



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

Vol 11, No. 07, 01 February 2017

## OPINION – Manpreet Sethi

### Unclear Nuclear Pathways for 2017

The inauguration of Donald Trump as the 45th president of the US has just taken place. A lot of what happens in the nuclear domain in the coming 12 months will be dependent on the direction that is adopted by the new president as he settles in. Every fresh incoming administration normally brings in its own policies, and hence changes in economic, political, foreign policy and nuclear issues are always expected. But, the uncertainties being felt this time are more than usual.

The statements and tweets made by Donald Trump as a presidential candidate and later as president-elect indicate a reversal of many of the previous administration's nuclear-related policies and actions. For the moment then, Trump looks like the proverbial bull in the nuclear china shop, and all are closely watching to see what all breaks, or not, under his nuclear watch. A few of the issues that will vie for his attention fairly quickly can be highlighted amid an as yet unclear nuclear path for 2017.

The first of the issues that can be expected to be handled by President Trump is the resetting of US relations with Russia. There is no doubt that this particular relationship has

**The statements and tweets made by Donald Trump as a presidential candidate and later as president-elect indicate a reversal of many of the previous administration's nuclear-related policies and actions. For the moment then, Trump looks like the proverbial bull in the nuclear china shop, and all are closely watching to see what all breaks, or not, under his nuclear watch.**

<u>CONTENTS</u>	
☞	OPINION
☞	NUCLEAR STRATEGY
☞	BALLISTIC MISSILE DEFENCE
☞	NUCLEAR ENERGY
☞	URANIUM PRODUCTION
☞	NUCLEAR COOPERATION
☞	NUCLEAR PROLIFERATION
☞	NUCLEAR DISARMAMENT
☞	NUCLEAR SAFETY
☞	NUCLEAR TERRORISM
☞	NUCLEAR WASTE MANAGEMENT

been left in a sorry state by the outgoing administration. Trump will most likely act quickly to arrest the trend and mend the situation. Will he do this by making compromises on sanctions,

as he has indicated earlier? Will he link these actions to Russian concessions on nuclear arms control? Does the US itself have an inclination to undertake arms control given that it is looking to upgrade its own nuclear arsenal?

After having been in a nuclear weapons reduction mode for some time, the US now appears to have moved in favour of modernisation. Before demitting office, Barack Obama approved a budget of US\$ 1 trillion to be spent over three decades for this

purpose. President Donald Trump has indicated the intention to stay the course and even tweeted that the US would not shy away from an arms race if his rivals so desired. While neither Russia nor China may rise to the bait, both are nevertheless engaged in modernising or building their own nuclear capabilities as per their visions of credible deterrence.

As the US, Russia, and China proceed with their nuclear weapons programmes with an eye on one another, their behaviour and actions will have an impact on the global nuclear picture with ripples being felt in India and Pakistan too. Better US-Russia relations can be expected to have a positive fallout on the overall atmospheric. They may even help revive some of the bilateral US-Russia arms control agreements that have recently fallen by the wayside owing to lack of communication from both sides. But unless they specifically target arms control, a mere thawing of relations is unlikely to arrest the ongoing nuclear modernisation currently underway across all nuclear-armed states.

**Better US-Russia relations can be expected to have a positive fallout on the overall atmospheric. They may even help revive some of the bilateral US-Russia arms control agreements that have recently fallen by the wayside owing to lack of communication from both sides. But unless they specifically target arms control, a mere thawing of relations is unlikely to arrest the ongoing nuclear modernisation currently underway across all nuclear-armed states.**

A second issue sure to grab Trump's attention is the nuclear agreement with Iran. In January 2017, international diplomacy should have been celebrating the first anniversary of the Implementation Day of the Joint Comprehensive Plan of Action (JCPOA) that brought a negotiated halt to the suspected military oriented activities of Iran's nuclear programme. 2016 saw Iran living up to its promises under the agreement. It dismantled centrifuges that could have led it to enrich uranium, shipped out of the country enriched uranium in excess of what the JCPOA allows it to keep, removed the core from the Arak reactor that could have helped it build plutonium, and met the necessary requirements of IAEA inspections. In return, the country gained from a lifting of a majority of the sanctions imposed upon it. There was an upsurge in its oil

production and exports, and many international leaders made a beeline to Tehran to establish new political and economic relations.

However, instead of celebrating the successful conclusion of the first year of the JCPOA, the past few months have been spent in trying to read the tea leaves on how President Trump (and the Republicans now dominating Congress) would treat the Iran deal on assuming office. Trump has been vocal about his dissatisfaction with the JCPOA, and even let it be known that he intended to "rip open the deal" once elected. Now that he is the elected president, will he go through with the threat? Would he find it in US interest to do so, thereby destroying years of negotiations?

Iranian leaders have signalled that any such act would mean the end of the agreement for Iran. They have been reminding the international community that the JCPOA involved multiple parties and that it cannot be for the US to kill it unilaterally. The other major powers - Russia, China and the European Union - too have invested heavily in the deal. The Iranian appeal, therefore, is to the rest of the actors to

use their good offices to make good sense prevail on the new US administration.

A third thorny nuclear issue that will seek Trump's attention pertains to North Korea's provocative nuclear actions and behaviour. It may be recalled that in 2016, the country not only conducted two nuclear tests - in January and May - but also announced that it had miniaturised its nuclear weapons enough to be able to deliver them atop a ballistic missile. These actions and announcements were attention-seeking gestures, hoping to get the US to agree to conduct some kind of direct negotiation with Kim Jong-un, along the lines of those with Iran. However, the US was hesitant to be seen as negotiating with Pyongyang with the latter apparently holding a gun to it.

President Obama appeared content to leave the issue to be resolved by China, which nevertheless had little initiative to do so since it kept the US unsettled. China also claimed that its leverage upon North Korea was diminishing. With the change in administration, there is once again a window of opportunity for the US to take a serious relook at the issue. President Trump's long experience as a successful businessman and his behaviour now as a politician show him to be a risk-taker. North Korea is obviously keen to engage directly with the US and there may be a deal here to look out for.

The North Korean issue also has special significance since it is tied up with relations between the US and its allies in Northeast Asia. Given that Donald Trump, during his campaign speeches, had mentioned that Japan and South Korea must bear a greater burden of the nuclear umbrella extended to them, including the BMD deployments, the two countries are anxious about how the North Korean imbroglio would be resolved.

As President Trump grants some clarity on his nuclear policies towards Russia, Iran, North Korea, and by extension, towards Japan and South Korea, he will be shaping the nuclear discourse that will dominate this year and beyond. Interestingly, amid this flux, a conference to negotiate a nuclear ban treaty is planned for 2017. The UN First Committee Resolution passed in October 2016 that calls for negotiations on a legally binding instrument to prohibit nuclear weapons, leading to their total elimination, has not yet caught the attention of President Trump. Of course, it may be recalled that the Obama administration had not succumbed to its charms either. But as the momentum for the conference builds up, it could catch Trump's fancy. After all, former President Reagan immortalised himself through the sanity he brought to the nuclear arms race when he and Soviet Premier

Gorbachev pronounced in 1988 at Reykjavik that a nuclear war can never be won and must never be fought. Who knows if Trump might grow to like the idea of disarmament and does something about it - after all, he is a risk-taker.

Meanwhile, it can only be hoped that President Trump understands the significance of the NSS that concluded last year. While the usual politics can be expected to get in the way of a Republican president acknowledging merit in a former Democrat president's initiative, there is no doubt that the NSS process achieved success in raising awareness and political action on nuclear security at the highest level in countries across the globe. The consensus so built and momentum acquired in setting international benchmarks for national efforts must not be lost. While Trump has not paid much attention to this issue, nuclear terrorism remains a palpable threat and the world cannot afford to lose out on efforts towards securing nuclear material and technologies from non-state actors.

The nuclear pathways that the US adopts will become clear in the coming months. Undoubtedly, their impact

will be felt worldwide as the fashion on the nuclear ramp is set by Washington. President Trump may believe in "America First" for many of his policy decisions, but on the nuclear front, one hopes he realises that he carries the burden of international security, too.

*Source: <http://www.ipcs.org>, 27 Jan 2017.*

**OPINION – John Glaser**

**Enforcing Iran Nuke Deal Crucial for Mideast Peace**

Much is unknown about how Trump's foreign policy will play out. If the experience of his predecessors is anything to go by, the Middle East will attract outside time and resources, no matter how much the administration tries to focus on Europe or Asia. When that historically irresistible draw happens,

Trump's priority should not be peace between Israel and Palestine or even renewing the fight against ISIS. It should be sustaining and enforcing the Iran nuclear deal.

To recap, the Iran nuclear deal, was negotiated by Iran and the US along with five other nations – the UK, France, Russia, China, and Germany. It imposed stringent controls and invasive inspections on the Iranian nuclear program in exchange for sanctions relief. Since the agreement, Iran has reduced its stockpile of centrifuges by two-thirds, gotten rid of about 95 percent of its LEU, and begun converting two major enrichment sites into peaceful research centres.

Iran's nuclear program is now the most intensely monitored nuclear program in the world. Inspectors from the IAEA are on the ground in Iran every month scrutinizing all related facilities, and continuous video surveillance watches the entirety of the nuclear fuel chain. As a recent report from the International Crisis Group put it, the deal has so far succeeded in "effectively and verifiably blocking all potential pathways for Iran to race toward nuclear weapons."

But as successful as it has been in blocking an Iranian nuclear weapons program, the deal rests on shaky ground. In the US, opponents of the deal have pounced on the few minor technical infractions — normal in any arrangement of such complexity – that have occurred on the Iranian side, none of which amounted to material breaches. More troubling is the Trump administration's decidedly confrontational approach toward Iran. Trump's top national security adviser, Lt. Gen. Michael Flynn, hates the deal and thinks regime change is a better option. Trump's newly sworn CIA director, former US Rep.

Mike Pompeo, has advocated "rolling back" the "disastrous" deal.

Trump himself has less consistent views on the matter. During the campaign, he promised numerous times to rescind sanctions relief and rip up the agreement. But he also promised to "stop racing to topple foreign regimes that we know nothing about." Since the deal accomplishes this goal by eliminating the primary justification for a US attack on Iran, Trump should be reluctant to tear it up. Moreover, Trump's Secretary of Defence Gen.

**But as successful as it has been in blocking an Iranian nuclear weapons program, the deal rests on shaky ground. In the US, opponents of the deal have pounced on the few minor technical infractions — normal in any arrangement of such complexity – that have occurred on the Iranian side, none of which amounted to material breaches.**

James Mattis, although a major critic of the deal, has consistently said enforcement is the right approach. Maintaining the agreement also happens to be the international consensus, including not only all of our European allies but also Russia, a regime Trump seems eager to please.

