



NUCLEAR SECURITY



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

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OPINION – Manpreet Sethi

JCPOA's First Anniversary: Significance and Future Challenges

Provocations, sobered by abundant caution, were the hallmark of the first year of the Joint Comprehensive Plan of Action (JCPOA), simply called the Iran deal. For now, the supporters of the agreement can breathe easy that it has lived to celebrate its first anniversary. Given that it took the international community 13 long years of difficult negotiations peppered with allegations and counter-allegations to resolve the 'Iranian nuclear issue', it is heartening that all parties managed to stay the course despite distractions.

President Obama, who provided dogged support during the negotiations in face of strong opposition from the Republicans and even some influential Democrats, besides a very vocal Israel, displayed his commitment to the deal in the last 12 months. President Rouhani too showed a personal conviction in its implementation. Luckily, he has also had the backing of the Supreme Leader. Meanwhile, proactive diplomacy by the EU, China's economic interest in mainstreaming Iran, and Russian desire to be seen as playing a constructive role at the international high table have also been equally critical in making the JCPOA endure.

Over the last year, the JCPOA has provided a useful framework for Iran to resume meaningful relations with the international community. The most immediate benefits have been in the upsurge in its oil exports. By April 2016, Iran had begun exporting oil to the tune of 1.7 mbpd, up from 700,000 mbpd during the period of the sanctions.

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The Iran deal is an interesting agreement that has been subject to many interpretations. Western countries value it for its ability to remove the near-time risk of Iran's nuclear weapons breakout. Iran considers it a tool to remove the sanctions pressure that was adversely impacting its economy, besides using it also to showcase the country's strength to stand up to major powers by having managed to retain the right to enrichment, even if to low levels. Thus, the country vindicated its pride and position.

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most immediate benefits have been in the upsurge in its oil exports. By April 2016, Iran had begun exporting oil to the tune of 1.7 mtpd, up from 700,000 mtpd during the period of the sanctions. Meanwhile some of the formerly blacklisted Iranian banks have reconnected to SWIFT and inflation is down to 12 per cent compared to 40 per cent in mid-2013. However, the quick economic gains that the public was expecting are yet to materialise, leading to impatience and disenchantment. This is partly because Iran itself has yet to get its institutions and entrepreneurial skills ready to exploit the opening. Besides an opaque banking system, it also suffers from corruption, an inflexible labour market, traditional dominance of the public sector, and multiple political power centres often in conflict with each other.

While resolution of the structural issues will take time, the sense of disappointment in public given the slow trickledown effect could be utilised by deal naysayers, particularly the hardliners in the Iranian Revolutionary Guards Council (IRGC), to fan nationalism and hostility. It may be recalled that the IRGC had described the deal as 'nuclear sedition', and tried to scuttle it, including by undertaking missile launches in March. More such attempts could put Iran's engagement with the world again under a cloud. For the moment though, President Rouhani seems relatively better placed after the recent elections in March 2016. The vote was seen as a sort of a referendum on the nuclear agreement, indicating a desire of the Iranian people to support leaders who could get them out of political and economic isolation.

Meanwhile, there are chances of things going wrong at the US end particularly as the domestic

political situation heats up in the run up to the presidential elections later this year. Already, not many Americans, in the Congress or out of it, have solidly put their weight behind the deal. A Gallup poll in mid-Feb 2016 showed 57 per cent of the Americans as being opposed to the agreement and only 30 per cent approving it. President Obama is doing his best to kill any legislative action that could jeopardise the JCPOA, but its future would seriously depend on the next occupant of the White House.

Given the volatility in Iran and the US, other stakeholders such as the EU, China, and Russia will have to remain constructively engaged with the implementation process and watch out for any drastic action by either Iran or the US that could rock the JCPOA. For now, Russia has already started receiving enriched uranium that Iran must remove from its territory and China has started work on re-designing the Arak reactor. Slowly, as all sides build confidence in each other and as benefits flow into Iran start to make a difference, the deal would acquire surer footing. There would develop a vested interest of each to avoid violation of the agreement.

The next helpful step in this direction would now be to initiate measures that could help resolve regional issues to make all players more secure. Of particular relevance in this context is the need to find a way of establishing a Middle East WMD Free Zone. This has been a long-standing objective of the NPT. In fact the NPT Rev Con 1995 had secured an unconditional and indefinite extension of the treaty on the promise of resolving the Middle East nuclear conundrum, particularly with reference to Israel's undeclared but well-known nuclear weapons capability.

