerful nuclear and non- nuclear weapons it will build that will “reach anywhere in the world”. Putin added that Russia had also developed a high-speed underwater nuclear drone that can target both aircraft carriers and coastal facilities. The leader made the revelations during his annual State of the Nation address on 1 March, ahead of elections for his fourth term as president,

which he is expected to win on 18 March.

Putin has been in power since 2000, either as president or prime minister. If he wins the March poll he will be eligible to serve until 2024. During a two-hour televised speech, Putin said the Russian army had first tested the new generation cruise missile last autumn. He added the weapon was “a low-flying, difficult-to-spot cruise missile with a nuclear payload with a practically unlimited range and an unpredictable flight path, which can bypass lines of interception and is invincible in the face of all existing and future systems of both missile defence and air defence.”

The Russian leader added the missile could not be stopped by US shields in place in Europe and Asia. Putin, talking before a joint sitting of both houses of parliament, asked Russians watching on TV to write in and suggest names for the two new systems. The president also said that Russia has tested a new heavy ICBM, called Sarmat, which has a greater range and carries more warheads than its predecessor. Putin said the development of the new weapons was in response to the US withdrawing from a Cold War-era treaty that banned missile defences and Washington’s moves to boost its missile defence systems.

Source: www.ibtimes.co.uk, 01 March 2018.

BALLISTIC MISSILE DEFENCE

INDIA

India Completes Trials of Ant-Tank Guided Missile ‘Nag’

India on 28 February successfully test-fired anti-tank guided missile ‘Nag’ in desert conditions. The test, conducted in the desert area in Pokharan

against two different targets, proved Nag’s capabilities in desert conditions. DRDO said the tests were conducted in different conditions against two tank targets at different ranges and timings. With this, the developmental trials of the missile have been completed and it is now ready for induction into the armed forces.

The Nag is a third-generation “fire-and-forget” missile. Once fired, its infrared seekers automatically guides the missile to the target. Initially, the Army is likely to place an order for 443 Nag ATGMs and 13 NAMICA missile launch vehicles. In its perspective plan, the Army has projected the need for 7,000 Nag missiles and around 200 NAMICAs. The DRDO is currently developing two new variants of the missile for the Indian Air Force: the 8 km-range ‘Helina’ to arm Dhruv Advanced Light Helicopter and a 10 km-range variant capable of being launched from aircraft. A man-portable version of the missile, which would weigh less than 14 kg, is also being developed. ...

Source: <http://www.domain-b.com>, 01 March 2018.

IRAQ

Iraq Intends to Buy Russian Missile Defence System

Iraqi FM, Al-Jaafari, revealed that his country intends to buy a Russian missile defence system as part of its efforts to rebuild its weapons capabilities after a three-year war against the terrorist group Daesh. This came in Al-Jaafari’s statements during a joint press conference he held on 28 February with Russian Vice President Rogozin in the Russian capital Moscow, according to a report by the Iraqi Foreign Ministry. The Iraqi

The missile could not be stopped by US shields in place in Europe and Asia. Putin, talking before a joint sitting of both houses of parliament, asked Russians watching on TV to write in and suggest names for the two new systems. The president also said that Russia has tested a new heavy ICBM, called Sarmat, which has a greater range and carries more warheads than its predecessor.

Initially, the Army is likely to place an order for 443 Nag ATGMs and 13 NAMICA missile launch vehicles. In its perspective plan, the Army has projected the need for 7,000 Nag missiles and around 200 NAMICAs. The DRDO is currently developing two new variants of the missile for the Indian Air Force.

minister said: “We intend to buy a missile defence system. We are studying all the problems and their surrounding difficulties, and working to overcome them. The state will take the final decision in this regard, and we will announce that at the right time.”

Iraq has recently announced that it has received a new batch of modern Russian tanks following a deal which was signed two years ago to buy 73 tanks of T-90 type. Baghdad had heavily relied on Russian weapons before resorting to US weapons after the fall of the former regime, following the US invasion of the country in 2003.

received a new batch of modern Russian tanks following a deal which was signed two years ago to buy 73 tanks of T-90 type. Baghdad had heavily relied on Russian weapons before resorting to US weapons after the fall of the former regime, following the US invasion of the country in

He pointed out that “Iraq has the right to look for the best opportunities to strengthen its defence after it paid a high price in fighting against terrorism and the resultant destruction that affected its sources and people.” In a press statement, on 8 February, Russian ambassador to Baghdad, Maximov, said that his country is ready to discuss the possibility of supplying Iraq with the anti-aircraft system S-400. At the time, Maximov expressed his hope that Baghdad would send a demand regarding this matter. The Russian ambassador’s statements came after reports revealed that Iraq intends to buy the Russian missile system.

However, Washington warned Baghdad and other countries of the consequences of Russian weapons deals, in accordance with the law of “confronting the US enemies through sanctions.” In response to a question about the possibility of Iraq acquiring the S-400 Russian system, US State Department spokesperson Nauert asserted that “the US is holding discussions with many countries, including Iraq, to explain the significance of the aforementioned law and the possible consequences of these countries having defence deals with Russia.”

Nauert insisted that she did not know whether the signing of the deal between Iraq and Russia regarding the S-400 systems had already been made. Iraq has recently announced that it has

2003.

Source: *www.middleeastmonitor.com*, 01 March 2018.

RUSSIA

Russia Tests Hypersonic Missile it Says ‘cannot be Stopped by any Defence System’

Russia has said it successfully test-launched a hypersonic missile, one of a range of new nuclear-capable weapons Putin has boasted could outmanoeuvre any defence system. Moscow’s defence ministry released footage showing a fighter jet taking off before the missile detaches, leaving flames blazing in its wake. “The launch was normal; the hypersonic missile hit the preset target on the test site,” the ministry said.

Mr Putin described the Kinzhal missile as an “ideal weapon” when

Moscow says the missile can deliver nuclear warheads at a range of more than 2,000 kilometres and could change trajectory mid-flight, “which also allows it to overcome all existing and...prospective anti-aircraft and anti-missile defence systems”. The Kinzhal missile launched from a MIG-31 aircraft that took off from a military airfield in south-west Russia.

he announced the new arsenal of strategic weapons earlier this March, The missile takes its name from a type of double-edged dagger and is said to be capable of travelling at 10 times the speed of sound. Speaking in an annual state address on 1 March, the Russian leader

claimed the missile’s speed “makes it invulnerable to current missile and air defence systems since interceptor missiles are, simply put, not fast enough”. Moscow says the missile can deliver nuclear warheads at a range of more than 2,000 kilometres and could change trajectory mid-flight,

“which also allows it to overcome all existing and...prospective anti-aircraft and anti-missile defence systems”. The Kinzhal missile launched from a MIG-31 aircraft that took off from a military airfield in south-west Russia.

Other technologies touted by Mr Putin during the speech included a robot torpedo that Russia said could hit US port cities. The Russian leader’s belligerent address raised the prospect of a new arms race. It came weeks after the Washington announced the US would expand its nuclear capabilities and signalled a hardening resolve against Moscow. “Our strategy will ensure Russia understands that any use of nuclear weapons, however limited, is unacceptable,” said a Pentagon policy document.

