



NUCLEAR SECURITY



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

Vol 11, No. 17, 01 JULY 2017

OPINION – Brahma Chellaney

India's Inward Nuclear Turn

Just as Japan's Diet has ratified the civil nuclear agreement with New Delhi, India has decided to build 10 nuclear power reactors of indigenous design in what is the largest such construction decision in the world since the 2011 Fukushima nuclear disaster. India's turn to a "fully home-grown initiative" reflects the continuing problems in implementing the 2005 Indo-US nuclear deal. India, duped by its own hype over the nuclear deal, had announced plans to import Western reactors costing tens of billions of dollars. The Indian plans helped to motivate Toshiba to acquire Westinghouse - a takeover that ultimately proved a huge blunder, plunging Toshiba into a grave financial crisis.

Japan, a top nuclear-equipment supplier, signed a separate nuclear agreement with India only in 2016 after other supplier-nations had already concluded such accords. The recent Japanese parliamentary approval removes a critical missing link in commercialising the Indo-US deal. It, however, has come when Westinghouse, GE Hitachi and Areva which dominate the international reactor export business - are in a dire financial state, with their futures hanging in balance.

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Having invested considerable political capital in the vaunted Indo-US deal, India today confronts

an embarrassing situation: the nuclear power promise is fading globally before New Delhi has signed a single reactor contract as part of that deal. To save face, India, with one of the world's oldest nuclear energy programmes, has embarked on a major expansion of domestically designed power reactors. That the decision to construct 10 reactors of 700 MWs capacity each is monumental is

underscored by the fact that the total size of these units surpasses the current installed nuclear

generating capacity in the country. India has 22 nuclear power reactors in operation, with capacity of 6,780 MWe but producing 6,219 MWe. To be clear, the 10 reactors will be in addition to seven others already under construction, with a combined capacity of 5,300 MWe.

The 10-reactor decision fits well with India's commitment under the Paris climate accord to reduce reliance on fossil fuels. The single-minded focus on carbon, however, threatens to exacerbate India's water crisis, given the water guzzling nature of the energy sector, especially nuclear power. Moreover, US President Trump's decision to exit the Paris accord has cast unflattering light on the onerous climate-related obligations India has taken on before it has provided electricity to all its citizens.

Given that the Indian nuclear plant construction time frame averages seven years, India's decision to ramp up its nuclear power capacity may contribute little to meeting its goal of making 24hour electricity available to all villages and towns by 2022. But the decision will yield major economic dividends, including boosting domestic industry and creating tens of thousands of jobs. By providing \$11 billion worth of likely manufacturing orders to Indian industry, the decision will help to transform the domestic nuclear industry.

By contrast, had India relied primarily on imports of Western reactors to accelerate new capacity additions, the financial costs would have been considerably higher, without tangible benefits accruing to domestic industry. In fact, with India already a top weapons importer, reliance on Western reactors would have made it the world's largest importer of nuclear power plants - a double whammy for Indian

taxpayers, especially given that the country is the only major Asian economy that is import dependent rather than export driven.

In this light, the travails of the Indo-US deal may be a blessing in disguise for India. But for the serious financial woes of Westinghouse, GE Hitachi and Areva - each of which was to build a cluster of reactors at a separate Indian park - Indian taxpayers would have been potentially saddled with plants like Areva's reactor project in Finland, which is currently almost a decade behind schedule and billions of euros over budget. To be sure, a dispute with Western suppliers over nuclear accident liability also put a break on India's reactor-import plans.

Nuclear power may be on a downward trajectory globally, yet it has earned a rightful place in India's energy mix. The country's domestic nuclear power industry, without technological assistance from overseas, has done a good job in beating the mean global plant-construction time frame and in producing electricity at a price that is the envy of Western reactor vendors. For many in India's governing elite, the nuclear deal with the US - despite the conditions quietly put into the American ratifying legislation - became the acme of their aspirations for the country. They believed the deal would turn the US into India's enduring benefactor and catapult the country into the big-power league.

It has taken 12 years for Indian hype over the nuclear deal to give way to sober realism. A cost-benefit analysis has helped to lower India's expectations from the deal. India may still buy some Western reactors, but the latest decision clearly signals that its focus will be on building its own reactors. By emphasising its reactor models, India is laying the base for its potential emergence

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as a reactor exporter. The inward turn reaffirms India's embrace of a zero-carbon power source and underscores its faith in the likely advent of commercially attractive reactors based not on uranium - a resource it lacks - but on thorium, which it has in plenty.

Source: <http://economictimes.indiatimes.com/>, 22 June 2017.

OPINION – Chris Baraniuk

How Should We Manage Nuclear Energy?

At a quarter to four in the afternoon on 11 March 2011, a 14-metre tsunami crashed over the defensive seawall at the Fukushima Daiichi nuclear power plant. But the seawall was only designed to protect the plant, situated on Japan's eastern coast, from waves no higher than 5.7 metres. What followed was a tragedy that highlighted the grand challenge of managing nuclear energy – a powerful, complicated, expensive source of power.

Fukushima Daiichi's own electricity supply had been shut down about an hour earlier that day, after the 9.0 magnitude earthquake that caused the waves. Cooling of the reactors – needed to stop them overheating – was therefore reliant on diesel generators. But the 14-metre wave disabled most of these, washing fuel tanks away. Three reactors went into meltdown as a result.

The earthquake and tsunami claimed the lives of three workers of the plant – and nearly 16,000 lives of people in the region. More than 100,000 local people were evacuated and the plant is still the subject of a large and troubled clean-up project – which has been estimated to cost \$100bn. "I was at the [US NRC] during the Fukushima disaster," recalls William Magwood IV, DG of the OECD NEA. "Anyone in our organisation that day would tell you it didn't feel like it was in Japan, it felt like it was in the US. We took it very personally."

Nuclear energy has long struggled to convince sceptics, fearful of accidents and the long-term

hazards of radioactive waste. But these issues are now compounded with market forces currently favouring cheap fossil fuels, like natural gas, over the high cost of installing new nuclear power stations. Can atom-splitting keep up? Will nuclear energy survive the 21st Century?

One-time Energy Poster Child. After Fukushima, the industry "rallied", adds Magwood, pointing out that ever since, regulators and technicians have been working on nuclear safety and plant design to try and ensure a similar accident cannot happen again. But it's important not to understate the impact Fukushima had on the nuclear industry. Partly as a result of the disaster, Germany decided to phase out nuclear power altogether by 2022. And some places closer to Fukushima geographically were even more

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disturbed by the incident. Even South Korea, which has spent years building up its nuclear energy industry, is now considering scaling back. Public opinion of nuclear power in Japan itself has been severely rocked, too.

"I was in Hawaii after [the Fukushima incident] and there were extreme fears in Hawaii of radiation getting to us," remembers Robert Rapier at green energy firm Advanced Green Innovations. "If you asked in Hawaii whether they want a nuclear plant, they would say, 'Absolutely not, not anywhere near.'" It is a far cry from the hype of the 1950s, when promotional films about nuclear power told people that it might provide a practically endless energy supply. It could even routinely power ships, planes and trains – not just giant power stations supplying entire cities. It was a time when nuclear power was still being theorised as a large-scale energy source, but scientists already knew the power of nuclear fission. The possibilities seemed endless.

But today, in some places, it seems like nuclear just can't catch a break. The Swiss recently voted to ban nuclear power plants and invest in renewable energy instead – a sign that in some markets at least, renewable are winning over the public. And yet, many

countries have by no means given up on nuclear power.

Some Nations Remain Undeterred: In 2017, China plans to finish building five new reactors – and start working on eight more. France is still hugely reliant on nuclear since it provides roughly 75% of its energy. And the UK recently approved the construction of Hinkley Point C, a 3.2 GW plant, which will be the country’s largest in terms of generating capacity. Those who argue that it is a bad idea to dismiss nuclear power – including former NASA climate scientist James Hansen – point out that the variability of renewable energy makes it very difficult for large, developed countries in particular to rely on. The late Prof Sir David MacKay, the UK’s former chief scientific adviser, also said that wind, solar and biomass from plant-based sources would need to cover huge swathes of Britain’s land and sea – and cost too much – to provide all of the nation’s energy.

These projections continue to be the subject of some debate, but those who back nuclear energy believe it is practically the only way of providing a reliable base load – the minimum energy requirements for a country – without excessive carbon emissions or other forms of pollution. Nuclear energy still has something of an image problem. Keen observers like Rapier say the plants could be designed to be safer than they are today. He advocates “fail-safe” systems, where even catastrophic loss of power and back-up generation would not stop reactors from being able to cool themselves or enter a safer state of operation. Reactors cooled with molten salt are currently being researched at the Shanghai Institute of Applied Physics, for example. In theory, they can’t suffer the disastrous meltdowns that can occur in traditional designs.

This is because the fuel in the reactor is dissolved into molten salt, which reaches very high

temperatures of around 700C. As this fuel expands during nuclear fission, some of it is pushed away into a circulation loop away from the main reaction. That keeps a check on activity in the reactor.

Sky-high Costs: A more immediate concern for many in the industry, perhaps, is the high cost of nuclear energy when compared to cheaper alternatives – notably natural gas, the price of which has recently crashed. In the US for example, it was recently reported that the energy cost per kilowatt hour from a new nuclear power plant is 2 cents higher than that from a new natural gas plant. That’s a big enough difference to deter investors, especially because new nuclear facilities cost much more to build than natural gas stations.

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Nuclear proponents like Matthew Wald at the US NEI argue that goals to reduce greenhouse gas emissions must be combined with investment in nuclear infrastructure. “We disagree that the market is working because among the benefits that the market wants but does not presently pay for is clean air,” he explains. “In some [US] states there is an explicit goal to reduce carbon dioxide emissions.”

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are routed between states) in the US could, for example, adjust electricity prices based on carbon emissions so that cleaner resources become more competitive. That would likely take a lot of political will, however. Magwood says the market is essentially “dysfunctional”

in many developed countries, due to the short-term attitude of those eyeing fossil fuel investments. He suggests this effect has helped to stall nuclear, though he acknowledges the extremely high cost of building new plants. The plants may last between 50 and 100 years in the end, but they remain difficult for investors to stomach, thanks to energy sources like new gas-fired facilities being comparatively

cheap to set up. To take an example: Hinkley Point C, the UK's latest nuclear project, could end up costing £37bn to build and run, some have estimated.