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The Iranian nuclear issue would receive a more secure sense of resolution if regional security issues could be addressed through the elimination of all nuclear weapons from the region. The task will certainly not be easy. In fact, even a conference of the regional powers to discuss the issues under the aegis of the special authority appointed in the form of an ambassador from Finland in 2010 has not yet been possible. Nevertheless, work must be started on this next step after the JCPOA. It will be a long journey but one that must get started.

Source: <http://www.ipcs.org>, 18 July 2016.

OPINION – Anil Sasi

Uranium Imports: A Critical Dose to Step up Generation

By the end of this calendar year, nearly 3,000 metric tonnes of nuclear fuel is likely to be shipped into India from three countries — the Russian Federation, Canada and the Republic of Kazakhstan. The uranium shipments expected in 2016 is a record for a single year and would, in quantitative terms, amount to nearly 53 per cent of total nuclear fuel imported into India since the country's access to the global nuclear fuel market opened up in 2008.

Till now, about 5,559 MT has come into the country from these three nations, alongside France, while 2,937 MT is the anticipated supplies of nuclear fuel in the form of natural uranium ore concentrate and natural uranium oxide pellets during calendar year 2016. In India, there are currently 21 reactors with an installed capacity of 5,780 MWe, of which, eight reactors with aggregate capacity of 2,400 MWe are fuelled by

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indigenous uranium while the remaining 13 with a capacity of 3,380 MWe are under IAEA Safeguards and use imported uranium. The second unit of the Kudankulam nuclear project (1,000 MWe Unit-2) has also attained first criticality (start of controlled self-sustaining nuclear fission chain reaction in the reactor for the first time) on July 10, 2016, which also uses imported fuel.

A steady supply of uranium is good news for the country's nuclear power sector, something that is expected to push up the performance of Indian nuclear power plants, as well as of the several fuel cycle facilities. The capacity factor – or operational efficiency – of the 21 nuclear power reactors currently running in the country was recorded at 73 per cent in the first three months of the current fiscal (April-June 2016). This includes the operational data for the first unit of the Kudankulam power project.

An improvement in gross nuclear generation in the coming months could be powered by a combination of two factors: international cooperation leading to augmentation of fuel supplies to 13 reactors

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that qualify for imported fuel, and a commensurate improvement in domestic fuel supplies for the other eight. Under the "separation plan" announced by the government in March 2006, negotiated after the July 2005 nuclear deal with the US, India was required to bring 14 reactors under IAEA Safeguards in a phased manner. Thirteen of these reactors – including RAPS 2 to 6 at Rawatbhata, Rajasthan, KAPS 1 and 2 at

Kakrapar, Gujarat, NAPS 1 and 2 at Narora, Uttar Pradesh, TAPS 1 and 2 at Tarapur, Maharashtra, Kudankulam 1 in Tamil Nadu – are already under IAEA safeguards, and eligible to run on imported fuel. They are now operating at close to full capacity, officials of NPCIL, which runs the

country's nuclear power plants, said. The other reactors – KGS 1 to 4 at Kaiga, Karnataka, MAPS 1 and 2 at Kalpakkam, Tamil Nadu, and TAPS 3 and 4 at Tarapur, Maharashtra – continue to use uranium sourced within the country.

Official sources said that the Department of Atomic Energy reckons the annual fuel need for operating the indigenous PHWRs at 85 per cent capacity is about 45 tonnes of uranium dioxide for the older 220 MWe units, 100 tonnes for the 540 MWe units and 125 tonnes for the new 700 MWe units. By contrast, the need of low enriched uranium for operating imported light water reactors (LWRs) at 85 per cent capacity factor are six tonnes for the older 160 MWe Tarapur units and 27 tonnes for 1,000 MWe units such as the twin Russian-built VVER-1000 reactor units at Kudankulam. The total installed capacity is scheduled to go up to 9,980 MWe at the end of the current five-year plan period (March 2017), as seven new reactors are commissioned. These include the imported LWRs of Russian design, four indigenous PHWRs, and one indigenous PFBR.

NPCIL had planned to start work on 16 new reactors with a total capacity of 16,100 MWe during the Twelfth Plan (2012-17). These included eight indigenous PHWRs of 700 MWe each with a total capacity of 5,600 MWe and eight LWRs based on international cooperation – with Russia, France and the US – totaling to a capacity of 10,500 MWe....