Mr Putin said: “To those who in the past 15 years have tried to accelerate an arms race and seek unilateral advantage against Russia, have introduced restrictions and sanctions that are illegal from the standpoint of international law aiming to restrain our nation’s development, including in the military area, I will say this: everything you have tried to prevent through such a policy has already happened. “No one has managed to restrain Russia.” However, US defence secretary Mattis said the technology unveiled by Russia showed nothing that would change the Pentagon’s perspective.

He said: “I saw no change to the Russian military capability and each of these systems that he’s talking about that are still years away, I do not see them changing the military balance. They do not impact any need on our side for a change in our deterrence posture.” Former defence secretary William Perry suggested Mr Putin’s “aggressive stance was almost entirely for domestic consumption and geopolitical posturing”. In an article for Politico, he added: “Whether or not these new weapons work and whether or not they are available, they don’t change the basic deterrent posture or military capability of Russia.”

Source: <http://www.independent.co.uk>, 11 March 2018.

NUCLEAR ENERGY

EU

Foratom Calls for Increased EU Nuclear R&D Spending

A “substantial” increase in the level of EU funding for future Euratom research programmes is required if the EU is to maintain its share of nuclear electricity, according to Foratom, the European nuclear trade body. The power sector will need to be fully decarbonised if the EU is to meet its goal of reducing CO2 emissions by up

to 95% by 2050... and low-carbon technologies - including nuclear - will play a key role in this transition. Nuclear energy already accounts for some 50% of the EU’s low-carbon electricity generation, avoiding about 700 million tonnes of CO2 equivalent emissions annually.

The power sector will need to be fully decarbonised if the EU is to meet its goal of reducing CO2 emissions by up to 95% by 2050... and low-carbon technologies - including nuclear - will play a key role in this transition. Nuclear energy already accounts for some 50% of the EU’s low-carbon electricity generation, avoiding about 700 million tonnes of CO2 equivalent emissions annually.

Foratom said on 05 March:

“In order to maintain low-carbon nuclear electricity production in the EU, a mixture of new build and long-term operation of existing nuclear power plants will be needed. A strong nuclear research and training capability is essential to underpin these operations.” The organisation said R&D activities should focus on issues including the development of new reactor concepts that are more efficient, more sustainable and more economic. Research on improving the safety and efficiency of current light water reactors should also continue. R&D should also focus on gaining a better understanding of the ageing of power reactors and how to control and mitigate it. Investigations should also be made into making reactor components and nuclear fuel more resistant to radiation and higher temperatures. Waste management and disposal technologies should also be developed for non-standard waste streams, as well as new recycling technologies for fast reactor fuels.

“Shared, large research infrastructures of common interest, which can be useful for training and encouraging researcher mobility,” should be maintained, Foratom said. “Significant investment in research facilities, as well as human resources and equipment, will be needed to achieve these aims,” it said. “If Europe is truly committed to decarbonising its economy, then this should be reflected in the budget allocated to nuclear R&D.” In a position paper released in February, Foratom said the current level of funding in the Euratom Fission Programme, at around EUR50 million (USD62 million) per year, is “patently out of tune” with the EU’s objective of maintaining European technological leadership in the nuclear field.

“The fact that nearly 20 times more funding under Horizon 2020 is allocated to research on non-nuclear energies does not, in our view, reflect the important part that nuclear must play in meeting the EU’s decarbonisation objectives for 2030 and 2050,” it said. The European Commission is mandated by the Euratom Treaty to periodically issue a new *Communication on the Nuclear Illustrative Programme (PINC)* to indicate targets and a programme for nuclear production and the corresponding investment required. The latest PINC was published in May 2017.

Foratom said it fully supports the conclusion of the latest PINC that continuing to pursue research and development is instrumental to maintaining the EU at the forefront of nuclear technology, and develop the highest standards of safety, security, waste management and non-proliferation. This implies continued investment in research and training/education, as well as in nuclear research infrastructure, it added. It noted that current governance arrangements require unanimity for approving new Euratom research programmes. This means that the non-nuclear Member States are “effectively able to dictate” that the programme objectives are focused only on safety, radioprotection and waste management.

Source: <http://www.world-nuclear-news.org/>, 06 March 2018.

SAUDI ARABIA

Saudi Cabinet Approves Nuclear Power Program National Policy

Saudi Arabia’s cabinet approved on 13 March the national policy of the atomic energy program, state news agency SPA reported. The national policy includes limiting all nuclear activities to peaceful purposes, within the limits defined by international treaties, SPA said. It also stressed on the importance of optimal utilization of natural resources from nuclear materials and applying best practices for radioactive waste management.

Saudi Arabia, the world’s top oil exporter, wants nuclear power to diversify its energy supply mix. Riyadh is interested in reaching a civilian nuclear cooperation agreement with Washington, and has

invited US firms to take part in developing the kingdom’s first atomic energy programme.

Source: <http://english.alarabiya.net>, 13 March 2018.

Jaitapur is set to be the biggest nuclear project in the world, with a total power capacity of around 10 GW. The agreement defines the project’s industrial framework, the roles and responsibilities of the partners, as well as a planned timetable for the next steps. Under the terms of the agreement, EDF will act as supplier of the EPR technology. EDF will undertake all engineering studies and all component procurement activities for the first two reactors.

NUCLEAR COOPERATION

INDIA–FRANCE

EDF Group and NPCIL Ink Agreement for Six EPRs in Jaitapur

EDF and NPCIL on 10 March signed an agreement for the implementation of six EPR reactors at the Jaitapur site in India. The pact was signed by Lévy, EDF Chairman and CEO, and Sharma, Chairman and CEO of NPCIL. Jaitapur is set to be the biggest nuclear project in the world, with a total power capacity of around 10 GW. The agreement defines the project’s industrial framework, the roles and responsibilities of the partners, as well as a planned timetable for the next steps. Under the

terms of the agreement, EDF will act as supplier of the EPR technology. EDF will undertake all engineering studies and all component procurement activities for the first two reactors. For the other four units, the responsibility for some purchasing activities and studies may be assigned to local companies.

EDF will also provide NPCIL with its valuable experience from the construction of EPR reactors. In its capacity as owner and future operator of the Jaitapur NPP, NPCIL shall be responsible for obtaining all authorisations and certifications required in India, and for constructing all six reactors and site infrastructures. EDF and its industrial partners will assist NPCIL during the construction phase. This industrial framework has already been approved in India and will be bolstered by the complementary skills and experience of the partners involved.

In this manner, the knowledge and expertise required to operate the plant can be readily shared. It will also pave the way for the industrial involvement of Indian companies in the project, opening up possibilities for partnerships within the French nuclear power sector. In this way, the project will be developed in line with Indian policies “Make in India” and “Skill India”, with the ever-increasing participation of local companies, reaching a potential 60% for last two of the six reactors.