The Challenge of Dismantling:

And then there is the cost of dismantling a plant once it can no longer be used to generate electricity. This process, decommissioning, takes decades and has many of its own safety risks due to radiation and the complexity of the structures. Kym Jarvis, a scientist and entrepreneur at Viridian Consultants has helped to develop new technology that may help those working in such conditions to eventually decommission nuclear plants in the future. It's called the Viridiscopes and allows small pieces of, for example, a concrete wall to be removed – or ablated – with a laser, so they can then be analysed for radioactivity. It can even be mounted on a robot to quickly reach areas higher up without the need to erect scaffolding. The Viridiscopes will be trialled at five nuclear sites in the UK by spring 2018.

Jarvis and her colleagues are working on tools like this that they hope will make the decommissioning process safer and faster. That might sustain nuclear energy's appeal in the 21st Century, but she notes that the nuclear industry, traditionally, has not adopted new technologies very quickly. "It doesn't take on innovation and change very well and I think it knows that," she says.

"We've noticed in the past 12 to 18 months that the willingness to look at new innovation is becoming much better." But there are all sorts of snags when working in this highly complicated area that businesses elsewhere don't have to think about. "There is the possibility that our equipment will become contaminated and we can never have it back again – and we can't get insurance for that," explains Jarvis, pointing out one example.

Prices Need to Drop: The cost of nuclear infrastructure will have to come down, says Kirsty

Gogan, an environmental campaigner at Energy for Humanity. She suggests moving towards reactors or reactor components that can be more easily and cheaply mass produced in factories. Smaller, "modular" reactors have recently been proposed as a potential way to achieve this. Perhaps they will help nuclear facilities survive as a more sustainable option in the 21st Century.

Companies behind

the development of these devices, including NuScale, argue that they would be easier to produce and install – and also perhaps safer because the designs might be well understood across the industry. There's the possibility that they could be more easily exported to other countries and shipped to emerging markets, as well. But there are downsides. These smaller, easier-to-install movable reactors still need to be contained safely, and the cost of building multiple containments for small reactors at many different sites would be very great. On the other hand, containing more than a few at a single site could make the project comparable in cost and complexity to existing, larger reactor designs, some say.

New Reactor Design?: Research into novel reactor designs continues, however. Another option is the TWR, which would use uranium that has not gone through the process of enrichment – which

increases the proportion of U-235 in the material – before it can be used in conventional reactors. In a TWR, a small amount of U-235, which is able to undergo nuclear fission, is inserted within a mass of U-238. Proponents believe that makes it a more efficient and more dependable energy source. The Canadian Nuclear Association is also pursuing this technology.

"It starts to breed fissionable material – and it consumes that fuel as it builds up," says John Gilleland, chief technological officer of TerraPower, pointing out that this might reduce the need for

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enrichment plants. That could make the nuclear fuel supply chain simpler and less expensive. "This goes on indefinitely." In fact, the reaction could continue for a few decades. Gilleland says TerraPower is in a position to start construction on a working reactor within a couple of years from now.

What to Do with Waste?: Of course, there remains the issue of what to do with nuclear waste. Nuclear fuel – say, a uranium rod – becomes waste when the atoms within it have been bombarded with neutrons. Some of those atoms within the rod get broken up in this process, changing the element in the material and forming highly radioactive isotopes. Spent fuel and radioactive power plant materials remain dangerous for thousands of years. Many experts agree that deep geological repositories, into which tightly sealed containers of waste can be buried within concrete and rock, are the best solution. Finland and Germany are two countries pushing ahead with plans for these. But the long-term stability of such facilities has never been tested – which understandably can cause concern to those living near them.

The short-term energy market may not be very favourable to nuclear energy right now in some places, but clean energy advocates have started to take the industry under their wing. A good case-in-point is California, where protestors recently called for the Diablo Canyon nuclear power plant to remain open. The costs of opening a new plant remain prohibitive and there are investment risks involved that surely put many of these projects – hence industry desire for governments to roll out nuclear-friendly policy.

But the enthusiasts make a good point. A nuclear power plant lasts much longer than many renewable energy assets like wind turbines. Plus, if carefully designed and managed, it can actually be a very clean and safe source of power. For many, that's just what the future needs. "You're building an asset that

could run for 80 years," says Wald, "You have to be thinking far ahead."

Source: <http://www.bbc.com/>, 23 June 2017.

OPINION – Japan Times

Japan Should Join Negotiations to Ban Nuclear Weapons

The second round of negotiations to create a global treaty to outlaw nuclear weapons started at the UN and is scheduled to conclude July 7. Japan, which relies on the US nuclear umbrella, has boycotted the talks, apparently out of concern that its participation could complicate its relationship with the US. The Abe administration should reconsider whether its stance is beneficial for Japan — the only nation in history to suffer a nuclear attack. Japan should take part in the negotiations and seriously seek ways to bridge the differences between the nuclear weapons powers, which oppose the treaty, and the non-nuclear weapons states that are pushing forward with the accord. A failure to take concrete action in this direction could imperil Japan's credibility as a country serious about nuclear disarmament.

Last December, the UNGA adopted a resolution calling for the start of the treaty talks, with 113 members voting for it and 35 others, including the US, Russia, Britain and France — all of which are nuclear powers — and Japan, voting against it. Thirteen other members, including China and the Netherlands — a

NATO member that is under the US nuclear umbrella — abstained from the vote. Following the first round of negotiations on the prospective treaty, Costa Rica, which serves as chair of the talks, submitted a draft treaty in late May.

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ideal is founded on “the catastrophic humanitarian consequences that would result from any use of nuclear weapons,” a phrase appearing at the outset of the preamble, and that it takes into consideration the pains of survivors of the nuclear-bombed cities of Hiroshima and Nagasaki, who still suffer from health damage caused by the radiation and have played an important role in rousing global opinion against nuclear arms. The preamble says the catastrophic consequences of nuclear weapons “pose grave implication for human survival” and mentions “the suffering of the victims of the use of nuclear weapons (Hibakusha) as well as of those affected by the testing of nuclear weapons.”

The draft treaty binds state parties to “never under any circumstances ... develop, produce, manufacture, otherwise acquire, possess or stockpile nuclear weapons or other nuclear explosive devices ... (or) use nuclear weapons.” It prohibits conducting nuclear weapons test explosions and transferring nuclear arsenals and control over them to any other state. It likewise bans receiving the transfer of nuclear weapons and accepting control over them.

Although the draft stops short of outlawing the threat of the use of nuclear weapons, it obliges state parties to “never ... assist, encourage, or induce, in any way, anyone to engage in any activity prohibited to a state party under the convention” — apparently with countries under a nuclear umbrella in mind. This part of the draft treaty can be taken as an effort to challenge the idea of extended nuclear deterrence, under which a nuclear weapons state seeks to prevent a nuclear attack against an ally by indicating its readiness to use its own nuclear weapons in retaliation.

Unfortunately, all states possessing nuclear weapons, including the US, Russia and China,

have refused to take part in the treaty negotiations, and all countries relying on the US nuclear umbrella, except the Netherlands, have followed suit. Explaining its nonparticipation in the talks, Japan said that if the negotiations proceed without the participation of the nuclear weapons powers, it would cause the schism in the international community to deepen, making it difficult for it to take part in the talks “in a constructive manner and in good faith.”

Japan also thinks that at a time when North Korea continues to carry out nuclear weapons and ballistic missile tests, US nuclear deterrence is as important as ever. But if Japan continues to oppose the treaty-based ideal of outlawing nuclear weapons and emphasizes the importance of

nuclear deterrence as its security umbrella, North Korea has an excuse to rely further on its nuclear weapons as diplomatic leverage and even to justify their use.

Japan should immediately take part in the treaty negotiations and contribute to devising a system under which nuclear weapons states can join the treaty in the future and then begin a process of reducing and

eventually eliminating nuclear weapons. It should not forget that given the large number of nations that support the treaty, it is likely to be adopted, and that if it enters into force it will have a global moral weight even without the participation of the nuclear weapons powers.

Opponents of the planned treaty have argued that it would weaken the regime of the NPT. But the draft treaty characterizes the NPT as “an essential foundation for the pursuit of nuclear disarmament.” Japan should make sincere efforts to create a system under which both the NPT and the global treaty outlawing nuclear weapons can co-exist.

Source: <http://www.japantimes.co.jp/>, 21 June 2017.

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OPINION – Jack Caravelli, Sebastian Maier

Has Iran Laid the Groundwork to Develop Nuclear Weapons on A Moment's Notice?

Hailed as a diplomatic breakthrough at its signing in July 2015, Iran's nuclear agreement with leading members of the international community—formally known as the JCPOA—has achieved some notable short-term successes, many in Iran's favor. Most, not all, of Iran's nuclear activities are either frozen or highly circumscribed. In exchange, Iran is reaping the benefit of receipt of billions of dollars in previously frozen assets as well as a return to international commerce where Europe and China, among others, are seeking to invigorate trade and investment with the theocratic regime. This will be a boon for Iran's chronically mismanaged and struggling economy.

The bad news is that it is misleading to conclude that Iran's nuclear ambitions have been shuttered or that those ambitions will no longer pose a threat to the security and stability of the Middle East or beyond. This is because the agreement has finite limits, ranging from 10 years to 15 years depending on the issue. For the time being, Iran has incentives to abide by the agreement's terms, beginning with its financial windfall and reintegration into the international community. None of that has lessened Iran's fervor for supporting terrorism or the murderous regime of Syrian President Bashar al-Assad.

Moreover, even now there are signs Iran in the long-term has no plans to abandon its nuclear program—and all that implies for the possible development of nuclear weapons. A recent report from the highly credible Institute for Science and International Security takes note of a statement from Ali Akbar Salehi, the director of the AEO of Iran. According to the Institute report and quoting Salehi, Iran "has the capability to initiate mass

production of advanced centrifuges on short notice." Centrifuges are the machinery that enriches uranium and creates the fissile material needed to make a nuclear weapon.

While Iran may make the specious claim it has the right to do so in coming years, on practical grounds there should be no reason for Iran to devote resources to this activity if it does not intend, as it so claims, to pursue a nuclear weapons capability. Mass production of advanced centrifuges, if carried out, would give Iran a decided advantage if it wanted to shorten a rush to a nuclear weapon.

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Similarly, Iran continues to develop its ballistic missile program, an element of its defence regime that was left unhindered in the nuclear negotiations except for the fact that existing UN sanctions on the missile program are to be lifted in about six years.

The capability to deliver nuclear weapons to targets is all important; Iran recognizes this requirement

and makes no secret of its commitment to maintaining and advancing its program. At present, Iran has ballistic missiles capable of attacking targets throughout the Middle East and probably beyond. In addition, Iran also continues to defy repeated international requests to come clean on suspect activities at the Parchin military facility where suspicions for years have been high that Iran carried out high explosives testing that can only be useful in developing a nuclear weapon.