Source: <http://indianexpress.com>, 27 July 2016.

OPINION – Rodger Baker

Facing North Korea's Nuclear Reality

After announcing that it would cut communications with the United States, North Korea launched three missiles (two Scuds and a

No Dong). In some ways, there is little unexpected in North Korea's actions. Since the early 1990s, the North Korean nuclear and missile programs have been a focus of greater and lesser international attention, and there is no reason to predict that a resolution satisfactory to the United States (or North Korea) will emerge any time soon.

Similarly, the United States followed a familiar script in its reaction to the recent launches, threatening additional sanctions and further isolation.

But that doesn't mean nothing has changed. North Korea once treated its nuclear weapons program as a bargaining chip – a way to raise the stakes with the United States to wheedle concessions and aid. Now, however, nuclear weapons development is no longer something Pyongyang is willing to trade away for economic support and promises of nonaggression. North Korea has ramped up the testing cycle for its various missile systems, and it may be preparing for another nuclear test. If Pyongyang has no intention of stopping or reversing its nuclear weapons program – the two outcomes that U.S. policy has been geared to achieve – then perhaps it is time for Washington to reconsider its strategy for dealing with a nuclear-armed North Korea.

From Bargaining Chip: North Korea launched its nuclear weapons program in earnest in the 1980s. After the Soviet Union collapsed, and amid social and political instability in China, Pyongyang rapidly expanded the program, fearing that its two primary backers could no longer provide the economic and security guarantees that North Korea had previously relied on. The United Nations' recognition of both Korean governments as legitimate reinforced those concerns, and when South Korea began to engage politically and economically with China and Russia, Pyongyang's worries mounted.

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By the early 1990s, a major nuclear crisis was emerging, carefully crafted by North Korean founding leader Kim Il Sung to draw the United States into an economic and energy settlement called the Agreed Framework. Kim also launched a diplomatic offensive, inviting South Korean President Kim Young Sam to visit Pyongyang for what would have been the first inter-Korean summit. But the meeting never occurred. Kim Il Sung died unexpectedly, and his son, Kim Jong Il, took power and finished the negotiations for the Agreed Framework, signed in 1994. At the same time, he pushed forward with North Korea's long-range missile program, leading to the 1998 launch of the Taepodong/Unha missile. Though Pyongyang claimed it had launched the missile to put a satellite into orbit, the United States contended that the move was a clear attempt to develop an ICBM.

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conventional political means. If the country's economic crisis precipitated its ruin, then the government might unleash its burgeoning arsenal. To avoid that outcome, the United States opted to provide North Korea with just enough aid and negotiating opportunities (particularly under the multilateral six-party talk format) to slow its nuclear weapons development and forestall economic collapse. This approach proved beneficial for both sides, reducing the threat of U.S. military action in North Korea while also mitigating the risk of a global disaster at a relatively low cost. North Korea even undertook various diplomatic offensives, expanding relations with Western nations, opening up to increased

Western tourism and holding summit meetings with South Korean leaders. But, as U.S. President Dwight D. Eisenhower once noted, "The world moves, and ideas that were good once are not always good."

Following the 9/11 attacks, Pyongyang toned down its histrionics and even proffered something of an olive branch to the United States. But the offer was rebuffed, and the United States named North Korea part of the Axis of Evil, along with Iraq and Iran. When the United States invaded Iraq, suspecting that the country possessed weapons of mass destruction that it could deploy, along with conventional capability, against neighboring countries, Pyongyang began to rethink its security strategy. Having the means to damage South Korea – or as North Korea puts it, to turn Seoul into a sea of fire – in case of invasion was no longer a deterrent for foreign military intervention.

To Security Cornerstone:

Nonetheless, as Libya renounced its quest for WMD in 2003 (likely in an attempt to avoid Iraq's fate), Pyongyang continued to negotiate with Washington, hoping for a security guarantee. Then in 2006, North Korea carried out its first nuclear test,

sounding alarm bells in the United States and around Asia. Pyongyang used the fears that the test inspired to speed up negotiations, and in 2008, it destroyed the cooling tower at the Yongbyon nuclear reactor. North Korea continued this pattern, carrying out another nuclear test in 2009 and revealing a secret nuclear facility in 2010 before suspending nuclear and missile tests in 2012.