Still, the incentives President Trump faces appear ominously tilted against careful enforcement of the Iran nuclear deal. Sustaining the agreement requires Trump, not known for his sober intellect, to look beyond Iran's rhetoric and foreign policy and mentally frame it strictly as a non-proliferation agreement. It requires the president's affirmative renewal of the waivers on nuclear-related sanctions every 120 or 180 days. It also calls for

**What the Trump administration needs to understand is that pulling out of the deal would be all loss and no gain. The Iranian parliament has mandated renewed uranium enrichment and reduced transparency for UN inspectors if the US fails to live up to the deal's stipulations.**

resisting the Republican-controlled Congress, which is largely opposed to any mutual agreement with Iran.

What the Trump administration needs to understand is that pulling out of the deal would be all loss and no gain. The Iranian parliament has mandated renewed uranium enrichment and reduced transparency for UN inspectors if the US fails to live up to the deal's stipulations.

Furthermore, the US will have no leverage to force harsher terms on Iran because our European allies, along with Russia and China will undoubtedly blame Washington for reneging – and all would refuse to re-impose sanctions.

More than anything else, the Iran nuclear deal must be kept because the alternative is a return to ever-heightening tensions and clamouring by hawks in both countries. From 2003 to 2014, years of unrelenting US sanctions and confrontation, Iran went from 164 centrifuges to 19,000. The hostile approach generates a more expansive, less transparent Iranian nuclear program and increases the chances for another disastrous US war in the Middle East. Let's hope the Trump administration chooses not to go that route.

**Nuclear power accomplishes all three of these objectives. It is clean, reliable and affordable. Notwithstanding opposition from anti-nuclear environmental groups, it is the only source of zero-carbon electricity that is available around the clock. The US fleet of nearly 100 nuclear plants supplies 19 % of the nation's electricity and more than 60 % of the carbon-free power.**

Source: <http://www.bostonherald.com/>, 25 Jan 2017.

#### **OPINION – Mark Perry**

### **Going Nuclear: Perry Poised to Lead Renewable Energy Push**

No political leader since the first Energy Secretary James Schlesinger, under then-President Jimmy Carter, has been in a position to reshape America's energy policy as much as former Texas Gov. Rick Perry. With Senate confirmation hearings having occurred, Perry knows that we cannot postpone dealing with the threat to our nation's energy security any longer. The Obama administration's policies have favoured renewable energy sources and undervalued the importance of fossil fuels, nuclear power, and energy diversity. Instead, we need policies that are good for our economy, address concerns about the environment and provide well-paying jobs for American workers.

Nuclear power accomplishes all three of these objectives. It is clean, reliable and affordable. Notwithstanding opposition from anti-nuclear environmental groups, it is the only source of zero-

carbon electricity that is available around the clock. The US fleet of nearly 100 nuclear plants supplies 19 % of the nation's electricity and more than 60 % of the carbon-free power. Importantly, the cost of nuclear-generated electricity has been relatively stable, whereas natural gas has a long history of price volatility.

The US is now a net exporter of natural gas and its price is expected to rise as cargoes of liquefied natural gas are shipped overseas to markets in Asia and Europe. Given the growing demand for electricity here at home, nuclear power has a critically important role to play in the years ahead. Additional nuclear plants are needed to provide prudent insurance against possible spikes in electricity prices and shortages that could harm households and businesses, adversely affecting the US economy.

Fortunately, construction is moving forward on four new nuclear plants – two each in Georgia and South Carolina, respectively. These reactors are being equipped with advanced technology that will make them even more efficient than existing power plants. The cost of similar plants of the same design will almost certainly decline as more plants are built. New techniques in modular construction and the return of many equipment suppliers, following a hiatus in nuclear construction, make that possible.

Still, much more needs to be done at the federal and state levels to foster the growth of nuclear power. This is where the new administration can make a difference. With Perry guiding the DOE, the agency can stimulate development of a new generation of small modular reactors and advanced nuclear plants. Just on the 2<sup>nd</sup> week of January 2017, NuScale, an Oregon-based nuclear company, applied to the NRC for safety certification of a small modular reactor that it intends to develop for use in the US and abroad.

This is the first request for certification of a new reactor design in many years and it could mark the start of the next step for advanced nuclear power. Some 20 other nuclear companies are developing designs for SMRs and advanced reactors, such as those that are cooled with liquid metal instead of water. Although it's still in the design stage, the NuScale reactor already has a utility customer for the 50 MWs of electricity it will generate. The Energy Department will need to do its part in ensuring there are no roadblocks that stand in the way of the SMR's construction at a government site in Idaho.

Perry is a strong supporter of nuclear power. He can play an invaluable role in pushing for action at the state and regional levels to keep existing nuclear plants online. Currently, a number of nuclear plants are at high risk of being shut down because they receive no value in state renewable electricity standards for their role in supplying carbon-free electricity and ensuring power reliability. There needs to be a level energy playing field in order for nuclear power to compete against low-cost natural gas and subsidized wind and solar power. We can all think of energy reforms to improve policies. Ultimately, it takes new leadership and a renewed appreciation for the importance of nuclear power. Hopefully, Perry will soon provide that leadership as the head of the DOE.

Source: <http://thehill.com/>, 20 Jan 2017.

**OPINION – Ernest Moniz**

**The Way Forward on Nuclear Waste**

On 2<sup>nd</sup> week of January 2017, I joined the New Mexico governor, congressional delegation

members, the mayors of Carlsbad and Hobbs, citizens and a proud workforce in commemorating the reopening of the Waste Isolation Pilot

Plant after a three-year shutdown because of an underground accident. The facility is the US's only geological repository for nuclear waste, such as plutonium-contaminated materials from the DoE national security complex. The lesson of this milestone is that a lot can be accomplished on addressing challenging nuclear issues when local, state and federal governments are aligned.

The 115<sup>th</sup> Congress is likely to also take up nuclear waste, specifically the disposal of highly radioactive spent fuel from nuclear power plants and high-level waste from the Cold War nuclear weapons program. The opportunity to move forward is real, but not if we continue to clash over policies and methods that have not worked for decades. Congress should look at the entire nuclear waste system and adopt an approach that emphasizes community and state buy-in and provides options for implementing a long-term program that will inevitably have technical and political surprises.

Thirty years ago, Congress designated Yucca Mountain in Nevada as the only site to be developed. Further, the DoE was directed not to develop complementary approaches, such as

consolidated storage of irradiated nuclear reactor fuel, as part of the waste disposal system. Predictably, this top-down approach drew strong opposition from the state government and citizenry. That has not changed. We are now 19 years beyond the date that Congress set for the opening of Yucca Mountain, and taxpayers have had to foot the bill for the mounting payments to utilities holding spent fuel. The Blue Ribbon

**Currently, a number of nuclear plants are at high risk of being shut down because they receive no value in state renewable electricity standards for their role in supplying carbon-free electricity and ensuring power reliability. There needs to be a level energy playing field in order for nuclear power to compete against low-cost natural gas and subsidized wind and solar power.**

**The 115<sup>th</sup> Congress is likely to also take up nuclear waste, specifically the disposal of highly radioactive spent fuel from nuclear power plants and high-level waste from the Cold War nuclear weapons program. The opportunity to move forward is real, but not if we continue to clash over policies and methods that have not worked for decades.**

Commission on America's Nuclear Future emphasized that prospective host jurisdictions must be engaged as partners and that public trust and confidence is a prerequisite for success, as it has been in Scandinavia. Forcing an unwanted facility on an unwilling population is not likely to have any more success now. The DoE has invited public comment on a consent-based approach to storage and disposal to help inform congressional and public discussion.

The Blue Ribbon Commission also advocated exploring several options: consolidated storage facilities; geological repositories for spent nuclear fuel and high-level waste; and potentially a separate program for geological disposal of high-level waste from the nuclear weapons program. This is the strategy adopted by the Obama administration, in addition to endorsing the consent-based approach. Any successful business plans its long-term future with options and hedges. This should be no different.

Consolidated storage will allow for the fastest removal of spent nuclear fuel from reactor sites.

This is especially important for sites where the nuclear reactors have shut down. More generally, it will also relieve some of the pressure against building new nuclear plants. Dry storage of the fuel can provide a century or so of storage, a period that would allow the spent fuel to cool off before going to a geological repository that should be developed in parallel. A Texas company has already filed a license application with the NRC to provide consolidated storage and has had supportive statements at both local and state levels. Still, Congress will need to provide legislative support for the DoE to advance consolidated storage and to access the Nuclear Waste Fund for storage as a key part of the spent fuel disposal system.

Last March, the administration moved beyond the discussions of the 1980s by announcing the beginning of planning for a repository for the high-

level waste from the nuclear weapons program that would be separate from and in parallel with the plan for power reactor fuel. This important step recognizes that defence waste disposal can be easier and faster. While the amount of spent fuel for disposal grows as long as nuclear power is active, the defence waste stopped growing with the end of the Cold War. Defence waste is also relatively small compared with spent fuel and is cooler than recently irradiated fuel. It also comes in different forms that may be amenable to tailored disposal pathways – for example, the DoE is supporting scientific studies of deep borehole disposal for smaller waste forms.

The president's authorization for studying separate defence waste disposal did not constitute a decision to build such a repository. Rather, a relatively small investment now can provide critical options for meeting defence waste disposal commitments in Washington, Idaho, South

Carolina and other states at the earliest date and with the lowest net cost if a spent fuel repository continues to take more time than hoped. The dogged pursuit of a 30-year top-down approach to the siting of nuclear waste facilities – without a recognition that changed circumstances offer new possibilities and new imperatives – is a formula for another triumph of hope over experience. A different approach that provides more options is warranted.

Source: <https://www.bloomberg.com/>, 18 Jan 2017.

**The Blue Ribbon Commission also advocated exploring several options: consolidated storage facilities; geological repositories for spent nuclear fuel and high-level waste; and potentially a separate program for geological disposal of high-level waste from the nuclear weapons program.**

#### **OPINION – Federica Mogherini**

#### **The Iran Nuclear Deal is a Success – and the Whole World is Safer for it**

One year ago, the EU, China, France, Germany, Russia, the UK, the US and Iran began to implement the joint comprehensive plan of action on Iran's nuclear programme. This agreement was the result of brave choices, political leadership, collective determination and

hard work. A year on, we can clearly say that the Iran deal is working and we need to maintain it.

To those critics who have raised concerns, both about the terms of the agreement or about the very idea of having an agreement at all with Iran, I say: take a close look at the facts. The agreement has already paid off by addressing a highly contentious and longstanding dispute in a peaceful manner. In its absence, today we might be facing one more military conflict, in a region that is already far too destabilised.