Much of the international community would be pleased to see these and related questions not resurface but they are inconvenient truths that if left unaddressed may well lead to a future crisis. The mechanism to take up these issues is the Vienna-based IAEA. Most nations around the globe are IAEA members and they merit a clear understanding of Iran's activities, in no small measure to convince them that the international community can deal with Iran successfully and that Iranian actions can be monitored credibly.

That conclusion cannot be reached with credibility until much more is known about the pace and scope of Iran's nuclear and missile activities. Until those questions are resolved it is fair to conclude that Iran's actions since the signing of the JCPOA are troubling and raise new suspicions.

Source: <http://thehill.com/>, 24 June 2017.

OPINION – George Erickson

Nuclear Power is the Safe Alternative Energy

In a May *Mesabi Daily News* article, former Texas Gov. Rick Perry praised President Trump, saying that "Trump Will Show us the Way to Clean Energy," thereby proving then-candidate Trump correct when he said that "Perry should be forced to take an IQ test before being allowed to enter the GOP debates." Perry then described Texas in glowing terms that predictably failed to admit that Texas is the fifth most polluted state in the Union, and that it ranks number one in releasing toxic chemicals and carcinogens into the atmosphere and water. That pollution is partly due to Texas' rampant fracking for the natural gas that inefficient, "renewable," wind and solar farms depend on to provide 70% of their rated power.

A week or so later, the July 6 MDN published a thoughtful article about biomass, which has been promoted as a "green" energy source by those who like the colour of money, regardless of the cost to the environment. Biomass, to put it bluntly, is worse than lignite, the dirty runt of the coal family. Biomass is primarily used to support 30% efficient solar and windfarms, which need backup power when it isn't sufficiently sunny or windy, which is about 70% of the time.

In an April 5, 2017 *Spectator* article titled "The Flawed Thinking at the Heart of the Renewable Energy Swindle", Bjorn Lomborg pointed out the absurdity of believing that burning biomass is green, writing that EU countries, the largest burners of biomass, take "the fictitious position that biomass produces no CO2." (The 2009 EU directive states, "Emissions from the fuel... shall be taken to be zero.") "Even in the rich world, burning wood – encouraged by rising energy costs from green policies – is becoming a leading cause

of death. In Prague, 27% of the dangerous air pollution in winter comes from wood smoke; in southern Germany, it can reach 59%.... Biomass is a terrible short-term answer to global warming. By incentivizing its use, policy-makers are...destroying biodiversity and killing tens of thousands from air pollution," wrote Lomborg. (Biomass smoke contains carcinogens like chromium, lead, nickel, benzene, toluene and formaldehyde.)

As I wrote in *Unintended Consequences: the Lie That Killed Millions and Accelerated Climate Change*.... "Biomass advocates claim that the carbon dioxide produced by burning biomass will be absorbed by forests, which supposedly makes it renewable – but that's ludicrous. When we burn fuel to level our forests, we create more CO2 while leaving fewer trees to absorb the CO2 created by subsequently burning the biomass. Due to increasing European demand, wood pellet production is predicted to consume an additional 15 million acres of our CO2-consuming, oxygen-producing forests within just a few years. Furthermore, wood-burning power plants, because of their low efficiency, emit about 50percent more CO2 than coal per unit of energy produced than burning coal. How "green" is that?

As *Unintended Consequences* explains, we accepted these inefficient, short-lived, resource-consuming, carbon dioxide-producing, environment-damaging "alternatives" because of a multi-decade, anti-nuclear campaign led by fearful, science-deficient greens who were supported by carbon companies that know that nuclear power, the safest of all means of electricity production, will slash their profits.

The June 6 article also mentioned nuclear "waste", an issue that is always raised by the opponents of nuclear power. Here are the facts: Nuclear power is statistically the safest, most efficient, environment-friendly means of producing electricity. During operation, breakdown products accumulate in the uranium pellets that power the reactor, making those pellets "inefficient" for generating power. However, those breakdown products can be removed by recycling, which the

French do, and so should we, because the remaining uranium can then be used as fuel in a continuing process that eventually reduces waste by at least 80 percent.

All of the waste (potential fuel) created by civilian nuclear power plants since the 1960s could be stored in 9-foot tall concrete cylinders on a single football field, and because only about 15% is long-term hazardous, this “waste” is a much smaller problem than critics always imply. Furthermore, we know how to make walk-away-safe reactors that cannot melt down and can even consume unrecycled “waste” as fuel. One of these reactors ran successfully for 22,000 hours during the Nixon administration, but the project was terminated due to a very short-sighted political decision.

Russia, India and China are developing these super-safe, highly efficient, environment-friendly reactors because they are not hampered by fearful, science-deficient, anti-nuclear zealots and organizations that prefer to support inefficient “renewables” that need natural gas-burning power plants to supply the 70% of the power they never produce, which is why “renewables” are supported by a fracking industry that leaks methane (a powerful greenhouse gas) so badly that it is offsetting any gains we have made from reducing our dependence on coal. Again, how green is that? Only when the last tree has died, and the last river has been poisoned, and the last fish has been caught, will we realize that we cannot eat money.

Source: <http://www.virginiamn.com/>, 20 June 2017.

NUCLEAR STRATEGY

NORTH KOREA

North Korea Can Now Target Japan with a Nuclear Missile

One of North Korea’s missile test-firings in May suggests that the country’s ballistics development program is nearly complete. On May 14,

Pyongyang launched an intermediate-range missile, what it calls a Hwasong-12. The projectile reached an altitude of more than 2,000km – well out of the Earth’s atmosphere, which is about 480km thick – then hit the Sea of Japan while traveling at least Mach 15. Mach 1 is the speed of sound. Mach 2 is twice that. That the missile did not disintegrate upon its re-entry into the atmosphere shows that it is capable of carrying and delivering a warhead.

Furthermore, it is believed that the missile’s electronics were able to keep measuring the inside temperature, flying speed and perhaps other data – and send the information back to ground control. Sometime later, a national security source who is

familiar with Japan’s missile defense circumstances told me, “North Korea appears to have completed the development of a Japan-targeted nuclear missile.”

Ballistic missiles typically fly in three phases: slowly gaining altitude, remaining in space and finally re-

entering Earth’s atmosphere. There are missile defense systems designed to target a missile at each of these stages. The Aegis anti-missile system used by Japan’s Maritime Self-Defense Force tries to intercept missiles at the second stage. Just not at 2,000km. An advanced Aegis system can send an intercept missile up to 1,000km.

Japan could possibly consider deploying a land-based missile defense system like Aegis Ashore, but such systems offer no guarantees. Moving targets are hard to hit, especially when they’re moving at Mach 15. The Self-Defense Forces also have Patriot PAC-3 surface-to-air intercept missiles at their disposal. These are designed to intercept a missile as it re-enters the atmosphere – but not those traveling as fast as the Hwasong-12.

Terminal High Altitude Area Defense systems, also known as THAAD, could be deployed in Japan one day, but even their probability of interception is

All of the waste (potential fuel) created by civilian nuclear power plants since the 1960s could be stored in 9-foot tall concrete cylinders on a single football field, and because only about 15% is long-term hazardous, this “waste” is a much smaller problem than critics always imply.

low. Even though Japan has spent massive amounts deploying US-made missile defense systems, it still has no shield against North Korea's latest missile.

Let's look at a related matter: How did North Korea manage to accelerate its missile development program? I believe another country is aiding Pyongyang. A national security source recently told me Russia has been inviting young, talented North Korean engineers to its research facilities, then teaching them about key ballistic missile technology.

During the Cold War, China imitated Soviet-made short-range Scud missiles. Pyongyang obtained blueprints from China and began making its own Scuds. Later, after their country collapsed, a number of suddenly jobless Soviet engineers found work in North Korea.

So today's North Korean engineers are at least familiar with Soviet and Russian missile technologies. Earlier, Russian President Vladimir Putin defended Pyongyang's nuclear development program, saying that a small country like North Korea has no other option but to possess nukes if it wants to maintain its independence and security. Russia has also OK'd a cargo-passenger ship route between the two countries. Moscow seems to be becoming increasingly supportive of Pyongyang. But its military aid to the country goes way back.

Time for another question: What could Russia hope to gain by helping to arm North Korea with nuclear missiles? We have to take in the big picture here. Russia has been supporting the regime of Syrian President Bashar al-Assad, while the US and other Western powers oppose Assad. This is why the Syrian conflict is often referred to

as a proxy war between Russia and the US

Moscow is also building up its military presence on its borders with Estonia and Latvia — two former Soviet states that chose independence after the Soviet Union disintegrated and later became members of NATO. NATO's founding principle is collective self defense by all members should one be attacked by external forces. It began in 1949 with 12 member states and now has 29.

From our broad perspective we see Russia is applying pressure in the Middle East as well as in Eastern Europe. If it can do the same in Northeast Asia, it can dilute the US military's focus. In this sense, North

Korea is a tool Russia is using — and with little effort — to annoy the US. Like NATO, the US and Japan have a security pact that calls on the US to defend Japan should the Asian nation come under attack.

Russia could also be using North Korea as a testing ground for its missile capabilities. The treaty on intermediate-range nuclear forces, agreed to between the US and Russia, bans both parties from possessing such weapons. Why break such a treaty when North Korea is willing to test your technology for you?

Meanwhile, Japan is obsessed with the idea of enhancing its missile defense systems — despite

the apparent impossibility of such a mission. The 2011 earthquake and tsunami revealed that Japan lacks satisfactory quartermaster and field support capabilities. There have been no improvements in the intervening years. This is largely because the government has focused on acquiring extremely expensive — not to mention fallible — anti-missile systems. But without sufficient field

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support, how can the country's self defense forces take on enemies in a conventional war? The government should be able to oversee all of its defense and security needs.

Source: Tetsuro Kosaka, <http://asia.nikkei.com>, 25 June 2017.

North Korea Performs Test of Rocket Engine for ICBM

The regime of North Korea's leader Kim Jong-un has carried out a new test of a rocket engine that could be used for powering an ICBM, the weapon that can threaten directly the US mainland, according to a report citing US officials. North Korea had tested a new high-thrust rocket engine under the "supervision" of its "supreme" leader Kim Jong-un as recently as March 2017. Earlier, on behalf of the Kim Jong-un regime, North Korea's Ambassador to India offered the US a conditional moratorium on his country's nuclear and ballistic missile tests.

The offer which is seen as an attempt to hold direct talks with the US comes against the backdrop of the death of US college student Otto Warmbier who has passed away after 17 months in North Korean captivity, and South Korea's decision to suspend the further deployment of the US THAAD missile shield. In the latest of its constant ballistic missile provocations, in early June, North Korea fired several ASCM. North Korea's previous ballistic missile firing was at the end of May when the regime of Kim Jong-un has alleged that it had been a successful test of a precision-guided system as it was known to be in pursuit of developing an "aircraft carrier killer", i.e. an ASBM.