The framework agreement has provisions for a preliminary tender by EDF to be submitted in the weeks following its signature, with the objective of producing a binding EDF tender towards the end of 2018. Lévy, the EDF Chairman and CEO stated: The industrial agreement just signed with NPCIL marks a decisive step in the development of the Jaitapur nuclear project, meaning we can now envisage with confidence the rest of this essential project for India and for EDF. We are proud to support the Indian government in its

objective of achieving an energy mix that is 40% carbon-free in 2030. Our presence in India, already tangible in the areas of renewable energies and smart city, is a perfect illustration of our CAP 2030 strategy, which aims to develop a lowcarbon mix and innovative energy services for urban and rural areas”.

Cooperation agreements signed with industrial players in France and India. In addition to the framework agreement with NPCIL, EDF has also signed two cooperation agreements with French and Indian industrial players, setting out the operational foundations for the Jaitapur project: The first such agreement, signed with Assystem, Egis, Reliance and Bouygues, covers the installation of an engineering platform for studies that fall within the scope of the Jaitapur project.

Over the coming months, under the terms of the agreement, the five companies will define the rules for collaborative work with a view to creating a joint-venture. EDF will hold 51% of the joint-venture and will be responsible for engineering integration. The collaborative work aims to reinforce the project’s competitiveness and ensure increasing participation from local companies.

Over the coming months, under the terms of the agreement, the five companies will define the rules for collaborative work with a view to creating a joint-venture. EDF will hold 51% of the joint-venture and will be responsible for engineering integration. The collaborative work aims to reinforce the project’s competitiveness and ensure increasing participation from local companies.

The second agreement, signed with Larsen&Toubro, AFCEN and Bureau Veritas, covers the creation of a training centre compliant with standards for the design and construction of equipment for the nuclear industry (RCC codes). The objective is to train local companies on the technical standards applicable to the manufacture of equipment for the Jaitapur project. ...

Source: <http://energyinfrapost.com>, 10 March 2018.

Unproven Tech Keeps Jaitapur Project Grounded

India and France may have cloaked it well enough not to cloud the visit of French President Emmanuel Macron, but the Jaitapur nuclear power

project has got caught in a logjam that both sides are finding difficult to address.

The problem is with the massive 1,600 MW EPR reactors to be installed in Jaitapur. The technology is yet to be proven despite being under works for over a decade. None of the EPR sites — Flamanville in France, Okiluoto in Finland and Taishan in China — have become functional by way of generating power on a commercial basis.

The AERB guidelines in India are clear that it cannot approve a nuclear power project without a 'reference site', which should be up and running with the same technology. In other words, the technology has to be proven. As a result, India and France may agree to milestone charts or "way forward" agreements like the one reflected in the joint statement issued after Macron's visit, but cannot seal any legal commercial document on the project.

The matter was also discussed within the high-powered Atomic Energy Commission ahead of Macron's visit as France was keen to firm up the general financial agreement on the project. Nuclear scientists from DAE told the Prime Minister's Office that the Jaitapur project will not get AERB approval unless one of the other EPR sites becomes operational. For all practical purposes, the Flamanville project in France is the reference site for Jaitapur. However, the project has already recorded massive time and cost overruns.

This problem means each time there's a visit or a summit, Jaitapur turns into a face-saving exercise. In 2016, when Francois Hollande, the then French President, visited India, both sides agreed in the joint statement to aim to "start the implementation of the (Jaitapur) project in early 2017".

This time with Macron, the joint statement shifts the timeframe to 2018-end. "The two leaders reiterated the goal of commencing works at the Jaitapur site around the end of 2018, and encouraged NPCIL and EDF to accelerate the

contractual discussions in that respect," it read. The fact is that the Nuclear Power Corporation of India Ltd, which is to implement the project on the Indian side, cannot move forward until its 'reference site' is commissioned.

French state-owned utility EDF, which acquired the original contractors Areva, have faced severe roadblocks in getting the EPR off the ground. This, officials said, includes getting qualified manpower as the nuclear building industry in France and most of Europe had folded up in past three decades.

Those familiar with the details told ET that top government officials have also asked the DAE on how it could give its go ahead for this agreement with France in 2008 when the technology was not proven. These sensitive issues, officials said, are now under scrutiny as the project gets evaluated closely.

Source: Pranab Dhal Samanta, <https://economictimes.indiatimes.com>, 14 March 2018.

INDIA–RUSSIA–BANGLADESH

India, Russia, Bangladesh Sign Tripartite Pact for Civil Nuclear Cooperation

In a landmark development India for the first time signed a tripartite agreement on 01 March with foreign partners – Russia & Bangladesh – for civil nuclear cooperation. NPCIL will play a key role in building a nuclear power plant on foreign soil with the proposed supply of equipment and material for the power station being built by Russia in

The AERB guidelines in India are clear that it cannot approve a nuclear power project without a 'reference site', which should be up and running with the same technology. In other words, the technology has to be proven. As a result, India and France may agree to milestone charts or "way forward" agreements.

The AERB guidelines in India are clear that it cannot approve a nuclear power project without a 'reference site', which should be up and running with the same technology. In other words, the technology has to be proven. As a result, India and France may agree to milestone charts or "way forward" agreements.

Bangladesh. India is also extending support for capacity building and has been training Bangladesh nuclear scientists for the project.

The agreement was signed in Moscow on 01 March by Deputy DG of Rosatom (Russia's Alex civil nuclear body) Spassky, Ambassador of Bangladesh in Russia Hoque and Indian Ambassador to Russia Saran. Rosatom is constructing nuclear power plant in Bangladesh on a turnkey contract basis. The scope of work includes design, production and supply of equipment, construction, installation, pre-commissioning and commissioning, according to Rosatom officials.

India having experience in building its nuclear power stations and operating the Kudankulam Plant, built with Russian assistance, showed interest in participating in a Russian project in Bangladesh. The memorandum set a framework for the interaction of the Russian Contractor, Indian and Bangladeshi experts in the implementation of the project. The parties, in particular, will cooperate in the field of personnel training and mentoring, exchange of experience and provision of consulting support. Indian companies can be involved in construction and installation works, the supply of materials and equipment of a non-critical category in the interests of the project, officials told ET.

This will be first ever nuclear power plant in Bangladesh. "Today was a landmark event for both of our countries – and the industry as a whole. We are confident that this is the first step toward the formation of a new, forward-looking cooperation agenda in the region," Spassky said. ...Zulquarnain, Former Chairman of Bangladesh Atomic Energy Commission said, "We still have a long way to go with nuclear technology. Our neighbour India is more advanced than us is regard. Some of the Indian nuclear power plants are built by Russia and the two countries share a good working relation in this regard. Bangladesh can also enter into cooperation with the two

countries and gain from their experiences."