The deal, one year after its implementation, is delivering on its main purpose: ensuring the purely peaceful, civilian nature of Iran's nuclear programme. The IAEA – the UN's nuclear watchdog – has issued four reports on the matter and has regularly verified that Iran is complying with its nuclear-related obligations. This means that the Iranian nuclear programme has been significantly reformatted and downsized and is now subject to intense monitoring by the IAEA. The joint commission – which I coordinate – oversees constantly the implementation of the agreement, meeting regularly, which allows us to detect even minor possible deviations and to take necessary corrective measures if the need arises.

The deal is also working for Iran. Major companies are investing in the country: the oil sector, the automotive industry, commercial aircraft, just to give a few examples, are areas where significant contracts have been concluded. The IMF has forecast real GDP growth in Iran to rebound to 6.6% in 2016-17. More work is needed, for sure,

**The deal, one year after its implementation, is delivering on its main purpose: ensuring the purely peaceful, civilian nature of Iran's nuclear programme. The IAEA – the UN's nuclear watchdog – has issued four reports on the matter and has regularly verified that Iran is complying with its nuclear-related obligations.**

**Without the agreement, the regional situation would be even more alarming. And we would be losing a historic opportunity if we missed the chance to build a more cooperative regional environment. Against a dramatic regional background, the nuclear deal is a glimpse of what is possible in international relations, by tackling the conflicts affecting the region in a cooperative manner.**

including domestic economic reforms, to make these positive results trickle down to the Iranian population, especially its youth. But the trend is absolutely clear, and progress undeniable. Trade between the EU and Iran has risen by a staggering 63% over the first three quarters of 2016. After more than 30 years of a diplomatic ice age, the EU and Iran are also discussing cooperation on matters as diverse as the economy, protection of the environment, migration, and culture – and the list could continue.

Therefore – and despite criticism that deceitfully stresses the deal's perceived shortcomings and overlooks its proven benefits – it is important to state very clearly: the nuclear agreement with Iran is working. There should be no doubt that the EU stands firmly by the deal, which is a multilateral endeavour. It was borne out of the efforts of the "E3/EU+3" – Britain, Germany, France plus the US, Russia and China – and Iran, but it now belongs to the entire international community, through its endorsement by the UNSC.

Without the agreement, the regional situation would be even more alarming. And we would be losing a historic opportunity if we missed the chance to build a more cooperative regional environment. Against a dramatic regional background, the nuclear deal is a glimpse of what is possible in international relations, by tackling the conflicts affecting the region in a cooperative manner. We can mark the first anniversary of the start of the implementation of the nuclear deal by clearly saying that it is working, thanks to the commitment and determination of all. And we can start 2017 by reaffirming our strong collective interest in living up to the commitments we have all made, building



security not only for the region but for the entire world.

Source: <https://www.theguardian.com>, 17 Jan 2017.

**OPINION – Leonard Hyman & William Tilles**

**Is it Game Over for Nuclear Power in New York?**

IPEC announced that the three unit nuclear power station on the Hudson River will close fully by 2021. The power station has been a source of controversy through most of its 40 plus year life, beginning when its construction almost bankrupted Consolidated Edison Co. of New York, its builder. It was subsequently owned by the state's power authority and then eventually purchased by a subsidiary of New Orleans based Entergy Corp. The original Indian Point site contained a waterfront amusement park. We doubt at this stage that anyone is still amused.

Controversy surrounding this facility has always centered on two questions. What harm is this facility causing to Hudson river ecology? And, with a large nuclear power station 36 miles north of midtown Manhattan, can authorities safely evacuate the surrounding areas in case of accident? The NRC has identified two emergency pathway zones around nuclear power plants. We can think of them as two concentric circles. The first circle with a 10 mile radius poses risk of exposure and inhalation of airborne radioactive particles. The second, wider circle, with a 50 mile radius is the ingestion pathway zone. Foods and liquids within this zone are at risk of contamination in the event of nuclear accident. So much for eating locally.

Let's step back for a moment. These zones are intended presumably to provide civil authorities with some guidelines in case of need for evacuation. The first zone incorporates about 500,000 people and the second, wider zone about 21 million people. Realistically, when asked about

evacuating these numbers there have typically been only two answers: "Of course we can." Or, our preferred response, "Are you insane?" (The plant, in addition to its proximity to New York City, virtually sits alongside the major north-south arterial roadways as well as the main rail lines. The scenic lower Hudson River would prevent westward evacuation.)

Opposing nuclear power plants has been something of a family business for the Cuomo's. Our present Governor Cuomo (Andrew) has been on record as opposing Indian Point since 2007 primarily on environmental grounds. His father,

Governor Mario Cuomo, was instrumental in shuttering the Long Island Lighting Co.'s Shoreham nuclear power station after it was fully completed and irradiated for final testing. Cuomo pere used the other available rationale for denying a nuclear plant an

operating license – that safely evacuating large numbers of people from a long, narrow island (120 miles long and only 20 miles wide) was simply not feasible.

However, our current Governor Cuomo recently sponsored a settlement to keep open uneconomic upstate nuclear power stations (Ginna, Fitzpatrick and 9 Mile Point). Ironically perhaps, his administration cited nuclear's considerable contribution to the state's environmental goals in terms of producing low carbon electricity. A typical nuclear plant probably pays about \$50 million per year in taxes and employs 1,000 people. We're sure neither of these considerations were a factor in economically challenged areas upstate.

The Indian Point Energy Centre is big. Units 2 and 3 are Westinghouse designed PWRs capable of producing 2083 MWs. On a really hot day, Con Ed might need upwards of 13,000 MWs. 2083 MWs is a big chunk of that demand. As an aside we should point out that Indian Point unit 1 first entered commercial service in 1962. This 275 mw PWR was shuttered in 1974 and defueled. Thorium fans will be pleased to learn that early fuel cores

**As an aside we should point out that Indian Point unit 1 first entered commercial service in 1962. This 275 mw PWR was shuttered in 1974 and defueled. Thorium fans will be pleased to learn that early fuel cores at Indian Point unit 1 were thorium based.**

at Indian Point unit 1 were thorium based. Whenever there is a public discussion about power plant closures two issues typically arise: grid reliability and “keeping the lights on.” Pardon our lack of sympathy here, but the Governor first began publicly advocating for Indian Point’s closure ten years ago. Was there no thought given in the ensuing decade to replacing this large, base load resource?

The governor’s staff says they’ve identified 2800 MWs of renewable energy sources to replace the electricity from Indian Point. The Champlain Power Express, a DC transmission line from Canada, makes up 1000 MW of that total and is scheduled for 2021 service. It awaits approval. But the county executive of Rockland County talks about it only bring “disruption” and he favours upgrades at existing, underutilized power stations to pick up some of the slack. So the line may face delays in receiving approval. Keep in mind, as well, that environmentalists have objected to importation of Canadian power. Also uncertain is the Trump administration’s position on NAFTA and trade arrangements with Canada.

Professor Karl Rábago, utility and energy expert at nearby Pace University’s Energy and Climate Centre, commented publicly he was sure that the state could make up for the loss of Indian Point’s output with a combination of renewable and energy efficiency. And he is probably right. Although his reassurance does not address issues of execution and timing. We will all know the answer in about three years. The IPEC closure announcement brings up a number of other issues apart from reliability of electricity service in the NY metro region.

First, after a long struggle Entergy Corp. decided to retire these two units. Presumably if they remained profitable Entergy would have persevered. Clearly the power market in New York State is not paying for nuclear power’s supposed

benefit: no carbon emissions, or at least not enough to keep an old, fully depreciated plant running. Does that imply something is wrong with the market for electricity? Answer: yes. Second, although the Federal government has primacy in most energy matters, including nuclear power, states can influence outcomes, especially for environmental reasons. A recent NY Court of Appeals ruling upheld the Cuomo administration’s challenge to IPEC’s operating license. The appeals court found that the NRC’s grant of an operating license had to be viewed in light of the state’s coastal management programs. The NYS DoEC had found the plant in violation of coastal management requirements. Whether this also may also have triggered a plant closure is now moot.

Third, energy planning becomes more difficult when politicians use their influence and public subsidies to open or shut power generating facilities. In the current deregulated environment, no single organization has an obligation to build facilities to ensure reliable service for present as well as future energy users. And New York remains heavily dependent on its aging nuclear infrastructure. Unit 1 at 9 Mile Point is in fact the oldest operating

**Third, energy planning becomes more difficult when politicians use their influence and public subsidies to open or shut power generating facilities. In the current deregulated environment, no single organization has an obligation to build facilities to ensure reliable service for present as well as future energy users. And New York remains heavily dependent on its aging nuclear infrastructure.**

nuclear facility in the US. The decision to eventually shutter Indian Point seems to us like a long overdue realization that the facility is in the wrong place despite its proximity to one of the biggest electrical load centres in the world. Con Ed executives thought this was a suitable site for a nuclear power station in 1954—two years into Eisenhower’s first term as President. And they were probably right given what they knew at the time. Heck, the 2017 Ford even prototyped a nuclear powered version of its Ranchero, the Nucleon, with optional tail fins.

As for the two full spent fuel pools at the site, they are served by multiple, redundant back up cooling systems. After five years “in the pool” so to speak, irradiated fuel can be relocated to

onsite, dry cask storage. A process that began in 2008. Longer term, this is where public focus should shift. Sooner or later this was going to happen. Either the environmental or the evacuation issues had to be seriously addressed. Politicians of varied stripe can pass the buck. But it stops with us the ratepayers paying some of the highest electricity rates in the country.

Source: <http://oilprice.com/>, 20 Jan 2017.

**OPINION – Ewen MacAskill**

**MoD cannot Fall Back on Usual Excuses to Explain Trident Misfire**

Defence departments and arms companies can usually explain away embarrassing failures in the development of new military hardware. There is a ready answer: mistakes are an inevitable part of the process of trial and error at the cutting edge of technology. But the Ministry of Defence cannot fall back on such an excuse in the catastrophic test-firing of the UK's Trident II D5 ballistic missile in June 2016 off the coast of Florida.

This was not some revolutionary new development still at the experimental stage. The missile completed its design stage in 1989 and was deployed a year later.

Nor was the Vanguard-class nuclear submarine that fired it, HMS Vengeance, new. It has been in service since 1999. So there should not have been the kind of malfunction that saw the missile targeted in the direction of west Africa head off in the opposite direction towards the US mainland. Any teething troubles should have been worked out long ago.