North Korea has performed 11th ballistic missile tests since Trump became President of the US, with eight successful and three failed tests. The

recent North Korean provocations have led South Korea to admit that the missile program of Kim Jong-un's regime is advancing faster than thought, and that a war might be in the making. North Korea's regime has claimed that its new rocket could deliver a "large heavy nuclear warhead" all the way to the US mainland.

Ongoing activity and a large number of people have been spotted at North Korea's nuclear test site, the Punggye-ri Nuclear Test Facility, amid lingering concerns that the regime of leader Kim Jong-un could carry out its sixth nuclear test. There have been reports that North Korea has been bracing for a pre-emptive US missile strike similar to the missile strike on the regime of Syrian President Bashar al-Assad in response to the April 4 attack with chemical weapons. In early June, the US Treasury Department's OFAC imposed new sanctions on North Korea and entities trading with it over its ongoing development of WMD and continued violations of UNSC resolutions.

North Korea's Rocket Engine Test: North Korea's regime has carried out another test of a rocket engine that could be part of its program to develop an ICBM capable of striking the US homeland, a US official told Reuters. Speaking on the condition of anonymity, the official said the US assessed that the test could be for the smallest stage of an ICBM rocket engine. A second US official also confirmed the test but did not provide additional details on the type of rocket component that was being tested or whether it fit into the ICBM program.

North Korea's state media, which is normally quick to publicize successful missile-related developments, did not carry any reports on the engine test. South Korean officials did not have details about the reported rocket engine test. Chinese Foreign Ministry spokesman Geng Shuang said China opposed any action that

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violated UNSC resolutions and called for restraint from all parties.

South Korea's Own Ballistic Missile Program: "I

believe in dialogue, but dialogue is possible when it's backed by strong defence and engagement policy is possible only when we have security ability that can overwhelm the North," South Korean President Moon said, as he inspected the test launch of a ballistic missile on 23rd June 2017. Moon was elected on a platform of seeking engagement with North Korea. Moon's office did not disclose the details of the missile being tested, but Reuters points out that South Korea has been working to develop ballistic missiles with a range of 800 km, a voluntary cap under an agreement with the US. The US has tried for years to discourage South Korea from developing longer-range ballistic missiles in keeping with the MTCR, a voluntary international arms-control pact.

China 'Pressured to Pressure': The reports that North Korea has tested a new rocket engine that could be potentially be used for ICBMs came a day after the US pressed China to exert more economic and diplomatic pressure on North Korea to scale down its nuclear and missile programs during a round of high-level talks in Washington. Meanwhile, South Korean President Moon told Reuters that he planned to call on Chinese President Xi Jinping to play a greater role in reining in Pyongyang's arms program.

"When the world says that it hopes China can do even more, I don't know what 'do even more' refers to," Chinese Foreign Ministry spokesman Geng told a daily news briefing in Beijing. "We've said many times that China is making unremitting

efforts to resolve the Korean Peninsula nuclear issue, and plays an active and constructive role," he said. According to a statement from China's Foreign Ministry, Chinese Foreign Minister Yang Jiechi told US President Trump in a meeting at the White House that Beijing was willing to "maintain communication and coordination" with the US in an effort to defuse tension on the Korean Peninsula.

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Source: <http://www.intelligencepost.com/>, 23 June 2017.

BALLISTIC MISSILE DEFENCE

RUSSIA

Russia Tests Short-Range Nuclear Missile Interceptor

Russia's military has successfully launched a short-range interceptor missile, capable of delivering a nuclear warhead in a ballistic flight trajectory, to boost the country's defensive network, the Defence Ministry says. The Russian Strategic Missile Troops and Aerospace Forces jointly carried out the launch of a 53T6 (SH-08 Gazelle) endo-atmospheric interceptor missile at the Sary Shagan test range in Kazakhstan, said Col. Andrey Prikhodko, a VKS deputy commander. "During the test, the ABM successfully accomplished its task and destroyed the designated target," he said,

The A-135 ABM system includes phased-array radars, a command centre and launchers, which fire two types of interceptor missiles, the long-range 51T6 and the short-range 53T6, both designed to be tipped with nuclear warheads to eliminate any incoming nuclear warheads with a nuclear blast in the air.

referring to the country's A-135 ABM system, which has been designed to protect the capital Moscow and its surroundings from a possible nuclear missile strike.

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designed to be tipped with nuclear warheads to eliminate any incoming nuclear warheads with a nuclear blast in the air. The 10-meter-long 53T6 missile is reportedly capable of carrying a 10-kiloton nuclear warhead to as far as 80 kms at a speed of three kms/s.

The defensive system, operational since 1995, reportedly uses 68 launchers for 53T6 interceptors at five launch sites with 12 or 16 missiles each. It also employs 16 launchers for 51T6 interceptors at two launch sites with eight missiles each. The Russian military tests interceptor ballistic missiles roughly annually to confirm their combat readiness. A video of the launch was released by the Russian Defence Ministry. The short-range missile launched did not deliver a nuclear warhead. Russia says the A-135 ABM defensive system is compliant with the 1972 ABM Treaty, from which the US unilaterally pulled out in 2002.

Source: <http://www.presstv.ir/>, 16 June 2017.

USA

US Navy Ballistic Missile Intercept Test Fails

The US Navy conducted a failed ballistic missile intercept with its SM-3 Block IIA off the coast of Hawaii. The destroyer John Paul Jones, running the Navy's top-of-the-line Aegis Baseline 9.C2 combat system, failed to intercept a MRBM launched from the Pacific Missile Range Facility at Kauai, Hawaii. The destroyer detected and tracked the target on the AN/SPY-1 phased array radar but was unable to intercept it. It was the second test of this latest iteration of the SM-3. The John Paul Jones successfully shot down a target in February with it. That test was the first intercept using Baseline 9.2C.

"Program officials will conduct an extensive analysis of the test data," a news release for the US MDA said. The test also marked the fourth flight test of the SM-3 Block IIA and the second time it was launched from a ship. John Paul Jones

is the Navy's missile defence ship; it replaced the cruiser Lake Erie in 2014. Lake Erie was the test ship since 2000 and is currently on deployment in the Asia-Pacific region. The missile is being developed by Raytheon and is a joint project between the US and Japan, designed to counter rising missile threats from North Korea.

Source: <http://www.defensenews.com/>, 22 June 2017.

NUCLEAR ENERGY

INDIA

Westinghouse's Andhra Pradesh Nuclear Reactors to be Built by Indian Partner

US nuclear major Westinghouse which was proposed to set up six nuclear reactors in Andhra Pradesh will supply technology and construction will be undertaken by an Indian partner. This was discussed as a way out —to have Westinghouse presence in India following troubles faced by it over bankruptcy—during PM Narendra Modi's just-concluded visit to Washington. The finance for the project from the US Exim Bank remains intact and the initiative could kickstart only in 2018.

The proposal to set up the six nuclear reactors, which has been gathering dust for some time, figured in the joint statement made by PM Narendra Modi & President Donald Trump. Westinghouse is caught in a bankruptcy quagmire and there is no functional reference atomic plant — a pre-requisite to obtain permission from the AERB, the nuclear watchdog of the country.

As per the initial plan, the NPCIL and Westinghouse were scheduled to conclude a techno-commercial pact for the proposed plant in June this year but the US company's financial troubles has slowed down the progress. According to a joint statement by Modi and the then US president Barack Obama in 2015, both sides had resolved to work towards 'finalising the contractual agreement by June 2017'. Westinghouse, which was acquired by

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Japanese conglomerate Toshiba in 2006 for \$5.4 billion, filed for bankruptcy in March. Top Westinghouse officials visited India twice since March to assure that the project is on track.

The Indo-US nuclear cooperation agreement was signed in 2008, under which Westinghouse and GE Hitachi were to build six nuclear reactors each in Andhra Pradesh and Gujarat. Initially, Westinghouse was allocated the Mithi Viridi site in Gujarat, but was later given the Kovvada site in Srikakulam district of Andhra Pradesh after GE Hitachi was not keen on moving on with the project. Westinghouse had planned to build six AP-1000 atomic reactors with a capacity of 1,208 MW each at Kovvada. The other impediment to the Westinghouse project is the absence of a similar functional plant that could serve as a reference point.

Source: Dipanjan Roy Chaudhury, *The Economic Times*, 29 June 2017.

RUSSIA

Russia Could Offer India World's Most Advanced Nuclear Reactor Technology for Proposed Second Plant

Nuclear power generation may no longer be an attractive proposition in certain pioneering countries in the sector primarily owing to bankruptcy issues. But Russia continues to invest in this form of energy both in domestic and international markets and now possesses world's most advanced reactor in Novovoronezh, about 600 kms from Moscow. The technology in Novovoronezh is being offered to Bangladesh for its maiden nuclear power plant and could be offered to India for the second Russian built six set of reactors. The generation III+ reactor at the sixth unit of NVNPP is the world's first to be built using "post-Fukushima" safety standards and has an automated system in case of an emergency, officials of Rosatom, Russia's apex nuclear body told ET.

Novovoronezh is one of the oldest nuclear power plants in Russia and is located in the Voronezh Oblast, Central Russia. It is Russia's first nuclear power plant with VVER. The first reactor was commissioned in 1964. At the moment, there are three operating units at the power station.

Construction work is underway for a seventh reactor which is expected to be commissioned in 2018. NNPP unit 6, 28 miles south of the city of Voronezh, began delivering electricity to the Russia's energy system last August.

The "main feature" of the technology in NVNPP Generation 3 plus reactor is the use of additional passive safety systems that do not require the intervention of nuclear power plant personnel, it added. "Unique and globally unparalleled systems have been applied, including passive heat removal from the reactor, hydrogen recombiners and a core catcher," Rosatom officials explained.

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ROSATOM is the world's largest supplier of nuclear power plants in the global market. "We have made our position stronger with NPP Generation three plus reactor. This opens

new opportunities for building up our presence in the global market," claimed another senior Rosatom official. "In comparison with traditional power units with VVER-1000 reactor, the NPP-2006 project, upon which the first power unit of NVNPP-2 is constructed, has a number of advantages that substantially increase its economic characteristics and safety.

Thus, the electric capacity of the reactor unit has been increased by 20% from 1000 to 1200 MW; main equipment (reactor and steam-generators vessels) lifespan has been doubled from 30 to 60 years; due to high-level automation and implementation of new technological concepts the number of personnel is reduced by 25-30%. A number of up-to-date and unique safety systems has been applied, such as corium trap or passive heat removal system that in the absence of electric power supply and human participation allows to cool the reactor core by means of air natural circulation," according to a Rosatom statement. Presently 3+ generation nuclear power units are being constructed in the USA and France; however, it is the Russian power unit No 1 of NVNPP-2 that became the first new generation nuclear power unit in the world put into industrial operation.