While India has been working with major powers (USA, Russia and Japan) across various sectors as well as firming up joint ventures in third countries in Africa, SE Asia and Central Asia, it would be the first occasion where Delhi will be involved in a civil nuclear project on foreign soil marking India's global entry into a strategic sector. It will also boost the Make in India initiative amid a proposal by Delhi to Moscow for manufacturing of some nuclear power reactor

While India has been working with major powers (USA, Russia and Japan) across various sectors as well as firming up joint ventures in third countries in Africa, SE Asia and Central Asia, it would be the first occasion where Delhi will be involved in a civil nuclear project on foreign soil marking India's global entry into a strategic sector.

equipment in India. Few years back Delhi and Moscow had concluded a pact for joint civil nuclear ventures in third countries. Later India signed a civil nuclear cooperation deal, along with two more related agreements, with Bangladesh last April during PM Hasina's India visit. This was Delhi's second such

agreement in the neighbourhood after an agreement with Sri Lanka reflecting India's growing stature as a responsible nuclear power. The Rooppur plant involves two units, each with a capacity of 1200 MW and is situated on the bank of Padma river. Rooppur NPPs generation units will be based on VVER-1200 reactors of the 3+ generation technology.

The VVER-1200 is the most powerful reactor in Russia and it has three key advantages: it shows high-performance, it is durable and safe. The main feature of VVER-1200 project (one of the world's advanced reactors) is its unique combination of active and passive safety systems, which provide the maximum resistance against external and internal impact, including tornadoes, hurricanes, earthquakes, and plane crash. VVER-1200 technology is also likely to be offered to India for the second set of six Russian built nuclear reactors. This technology uses "post-Fukushima" safety standards for a nuclear power plant, Russian officials told ET.

Source: economictimes.indiatimes.com, 01 March 2018.

INDIA-VIETNAM

India and Vietnam Enhance Nuclear Cooperation

India and Vietnam have signed a MoU to strengthen their cooperation in nuclear energy. The agreement was one of three MoUs signed during Vietnamese President Quang’s visit to India. The MoU was signed on 3 March in New Delhi by Basu, secretary of India’s DAE, and Quy, Vietnam’s deputy minister of foreign affairs. The signing was witnessed by Quang and Indian PM Modi. “The purpose of the MoU is to strengthen the technical cooperation in the field of atomic energy for peaceful purposes,” the Indian PMO said in a statement. The MoU calls for cooperation between the DAE’s Global Centre for Nuclear Energy Partnership (GCNEP) and the Vietnam Atomic Energy Institute (VinAtom).

Vietnam’s Nuclear Plans: In February 2006 the Vietnamese government announced that a 2000 MWe nuclear power plant should be on line by 2020. This general target was confirmed in a nuclear power development plan approved by the government in August 2007, with the target being raised to a total of 8000 MWe nuclear by 2025. A general law on nuclear energy was passed in mid-2008, and a comprehensive legal and regulatory framework is being developed. Since October 2008, two reactors totalling 2000 MWe had been planned at Phuoc Dinh in the southern Ninh Thuan province. A further 2000 MWe was planned at Vinh Hai nearby, followed by a further 6000 MWe by 2030. However, in November 2016, Vietnam’s legislature endorsed the government’s decision

to abandon plans to build the country’s first two nuclear power plants in favour of renewable energy and power imports amid lower crude oil and coal prices.

Source: <http://www.world-nuclear-news.org>, 05 March 2017.

URANIUM PRODUCTION

INDIA

India Plans Tenfold Uranium Output Growth

UCIL ... has outlined a plan for “massive expansion” leading to a tenfold rise in uranium production by 2031-2032. The plan includes maintenance of sustained supply from existing facilities, capacity expansion of some existing units and construction of new production centres (mines and plants) in different parts of the country.

India is planning a tenfold increase in uranium production over the next 15 years, Minister of State Singh told the country’s parliament on 07 March. State company UCIL has outlined expansion plans to meet the DAE vision of achieving self-sufficiency in uranium production. In answer to questions in the Lok Sabha, Singh said UCIL ... has outlined a plan for “massive expansion” leading to a tenfold rise in uranium production by 2031-2032. The plan includes maintenance of sustained supply from existing facilities, capacity expansion of some existing units and construction of new production centres (mines and plants) in different parts of the country, he said.

The expansion is planned in three phases, with the first expected to increase uranium production to 3.5 times existing levels by the “12th year”. Completion of projects in the second phase is expected to achieve a sevenfold expansion over current production, with the third phase of projects leading to a tenfold increase over current levels by 2031-32.

“Considering the resources already identified in different geological basins by Atomic Minerals Directorate for Exploration and Research (AMD), a constituent unit of DAE, UCIL’s major production centres are planned in Jharkhand, Andhra Pradesh,

Karnataka, Telangana, Rajasthan and Meghalaya,” Singh said. The expansion is planned in three phases, with the first expected to increase uranium production to 3.5 times existing levels by the “12th year”. Completion of projects in the second phase is expected to achieve a sevenfold

expansion over current production, with the third phase of projects leading to a tenfold increase over current levels by 2031-32.

According to the 2016 edition of the OECD Nuclear Energy Agency and IAEA joint report on uranium resources, production and demand (the 'Red Book'), India's known conventional uranium resources - reasonably assured resources and inferred - were estimated to be 181 606 tU as of January 2015. Uranium mills currently operate at Jadugudah and Turamdih, both in Jharkand, and Tummalapalle in Andhra Pradesh. India produced 385 tU in 2015. The AMD claimed to have established domestic uranium resources of 232,315 tU as of November last year. ...

Source: <http://world-nuclear-news.org>, 08 March 2018.

USA

Trump Plan Ends Research on Uranium Mining Near Grand Canyon

US scientists studying the effects of uranium mining around the Grand Canyon say they are lacking information on whether the radioactive element is hurting plants, animals and a water source for more than 30 million people. And they would not get to fully gather it if President Trump's 2019 budget proposal is approved. The US Geological Survey is leading a 15-year study meant to determine whether a 1 million-acre area surrounding the national park needs protection from new uranium mining claims well into the future. Now, no one can stake claims until 2032, though a portion of that Obama-era ban is under review by the Trump administration.

No Funding for Study: The agency says it's received far less for its study than what's needed so far and would be left with nothing under Trump's plan, which eliminates the money in favor of other priorities. "We love to provide information," Geological Survey hydrologist Tillman said. "If you don't get the funding to do it, you simply can't do the studies." Former President Obama's administration implemented

the ban in 2012 as uranium prices soared and a flurry of new mining claims came pouring in. It faced a backlash from Republicans, who touted improved mining techniques and lamented job loss in a remote area. Without the study to document the effects of mining, some fear industry supporters would point to a lack of evidence of environmental harm to reopen the area to mining.

Ban Upheld by Federal Appeals Court: A federal appeals court recently upheld the ban, but the US Forest Service is reviewing whether it's necessary on 360,000 acres it manages. It follows an order by Trump to identify regulations that stand in the way of energy production. The ban provided an avenue for the Geological Survey to study

Former President Obama's administration implemented the ban in 2012 as uranium prices soared and a flurry of new mining claims came pouring in. It faced a backlash from Republicans, who touted improved mining techniques and lamented job loss in a remote area. Without the study to document the effects of mining, some fear industry supporters would point to a lack of evidence of environmental harm to reopen the area to mining.

uranium-bearing pipes, groundwater flow, windborne dust, and plants and animals near mines. Of particular concern for the Obama administration was the Colorado River, a lifeline for millions of people in seven Western states that runs nearly 300 miles (483 kilometers) through the Grand Canyon. Those supporting the ban have pointed to the legacy

of death and disease on the nearby Navajo Nation, the country's largest American Indian reservation, from Cold War-era uranium mining and to areas that have elevated levels of uranium.