The problem, according to defence sources, was not the missile itself or the launch system. The missile, they say, did not fail and veer off towards the US. The problem appears to have involved telemetry data, information gathered from various points and fed to the missile. There seem to have

been a communication breakdown involving directional data. When this became obvious, the test was aborted. This explanation is alarming enough and the MoD is braced for a series of questions on 23 January 2017 from opposition parties.

The case made by proponents of the nuclear weapon is that any attack on the UK will result in inevitable retaliation. The whole basis of the argument is undercut if the UK cannot guarantee that it is capable of hitting the right target or even the right country. The Scottish National party's Westminster defence spokesman, Brendan O'Hara, along with his party colleagues, is to put down a series of parliamentary questions and call for an emergency debate. O'Hara said there was a political issue of whether there had been a deliberate cover-up on the part of the PM, Theresa May, before a key Commons vote on the renewal

of the Trident nuclear programme, but there was also a technical issue.

"There is no suggestion this was a prototype or an experiment," he said. "A lot of planning and attention had gone into this. There was a loss of control. So it is deeply worrying." A former head of the Royal Navy, Adm Lord West, criticised the government

for failing to come clean at the time. He told Sky News: "Now they have to reassure us because they were so stupid not to let us see what was going on in June." The debate in the run-up to the Commons vote in July 2016 was dominated by issues such as the cost, the morality of nuclear weapons and whether technological change – such as the use of underwater drones – would make nuclear submarines redundant. Few, if any, questioned the possibility of such a malfunction involving a missile.

Lockheed Martin, which makes the missile, says on its website there have been more than 150 successful test flights since design completion in 1989, a record, the company boasts, "unmatched

**The problem, according to defence sources, was not the missile itself or the launch system. The missile, they say, did not fail and veer off towards the US. The problem appears to have involved telemetry data, information gathered from various points and fed to the missile. There seem to have been a communication breakdown involving directional data. When this became obvious, the test was aborted.**

by any other large ballistic missile or space launch vehicle". Most of the tests are carried out by the US navy. The UK, on a tighter budget, conducts fewer such test firings because of the cost: the missiles come in at £17m each. There have been only five such tests this century: in 2000, 2005, 2009, 2012 and 2016.

HMS Vengeance had completed a refit and the test was to demonstrate that it was ready to resume active service. Defence sources, playing down the scale of the malfunction, pointed out that Vengeance did resume active service in June 2016, the suggestion being that the problem could not have been regarded as that serious. But opposition parties do not see it that way. They will press for answers tomorrow and beyond. A week on 23 January 2017 it is Commons defence questions and ministers can brace themselves for a further inquisition into why such a spectacular and disturbing failure could happen.

Source: <https://www.theguardian.com/>, 22 Jan 2017.

## NUCLEAR STRATEGY

### CHINA

#### China Announces Deployment of New Long Range Nuclear Missile

In a rare move, China has publicly announced the deployment of a new ICBM. The Dong Feng-41 missiles, or DF-41, can carry up to a dozen nuclear warheads and China claims it has the longest range of any nuclear missile in the world. The announcement of the missiles is likely a warning to US President Trump, who is known for sharply worded anti-Chinese rhetoric and has announced plans for a new ballistic missile system. According to China's *Global Times* newspaper, the People's Liberation Army has deployed its newest ICBM to Heilongjiang Province. The article cited eyewitness photos culled from Chinese social

media by news media in Taiwan and Hong Kong. The photos showed heavy missile launchers, also known as TELs moving through Daqing City in Heilongjiang.

The DF-41 is described by *Global Times* as the most advanced ICBM in the world. It reportedly has a range of 8,699 miles, enough to hit any target on Earth with the exception of South America and parts of Antarctica. It can carry up to

12 nuclear warheads, and travels on China's nationwide network of roads to make it difficult to track down and destroy. The location of the missiles and the timing of the release are notable. Heilongjiang Province is in Northern China, near the country's long border with Russia. The DF-41's long

range, if accurate, means it could be based anywhere and still hit any useful target on Earth, but the implication is that China considers Russia a friendly country.

While China tends to be low-key regarding nuclear weapons and nuclear deterrence, this seems like a deliberate move to make a subtle threat. After all, it was probably completely unnecessary to move strategic nuclear weapons through a city of 2.9 million people, unless you want to get the word out. President Trump, meanwhile, has been talking tough about China as well as enhancing America's ballistic missile shield. If China wanted to overwhelm the shield with more missiles, the DF-41 would be the way to do it.

America's ballistic missile shield is provided by the GBMD system. The system has 37 Ground-Based Interceptors, 33 at Fort Greeley, Alaska and four at Vandenberg Air Force Base in California. Each GBI is designed to shoot down enemy warheads passing through space after they have separated from the actual missile, about midway through their flight to their targets. The system isn't perfect. The Pentagon reckons that each GBI has a fifty % chance of successfully intercepting

**HMS Vengeance had completed a refit and the test was to demonstrate that it was ready to resume active service. Defence sources, playing down the scale of the malfunction, pointed out that Vengeance did resume active service in June 2016, the suggestion being that the problem could not have been regarded as that serious.**

a warhead, and so it plans to shoot five GBIs at each warhead. Theoretically, that should be enough to ensure one hundred percent success. Theoretically.

GBMD was always meant to prevent rogue nations—think Iran and North Korea—from launching nuclear missiles at the US. Developing ICBMs is such an expensive effort that neither country would not be able to launch more than a handful of missiles. With 37 GBIs, the US would hopefully be able to shoot down up to seven warheads. The system has worried America's potential nuclear adversaries, Russia and China, for whom nuclear deterrence only works if their missiles can hit US targets. If the US builds more Ground-Based Interceptors, they could theoretically stop a Chinese or Russian nuclear attack.

China has a No First Use policy, which states it will never use nuclear weapons first in a conflict—but it does reserve the right to retaliate in kind. China has always maintained a small number of ICBMs, only has about 54 capable of hitting the US – compared to the arsenal of 400 Minuteman III ICBMs sitting in silos in North Dakota and Wyoming. China has traditionally placed one huge, 5 megaton city-smashing warhead on its older DF-5 missiles. That's 5,000 kt of thermonuclear firepower; the "Fat Man" bomb dropped on Hiroshima was only about 17 kt.

Missiles such as ICBMs are meant to lift nuclear warheads into space, setting them on trajectories that will land them on their targets thousands of miles away. The weakness in the US system is that it strikes warheads only after they have separated from missiles. With the DF-41 ICBM, however, the difficulty of defending against an attack rapidly increases over time. In the first five minutes, you have a one missile problem. After that, you have a twelve warhead problem. So for one missile, you suddenly need sixty GBI

interceptors to shoot down all the warheads with total certainty. Fifty four Chinese missiles with 12 warheads each presents the US with a problem that only 3,240 GBI could solve.

China's stockpile of fissile materials – plutonium and highly enriched uranium – is only enough for about 250 nuclear weapons. So each DF-41 would likely carry so-called "penetration aids", fake warheads, radar-confusing chaff, and other payloads meant to confuse and present more targets to US defences than there are actual warheads. Each DF-41 could carry just one actual warhead and eleven fakes. Unless the US could tell them apart, it would still be forced to shoot all of them down. China's parading of ICBMs through cities is likely meant as a message to the new administration of President Trump, which has promised to build a new, "state of the art BMD system". The message is: "That's not enough."

**China has a No First Use policy, which states it will never use nuclear weapons first in a conflict—but it does reserve the right to retaliate in kind. China has always maintained a small number of ICBMs, only has about 54 capable of hitting the US – compared to the arsenal of 400 Minuteman III ICBMs sitting in silos in North Dakota and Wyoming.**

*Source: <http://www.popularmechanics.com/>, 24 Jan 2017.*

## **NORTH KOREA**

### **North Korea Threatens to Launch ICBM Ahead of Trump Inauguration**

The North Korean regime has reportedly threatened to launch ICBM to coincide with Trump's presidential inauguration in the US. The North had earlier warned that the timing of the imminent launch will be decided by the country's leader Kim Jong-un. The North's key mouthpiece Rodong Sinmun, published by the ruling party, carried a report on 20 January 2017, which read: "An ICBM test-firing is a fair self-defence step to counter the US threat of a nuclear war against us (the North) that nobody can argue."

It added: "We don't care what others say, and our ICBM will be test-fired at a certain time and place which our leadership will decide." In anticipation of any provocative act from the North, the

reclusive regime's adversaries – the US, South Korea and Japan – have also announced a trilateral naval exercise starting. Aegis-equipped destroyers from all the three nations would take part in the three-day exercises, which would include simulated missile threats emerging from Pyongyang.

The North Korean warning comes a day after South Korea's military said that Pyongyang could be readying two ICBMs for a test launch in the near future and that two missiles have been placed on mobile launchers, according to Seoul's Yonhap news agency. The devices reportedly "are estimated to not exceed 15 meters (50 feet) in length, making them shorter than the North's existing ICBMs". The news agency quoted anonymous military official as saying that the North was aiming to send a "strategic message" to the incoming Trump administration ahead of his inauguration on 20 January.

**The North Korean warning comes a day after South Korea's military said that Pyongyang could be readying two ICBMs for a test launch in the near future and that two missiles have been placed on mobile launchers, according to Seoul's Yonhap news agency.**

An official from South Korea's Joint Chiefs of Staff said that the claims could not be verified and they are keeping a close eye on it. Additionally, two US government officials have also said that there are indications that the North could be preparing for a new missile test-launch in the coming weeks. According to the officials, US intelligence satellites picked up signs of activity at North Korea's Chamjin missile factory which is southwest of Pyongyang. The officials stressed it is unclear what kind of missiles would be launched or when. One of them was quoted as saying the launch could be carried out using a mobile launcher, meaning there would be little or no notice.

Pyongyang has never tested an ICBM successfully so far, with analysts strongly questioning the North's abilities to come with such advanced system. The military experts suspect though Pyongyang could trumpet the missile as an ICBM, the strike range of the weapon is likely to fall under 2,500 km which is half the range of an ICBM

of 5,500 km.

Source: <https://www.yahoo.com>, 20 Jan 2017.

## PAKISTAN

### Pakistan Successfully Tests Multiple Warhead Missile

Pakistan on 24 January successfully tested a nuclear capable, medium range missile equipped with MIRVs. "First successful flight test of surface-to-surface ballistic missile Ababeel, which has a maximum range of 2,200 kilometres, was conducted. The missile is capable of delivering multiple warheads, using MIRV technology," the Inter Services Public Relations (ISPR) said in a statement. ... "Ababeel is capable of carrying nuclear warheads and has the capability to engage multiple targets with high precision, defeating the enemy's hostile radars," the statement said.