Source: <http://economictimes.indiatimes.com/>, 21 June 2017.

SOUTH KOREA

South Korea, with 25 Reactors, to Phase out Nuclear Power

South Korea's new president Moon Jae-in said that the country will halt plans to build new nuclear power plants and will not extend the lifespan of existing plants, in a bid to phase out nuclear power. Moon campaigned on a programme of cutting South Korea's traditional reliance on coal and nuclear for the bulk of its power, but has not previously commented on the commitment to end nuclear power since being elected in early May. "We will end the nuclear-oriented power generation plan and pave the way for a nuclear-free era," Moon said at an event marking the closure of the Kori No 1 nuclear reactor in Busan, some 300 kms southeast of Seoul.

"We will withdraw existing plans to build new nuclear power plants and not extend the lifespan of nuclear power plants." South Korea's oldest nuclear reactor Kori No 1 was permanently shut down at midnight on 18th June 2017 after reaching the end of its 40-year-lifespan, the first South Korean nuclear power plants to be closed permanently. South Korea has 25 nuclear reactors, supplying about a third of the country's total electricity. During his campaign, Moon vowed to review plans to add new eight nuclear reactors, including the part-completed Shin Kori No 5 and Kori No 6.

Moon said he will soon reach a consensus on the Shin Kori No 5 and Shin Kori No 6 reactors after fully considering their construction costs, safety and the potential costs of paying compensation. He also said the government will seek to shut down the country's second-oldest nuclear reactor, the Wolsong No 1, as soon as possible depending on the country's power supply conditions. Public support for nuclear power has been undermined by a local scandal in 2010 over forged certificates for spare parts and the 2011 Fukushima meltdown in neighbouring Japan.

South Korea is seeking to scale back reliance on nuclear, and Moon has said he will support renewables and liquefied natural gas sectors in a bid to boost clean and safe energy. The new government plans to increase the use of renewables to 20% of the country's total power generation by 2030.

Source: <http://www.firstpost.com/>, 19 June 2017.

UGANDA

Uganda could become the First African Country to Develop Nuclear Power

Like there's not enough wrong in Africa right now, Uganda has signed a deal with Russia to develop uranium into nuclear power for peaceful purposes. Not to mention that it's really suspicious that Russia seems intent on handing nuclear power to anyone and everyone who will take it. But let's not worry; they said it's for peaceful purposes. Uganda's State Minister for Minerals, Simon D'Ujanga and Russia's Dy DG of Rosatom State Atomic Energy Corporation, Nikolai Spasskiy, signed the MoU in Moscow, and it includes collaboration in the areas of radiological and physical security, fundamental and applied researches, human resource training, and nuclear research centres.

The discussions with Russia started last October, shortly after the launch of the

Uganda-Russian Joint Permanent Commission, an inter-governmental framework for economic, scientific and technical cooperation. Uganda also has ongoing discussions with China to help develop peaceful nuclear power. This agreement with Russia comes just a month after a team from Uganda's MoE travelled to meet with the CZEC, a subsidiary of China CNNC.

At least 8 countries in Africa are actively considering starting nuclear programs - Nigeria, Ghana, Senegal, Kenya, Uganda, Tanzania, Zambia, Namibia; but the question is why? Emerging countries like the ones listed generally do not have the expertise for this, so as opposed

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to focusing on building and relying on licenses from developed countries who arguably have their own agendas when sponsoring developments like this one in African countries, why don't we focus on building the expertise first? And African countries are largely unable to manage the present grid system that we have, where do we get the assurance that they can manage nuclear power plants, which they say are built for peaceful purposes, but could just as easily harm citizens?

Source: <http://www.konbini.com/>, 22 June 2017.

UK

Fresh Scrutiny of Sizewell C Costs after Nuclear Power Branded 'Risky and Expensive' for Consumers

Construction of Britain's first new nuclear power station for decades has today come under fire – with the Government's own monitoring body saying the deal has “locked consumers into a risky and expensive” project. The NAO comments on the Hinkley Point C plant casts fresh concern over plans for Sizewell C, and is set to put ministers under huge pressure to provide better value-for-money if the Suffolk plant is to go ahead.

CGN and EDF Energy are already working together to develop the £14billion Sizewell C station, in which CGN has a 20% stake, and the £18bn HPC plant in Somerset, in which the company has a 33.5% share. The NAO – an independent Parliamentary body responsible for auditing central Government's activities and which has the motto “helping the nation spend wisely” – says the Department for Business, Energy and Industrial Strategy's deal for HPC “has locked consumers into a risky and expensive project with uncertain strategic and economic benefits”.

The NAO says the BEIS only considered the impact on bills up to 2030, which does not take account of the fact that consumers are locked into paying for Hinkley Point C long afterwards. It also did

not conclude whether forecast “top-up payments” – look set to rise to £30bn – are affordable. It says the Government's case for the project has weakened since it agreed key commercial terms in 2013 and its capacity to take alternative approaches to the deal were limited after that point.

Value-for-money tests showed the economic case for HPC “was marginal and subject to significant uncertainty”. Amyas Morse, head of the NAO, said: “The Department has committed electricity consumers and taxpayers to a high cost and risky deal in a changing energy marketplace. Time will tell whether the deal represents value for money, but we cannot say the Department has maximised the chances that it will be.”

An EDF Energy spokesman insisted the NAO report showed HPC remained good value compared with alternative choices. He said: “Consumers won't pay a penny until the power station is operating and it is EDF Energy and CGN who will take the risk and responsibility of delivering it.”

A BEIS Spokesperson said: “Hinkley Point C will be the first new nuclear plant in a generation. This was an important strategic decision to ensure that nuclear is part of a diverse energy mix. “Consumers won't pay a penny until

Hinkley is built; it will provide clean, reliable electricity powering 6 million homes and creating more than 26,000 jobs and apprenticeships in the process.” EDF Energy believes costs for Sizewell C will be lower than Hinkley Point C and that there are clear benefits from building new nuclear power stations.

An EDF Energy spokesman insisted the NAO report showed HPC remained good value compared with alternative choices. He said: “Consumers won't pay a penny until the power station is operating and it is EDF Energy and CGN who will take the risk and responsibility of delivering it. “The project is having a major impact on the UK's industrial capacity, jobs and skills. “Relaunching the UK nuclear new build industry at Hinkley Point C will enable costs for future projects, in particular Sizewell C, to be lower.”

Operators of HPC will be paid a guaranteed £92.50 per megawatt hour of electricity. Government said this would mean £10 to £15

being added to the average household fuel bill to pay for the plant up to 2030. Falling costs of fossil fuels, which reduce wholesale prices of electricity, means the forecast top-up payments on consumer bills have soared. Delays have pushed back construction of Hinkley Point C, while the expected costs of most low-carbon alternatives to nuclear power, such as offshore wind, have fallen more than expected.

In addition, the NAO said the NNB Generation Company building Hinkley Point could still seek further financial support from the Government, while the technology being used for the reactor is unproven and other projects using it are facing difficulties. BEIS estimates £10 to £15 will be added to the average consumer bill up to 2030 to pay for Hinkley Point C, while if it and other nuclear projects are delayed and the gap filled by other low-carbon alternatives, bills could increase by £21-24.

Source: <http://www.ipswichstar.co.uk/>, 23 June 2017.

URANIUM PRODUCTION

AUSTRALIA

Western Australia Bans Uranium Mining, but Existing Projects Safe

Western Australia's new government has brought back a ban on uranium mining in the state, but said it would not stand in the way of the four projects approved by the previous administration. The four proposed mines that will remain immune to the new regulation are Toro Energy's Wiluna, Vimy Resources' Mulga Rock, as well as Cameco's Kintyre and Yeelirrie — Australia's biggest undeveloped uranium deposits. The WA DMP noted, however, that multiple secondary approvals are still needed over the life of these projects, *Newburgh Gazette* reported.

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Mines and Petroleum Minister Bill Johnston said Canada's Cameco, the world's second-biggest uranium producer, has already spent more than \$1 billion on its two projects to date. Market conditions, however, remain poor, with prices hovering around \$23 per pound, less than half the \$50 per pound they were in 2011.

The market is not expected to pick up any time soon as actors are waiting to see whether an anticipated increase in demand from China and India becomes true. Miners are also watching closely an imminent decision on the future of Japan's mothballed reactor fleet. Australia does not use nuclear power itself, yet it's the world's No. 3 uranium producer behind Kazakhstan and Canada.

Source: <http://www.mining.com/>, 21 June 2017.

RUSSIA

Russia Plans to Increase US Uranium Market Presence from 25-35% by 2020

Russian nuclear monopoly Rosatom plans to further increase the volume of its uranium supplies to the US in the coming years, as the company considers the US market as strategic for its further development. Currently export portfolio of Rosatom includes 25 contracts on the supplies of uranium to the US, with a total value of about US\$6.5 billion and there is a possibility that these figures may significantly grow in the coming years. Supplies are currently carried out by Technabexport, (a Russian nuclear fuel and nuclear fuel cycle technology exporting company and a subsidiary of Rosatom), while the contracts are signed with 19 American companies, with supplies due until 2028.

At present Russia meets about 25% uranium needs of US nuclear power plants and hopes to increase these figures up to 30%-35% after 2020. In the meantime, the ever growing domination of

Russia in the US uranium market has already sparked concerns from the US public, however, due to the current crisis in the American uranium industry, the US will be forced to continue purchases of uranium from Russia. In 2016 the production of uranium in the US fell to the level of the 1950s, while its further enrichment with gas centrifuges was declared unprofitable. Due to this, Global Nuclear Fuel, a world-leading supplier of BWR fuel, was forced to sign a contract with Rosatom for the manufacture of fuel rods for American-type reactors.

In addition, Exelon Corporation, the largest operator of nuclear power plants in the US, in 2016 announced its plans to close at least two nuclear power plants – Clinton and Quad Cities by the end of the current year, despite the fact that their operational life is designed until 2047-2048. Being the world's leading country in terms of the number of nuclear power plants the US are not able to efficiently operate them. This creates conditions for Russian expansion, which has been carrying uranium supplies to the US since 1987 and which has significantly increased the volume of its supplies in recent years.