Proud of their Work: Without the science, the concern is "just opinion," said Balsom, senior adviser to the Grand Canyon National Park superintendent. ...The Geological Survey said its Environmental Health Mission funds the work, allocating \$800,000 to \$1.5 million a year to the studies between 2013 and 2017. That's about half the estimated need annually, the agency said. Trump's 2019 budget proposal nixes all funding for the program. The agency's associate director for environmental studies, Plumlee, said he's proud of the work done so far under budget constraints and will await word from Congress on what science will be produced. Other federal agencies and universities work to fill the knowledge gaps and have contributed funding for the larger effort.

Northern Arizona is rich in high-grade uranium ore, and companies have staked hundreds of claims in the area. Even with the ban, federal agencies estimated a dozen uranium mines would open under claims that were grandfathered in.

Energy Fuels Resources Owns Mines:

The 15-year plan assumed two mines would open and close before the ban expires. But one mine is still trying to get permits and the Canyon Mine about 6 miles from the Grand Canyon’s popular South Rim entrance won’t open unless uranium prices rise significantly. Energy Fuels Resources owns both mines. Company president Chalmers said the Canyon Mine will be mined responsibly and won’t harm people or the environment. He said its footprint is small and the ore extracted could provide an annual supply of power for Arizona. “There will be some people that will say ... ‘uranium mining has contaminated the water in Grand Canyon already,’” he said. “It is false, it is false. Natural contamination from the uranium is already in the system. Mother Nature put it there.”

Source: www.voanews.com, 08 March 2018.

NUCLEAR PROLIFERATION

IRAN

‘Iran Nuke Deal Opened Door to Nuclearization of Entire Mideast’

PM warns that Iran nuke deal encourages other regional powers to pursue nuclear programs, will lead to ‘nuclearization’ of the Middle East. The 2015 JCPOA, better known as the Iran nuclear deal, is liable to lead to the proliferation of nuclear weapons across the Middle East, as regional powers view Western acceptance of Iran’s program as a green-light to pursue their own nuclear aims, Israeli PM

The 15-year plan assumed two mines would open and close before the ban expires. But one mine is still trying to get permits and the Canyon Mine about 6 miles from the Grand Canyon’s popular South Rim entrance won’t open unless uranium prices rise significantly. Energy Fuels Resources owns both mines.

Netanyahu warned. Speaking at the cabinet meeting on 11 March, Netanyahu discussed the content of his recent meetings with senior US officials, including President Trump, US Ambassador to the UN Haley, and senior American lawmakers.

...”The diplomatic talks focused mainly on Iran. I said that the nuclear agreement with Iran

contains within it many dangers for the world, including the special danger of the nuclearization of the Middle East,” continued Netanyahu. “Many countries in the Middle East are saying that they are also allowed to enrich uranium if Iran is allowed to do so; therefore, the way to prevent this danger, the nuclearization of the Middle East, is to either thoroughly correct the agreement or abrogate it. Moreover, I remind you that Iran declares, on an almost daily basis – including recently, its intention to wipe out the State of Israel. It is hardly worth saying that we will not allow this, to put it mildly.” ...

Source: www.israelnationalnews.com, 11 March 2018.

NORTH KOREA

Mattis Goes Silent on North Korea Ahead of Trump-Kim Meeting

US Defense Secretary Mattis said on 11 March he will not publicly discuss issues related to North Korea, deferring to diplomats and the White House, ahead of a proposed meeting between President Trump and North Korea’s leader, Kim Jong Un. Mattis said the situation was simply too sensitive for comment by officials in places such as the Pentagon, which is not directly involved in the

diplomatic outreach.

The 15-year plan assumed two mines would open and close before the ban expires. But one mine is still trying to get permits and the Canyon Mine about 6 miles from the Grand Canyon’s popular South Rim entrance won’t open unless uranium prices rise significantly. Energy Fuels Resources owns both mines.

"I do not want to talk about Korea at all. I will leave it to those who are leading the effort," Mattis told reporters during a flight to Oman. "Because it's that delicate, when you get into a position like this. The potential for misunderstanding remains very high or goes higher." After months of escalating tension over North Korea's advancing nuclear and missile programs, Trump decided to agree to meet with North Korea's leader and become the first sitting US president to do so.

On 10 March, Trump said his meeting could fizzle without an agreement or it could result in "the greatest deal for the world" to ease nuclear tensions between the two countries. "Who knows what's going to happen?" said Trump. Trump's move marked a sharp departure from 60 years of largely arms-length U.S. diplomacy when it comes to North Korea, not to mention his own previous rhetoric against Pyongyang. No venue or date has been announced for the meeting, which is expected to be held by the end of May.

Mattis did not offer any clarity on his expectations, deferring to the State Department, the White House National Security Staff and Trump himself. "Right now every word is going to be nuanced and parsed apart across different cultures, at different times of the day, in different context," he said. "And right now, I want a very straight line from those actually responsible, not from those of us in a supporting or background role."

A White House official said on 09 March Trump remained committed to a meeting based on conditions laid out by South Korea: that Kim is committed to denuclearization, will refrain from any further nuclear or missile tests, and understands that US-South Korean military exercises must continue. The US-South Korean exercises are expected to be held in the coming weeks, raising questions about how the Pentagon would portray them. "I'm sure the White House and the Department of State will be keeping you very well informed," Mattis said.

Source: uk.reuters.com, 11 March 2018.

Trump Says China's Xi Approves of His North Korea Strategy

President Trump said 10 March that China's President Jinping is being "helpful" as the US moves toward a summit with North Korean leader Kim Jong Un. Trump gave few details in a tweet about his telephone conversation with Xi on 09 March, but the White House had said the two leaders committed to keeping the pressure on North Korea until it takes "tangible steps" toward denuclearization. Trump stunned the world by accepting an invitation to meet Kim before the end of May, an unexpected turnabout after months of intensifying brinkmanship that sent tensions soaring.

Trump tweeted that Xi "appreciates that the US is working to solve the

problem diplomatically rather than going with the ominous alternative. China continues to be helpful!" The White House said the ever-more-powerful Chinese president committed to "maintain pressure and sanctions until North Korea takes tangible steps toward complete, verifiable, and irreversible denuclearization."

In another tweet on 10 March, Trump said Japan's Prime Minister Abe also was "very enthusiastic" about talks with North Korea. Trump praised a possible future agreement with the communist North as "very good" for the international community as a whole in a 09 March tweet. "The deal with North Korea is very much in the making and will be, if completed, a very good one for the World. Time and place to be determined," Trump wrote. North Korea's ambassador to the UN, Pak Song il credited the turnabout to Kimm's "broadminded and resolute" decision to contribute to peace and security in the Korean Peninsula. "The US should know and understand our position and should further contribute to the peace and security-building in the Korean Peninsula with [a] sincere position and serious attitude," he wrote in an email to The Washington Post on 09 March.