With the successful test, Pakistan has joined the elite club of nuclear countries that have MIRV capabilities. Pakistan will be the seventh country to have this technology. Other countries in this league are Britain, France, Russia, the United States, China and India. China and India achieved this capability over the past couple of years.

The development further confirms the big strides that Pakistan has made towards mastering warhead miniaturisation. Pakistan's rationale for attaining the MIRV technology is to defeat Indian BMD shield. "Development of Ababeel weapon system is aimed at ensuring survivability of Pakistan's ballistic missiles in the growing regional BMD environment. This will further reinforce deterrence," the ISPR said.

MIRVing is a double-edged sword. While it will enhance strategic stability by allowing Pakistan to confidently evade BMDs at longer distances in addition to improving the survivability of nuclear forces, MIRVs at the same time become choice targets for a first-strike by the enemy. MIRVing

also implies that Pakistan is going to invest more in production of warheads and fissile materials, which will increase the size of nuclear arsenal.

Source: *Dawn*, 25 Jan 2017.

## **RUSSIA**

### **Russia Test-Fires Topol-M Intercontinental Ballistic Missile**

Russia's military successfully test-fired a Topol-M ICBM, according to the country's defence ministry. The missile, one of Russia's first ICBMs developed after the fall of the Soviet Union, was fired from the Plesetsk spaceport and struck its target at a firing range in the Kamchatka Peninsula. Russian defence authorities say the test was conducted to confirm the weapon's stability. "The missile's exercise head hit a hypothetical target at a firing range in the Kamchatka Peninsula with high degree of precision," defence officials told the Tass news agency. "The launch was geared to confirm the stability of flight characteristics of this type of intercontinental ballistic missiles."

The Topol-M is capable of being deployed from missile silos or APU launchers mounted on the 16-wheeled MZKT-79221 universal TEL. The missile's operational range is 6,835 miles. The weapon's developers claim their product is able to bypass any current or planned US missile defence system, and can make evasive manoeuvres to avoid missile interceptors during flight. Russia began testing the Topol-M in 1994 after the missile was developed by the Moscow Institute of Thermal Engineering. A silo-based modification of the missile entered service in 2000.

Source: <http://www.upi.com/>, 17 Jan 2017.

## **UK**

### **UK Govt Accused of Covering Up Failed Nuclear Missile Test**

The British government was accused of covering up a failed test of its nuclear weapons deterrent

2016, just weeks before lawmakers voted to renew the system. PM Theresa May refused to say whether she knew about the reported malfunction of an unarmed missile when she urged MPs to support updating the Trident nuclear system. *The Sunday Times* newspaper, citing a senior naval source, claimed that the Trident II D5 missile failed after being launched from a British submarine off the coast of Florida in June. The cause of the failure is top secret but the source suggested the missile may have veered off in the wrong direction towards the US.

"There was a major panic at the highest level of government and the military after the first test of our nuclear deterrent in four years ended in disastrous failure," the source told the paper. "Ultimately Downing Street decided to cover up the failed test. If the information

***The Sunday Times newspaper, citing a senior naval source, claimed that the Trident II D5 missile failed after being launched from a British submarine off the coast of Florida in June. The cause of the failure is top secret but the source suggested the missile may have veered off in the wrong direction towards the US.***

was made public, they knew how damaging it would be to the credibility of our nuclear deterrent." The malfunction came just weeks before the House of Commons was asked on July 18 to approve the replacement of the ageing submarines that carry Britain's nuclear

arsenal. May was not PM at the time of the test, but she took office shortly before the vote and successfully appealed to lawmakers to approve the £41 billion (47 billion euro) project.

In a *BBC* interview, she sidestepped questions about whether she knew about the malfunction when she made her statement to MPs. "What we were talking about is whether or not we should renew Trident," she said. "I have absolute faith in our Trident missiles," she continued, adding that tests take place "regularly". Opposition Labour leader Jeremy Corbyn, a longstanding opponent of nuclear weapons, said it was a "pretty catastrophic error" for a missile to go in the wrong

direction.

A government spokesman confirmed the Royal Navy conducted a routine test launch of an unarmed missile last June from HMS Vengeance, one of Britain's four SSBN. It was "part of an operation which is designed to certify the submarine and its crew", he said. "Vengeance and her crew were successfully tested and certified, allowing Vengeance to return into service. We have absolute confidence in our independent nuclear deterrent," he added. Britain is one of only three nuclear-armed NATO nations, along with the US and France.

Source: <http://tribune.com.pk/>, 22 Jan 2017.

## BALLISTIC MISSILE DEFENCE

### ISRAEL

#### Israel Army Gets New Ballistic Missile Interceptors

The Israeli army on 18 January received new ballistic missile interceptors that significantly upgrade the Jewish state's aerial defence systems in the face of "emerging threats", the defence ministry said. The Arrow 3 interceptor, designed to shoot down missiles above the atmosphere, was handed to air force bases in Israel after successful testing by Israel and the US at the end of 2015. A defence ministry statement said Israel and the US were dedicated to the continued development and enhancement of BMD systems as "threats continue to grow and new emerging threats surface".

The Arrow project was first launched in 1988 as part of the then Star Wars program under late US president Ronald Reagan that was abandoned in 1993. Arrow 3 is intended to serve as Israel's uppermost missile interception system. Lower-altitude interception systems are either already

deployed or close to being operational. Partly financed by the US, the Arrow system was developed and produced by Israeli Aerospace Industries in partnership with Boeing.

Israel's foe Iran has carried out a number of missile tests in recent months, which the US and European governments have said are a breach of its commitments under the 2015 nuclear deal. Western powers say the missiles are capable of carrying nuclear warheads and therefore go against the deal, while Iran says its missile program is "non-negotiable". Israel had opposed the deal between Iran and major powers, which lifted a wide range of international sanctions in exchange for limits on Iran's nuclear program.

Source: <http://newsinfo.inquirer.net/>, 19 Jan 2017.

### JAPAN

#### Japan to Launch Missile Defence Satellite

Japan is planning to launch a missile defence satellite on 24 January to upgrade the country's surveillance network that can detect and track North Korea missile launches. The satellite will be launched from Tanegashima Space Center in Kagoshima Prefecture, NHK reported. The satellite Japan's SDF will be launching is mainly for BMD. It is likely the satellite is a countermeasure to

North Korea's developing missile capability, according to the report.

The step is also being taken as Japan's SDF is shouldering more responsibilities, in line with security legislation ratified in 2015. In December, Japan's military was allowed for the first time to use firearms and other weapons in peacekeeping missions in South Sudan. Japanese law now allows its military to serve in overseas missions whenever it or a close ally is attacked. After it is launched, the new satellite could exchange large amounts of data at high speeds among military units, including launch information and videos

**The Arrow 3 interceptor, designed to shoot down missiles above the atmosphere, was handed to air force bases in Israel after successful testing by Israel and the US at the end of 2015. A defence ministry statement said Israel and the US were dedicated to the continued development and enhancement of BMD systems as "threats continue to grow and new emerging threats surface."**



from overseas bases, according to the report.

X-band satellite communication, capable of transmitting and receiving large amounts of data reliably, will be used among military units deployed across different areas, because X-band communication is not easily affected by weather or terrain. The new satellite is named Kirameki No. 2. Another satellite was originally scheduled to launch on July 1, 2016, but was damaged while in transit and the launch was canceled, according to NHK.

Source: <http://www.upi.com/>, 17 Jan 2017.

## **NUCLEAR ENERGY**

### **CHINA**

#### **Goals Set for Nuclear Energy Development in Next Five Years**

The NDRC and the NEA have officially issued the 13th FYP for energy development, China Securities Journal reported. Throughout the next five years, over 30 million KWs of nuclear energy facilities will be under construction in China. By 2020, China will have 58 million kW of installed nuclear power, up 16.5 % year on year. The country will continue developing nuclear power safely and efficiently while also speeding up the construction of nuclear projects in coastal regions, according to the development plan.

The country will develop some major nuclear technology projects, start the construction of CAP1400 demonstration project and create a high temperature gas-cooled reactor demonstration

**After it is launched, the new satellite could exchange large amounts of data at high speeds among military units, including launch information and videos from overseas bases, according to the report x-band satellite communication, capable of transmitting and receiving large amounts of data reliably, will be used among military units deployed across different areas, because X-band communication is not easily affected by weather or terrain. The new satellite is named Kirameki No. 2.**

According to the plan, the share of non-fossil fuels will rise to more than 15 % and the share of natural gas should reach 10 % by 2020. China's total energy consumption will be capped at 5 billion tons of coal equivalent by 2020, representing an annual uptick of about 2.5 % between 2016 and 2020.

Source: <http://usa.chinadaily.com.cn/>, 18 Jan 2017.

### **INDIA**

#### **Kundankulam Nuclear Power Plant's Second Unit Reaches Full Capacity**

The second unit of the KNPP has reached 100 % capacity (1000 MWs) for the first time, a senior Rosatom official told RIR on Jan. 22. "After completing the physical experiments stage at 90 % power level and after obtaining the permission of the Indian regulatory authority, the reactor plant was brought to 100 % nominal level of neutron power," said Andrey Lebedev, vice-president (South Asia), ASE Group of Companies, which is the construction and engineering division of Rosatom.

"We have reached the last stage of dynamic tests

at nominal power," Lebedev added. "As per the schedule, this stage will be completed during the first two weeks of February." The unit will go live once these final tests are complete. KNPP's second unit was connected to the power grid of India on Aug. 29, 2016. Physical start-up of the unit commenced in May 2016 when the first fuel assembly was loaded into the reactor. In total, 163 fuel assemblies were loaded into the reactor. Rosatom constructed the nuclear power plant, which is now being operated by The NPCIL. In December 2014, Russian President Putin and Indian PM Modi signed the 'Strategic Vision' document, which envisages the construction of at least 12 more Russian-designed nuclear power units in India.

Source: <http://in.rbth.com/>, 22 Jan 2017.

**The unit will go live once these final tests are complete. KNPP's second unit was connected to the power grid of India on Aug. 29, 2016. Physical start-up of the unit commenced in May 2016 when the first fuel assembly was loaded into the reactor. In total, 163 fuel assemblies were loaded into the reactor.**

## JAPAN

### Japan Gives Passing Grade to 10th Nuclear Reactor

Japan's nuclear watchdog said two reactors in south-western Japan passed safety screenings, marking a total of 10 units cleared for restart since all nuclear plants were ordered shut down following the March 2011 meltdown at Fukushima. The No. 3 and No. 4 reactors at the Genkai plant, overseen by Kyushu Electric Power in Saga Prefecture, are slated to resume operations by this summer at the earliest. Since tougher rules were put in place in 2013, applications for safety inspections covering 26 reactors at 16 plants have been filed.