Today Russia controls half of the world market of enriched uranium, while together with Kazakhstan and Uzbekistan, Russia's satellites and strategic allies this figure is estimated 73%. And this is only the basis of the pyramid, the top of which is the country's domination in the technology of production of fast neutron reactors. From 1994 to 2013 as part of the Megatons to Mws Program, (a program on the use of highly enriched uranium extracted from nuclear weapons), Russia through its Techsnabexport enterprises provided uranium enrichment services to the US, totalling about 90 million SWU. In general, since 1993, 7 trillion kWh of electricity have been produced at US nuclear power plants with the use of Russian uranium and it is planned that this figure will significantly grow during the next decade.

Source: <https://investorintel.com/>, 22 June 2017.

USA

US Uranium Production, Prices Fall

Production of US uranium concentrate fell 40% between 2014 and 2016 to 2.9 million pounds in 2016, the lowest annual total since 2005, the US Energy Information Administration reported. Production was affected by falling uranium prices, which moved from \$34 per pound in January 2016 to \$18 per pound in November, the lowest price since May 2004. Approximately 0.45 million pounds of uranium was produced in the first quarter. If that level keeps up, it would be the lowest production year since 1952.

Though uranium production reached its peak of 44 million pounds in 1980, that level fell to an average of four million pounds per year since 1990. Nuclear power plants now rely heavily on uranium mined in other countries, though much of it is enriched domestically. From 2012 to 2016, 90% of uranium purchases by owners and operators of nuclear power reactors came from foreign sources. Uranium inventory continues to build, with 144 million pounds of uranium stocks at the end of 2016.

Source: <http://www.power-eng.com/>, 23 June 2017.

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NUCLEAR COOPERATION

CHINA-ARGENTINA

China Drives Nuclear Expansion in Argentina, but with Strings Attached

Two new nuclear power plants, to cost 14 billion dollars, will give a new impetus to Argentina's relation with atomic energy, which began over 60 years ago. President Mauricio Macri made the announcement from China, the country that is to finance 85 per cent of the works. But besides the fact that social movements quickly started to organise against the plants, the project appears to face a major hurdle.

The Chinese government has set a condition: it threatens to pull out of the plans for the nuclear plants and from the rest of its investments in Argentina if the contract signed for the construction of two gigantic hydroelectric power plants in Argentina's southernmost wilderness region, Patagonia, does not move forward. The plans are currently on hold, pending a Supreme Court decision. Together with Brazil and Mexico, Argentina is one of the three Latin American countries that have developed nuclear energy.

... According to the announcement Macri made during his visit to Beijing in May, construction of Atucha III, with a capacity of 745 MW, is to begin in January 2018, 100 km from the capital, in the town of Lima, within the province of Buenos Aires. Atucha I and II, two of Argentina's three nuclear power plants, are located in that area, while the third, known as Embalse, is in the central province of Córdoba. Construction of a fifth nuclear plant, with a capacity of 1,150 MW, would begin in 2020 in an as-yet unannounced spot in the province of Río Negro, north of Patagonia.

Currently, nuclear energy represents four per cent of Argentina's electric power, while thermal plants fired by natural gas and oil account for 64 per cent and hydroelectric power plants represent 30 per cent, according to the Energy Ministry. Other renewable sources only amount to two per cent, although the government is seeking to expand them.

Besides diversifying the energy mix, the projected nuclear and hydroelectric plants are part of an ambitious strategy that Argentina set in motion several years ago: to strengthen economic ties with China, which would buy more food from Argentina and boost investment here. During his May 14-17 visit to China, Macri was enthusiastic about the role that the Asian giant could play in

this South American country. ...

However, there is a thorn in the side of relations between China and Argentina regarding the nuclear issue: the project of the hydroelectric plants. These two giant plants with a projected capacity of 1,290 MW are to be built at a cost of nearly five billion dollar, on the Santa Cruz River, which emerges in the spectacular Glaciers National Park in the southern region of Patagonia, and flows into the Atlantic Ocean.

In December, when the works seemed about to get underway, the Supreme Court suspended construction of the dams, in response to a lawsuit filed by two environmental organisations. The three Chinese state banks financing the two projects then said they would invoke a cross-default clause included in the contract for the dams, which said they would cancel the rest of their investments if the dams were not built.

To build the two plants, three Chinese and one Argentine companies formed a consortium, but after winning the tender in 2013, construction has not yet begun. Under pressure from China, the government released the results of a new environmental impact study on Jun. 15 and now plans to convene a public hearing to discuss it, so that Argentina's highest court will authorise the beginning of the works.

Added to opposition to the dams by environmentalists is their rejection of the nuclear plants. In the last few weeks, activists from Río Negro have held meetings in different parts of the province, demanding a referendum to allow the public to vote on the plant to be installed there. They have even generated an unusual conflict with the neighbouring province of Chubut, where the regional parliament unanimously approved a statement against the nuclear plants. The governor of Río Negro, Alberto Weretilnek, asked the people of Chubut to "stop meddling." ...

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Source: Daniel Gutman, <http://www.ipsnews.net/2017/06/china-drives-nuclear-expansion-argentina-strings-attached/>, 27 June 2017.

SOUTH AFRICA–RUSSIA

SA to Award Nuclear Build Contract by Year-End, with Russia's Rosatom

Russian state-controlled energy group Rosatom is a contender for SA's nuclear expansion project and the country will award the contract by the end of the year, the chairman of the South African NECSA said on 19th June 2017. SA is planning to build 9,600MW

of nuclear capacity to wean itself off coal, a project that could be one of the world's biggest nuclear contracts in decades. Besides Russia's Rosatom, major nuclear firms from South Korea, France, the US and China are interested in bidding for all or part of the contract.

"We are aiming for this to be done before the end of the year, and we very imminently want to start," Kelvin Kemm, Necsca chairman, said on the sidelines of a nuclear conference in Moscow, when asked when SA would make a decision on which company would build the new nuclear reactors. "Rosatom is definitely in there, but a decision has not been finally made. That will be a decision made by the senior politicians in collaboration with the technological and the company people," Kemm said.

Earlier on 19th June 2017, a Rosatom official said the Russian company was in contact with South African authorities over their plans to increase the country's nuclear capacity. Those plans were disrupted after SA's High Court earlier this 2017 deemed a nuclear cooperation pact with Russia unlawful. Earthlife Africa-Southern African Faith Communities Environment Institute had taken the DoE to court. The judges

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in the case found Rosatom had been favoured over other potential vendors as a "a firm legal commitment existed between SA's government and Rosatom in terms of the Intergovernmental Agreement signed with Russia in 2014". The deal was found to have been in breach of section 10 of the NER Act, which calls for participatory decision-making processes.

In May, Rosatom said it was still committed to taking part in a competitive bidding process to build nuclear plants in SA. Rosatom was created in 2007 from the Russian Atomic Energy Ministry with a view to turning

nuclear power into a major export industry for Russia. Necsca's Kemm said the court ruling had delayed the country's plans by a couple of months. In response to a question as to whether Rosatom was a leading contender for the planned nuclear expansion, Kemm said: "Absolutely, Rosatom is a very important player".

Source: <https://www.businesslive.co.za/>, 19 June 2017.

SUDAN–RUSSIA

Sudan and Russia Sign MOU for Cooperation Nuclear Power for Peaceful Uses

Sudan and Russia signed in Moscow a MoU for cooperation in the field of nuclear power for peaceful uses, which was signed by the State Minister at the Ministry of Water Resources, Irrigation and

Electricity, Engineer Yousif Hamza, and the General Director of the Russian Nuclear Power Agency for the Russian side. Engineer Yousif said that implementation of the programs included in agreement will result in the signing of an agreement between the Sudanese and Russian sides in the field of atomic power for peaceful uses by the end of the year 2017.

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He indicated that signing of the agreement will enable Sudan to benefit from the applications of the peaceful uses of nuclear power in several vital fields. It is to be recalled that a high-level delegation of the Ministry of Water Resources, Irrigation and Electricity, led by the State Minister, is visiting Moscow to participate in the Annual Nuclear Power Exhibition along with delegations of many countries and international companies operating in the fields of power and the building of nuclear reactors.

Source: <http://allafrica.com/>, 19 June 2017.

NUCLEAR DISARMAMENT

UN

Need for World Free of Nuclear Weapons More Urgent Than Ever

Negotiations on the first-ever treaty to ban nuclear weapons resumed on 15 June in New York, with the UN disarmament chief expressing hope that the talks result in an effective instrument that “complements and strengthens” existing ones. “These talks are truly historic, as they represent the most significant negotiations in the area of nuclear disarmament,” Izumi Nakamitsu, High Representative for Disarmament Affairs, told the second session of the UN Conference to negotiate a legally binding instrument to prohibit nuclear weapons.

“Nuclear disarmament has been the longest sought objective of the UN, dating back to the very first resolution adopted by the General Assembly, in January 1946,” she said, referring to the body’s decision to establish a Commission charged with, among other tasks, making specific proposals for the ‘control of atomic energy to ensure its use only for peaceful purposes,’ and ‘the elimination from national armaments of atomic weapons and all other major weapons adaptable to mass destruction.’ During this resumed session, delegates will deliberate on a

draft of the treaty that has been tabled by Conference President Whyte Gómez of Costa Rica. The first session was held in March.

Ms. Nakamitsu expressed hope that the talks produce an effective instrument that complements and strengthens the NPT, the CTBT and the treaties establishing nuclear-weapon-free zones. Also highlighting the need for systematic measures and steps to facilitate the elimination of nuclear weapons, she said it will be critical that the outcome of negotiations “build a bridge to the future” in order to facilitate the inclusive engagement needed to achieve the total elimination of nuclear weapons. As of now, nuclear-weapons-States are absent in the negotiations.

An instrument legally sound, technically accurate and politically wise: To accomplish these aims, she believes “great care should be taken in finalizing an instrument that is legally sound, technically accurate and politically wise.” With the growing urgency posed by the deteriorating international security landscape and by the new awareness of the devastating humanitarian consequences of nuclear weapons, “the need for progress is clear,” she said. “And yet there seem to be no near-term prospects for further reductions.” Amid some scepticism about further pursuing nuclear disarmament, she stressed that “measures for disarmament have served historically as a means to

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ease international tensions and to prevent conflict.” Supported by the UN Office for Disarmament Affairs, the conference will run through 7 July.

Source: <http://www.un.org/>, 15 June 2017.

USA

US May Leave the INF Treaty on Nuclear Disarmament

A group of US Congressmen suggested Trump administration to leave the INF Treaty, *Politico* reported on 24th June 2017. The initiators accused Russia of violating the terms of this agreement,

thus considering it inexpedient for the US to follow observe the treaty any further. For instance, Mike Rogers, head of an oversight panel on nuclear weapons, called following such a policy "irresponsible". However, there is no confidence regarding possible withdrawal from the INF Treaty among Pentagon, State Department and National Security Council officials.