Trump's move marked a sharp departure from 60 years of largely arms-length U.S. diplomacy when it comes to North Korea, not to mention his own previous rhetoric against Pyongyang. No venue or date has been announced for the meeting, which is expected to be held by the end of May.

As aides scrambled to catch up with Trump's decision, taken before consulting key confidantes, the White House sent mixed messages about conditions. "They've made promises to denuclearize, they've made promises to stop nuclear and missile testing," White House spokeswoman Sanders said. "We're not going to have this meeting take place until we see concrete actions that match the words and the rhetoric of North Korea" she told reporters. Officials behind the scenes said this did not constitute a change of heart.

In The Hague, former secretary of state and Trump rival Clinton questioned the administration's readiness for the diplomatic challenge ahead. "If you want to talk to Kim Jong Un about his nuclear weapons you need experienced diplomats," Clinton told Dutch tabloid Dagblad in an interview published on 10 March. She said the State Department was "being eroded," and experienced diplomats on the North Korean issue were in short supply because many have left.

"You cannot have diplomacy without diplomats," she said, adding "the danger is not being recognized by the Trump government." Clinton's words echo those of veteran diplomat and former US ambassador to the UN, Richardson, who warned that negotiating with North Korea was not "reality television." "It's a real opportunity... I worry about the president's unpreparedness and lack of discipline. But I commend him for his very bold move in accepting the invitation," Richardson told....

Source: /www.newsmax.com, 11 March 2018.

NUCLEAR NON-PROLIFERATION

NORWAY

'Double Standard' On Israel, Pakistan Cripples Nuclear Non-Proliferation

At a conference on tolerance in Europe, a former leader of Norway said that Israel was part of the problem undermining efforts to limit the

proliferation of nuclear weapons. Bondevik, whose last term as Norwegian prime minister ended in 2005, singled out Pakistan, India and the Jewish state in a speech 06 March in Monaco's Casino Monte Carlo during a conference on tolerance by the European Council on Tolerance and Reconciliation — a think tank headed by European Jewish Congress President Kantor and former British PM Blair.

"We have used wars and occupation of Muslim countries," Bondevik, a Lutheran pastor and founder of the Oslo Center, said in prefacing his comments about nuclear proliferation. "Of course

this does not excuse terrorism but we need to be more consistent. The same can be said about nuclear proliferation, but how to approach countries like Pakistan, India and Israel? It this a double standard? We have to question ourselves and we have to be aware that many in the

Muslim world may use this as an excuse and talk of double standard in this regard."

Kantor, the president of the European Jewish Congress and of the European Council on Tolerance and Reconciliation, said that Bondevik's observation is part of "endless talk" on this subject, which he said does not help find practical solutions. "This attitude in which everything is seen as connected, if we continue we will never come to see the realization of our goal: Practical, on-the-ground recommendations for civil society," Kantor said at the conference in Monaco, titled "Tackling Extremism and Intolerance in a Diverse Society."

In 2015, Iran and six other world powers agreed to lift international sanctions from the Islamic Republic in exchange for its dialing back of some elements of its nuclear program, which Western intelligence agencies said was aimed at achieving offensive capabilities. Unlike Iran, India, Pakistan and Israel have not signed the 1968 UN NPT. Both southern Asian countries said they have nuclear weapons. Israel is believed to possess them, as well, but it has neither denied nor confirmed this. In a second possible reference to Israel, Bondevik

They've made promises to denuclearize, they've made promises to stop nuclear and missile testing," White House spokeswoman Sanders said. "We're not going to have this meeting take place until we see concrete actions that match the words and the rhetoric of North Korea.

also said that a main reason for “extremism is humiliation, and occupation can create the feeling of humiliation.”

Source: www.clevelandjewishnews.com/, 06 March 2018.

NUCLEAR DISARMAMENT

GENERAL

PM Turnbull Warns of ‘Dangerous Times’

A meeting between the Australian and New Zealand leaders has thrown into focus starkly different views on banning nuclear weapons. Malcolm Turnbull has warned of “dangerous times” as the world’s nuclear powers look to boost their arsenals. With US President Trump talking up his plans for more nuclear weapons, Russia’s Putin has also announced an array of missiles he says could hit almost any point in the world. “These are dangerous times,” Mr Turnbull told reporters on 02 March in Sydney where he was meeting with New Zealand Prime Minister Ardern.

“Our focus right now ... is in doing everything we can to prevent and arrest nuclear proliferation. “The most stark example is in North Korea, where we are working with our allies and indeed with international partners, including China, in seeking to enforce strict economic sanctions in North Korea to bring that regime to its senses.” But he said Australia would be sticking to its opposition to signing up to a UN ban on nuclear weapons. “The weakness of it, from our perspective, is that the nuclear powers are not a party to it,” Mr Turnbull said. “We work internationally to prevent proliferation. We clearly, all of us, would like to aspire to a world which is free of nuclear weapons but we have to focus on the here and now.” Ms Ardern said NZ’s firm stance against nuclear proliferation had “become part of our identity as a nation”. “We are seeking to expedite the

Malcolm Turnbull has warned of “dangerous times” as the world’s nuclear powers look to boost their arsenals. With US President Trump talking up his plans for more nuclear weapons, Russia’s Putin has also announced an array of missiles he says could hit almost any point in the world.

ratification of that (treaty),” she said.

Source: www.sbs.com.au, 02 March 2018.

NUCLEAR TERRORISM

USA

Two Six Labs to Support SIGMA Anti-nuclear Terrorism Program

Two Six Labs LLC has been awarded a contract by the Defense Advanced Research Projects Agency to support the SIGMA project, aimed at deterring nuclear terrorism. The deal, announced by the Department of Defense, is valued at more than \$13.2 million under the terms of a cost-plus-fixed-fee contract. The SIGMA program, headed by DR Wrobel at the Defense Sciences Office, aims to “revolutionize detection and deterrent capabilities for countering nuclear terrorism.” To do so, the project is focused on developing low-cost, high-efficiency radiation detectors in order to prevent attacks using proliferated and special nuclear materials. Work on the contract will occur in mostly in Arlington, Va., as well as other locations in Virginia, Maryland and Massachusetts, and is expected to be completed in March 2020. More than \$1.5 million will be obligated to Two Six Labs LLC at the time of award from fiscal 2018 research and development funds, according to the Pentagon.

Source: www.upi.com, 02 March 2018.

NUCLEAR SAFETY

QATAR

Qatar Emphasises Importance of Coordination on Nuclear Safety

The State of Qatar stressed the importance of combining national efforts and measures with regional and international measures and adhering to the Vienna Declaration on Nuclear Safety of

2015 in order to confront any trans-boundary nuclear and radiological incidents. In a statement delivered by Thani, permanent representative of the State of Qatar to the UN and international organisations in Vienna, to the session of the Board of Governors of the IAEA held in Vienna, the State of Qatar urged all countries with existing or under-established power reactors to pay greater attention to this subject and apply all safety standards to their facilities and inform member states, in particular geographically neighbouring states and riparian states, of their procedures and allow visits by scientists from states wishing to see the safety of their facilities. Qatar expressed its support for the efforts of IAEA and its Department of Security and Nuclear Safety in supporting the member states to establish a framework for nuclear safety and building national capacities in the field of radiation protection.