All 10 units that passed at the five plants are PWRs, which are common in western Japan. The devastated facilities at Tepco Holdings' Fukushima Daiichi plant were BWR. Units sharing that design have yet to pass safety screenings. Tepco's plans to restart the Kashiwazaki-Kariwa plant in Niigata Prefecture have hit the skids, and the heavy decommissioning and compensation costs will weigh down on the utility's earnings.

Even if a reactor wins the NRA's seal of approval, that is no guarantee that it will go back online. A restart also requires the consent of the local population. Saga Gov. Yoshinori Yamaguchi has indicated that he will approve the resumption of the Genkai reactors if the public approves. Yamaguchi spoke on the phone with Hiroshige Seko, the minister of economy, trade and industry, seeking assurances from the state that his citizens will be protected.

The town of Genkai, home of the reactors, plans to start the approval process as soon as February 2017. The cities of Imari and Iki, located within 30km of Genkai, are opposed to the restart. Operations may be blocked by a court order as well. Kansai Electric Power restarted the Takahama No. 3 and No. 4 reactors last year, only to be halted since

March 2017 by an injunction. Kyushu Electric's Genkai station is also facing court action. In addition, Genkai's spent fuel pool storage space is projected to be completely filled in about five years. Kyushu Electric's plans to increase capacity by transferring spent fuel elsewhere may be rejected by the NRA.

Source: <http://asia.nikkei.com/>, 19 Jan 2017.

## UAE

### UAE Moves Step Closer to Nuclear Energy

The UAE's nuclear regulatory body has issued two licenses for the transport and storage of 'fresh' nuclear fuel, state news agency WAM has reported. The licenses were issued by the FANR, to transport 'fresh' nuclear fuel and to handle and store such fuel at Unit 1 of the Barakah NPP. The receipt of nuclear fuel will be a first for the UAE – the licensing by the FANR played a significant role in enabling this to happen.

The licenses were approved for the ENEC, and Nawah Energy Company, respectively, in mid-December, after FANR's staff carried out intensive

assessments and inspections into their readiness, to ensure the license applications met FANR's safety, security and safeguard requirements. "I am pleased with the concerted efforts of the departments at FANR, who have worked laboriously throughout the licensing review period to ensure that the license applicants complied with our regulations and met the highest international standards of safety, security and safeguards. FANR fosters a strong safety culture and this commitment is shared by our Board of Management," said Christer Viktorsson, Director General of FANR.

The operator will still need a FANR license to operate a nuclear facility in order to load nuclear fuel into Unit 1 at Barakah. This is currently being reviewed by the FANR. FANR has over 1,800 licensees and has gained international recognition as a competent regulator. The UAE nuclear regulator cooperates closely with the IAEA, IAEA, and it endeavors to maintain its strict adherence to the highest standards of nuclear safety.

Source: <http://english.alarabiya.net/>, 22 Jan 2017.

## **USA**

### **US House Passes Advanced Nuclear Act**

The US House of Representatives – the lower chamber of the US Congress - has approved a handful of bipartisan bills from the last session of Congress that aim to bolster research on advanced nuclear reactors, allow for more challenges at the Federal Energy Regulatory Commission and change rules for federal efficiency standards. The Advanced Nuclear Technology Act of 2017 was passed by voice vote on 23 January. The document,

**FANR has over 1,800 licensees and has gained international recognition as a competent regulator. The UAE nuclear regulator cooperates closely with the IAEA, IAEA, and it endeavors to maintain its strict adherence to the highest standards of nuclear safety.**

H.R. 590, is titled 'To foster civilian research and development of advanced nuclear energy technologies and enhance the licensing and commercial deployment of such technologies'.

In a statement, announcing passing of the Act, Congress noted that nuclear energy generates about 20% of the total

electricity and about 60% of the carbon-free electricity of the USA. Nuclear power plants operate consistently at a 90% capacity factor, and provide consumers and businesses with reliable and affordable electricity, it said. Nuclear power plants "generate billions of dollars in national economic activity" through nationwide procurements and "provide thousands of Americans with high paying jobs contributing substantially to the local economies in communities where they operate", it added.

The USA's commercial nuclear industry "must continue to lead the international civilian nuclear marketplace", it said, "because it is one of our most powerful national security tools, guaranteeing the safe, secure, and exclusively peaceful use of nuclear energy". Maintaining the country's nuclear fleet of commercial light water reactors and expanding the use of new advanced reactor designs would support continued

production of reliable base load electricity and maintain the USA's "global leadership" in nuclear power, it said.

Nuclear fusion technology also has the potential to generate electricity with significantly increased safety performance and no radioactive waste, it added.

The development of advanced reactor designs would benefit from a "performance-based, risk-informed, efficient, and cost-effective regulatory framework with defined

**In a statement, announcing passing of the Act, Congress noted that nuclear energy generates about 20% of the total electricity and about 60% of the carbon-free electricity of the USA. Nuclear power plants operate consistently at a 90% capacity factor, and provide consumers and businesses with reliable and affordable electricity, it said.**

milestones and the opportunity for applicants to demonstrate progress through Nuclear Regulatory Commission approval," it said. Seth Grae, president and CEO of Lightbridge Corporation, "commended" the US House for the quick passage of H.R. 590, which he said "creates a framework" for licensing advanced nuclear technology. Reston, Virginia-based Lightbridge is developing advanced nuclear fuel technology designed for existing and some new types of reactors "to make them even more economical and efficient", he added.

Source: <http://world-nuclear-news.org/>, 25 Jan 2017.

## URANIUM PRODUCTION

### USA

#### Uranium Stocks are Booming, Thanks to Trump

Uranium stocks are...going nuclear lately thanks to hopes that Trump and his administration will be more willing to invest in nuclear power. The Global X URA, a basket of several big uranium mining stocks, is up nearly 40% since Election Day. The fund has soared more than 25% this year alone – despite the fact that its largest holding, CCJ, plunged nearly 20% on 18 January after warning of a loss due to lower production at a mine in Kazakhstan.

Cameco also announced that it will be cutting more than 100 jobs at mines in Saskatchewan. But Cameco's stock, even with the drubbing it took earlier this 2nd week of January 2017, is still up more than 15% this year. It rebounded sharply on 19 and 20 Jan 2017. The optimism seems almost entirely due to Trump. In an interview with Canada's BNN network, Cameco CEO Tim Gitzel said that "we've heard some encouraging words from the Trump team on nuclear power. We're optimistic that will help our nuclear industry."

So far, Trump hasn't said much about investing in nuclear power since the election. His most notable comment about nuclear energy was actually a tweet about nuclear weapons a few days before Christmas. Trump wrote that "the US must greatly strengthen and expand its nuclear capability until such time as the world comes to its senses regarding nukes."

Trump's energy secretary nominee Rick Perry, the former governor of oil-rich Texas, hasn't talked much about nuclear power either. But investors are clinging to the hope that Trump is pro-nuclear power, partly because of comments he made nearly six years ago after the meltdown at Japan's Fukushima Daiichi plant in March 2011 after an earthquake hit the area.

"I'm in favor of nuclear energy, very strongly in favor of nuclear energy," Trump said in an appearance on Fox News. "If a plane goes down people keep flying. If you get into an auto crash people keep driving."

**Investors are clinging to the hope that Trump is pro-nuclear power, partly because of comments he made nearly six years ago after the meltdown at Japan's Fukushima Daiichi plant in March 2011 after an earthquake hit the area. "I'm in favor of nuclear energy, very strongly in favor of nuclear energy," Trump said in an appearance on Fox News. "If a plane goes down people keep flying. If you get into an auto crash people keep driving."**

Bloomberg also reported that members of Trump's transition team have reached out to the Energy Department about finding ways to help keep more nuclear power plants running. Several large plants have already closed. And ETR recently reached an agreement with New York state to shut down the Indian Point nuclear power plant near New York City by 2021. So the fact that Trump appears to be committed to keeping the industry alive is being viewed as a significant win by investors.

But the uranium industry is as volatile as some of the compounds derived from the radioactive element. Investors need to be careful. Many of the top holdings in the uranium ETF, which also includes NexGen and Denison Mines, are relatively small penny stocks. And even if Trump does wind up committing to more investments in

nuclear energy, it's unlikely that he's going to abandon traditional fossil fuels. In fact, many oil stocks have rallied since Trump beat Hillary Clinton on the hopes that Trump will pursue policies that are favourable for the likes of XOM, Chevron and US shale gas producers EOG and Devon Energy.

Trump's selection of former ExxonMobil CEO Rex Tillerson to be his secretary of state has made oil investors even more excited about the prospects for more domestic drilling in the next few years. ExxonMobil just made a big investment in shale, scooping up assets in the Permian Basin of Texas and New Mexico for \$5.6 billion.

Source: <http://money.cnn.com/>, 20 Jan 2017.

## **NUCLEAR COOPERATION**

### **EU-IAEA**

#### **EC-IAEA Cooperation on its Action Plan on Nuclear Safety Continues**

The EU, represented by the EC, and the IAEA have recently concluded a delegation agreement: INSC/2016/378-378 amounting to EUR 3.5 million. The agreement, signed on 21 December 2016, defines the activities entrusted to the IAEA for the implementation of the Action Plan on Nuclear Safety and in providing assistance to INSC beneficiaries for improving global nuclear and radiation safety.

The themes and projects of the cooperation were identified through a consultative process between both organizations and are based on the needs expressed by their Member States, as well as in view of global and regional nuclear and radiation priorities including life cycle management of

**The agreement, signed on 21 December 2016, defines the activities entrusted to the IAEA for the implementation of the Action Plan on Nuclear Safety and in providing assistance to INSC beneficiaries for improving global nuclear and radiation safety.**

radioactive waste – responsible and safe management of spent fuel and radioactive waste, decommission and remediation of former nuclear sites and installations, and strengthening emergency, preparedness and response

capabilities and arrangements at national and regional levels. Delegation agreement INSC/2016/378-378 is subject to the provisions of the FAFA between the European Commission and the United Nations to which both the European Atomic Energy Community and the IAEA adhered in 2004.

Source: <https://www.iaea.org/>, 25 Jan 2017.

### **FRANCE-SOUTH AFRICA**

#### **France's EDF Declares Intention to Respond to Eskom's Nuclear RFI**

The French nuclear industry, led by electricity utility EDF, formally declared its intention to submit a response to the Nuclear New Build Programme RFI, which was released by South Africa's Eskom on December 20. The announcement by EDF followed reports that Russian nuclear vendor Rosatom also intended responding to the RFI, along with denials by Rosatom that it had already submitted a bid to build new reactors in South Africa.