Many believe that such a move may result in a new arms race between Russia and the US, insisting that the treaty suits interests of country's national security. The INF Treaty was signed in 1987 by US President Reagan and USSR leader Gorbachev as a part of major progress in mutual nuclear disarmament of the two superpowers. More than 2,600 missiles with ranges of 500-1,000 kilometres and 1,000-5,500 kms, were liquidated on both sides under the terms of the treaty. In 2014, however, Obama administration accused Russia of deploying banned missiles in Eastern Europe, calling it a direct violation of the INF Treaty.

In October 2016, Russian MoD announced deployment of Iskander-M tactical missile systems in Kaliningrad region. A group of Republican hawks within the Congress consider this move by Russia as a good reason for the US to withdraw from the agreement. Russian officials, in turn, reiterated that it was the US that violated terms of the INF Treaty, in the first place, having deployed AEGIS Ashore anti-missile defence system in Romania in 2015 and planning to deploy another one in Poland by 2018.

Source: <https://www.almasdarnews.com/>, 25 June 2017.

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The 2015 Iran nuclear deal did not force Iran to make any concessions with respect to ballistic missiles, but Jafarzadeh said the current efforts violate UNSC resolutions against Iran missile development. He also asserted that the revelations expose violations of the nuclear deal, since many of the ballistic missiles serve only one purpose – to carry nuclear warheads.

accelerating its nuclear program ever since it became clear the West was committed to making a deal back in 2015. Ballistic missile tests are blatant evidence the regime continues to pursue nuclear weapons, according to a report released

by the National Council of Resistance of Iran, or NCRI. "Tehran had decided (before the nuclear deal was finalized) to step up their efforts on the missile side of their rogue behavior, namely expanding both the production of the missiles

but their readiness to deploy them and make them operational," said Alireza Jafarzadeh, deputy director of the NCRI's US office, at a news conferences in Washington.

Jafarzadeh said the IRGC, is taking a bigger role in the missile program through the Aerospace Force. "It used to be called the Air Force of the IRGC, basically having helicopters control airports and all of that. Since a few years ago, they changed the whole structure into Aerospace Force, meaning the dominance is with the missile

program. Most of their work is the expansion of the missile program," said Jafarzadeh.

The new report, gathered through intelligence sources in Iran who are hostile to the regime, shows a vast network of facilities working on the missile program. "We managed to identify, so far,

42 different locations around the country that are dedicated to their missile program, and they include sites that are engaged in the design, production, testing and launching their missiles," said Jafarzadeh.

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NUCLEAR PROLIFERATION

IRAN

Iran Accelerating Pursuit of Nukes on Missiles

New evidence collected by opposition sources shows Iran's mullah-led regime has been

purpose – to carry nuclear warheads.

“One of the troubling things we found out during our investigation was that there was a direct connection between the nuclear weapons program of Iran and their missile program. These are not two separate entities,” said Jafarzadeh. He said one of the bases on the list, Semnan, is a smoking gun of collaboration between the nuclear weapons program and the advancement of missile capability. The agency tasked with weaponizing nukes, STND, is joined at the hip with the missile program at Semnan, he said.

“We found out that every week there is a high-level delegation from STND going from Tehran to Semnan, doing some activities and coming back. So that’s a very troubling thing,” he said. Jafarzadeh also said the new intelligence sheds even more light on just how cozy Iran is with North Korea. “The other element we found out was the extensive connection and collaboration between North Korea and Iran on their missile programs, to the extent that North Korean experts, when they travel to Iran to help the missile program, they stay at the private residence area that the regime has allocated for the North Koreans. They don’t check into some hotel,” he said.

“Vice versa, the Iranian missile experts travel to North Korea and spend time and exchange ideas and views and expertise,” he added. The locations of the missile bases are also very suspicious, according to Jafarzadeh. “Most of the sites focusing on production were in the central part of the country near Tehran. All the sites related to launching and operations were either on the western border of the country, which brings them closer to their targets in Europe and the western side of the world, or the southern part of the country near the Persian Gulf,” he said.

“That makes the Iran regime much more accessible to the Persian Gulf countries, making

very clear the objective of their entire missile program. It’s not for defensive purposes. This is meant to intimidate. This is meant to dominate,” he said. “And most importantly, on top of all of these things, it is meant to give the Iranian regime the ability to build the bomb and to be able to carry it. That is to say building a nuclear warhead. That is their ultimate objective,” said Jafarzadeh.

Source: <http://www.wnd.com/>, 25 June 2017.

NUCLEAR SECURITY

USA

Safety Lapses Undermine Nuclear Warhead Work at Los Alamos

An extended shutdown of the nation’s only scientific laboratory for producing and testing the plutonium cores for its nuclear weapons has taken a toll on America’s arsenal, with key work postponed and delays looming in the production of components for new nuclear warheads, according to government documents and officials. The unique research and production facility is located at LANL in New Mexico, the birthplace of the US atomic arsenal. The

Los Alamos’s persistent shortcomings in plutonium safety have been cited in more than 40 reports by government oversight agencies, teams of nuclear safety experts and the lab’s own employees over the past 11 years. Some of these reports say that safety takes a back seat to meeting specific goals for nuclear warhead maintenance and production by private contractors running the labs.

lab’s director ordered the shutdown in 2013 after the Washington official in charge of America’s warhead production expressed worries that the facility was ill-equipped to prevent an accident that would kill its workers and potentially others nearby.

Parts of the facility began renewed operations in 2016, but with only partial success. And workers there in 2016 were still violating safety rules for handling plutonium, the unstable man-made metal that serves as the sparkplug of the thermonuclear explosions that American bombs are designed to create. Los Alamos’s persistent shortcomings in plutonium safety have been cited in more than 40 reports by government oversight agencies, teams of nuclear safety experts and the lab’s own

employees over the past 11 years. Some of these reports say that safety takes a back seat to meeting specific goals for nuclear warhead maintenance and production by private contractors running the labs. Nuclear workers and experts say the contractors have been chasing lucrative government bonuses tied to those goals.

With key work at Los Alamos deferred due to safety problems, officials and experts say the US risks falling behind on an ambitious \$1 trillion update of its nuclear arsenal, which former president Barack Obama supported and President Trump has said he wants to “greatly strengthen and expand.” During the hiatus, Los Alamos has had to forego 29 planned tests of the safety and reliability of plutonium cores in warheads now deployed atop US SLBM and land-based missiles and in bombs carried by aircraft. The facility also hasn’t been able to make new plutonium cores to replace those regularly withdrawn from the nuclear arsenal for testing or to be fit into warheads, which are being modernized for those missiles and bombers at a projected cost of billions of dollars.

“The laboratory shut down an important facility doing important work,” said James McConnell, the associate administrator for safety, infrastructure and operations at the NNSA, a semiautonomous arm of the Energy Department, in a recent interview at the agency’s Washington headquarters. “What we didn’t have was the quality program that we want.” Ernest Moniz, the MIT physicist who served almost four years as President Obama’s energy secretary, said in a separate interview that “we were obviously quite concerned about” the shutdown at Los Alamos. Moniz said he considered the situation there a “mess” and the testing interruption “significant.”

“I don’t think it has, at this stage, in any way seriously compromised” the nuclear arsenal, Moniz said. But he added that it was still his conviction that “obviously we’ve got to get back

to that” work as soon as possible. A mock plutonium core was made at Los Alamos in 2016 in a demonstration timed to coincide with a visit by Ashton B. Carter, then secretary of defence. At a public hearing in Santa Fe on June 7, McConnell said that while Los Alamos is making progress, it is still unable to resolve the safety issue that provoked its shutdown four years ago, namely an acute shortage of engineers who are trained in keeping the plutonium at the facility from becoming “critical” and fissioning uncontrollably. “They’re not where we need them yet,” he said of the lab and its managers.

A February report by the Defence Nuclear Facilities Safety Board, an independent safety advisory group chartered by Congress, detailed the magnitude of the gap. It said Los Alamos needs 27 fully qualified safety engineers specialized in keeping the plutonium from fissioning out of control. The lab has 10.

Criticality accidents have occurred 60 times at various nuclear sites in the last half-century, causing a total of 21 agonizing deaths. Three workers at Los Alamos died in preventable criticality accidents in the 1940s and 1950s.

Some of the reports obtained by the Centre for Public Integrity described flimsy workplace safety policies that left workers ignorant of proper procedures as well as incidents where plutonium was packed hundreds of times into dangerously close quarters or without the shielding needed to block a serious accident. The safety risks at the Los Alamos plutonium facility, which is known as PF-4, were alarmingly highlighted in August 2011, when a “criticality accident,” as it’s known, was narrowly averted, one of several factors prompting many safety officials there to quit.

A criticality accident is an uncontrolled chain reaction involving a fissionable material such as plutonium that releases energy and generates a deadly burst of radiation. Its prevention has been an important challenge for the nuclear weapons program since the 1940s. Criticality accidents have occurred 60 times at various nuclear sites in the last half-century, causing a total of 21 agonizing deaths. Three workers at Los Alamos died in preventable criticality accidents in the 1940s and 1950s. The most recent criticality-related deaths elsewhere occurred in 1999 at a

factory north of Tokyo, where Japanese technicians accidentally mixed too much highly enriched uranium into some wide-mouth buckets. A burst of radiation — and its resulting characteristic blue glow — provoked school and road closures and the evacuation of those living nearby, plus a Japanese government order for 310,000 others to shelter in place.

The problems at Los Alamos were revealed by a year-long investigation by the Centre for Public Integrity, which also found several unpublicized accidents at other privately run US nuclear facilities. The investigation, which can be read in full at the Centre for Public Integrity's website, also showed that the penalties imposed by the government for these errors were typically small, relative to the tens of millions of dollars the NNSA gives to each of the contractors annually in pure profit. Some contractors involved in repeated workplace safety incidents were also awarded contract extensions and renewals by officials in Washington. Asked about the Los Alamos facility's record, NNSA spokesman Gregory Wolf responded that "we expect our contractors to perform work in a safe and secure manner that protects our employees, our facilities, and the public. When accidents do occur, our focus is to determine causes, identify corrective actions and prevent recurrences."

Kevin Roark, the spokesman for the consortium of firms hired by the government to run the lab, said in an email that he would defer to the NNSA's response. Charles McMillan, the Los Alamos lab's director since 2011, who receives government-funded compensation exceeding \$1 million a year, declined to be interviewed about its safety records or the national security consequences of the shutdown. But he said in a 2015 promotional video that "the only way" the lab can accomplish its vital national security mission "is by doing it safely."

Source: <https://www.washingtonpost.com/>, 18 June 2017.