Qatar also thanked IAEA Director General Amano for organising a training course in Doha last month, whose main objective was to enhance the knowledge, expertise and skills of those working in facilities dealing with radioactive sources. Qatar stressed the importance of implementing these standards at their highest levels, since they can play an effective role only through the collective cooperation of all member states with IAEA in order to provide the highest safety in nuclear installations and in accordance with the guidelines adopted by IAEA in this area in order to achieve effective control over emergencies in a timely manner.

Ali stressed that Qatar looks forward to strengthening its cooperation with IAEA in the

future, especially as it is ready to implement ambitious programs in different fields of peaceful uses of nuclear energy and development activities. Qatar also expressed support for IAEA's actions in terms of enhancing nuclear safety activities.

Source: www.thepeninsulaqatar.com, 07 March 2018.

Qatar stressed the importance of implementing these standards at their highest levels, since they can play an effective role only through the collective cooperation of all member states with IAEA in order to provide the highest safety in nuclear installations and in accordance with the guidelines adopted by IAEA in this area in order to achieve effective control over emergencies in a timely manner.

USA

Sandia Labs Completes Nuclear Triathlon to Test Spent Fuel Safety

Generating nuclear power requires moving spent radioactive fuel safely over thousands of miles from reactor sites for reprocessing or disposal.

To ensure that this is being carried out with the minimum of risks, SNL recently completed a nuclear "triathlon" that involved moving a simulated cargo of spent fuel rods over 14,500 miles to record the stress and jolts that fuel undergoes in transit.

Up to 2,600 tonnes of spent fuel is produced by the reactors that supply the United States with 20 percent of its electricity. Transporting this fuel is a serious and delicate operation because it not only involves containing the fuel rods in line with the strict regulations of the IAEA.

According to SNL, up to 2,600 tonnes of spent fuel is produced by the reactors that supply the United States with 20 percent of its electricity. Transporting this fuel is a serious and delicate operation because it not only involves containing the fuel rods in

line with the strict regulations of the IAEA, but it must also be done in a way that reassures the public that every possible precaution is being taken.

For over 30 years, the consignments have been stored in 125-tonne Type B casks, which contain up to about 24 tonnes of used fuel in the form of fuel rod assemblies. These consist of rectangular bundles of zirconium rods stuffed with fuel pellets of enriched uranium 235 or plutonium. The casks

are forged out of solid steel with heavily gasketed steel hatches held on by specially reinforced pins that can withstand 100 tonnes of force each. When loaded and sealed, these casks are so strong that they can take a direct hit at their weakest point by a 100 tonne diesel locomotive traveling at 100 mph (160 km/h) and still come away with little more than scratches and superficial dents.

The problem today is that the fuel rods themselves are very fragile. Sitting inside the intense radioactive environment of a critical nuclear reactor for several years, the metal cladding of the rods becomes very brittle and the assemblies require careful handling if they're not to shatter. A similar problem occurs in any routine transportation of fuel rods, where repeated strains place them in danger of unexpectedly snapping.

To understand more about the stresses that these rods undergo, SNL in collaboration with Spanish and South Korean partners as well as Pacific Northwest and Argonne national laboratories, loaded a brand new cask with three dummy fuel rod assemblies. Instead of spent nuclear fuel, the rods were stuffed with lead rope and pellets made of lead or molybdenum. Normally the cask would hold 32 assemblies, but these were special assemblies kitted out with accelerometers and strain gauges to record every bump, rattle and jolt of the journey.

This isn't the first test that SNL has conducted, but it is the most ambitious to date. Three previous tests included reproducing transport strains on a laboratory shaker table, then on a similar table with 50,000 lb (23,000 kg) of concrete to simulate a transport of casks over city streets and rough roads, and a third to simulate a rail journey.

The fourth and most recent "triathlon" test used a Spanish nuclear flask, which was sent on a 14,500 mile land and sea voyage that began with 250 miles over main roads and highways using a

heavy-haul truck from northern Spain to a seaport, where the cask was transferred to a barge and shipped 1,000 miles along the coast to Belgium. There, it was placed aboard a cargo ship headed for Baltimore, 4,000 miles and a fortnight away. Then the cask was set on a flatbed rail car and passed through 12 states as it covered another 2,000 miles to the Transportation Technology Center Inc facility near Pueblo, Colorado for controlled runs on a 50 mile test track. Finally, the whole thing went in reverse as the cask was sent back to Spain.

As the cask traveled, the sensors collected data on shock and vibrations, which was recorded by a bespoke system. The final result is 8 terabytes of data that will take a year to analyze. According to SNL, this treasure trove will allow engineers to evaluate computer models used to estimate fuel rod stresses.

The fourth and most recent "triathlon" test used a Spanish nuclear flask, which was sent on a 14,500 mile land and sea voyage that began with 250 miles over main roads and highways using a heavy-haul truck from northern Spain to a seaport, where the cask was transferred to a barge and shipped 1,000 miles along the coast to Belgium.

"Preliminary results show very low shock and vibration levels, which we will compare to the mechanical properties of fuel that's come out of a nuclear power reactor," says Paul McConnell, project manager for the tests. "Ultimately, we want to understand if the fuel can withstand the accumulation of shocks and vibrations during the journey that could potentially cause a fuel rod to break."

Source: David Szondy, <https://newatlas.com>, 14 March 2018.

NUCLEAR SECURITY

INDIA

Strategic Installations should Go for Regular Cyber-Security Audits

Home Minister Singh on 10 March 2018 asked those in the power, rail and nuclear energy sectors to conduct regular cyber-security audits against potential sabotage bids. Addressing CISF jawans

and officers on the 49th raising day of the paramilitary force at its camp here, Singh said a cyber-security plan against such new age threats should not only be prepared but also strengthened from time to time. The about 1.54-lakh-personnel-strong CISF is tasked with guarding 59 civil airports in the country and other vital facilities in the aerospace, nuclear and electrical power domains among others.

Singh, who took the salute of the CISF anniversary parade, said data theft, fraud and hacking were some of the major threats to India's critical assets and networks in the power sector, railways, nuclear power and airports as there had been attempts to penetrate their defence and breach the firewall. Critical industrial and strategic installations of the country should get a cyber-security audit done regularly to keep a check on potential sabotage and hacking-like attacks, he said.

The veteran BJP leader added that the best strategy to counter these threats was to be "prepared" against them and that keeping this in mind, a new division on cyber security was recently created in his ministry even as there was one at the federal-level, known as the National Critical Information Infrastructure Protection Centre (NCIIPC). "Cyber crimes have added a fourth dimension to industrial security and the response against them has to be effective," he said. Singh urged the CISF to sharpen and upgrade its responses as India was galloping towards becoming a USD 5-trillion economy in the coming days from the current USD 2-2.5 trillion mark. ...

Source: www.clipper28.com, 10 March 2018.