**The French nuclear industry, led by electricity utility EDF, formally declared its intention to submit a response to the Nuclear New Build Programme RFI, which was released by South Africa's Eskom on December 20. The announcement by EDF followed reports that Russian nuclear vendor Rosatom also intended responding to the RFI.**

EDF said its response would also deal with the nuclear fuel cycle and the commercial production reactor, which could be procured by the Necsa. "EDF and the French nuclear industry welcome the RFI as an opportunity to engage in a new phase of cooperation with Eskom and Necsa on

developing the South African Nuclear New Build Programme," the group said in a statement.

Eskom issued the RFI in line with an amended section 34(1) determination, published in the Government

Gazette of December 14, designating Eskom as the procurer of the nuclear generation plant. The RFI was issued instead of the request for proposals, previously mooted, and Eskom stressed that the process did not amount to a competitive tender and would, thus, not create any financial commitments or obligations on it or government.

The closing date for responses to the RFI is April 28, but vendors needed to inform Eskom by January 31 as to whether or not they intended to respond. Therefore, it is likely that other vendors could also make their intention known prior to the end of the month, given that intergovernmental agreements on nuclear have also been signed with, South Korea, Canada, Japan, China and the US.

South Africa and France signed an intergovernmental agreement on civil nuclear cooperation in October 2014 and EDF and Areva have long signalled that the French nuclear industry had an appetite for the South African programme, despite the controversy that surrounds it. "The French government has always been supportive of close cooperation, including know-how transfer and skills development, between the French nuclear industry and its South African counterparts," EDF said.

EDF would lead and coordinate the French effort drawing on capabilities built over its 40-years of domestic and international nuclear experience, "most recently in China and in the UK". The group operates the world's largest nuclear fleet, comprising a total of 73 units, 58 of which are located in France. It has been confirmed previously that the French intend offering the 1 650 MW EPR reactor design, which is being constructed at Flamanville 3 in France.

EDF also highlighted its long-standing relationship with Eskom at the Koeberg nuclear power station in the Western Cape, which remains Africa's only

operating nuclear plant. "EDF is already involved in South Africa and is determinate to go forward and be a key player of the South African energy transition in the future."

Source: <http://www.engineeringnews.co.za/>, 25 Jan 2017.

## IRAN-RUSSIA

### Iran, Rosatom Sign Roadmap for Nuclear Cooperation

The document was signed in Russia by Behrouz Kamalvandi, the AEOI deputy chief, and Nickolay Spasskiy, ROSATOM deputy director general, as a follow-up to a memorandum of understanding in Nov 11, 2014. Also, the two sides finalized a pre-project contract for the retrofitting of two gas centrifuge cascades in the Fordo facility. The documents were approved and prepared for signing as a result of recent negotiations between the AEOI and ROSATOM. The agreement is in line with a 2015 international nuclear deal between Iran and six world powers, which resulted in removal of sanctions against Iran in exchange for limits on the country's nuclear program.

Under the deal, Iran has committed to convert the Fordo facility into a nuclear, physics and technology centre to benefit from

international collaboration including in the form of scientific joint partnerships in agreed areas of research. Also, by the accord, two of the six centrifuge cascades at the Fordo facility have to spin without uranium and will be transitioned, including through appropriate infrastructure modification, for stable isotope production. Stable isotopes are used for medical and industrial purposes.

**Under the deal, Iran has committed to convert the Fordo facility into a nuclear, physics and technology centre to benefit from international collaboration including in the form of scientific joint partnerships in agreed areas of research. Also, by the accord, two of the six centrifuge cascades at the Fordo facility have to spin without uranium and will be transitioned, including through appropriate infrastructure modification, for stable isotope production. Stable isotopes are used for medical and industrial purposes.**

Iran launched a facility to produce raw material for stable isotopes in August 2016. Also, in an August interview with Azerbaijani state news agency AZERTAC, Russian President Putin said, "We will further assist our Iranian partners in implementing the Plan of Action on Iran's nuclear program, including the processing of enriched uranium and the conversion of facilities to produce stable isotopes."

Source: <http://www.tehrantimes.com/>, 20 Jan 2017.

## NUCLEAR PROLIFERATION

### NORTH KOREA

#### North Korea has Restarted Reactor to Make Plutonium

New commercial satellite imagery suggests North Korea has resumed operation of a reactor at its main nuclear site that is used to produce plutonium for its nuclear weapons program, a US thinktank said. Washington's 38 North project, which monitors North Korea, said previous analysis from 18 January showed signs that North Korea was preparing to restart the reactor at Yongbyon, having unloaded spent fuel rods for reprocessing to produce additional plutonium for its nuclear weapons stockpile.

It said in a report: "Imagery from January 22 shows a water plume (most probably warm) originating from the cooling water outlet of the reactor, an indication that the reactor is very likely operating." It said it was impossible to estimate at what power level the reactor was running, "although it may be considerable". A 38 North Korea report said operations at the reactor had been suspended since late 2015. ...

Source: *The Guardian*, 28 Jan 2017.

## NUCLEAR DISARMAMENT

### CHINA

#### Chinese President Xi Jinping Calls for Nuclear Disarmament

Xi Jinping has called for a world without nuclear weapons in his address at the World Economic Forum. The Chinese president also spoke out in favor of a multilateral world based on equality among big and small countries. In a landmark address in Davos, Xi held a speech to campaign for nuclear disarmament and a global governance system based on equality among countries. "Nuclear weapons should be completely prohibited and destroyed over time to make the world free of them," he said in a 45-minute-long address.

**The Chinese president also spoke out in favor of a multilateral world based on equality among big and small countries. In a landmark address in Davos, Xi held a speech to campaign for nuclear disarmament and a global governance system based on equality among countries. "Nuclear weapons should be completely prohibited and destroyed over time to make the world free of them," he said in a 45-minute-long address.**

"We should reject dominance by one or several countries," he said, adding that big countries needed to treat their smaller counterparts as equals "instead of acting as a hegemon." "Sovereign equality is the most important rule," he continued. Speaking about his own country, Xi said, "we always put people's rights and interests above

everything else and we have worked hard to develop and uphold human rights.... China will never seek expansion, hegemony or sphere of influence."

China has been accused of abusing human rights and stifling dissent among its dissidents. It has also been accused by its neighbours of having expansionist ambitions in the South China Sea. Xi also said his country would build a new model for relations with the US, partnership with Russia and cooperation for peace, growth and reform among different civilizations. He said the international community needed to cooperate rather than compete on new frontiers like the deep sea, the Polar Regions and outer space.

However, the Chinese leader did not mention US President-Elect Trump, who has emphasized the expansion of nuclear capability “until such time as the world comes to its senses regarding nukes.” Trump has also criticized China, accusing it of exploiting the US economically. Xi also called for unity on climate change, saying, “The Paris agreement is a milestone in the history of climate governance. We must ensure this endeavor is not derailed.... China will continue to take steps to tackle climate change and fully honor its obligations.” China is experiencing severe air pollution and is desperately taking up measures to improve air quality in its cities.

Source: <http://www.dw.com/>, 18 Jan 2017.

## NUCLEAR SAFETY

UK

### Safety System at Pilgrim Compromised

Two dampers designed to automatically close so radioactivity can't escape into the environment in an emergency failed to fully shut when tested during a routine maintenance check at Pilgrim Nuclear Power Station 16 January 2017. It turned out the dampers simply needed to be cleaned and lubricated. While the issue took only 15 minutes to address, there is no way to know how long they had not been working. Patrick O'Brien, speaking for the plant's owner operator Entergy Corp., called the incident “an example of the Pilgrim team conscientiously performing preventative maintenance, and when an unsatisfactory condition is found, promptly correcting the issue.”

One industry specialist disagreed with the characterization. ...“The evidence does not suggest one bad day by one worker, but years of poor performance across the board. Thus it should be no surprise when yet further evidence of this systemic problem surfaces.” The discovery marked the third time in five months that safety systems at Pilgrim, used to contain radioactivity in

emergencies, were compromised. In December, three of eight main steam isolation valves, designed to prevent radiation leaks in emergencies, were found to be leaking. Two were fixed, but operators had to shut down the reactor to fix the third. In August, one of the main steam isolation valves closed too slowly to meet federal requirements.

And in mid-2015, the Pilgrim reactor went into automatic emergency shutdown to prevent a buildup of reactor pressure after a steam isolation valve closed when it should have remained open. That shutdown contributed to the NRC's decision to categorize Pilgrim as one of the three worst performers in the country. Plant critics say this latest problem with the dampers is just a sign of the times, and that the 44-year-old plant has operated beyond its shelf life and has not been properly maintained.

**The discovery marked the third time in five months that safety systems at Pilgrim, used to contain radioactivity in emergencies, were compromised. In December, three of eight main steam isolation valves, designed to prevent radiation leaks in emergencies, were found to be leaking.**

... The dampers at nuclear reactors are tested every two years to check on how long it takes for them to close, NRC spokesman Neil Sheehan said. “They are inspected and lubricated on an annual basis,” Sheehan wrote in an email. “Our resident

inspectors assigned to Pilgrim will be gathering more information on the testing history of these and other dampers.” Diane Turco, director of Cape Down winders, said the latest problem would not have happened if routine maintenance was being done. “This is systemic mismanagement, and it is causing the house of cards to fall down at our peril,” she said.

The plant has a series of 18 dampers. There are 10 on the supply side of the plant's ventilation system for the reactor building and eight on the exhaust side. Sheehan said the dampers would automatically close in the event of an accident, upon receipt of a signal indicating a spike in radioactivity. Lochbaum said the main steam isolation valves and the isolation dampers “must each function properly, if radiation releases are



to be minimized.”

“Neither backs up the other and failure of either can allow too much radiation to get out,” Lochbaum wrote in an email. The main steam isolation valves are part of the primary containment system and the isolation dampers are part of the secondary containment, he said. “If an accident releases radioactivity, a failed main steam isolation valve allows it to take the express lane to the environment,” Lochbaum said. “A failed isolation damper forces the radioactivity to take a slower lane to the environment. Not good. But better.”

A team of 20 inspectors from around the country recently spent three weeks scouring systems and worker performance at Pilgrim, wrapping up 20 January 2017. The group will issue its findings within 45 days. An email from the inspection team leader mistakenly sent to Turco in early December described staff at Pilgrim as “overwhelmed.” “The corrective actions in the recovery plan seem to have been hastily developed and implemented, and some have been circumvented as they were deemed too hard to complete,” Donald Jackson wrote of Entergy’s plan to bring Pilgrim back up to acceptable standards. “We are observing current indications of a safety culture problem that a bunch of talking probably won’t fix.”

The email stirred up so much concern among state and federal legislators, elected officials and the general public, that the NRC has agreed to a public meeting in Plymouth tentatively set for Jan. 31 so Jackson can elaborate on his comments.