NUCLEAR SAFETY

CHINA

IAEA Concludes Safety Review at Qinshan Nuclear Power Plant in China

An IAEA team of nuclear safety experts on 15th June 2017 completed an assessment of long-term operational safety at the Qinshan NPP Unit 1 in China. The Safety Aspects of Long Term Operation review mission was requested by Nuclear Power Operations Management Co., part of CNNP. The 12-member team, which began its in-depth review on 6 June, focused on aspects essential to the safe LTO of Unit 1, which was put in commercial operation in 1991.

The IAEA team concluded that the plant had made significant progress on ageing management and preparation for safe LTO and made several recommendations for further enhancements. The plant's LTO project has addressed most of the areas recommended by IAEA safety standards, and is addressing remaining topics.

The design life of the plant's Unit 1 is 30 years. China's NNSA requires a Periodic Safety Review to be performed every 10 years. The plant license expires in 2021. The plant intends to extend its operating lifetime to 50 years and submitted a license renewal application to NNSA in

2016. The SALTO team reviewed the plant's organization and programmes related to LTO, including human resources and knowledge management. The findings of SALTO reviews are based on IAEA safety standards.

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- An organizational structure in place to support preparation for safe LTO.
- Comprehensive implementation of leak rate testing of containment isolation

valves.

- Revalidation of time-limited ageing analyses of mechanical components.

The recommendations provided by the team for improvements to LTO safety, included:

- The plant should make its PSR more comprehensive.
- The plant should establish and implement a comprehensive environmental qualification programme.
- The plant should implement effective ageing management programmes for civil structures and components.

The plant management said it was committed to implementing the recommendations and requested that the IAEA schedule a follow-up mission in approximately two years. The team provided a draft report to the plant management. The plant and NNSA will have an opportunity to make factual comments on the draft. A final report will be submitted to the plant, NNSA and the Chinese Government within three months. The review team comprised experts from Argentina, the Czech Republic, Finland, France, the Netherlands, Romania, Spain, Sweden, the USA and the IAEA.

Source: <https://www.iaea.org/>, 15 June 2017.

GENERAL

IAEA Tests Global Emergency Response in Largest Ever Nuclear Accident Simulation

The largest-ever international exercise simulating the global emergency response to a nuclear accident took place, involving hundreds of participants from 82 countries and 11 international organizations. The exercise was developed in cooperation with authorities in Hungary, which acted as the accident state in the scenario. "It is important to prepare for the worst, even while working to ensure it never happens," said Juan Carlos Lentijo, IAEA Deputy Director General and Head of the Department of Nuclear

Safety and Security. "Through exercises like this, we can evaluate our readiness in case of a nuclear accident and identify good practices and areas for improvement."

The exercise began at 4:30 a.m. on 21 June. Over 36 hours, the IAEA worked in tandem with national authorities from around the world and international organizations to practice implementing the international framework for emergency preparedness and response. The exercise involved continuous 24/7 staffing at IAEA headquarters, with over 100 staff members working in shifts, and additional IAEA staff members involved in other roles, including testing various elements of the Agency's Incident and Emergency System. IAEA personnel answered simulated questions from national authorities from all over the world, while technical experts analysed incoming mock data and prepared periodic status summaries for sharing with emergency response teams worldwide.

Exercises such as this one aim to enhance cooperation during an emergency, ensure prompt exchange of information, test mechanisms for international assistance and practice the release of public information, Lentijo said. The scenario was developed by Hungary's Paks Nuclear Power Plant and the Hungarian AEA, and involved the loss of coolant and release of radioactive material. "We hope an accident of this type never happens, but nonetheless we have to be prepared for it," said Arpad Vincze, Head of the Department of Nuclear Security, Non-proliferation and Emergency Management at the Hungarian Atomic Energy Authority.

"It's all about practice," said exercise participant Yassine Chaari, an IAEA Safety Officer. "I worked on a late shift as a liaison officer and was in constant contact with Member States, updating them on the scenario." Responders might work long hours but, as Chaari said, "it is an essential part of emergency preparedness." In coming weeks, the IAEA will compile feedback from participating countries and international organizations into a report. The report will identify good practices and areas that need to be improved

to strengthen national and international preparedness to respond to nuclear and radiological emergencies of all kinds.

In the event of a nuclear or radiological emergency, the IAEA's responsibilities and functions are as defined in accordance with its Statute, the Convention on Early Notification of a Nuclear Accident (the Early Notification Convention), the Convention on Assistance in the Case of

a Nuclear Accident or Radiological Emergency (the Assistance Convention) and relevant decisions of IAEA policy-making organs. Convention Exercises (ConvEx) take place to practice the operational arrangements for the implementation of these Conventions.

Source: <https://www.iaea.org/>, 22 June 2017.

USA

Permanently Closed US Nuclear Reactor should be "Autopsied"

A permanently closed nuclear reactor in Florida that, documents show, likely has a manufactured weakness in a vital safety component produced by a controversial French forge that also supplied components to 17 still operating US reactors, should be "autopsied," says Beyond Nuclear, a leading national anti-nuclear watchdog group. The Crystal River

Unit 3 reactor in Red Level, Florida, was permanently closed in 2013 and is in the decommissioning process. Research by Beyond Nuclear staff found that the Florida reactor

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likely shares an at-risk safety-related component manufactured at the French Le Creusot forge that

is currently shut down and under international investigation for the loss of quality control of its manufacturing process and falsification of quality assurance documentation. The Crystal River reactor pressure vessel head was supplied by a factory at Chalon-Saint Marcel that assembles pieces forged at Le Creusot, both Areva-owned factories.

"The US Nuclear Regulatory Commission should seize upon this opportunity and 'autopsy' Crystal River 3," said Paul Gunter, Director of the Reactor Oversight Project at Beyond Nuclear. "A close examination of Crystal River could provide critical safety data to inform the decision-making on whether the seventeen US reactors still operating with at-risk Le Creusot parts should also be materially tested," Gunter said.

The Le Creusot factory forges large ingots into

safety-related components such as reactor pressure vessels, pressure vessel lids and steam generators. The French industrial facility was discovered to be operating with lax quality control procedures that allowed the introduction of an excessive amount of carbon contamination into its manufacturing process, a problem technically known as "carbon segregation." The excess carbon weakens the component's "fracture

The French industrial facility was discovered to be operating with lax quality control procedures that allowed the introduction of an excessive amount of carbon contamination into its manufacturing process, a problem technically known as "carbon segregation." The excess carbon weakens the component's "fracture toughness" in the face of the reactor's extreme pressure and temperature. Failure of a weakened component during operation would initiate the loss of cooling to the reactor and a serious nuclear accident.

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accident.

At-risk safety components potentially containing these flaws, and manufactured at the Creusot Forge, have been delivered to reactors in France, other countries and the US over a period of decades. The NRC published Areva's list in January 2017 identifying the 17 operational US reactors with the at-risk components from the French forge. However, the federal agency did not disclose that Crystal River also installed a Le Creusot-manufactured replacement pressure vessel head during the October 2003 refueling outage and then operated the unit for nearly a decade before permanently closing.

"This information provides the incentive to do material testing on a component here in the US from the suspect forge," Gunter added. "It is only common sense, when presented in effect with the corpse, that the NRC should autopsy Crystal River before the body is buried," he continued. "This is a chance to better understand scientifically what the potential risks are at operating reactors with Le Creusot parts rather than relying on computer modeling, simulation or speculation," Gunter said.

"For the sake of science and public safety, it is fortuitous that Crystal River, which operated for nearly a decade with a possible Le Creusot replacement component, is now permanently shut down and can be materially examined," Gunter concluded. The carbon segregation problem was first discovered at the Areva-designed EPR reactor still under construction, and now well over budget and behind schedule, at the Flamanville Unit 3 in Normandy, France. French safety authorities are investigating and are expected to make a decision in September on whether to continue with the troubled Flamanville reactor which experts say does not meet the fracture resistance standards.

Beyond Nuclear petitioned the NRC on January 24, 2017 to suspend operations at the 17 affected US reactors pending thorough inspections and material testing for the carbon contamination of

the at-risk components and to open an investigation into the potential falsification of Le Creusot quality assurance documentation. To date, the NRC has accepted the petition in part for further review and in part referred the potential falsification of documents to the federal agency's allegations unit. Only one affected nuclear plant, Dominion Energy's Millstone 2 in Connecticut, has conducted a visual inspection on a Creusot Forge component at the behest of the state energy authority, but did not observe any defects or cracking.

However, a French newspaper revealed that metal specimens harvested from the Flamanville Unit 3 reactor pressure vessel, and subjected to shock resilience testing, fell dramatically below regulatory performance standards. A newly

surfaced memo (in French) from a leading safety physicist at the prestigious Institute of Radioprotection and Nuclear Safety said that, if subjected to violent pressure-thermal shock, the EPR reactor pressure vessel could shatter. Such a rupture could lead to a major loss of coolant accident and subsequently a nuclear meltdown.

Source: <https://www.commondreams.org/>, 21 June 2017.

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NUCLEAR WASTE MANAGEMENT

CANADA

Nuclear Waste Management Organization Trims List of Communities

The NWMO is narrowing its focus to fewer communities as it prepares to further advance the next set of activities in the selection process for a deep geological repository for Canada's used nuclear fuel. The Municipality of Central Huron and the Township of White River will no longer be considered a potential host for the project. Both will continue to play a role as activities continue in nearby communities of Huron-Kinloss and South Bruce in the southwest, and to the northwest in the vicinity of Hornepayne and Manitouwadge.

"As we work toward identifying a single preferred site, we need to increasingly focus on specific locations that have strong potential to meet safety requirements and a foundation for sustained interest in exploring the project," said Dr. Mahrez Ben Belfadhel, Vice-President of Site Selection. "Central Huron and White River have each made a significant contribution on behalf of Canadians to this project, and their continued leadership will be invaluable as we work together to plan next steps in their regions."

The next activities in the areas of Huron-Kinloss and South Bruce; and Hornepayne and Manitouwadge will involve planning for more geological studies and initial discussions about visioning and partnership. Regional engagement will continue, as the project will only proceed with interested communities, potentially affected First

Nation and Métis communities, and surrounding communities working in partnership to implement it.

Studies continue in areas around Ignace, Blind River and Elliot Lake, Ontario, which are also engaged in the process for citing the national infrastructure project. Ongoing field activities and engagement with municipal, First Nation and Métis communities in those regions are not affected by the decision. The NWMO will continue the process of narrowing down potential sites to host the project until it arrives at one preferred safe and socially acceptable site as the focus of more detailed site characterization. The preferred site must have a suitable rock formation in an area with an informed and willing host.

Source: <http://www.netnewsledger.com/>, 23 June 2017.



Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal Vinod Patney, SYSM PVSM AVSM VrC (Retd).

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