NUCLEAR WASTE MANAGEMENT

TAIWAN

Authorities Say Energy Policies are in Line with Public Demand

The Bureau of Energy, responding to a protest by anti-nuclear demonstrators on 11 March, said the government's energy policies are in line with public demand for improved energy efficiency and the abolition of nuclear power. In a statement released amid an anti-nuclear march on Ketagalan Boulevard in front of the Presidential Office, the bureau expressed hope the public

will get behind the execution of those policies. The protest was held on the seventh anniversary of the meltdown of the Fukushima Daiichi Nuclear Power Plant in northeast Japan on March 11, 2011, with the organizer National Nuclear Abolition Platform demanding the fast-tracking of three nuclear waste bills.

The bills include one on nuclear waste disposal, which is being considered by the Cabinet; the second

on the establishment of a nuclear waste management center, which has been delivered to the Legislature for review; and the third involves revisions of provisions governing the management of radioactive materials. The protesters also urged the government to decommission two aging operating nuclear power plants ahead of scheduled and to repurpose the Fourth Nuclear Power Plant in northern Taiwan, which is currently mothballed.

The energy bureau said the government is currently promoting measures on energy saving,

Data theft, fraud and hacking were some of the major threats to India's critical assets and networks in the power sector, railways, nuclear power and airports as there had been attempts to penetrate their defence and breach the firewall. Critical industrial and strategic installations of the country should get a cyber-security audit done regularly to keep a check on potential sabotage and hacking-like attacks.

The bills include one on nuclear waste disposal, which is being considered by the Cabinet; the second on the establishment of a nuclear waste management center, which has been delivered to the Legislature for review; and the third involves revisions of provisions governing the management of radioactive materials.

creating new energy resources and methods of energy storage, as well integrating intelligent electricity generation systems, so that Taiwan is better able to adapt to a future without nuclear energy. In terms of green energy resources development, the government has set itself the goal of increasing the proportion of renewable energy-generated electricity from 5 percent to 20 percent by 2025, the bureau said. Also efforts are being made to promote solar and wind power and to encourage people to install solar panels on the roofs of their homes, it added.

As for ending the use of nuclear power, the energy bureau said the First and Second Nuclear Power Plants will be decommissioned as scheduled, and that plans are being drawn up to develop the Fourth Nuclear Power Plant into a comprehensive electricity complex equipped with wind, fuel and solar power generators. Meanwhile, state-run Taiwan Power Co. (Taipowr) reiterated that the nation's three operational nuclear power plants will be decommissioned as planned and the nuclear-free home policy will be carried out.

Decommissioning of the First Nuclear Power Plant in New Taipei will start in December, while the Second Nuclear Power Plant, also located in New Taipei, and the Third in Pingtung County will begin decommissioning in 2021 and 2024, respectively, Taipower said.

Even though the Atomic Energy Council has approved the reactivation of the second reactor at the Second Nuclear Power Plant after maintenance work, whether or not it happens will in no way impact the decommission deadline or the goal of developing Taiwan into a nuclear-free homeland by 2025, the company underlined. The Atomic Energy Council, which is in charge of nuclear energy, said in response to the calls of anti-nuclear activists that one of its operational focuses is the disposal of nuclear waste. The

council said in a statement that it supports the drafting of radiative waste management bills and will oversee Taipower's mandatory mission to relocate the nuclear waste stored on Orchid Island, also called as Lanyu, off Taitung County.

Lanyu residents have been demanding the removal of nuclear waste stored on the island for 30 years. Taipower initially promised to remove the nuclear waste from Lanyu by the end of 2002 but has been unable to do so because it has failed to find a new storage site.

Source; <http://focustaiwan.tw>, 11 March 2018.

USA

US May Want to Keep Idaho Nuclear Waste Plant Running Longer

The Idaho treatment plant handles transuranic waste that includes items like work clothing, rags, machine parts and tools that have been contaminated with plutonium, americium or other radioactive elements. The U.S. Nuclear Regulatory Commission says transuranic wastes take much longer to decay and are the most radioactive hazard in high-level waste after 1,000 years.

US officials are considering extending the use of an eastern Idaho nuclear waste treatment facility beyond its scheduled closure this year so it can repackage radioactive waste brought in from other states before it's sent to a permanent disposal site in New Mexico. The US

Department of Energy's Advanced Mixed Waste Treatment Plant at a site that includes the Idaho National Laboratory was originally set to stop operating after it finished treating waste from Idaho this year.

But the Energy Department is considering keeping the \$500 million plant that employs about 600 workers running. ... Hanford, a sprawling Energy Department site in eastern Washington state that contains more than 50 million gallons of radioactive and toxic wastes in underground storage tanks, is a former nuclear weapons production area.

The Idaho treatment plant handles transuranic waste that includes items like work clothing, rags, machine parts and tools that have been contaminated with plutonium, americium or other

radioactive elements. The U.S. Nuclear Regulatory Commission says transuranic wastes take much longer to decay and are the most radioactive hazard in high-level waste after 1,000 years.

The Idaho treatment plant compacts the transuranic waste, making it easier to ship and put into long-term storage at the Waste Isolation Pilot Plant in New Mexico. There's a catch in keeping the Idaho plant operating, though.

In 1995, following years of litigation amid concerns by state officials that Idaho was becoming a nuclear waste dump, the Energy Department signed an agreement with Idaho limiting how much nuclear waste can come into the state. The agreement also requires that waste brought in from out of state be treated within six months of arriving and that it be shipped out within the following six months. ...

Bugger said the timeline in the settlement agreement could be a problem. ... He said part of the problem is a backlog of shipments leaving Idaho due to a backlog of receiving them at the Waste Isolation Pilot Plant, which shut down for several years following a 2014 radiation release that contaminated part of that facility. Wendy Wilson, executive director of Snake River Alliance, a nuclear watchdog group, blasted the idea ring-

in more transuranic waste.

... Idaho is currently preventing spent nuclear fuel into the state for research at the Idaho National Laboratory, the nation's top research nuclear lab, because the Energy Department has broken the 1995 agreement by missing a deadline to clean up other nuclear waste. Still, Wasden said he's "encouraged by recent discussions with DOE officials regarding clean up and future operations at INL."

The Energy Department and Wasden's office said they have been discussing the possibility of keeping the treatment plant running for the last several years. The Energy Department said talks have included Gov. C.L. "Butch" Otter's office. The Idaho Cleanup Project Citizens Advisory Board, a federally-appointed, 12-member panel that makes recommendations to the Energy Department, has been unable to decide about making a recommendation on keeping the treatment plant running. That group has called a special meeting to discuss the matter and possibly make a decision in a conference call on March 28 that will include an opportunity for public comments.

Source: Keith Ridler, <https://www.usnews.com>, 13 March 2018.



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).

Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,

New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: capsnetdroff@gmail.com

Website: www.capsindia.org

Edited by: Director General, CAPS

Editorial Team: Dr. Sitakanta Mishra, Hina Pandey, Chandra Rekha, Dr. Poonam Mann, Wg Cmdr Kaura, Dr Pamreihor Khashimwo

Composed by: CAPS

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