Source: <http://www.capecodtimes.com/>, 17 Jan 2017.

## **RUSSIA-ARMENIA**

### **Russia, Armenia Sign Protocol on Nuclear Safety Information Exchange**

Russia’s Rosatom state nuclear energy corporation and the Armenian Ministry of

Economic Infrastructures and Natural Resources signed a protocol on practical measures to meet commitments on prompt warning about a nuclear accident and the exchange of information on nuclear and radiation safety. The procedures are envisaged in the inter-governmental agreement on the exchange of information on nuclear and radiation safety between the two countries inked on Oct 7, 2015.

The accord was signed with a focus on the implementation of recommendations from the IAEA. It specifies conditions of mutual emergency warnings in matters of peaceful uses of nuclear energy. Under the document, the countries permanently exchange information on nuclear and radiation safety at nuclear facilities. Under the terms of the agreement, once it comes into effect, the parties will draw up practical measures for implementing the commitments they undertook, including deciding the order and the

**The accord was signed with a focus on the implementation of recommendations from the IAEA. It specifies conditions of mutual emergency warnings in matters of peaceful uses of nuclear energy. Under the document, the countries permanently exchange information on nuclear and radiation safety at nuclear facilities.**

amount of information transferred on a regular basis about the present conditions regarding nuclear and radiation safety at nuclear facilities.

Source: <http://tass.com/>, 24 Jan 2017.

## **NUCLEAR TERRORISM**

### **GENERAL**

#### **Pitt Professors Track Nuclear Smuggling**

“If you see something, say something.” That is today’s *mantra* about reporting suspicions of terrorist activity. Ordinarily, that means alerting the authorities to a suitcase left unattended in an airport or a package that looks out of place at a government building. Two professors at the University of Pittsburgh, however, have taken the “see something, say something” concept to a new level. They have begun updating a database to track the smuggling of nuclear material. Phil Williams, director of the Matthew B. Ridgway CISS, and Tom Congedo, adjunct professor and associate director of the Stephen R.

Tritch Nuclear Engineering Program, are documenting where nuclear material disappears and where it turns up, with the goal of identifying smuggling routes, places that might be ripe for theft and individuals or groups likely to be buyers or sellers of dangerous materials.

The database was created in the early 1990s and last updated more than a decade ago. Tracking the movement of nuclear material is half of the work; Mr. Congedo's expertise in nuclear engineering enables him to determine the significance of what is missing or stolen and how it might be used by terrorist networks always seeking to deepen their toolkits. The government already does this work, but not all of the details are publicly known. Mr. Williams and Mr. Congedo provide two more sets of eyes, and the government should embrace the intelligence they gather. It might fill a gap, open new avenues of inquiry or offer additional insight into how terrorists and garden-variety thieves interact in some of the shadiest places on the planet. Their work could thwart terrorist activity and save lives.

Mr. Williams and Mr. Congedo work from readily available sources, such as newspaper articles and public reports from government agencies, and their database will be available to the public. That could encourage people around the world to report what they have seen or heard, lending an element of crowd sourcing to the interdiction of nuclear smuggling. Nuclear proliferation is dangerous enough when stable governments are involved, but the prospect of black-market trading of nuclear materials – by unsophisticated, unrestrained terrorist groups and by the common thieves happy to supply them at the right price – is downright terrifying.

How real is the threat? An organization launched by former Defence Secretary William Perry drives home the danger with a video depicting a hypothetical nuclear terrorist attack on Washington, D.C. Tens of thousands die instantly. There are many roles to play in the war on terrorism. Mr. Williams and Mr. Congedo have selected an important one.

Source: <http://www.post-gazette.com/>, 18 Jan 2017.

## NUCLEAR WASTE MANAGEMENT

### CANADA

#### Groups Opposed to Nuclear Waste Burial Plan Given Federal Funds

Ten groups and individuals have been given another \$146,000 to help them weigh in on the wisdom of burying hazardous nuclear waste in a bunker close to the shore of Lake Huron. The bulk of the new money from the CEAA is earmarked for indigenous people to take part in the review of the safety of the contentious project proposed for near Kincardine, Ont. The Historic Saugeen Metis have been allocated just over \$54,000 – half the cash being given to aboriginal groups to participate.

The funding is aimed at allowing recipients meaningful input as the agency moves toward coming up with a final recommendation to federal Environment Minister Catherine McKenna on whether the Ontario Power Generation project should be allowed to proceed and, if so, under what conditions. Environmental and other activist groups opposed to the project are also among funding recipients. Individuals include retired sheep farmer Eugene Bourgeois, of Inverhuron, Ont., who was given \$7,000. Bourgeois, who lives near the proposed site but was previously denied funding to participate in the environmental assessment of the project, has alleged the entire process was fixed.

"The predetermined conclusion ensured that no opposing views or scientific evidence would sway or be taken into account," Bourgeois said at one point. The funding for participants is in addition to \$455,000 previously allocated to about two-dozen groups and individuals. The proposed deep geologic repository, currently estimated to cost about \$2.4 billion, calls for about 200,000 cubic metres of low and intermediate nuclear waste to be stored in bedrock up to 680 metres underground about 1.2 kilometres from Lake Huron starting in 2026.

**The database was created in the early 1990s and last updated more than a decade ago. Tracking the movement of nuclear material is half of the work; Mr. Congedo's expertise in nuclear engineering enables him to determine the significance of what is missing or stolen and how it might be used by terrorist networks always seeking to deepen their toolkits.**

Scores of Great Lakes communities on both sides of the border have passed resolutions or otherwise expressed opposition to the proposal on the basis that storing hazardous waste so close to such an important water source is irresponsible. Nevertheless, a joint assessment panel in 2015 agreed with OPG that the plan was the safest way to deal with the radioactive waste and gave it the tentative go-ahead. Since then, however, the federal government has delayed its decision, most recently asking OPG to report back on alternative locations to the proposed Bruce Nuclear Generating Station for the bunker. The OPG report maintains that trucking the radioactive material – potentially from one end of the province to the other — would pose more of a health and safety risk than burying it at the Bruce site, where much of it is produced.

**The proposed deep geologic repository, currently estimated to cost about \$2.4 billion, calls for about 200,000 cubic metres of low and intermediate nuclear waste to be stored in bedrock up to 680 metres underground about 1.2 kilometres from Lake Huron starting in 2026. Scores of Great Lakes communities on both sides of the border have passed resolutions or otherwise expressed opposition to the proposal.**

The report – widely panned by project opponents as grossly inadequate – is now before the assessment agency as it prepares its final recommendations for McKenna. McKenna is currently slated to decide either late this year or early next.

Source: <http://kitchener.ctvnews.ca/>, 20 Jan 2017.

## **FINLAND**

### **Finland's "100'000-Year Tomb" for Nuclear-Waste Storage is Gaining the World's Admiration**

Next to climate change, nuclear waste storage is one of the biggest generation-spanning issues facing the world. The stakes are high; world powers like the US and the UK get a fifth of their power from nuclear plants, while in France the share is 40 %. This reliance makes the need for safe and sustainable storage obvious. But it's a country with merely four plants that is pioneering

long-term storage: Finland. Onkalo, a "massive underground tomb" in Finland, has recently broken ground to store more than 6,500 tons of waste for at least 100,000 years. *The Wall Street Journal* has written an extensive article about the groundbreaking waste repository.

... Situated on an island just outside the Finnish coast, Olkiluoto is home to two of Finland's four nuclear plants; while a fifth one, the Olkiluoto-3 is under construction. And soon, the area will have its underground storage facility in the form of

Onkalo. Since 2004, Finland's two main nuclear-power companies, Fortum and Teollisuuden Voima have been digging into ancient bedrock, in order to create deposition tunnels leading 420 metres below ground. The nuclear-waste storage methods being used 25 January 2017 are seen as

inadequate in the long term, providing at best decades of safe storage; in addition to the added risks of storing waste on ground level.

Onkalo is surely groundbreaking in its potential store radioactive waste safely for millenia. But more importantly, it's the Finns' pragmatism and creativity in driving the project to fruition that has

lifted the world's eyebrows. ...Other major countries relying on nuclear power, like Germany, Japan and the UK have hit political roadblocks in their efforts to find sustainable of sorting methods. For instance, a German project aiming to store waste in a salt mine was recently halted due to political resistance. In Finland's case, cooperation between government, private sector and local community has proved crucial.

According to WSJ, a key enabler for Onkalo's construction has been the trust built with the people living in Eurajoki, the municipality where

**Other major countries relying on nuclear power, like Germany, Japan and the UK have hit political roadblocks in their efforts to find sustainable of sorting methods. For instance, a German project aiming to store waste in a salt mine was recently halted due to political resistance. In Finland's case, cooperation between government, private sector and local community has proved crucial.**

Olkiluoto and Onkalo are situated. Financial support has helped fund the public institutions; everything from a new library to school renovations. A spokesman for TVO highlighted a national characteristic as a success factor, to WSJ: But the project has nevertheless drawn criticism from environmental activists.... Nevertheless, as the amount of temporarily stored nuclear-waste accumulates around the world, and politics gets in the way of action, Finnish pragmatism has perhaps given it some hope for the future.

Source: <http://nordic.businessinsider.com/>, 25 Jan 2017.

## **JAPAN**

### **Plans to Remove Nuclear Fuel at Fukushima Delayed Again**

A plan to remove spent nuclear fuel from Tepco Holdings Inc's Fukushima Daiichi nuclear plant hit

by the March 2011 tsunami has been postponed again due to delays in preparation, the Nikkei business daily reported. Work is now set to begin in fiscal 2018 at the earliest, the Nikkei said. Removal of the spent fuel from the No. 3 reactor was originally scheduled in the first half of fiscal 2015, and later revised to fiscal 2017 due to high levels of radioactivity around the facilities, the Japanese business daily reported.

The timeline has been changed again as it was taking longer than expected to decontaminate buildings and clean up debris, the news agency reported. The report comes a few months after the Japanese government said in October the cost of cleaning up the Fukushima plant may rise to several billion dollars a year, adding that it would look into a possible separation of the nuclear business from the utility.

Source: <http://uk.reuters.com/>, 25 Jan 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).

Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,

New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: [capsnetdroff@gmail.com](mailto:capsnetdroff@gmail.com)

Website: [www.capsindia.org](http://www.capsindia.org)

**Edited by: Director General, CAPS**

**Editorial Team: Dr. Sitakanta Mishra, Hina Pandey, Arjun Subramanian P, Chandra Rekha, Dr. Poonam Mann, Gideon Kharmalki**

**Composed by: CAPS**

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