At the same time, the country's leadership had begun to lose faith in the efficacy of bartering its nuclear program for economic and security concessions. The world was changing too fast, North Korea's traditional sponsors were undependable and U.S. promises seemed

unreliable. Libyan leader Moammar Gadhafi's death in late 2011 also gave Pyongyang pause. Even though Gadhafi had abandoned his nuclear ambitions and had been partially reaccepted by the international community, the West stood by and watched as he was overthrown and killed in an uprising. Gadhafi embodied Pyongyang's worst fear: to give up its military deterrent and then fall to a foreign-facilitated insurrection. Kim Jong Il's death a few months later and the accession of his very young replacement, Kim Jong Un, only compounded the sense of uncertainty in North Korea.

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Since then, the country has unequivocally rejected the idea of trading away its nuclear weapons program. Pyongyang has spent too much time, money and political capital to simply walk away. What's more, it has no guarantee that doing so will protect its leaders from foreign military intervention. And simply being able to threaten South Korea or even Japan is not enough anymore to deter the United States from taking such action.

Over the past year, North Korea's testing cycle has accelerated rapidly, particularly for longer-range and mobile missile systems, such as the Musudan/Hwasong-10 and submarine-launched ballistic missiles, which provide second-strike capability that the Taepodong does not. In addition, Pyongyang is conducting tests on re-entry, which will be necessary for intermediate-range ballistic missiles and ICBMs. Although the United States has missile defense systems in place in the Asia-Pacific region and on the homeland, missile defense is not completely effective.

The United States has said it will not recognize North Korea's nuclear capabilities. But choosing not to recognize a reality is not a starting point for a viable strategy. Already the United States has adjusted to the reality that India, Pakistan and Israel have functioning nuclear weapons programs, despite the prohibitions against them.

Consequently, from Pyongyang's perspective, its demonstrated ability to deliver a nuclear device to the United States would alter Washington's cost-benefit calculations over whether to attack or destabilize North Korea.

Adjusting to the New

Status Quo: No longer a bargaining chip, North Korea's nuclear program has become a vital component of its national security. Pyongyang's *byungjin* policy, which places equal emphasis on nuclear weapons and economic development, is more than just posturing.

Though North Korea's goals will not be easy to achieve – if they are ever achieved at all – U.S. policies geared toward stopping or reversing the nuclear program will likely do little to thwart them. The question, then, may not be how to prevent North Korea from attaining a nuclear capability, but how to manage regional relations once it has. The United States has said it will not recognize North Korea's nuclear capabilities. But choosing not to recognize a reality is not a starting point for a viable strategy. Already the United States has adjusted to the reality that India, Pakistan and Israel have functioning nuclear weapons programs, despite the prohibitions against them. Acknowledging that North Korea has joined these countries would not mean an end to counter-proliferation policy; instead, it would establish a more realistic foundation for assessing policy options.

The true danger of a nuclear North Korea is less that Pyongyang would lash out with a pre-emptive strike than that its newfound nuclear capability would

prompt Japan, South Korea and Taiwan to follow suit. In discussions with China, the United States has even said as much. To prevent this domino

effect, the United States could increase its military presence and activity in the Asia-Pacific region, doubling down in its security guarantee to allies and partners. From China's perspective, though, neither scenario is ideal: A greater US presence would constrain China's options and actions, while a nuclear Japan and South Korea (and perhaps Taiwan) would fundamentally change the balance of power and security concerns in the region.

If the country will not back down from its nuclear program, the United States will need a different strategy to manage the new regional dynamics that it creates. Ideally, the new approach would not only reassure allies of their security but would also include North Korea, Pakistan, India and perhaps even China and Israel in broader discussions of nuclear weapons numbers and arms control measures.

The United States has a political calculation to make as well. For more than two decades, Washington has tried to stop Pyongyang's nuclear development. Sanctions, isolation, threats, talks and concessions have all failed. The failure is due in part to a significant misunderstanding between the two sides regarding their core security concerns and in part to the relatively low priority that North Korea's nuclear armament has always been for the United States (as a long-term threat, it was often set aside for more pressing issues).

Regardless, a nuclear-armed North Korea would cast doubt on the US ability to influence foreign powers through non-military means. Barring preemptive military action, a political crisis in North Korea, or a major accident that convinces Pyongyang that the risks of a nuclear program are not worth the reward, a nuclear-armed North Korea looks more and more inevitable. If the country will not back down from its nuclear program, the United States will need a different strategy to manage the new regional dynamics that it creates. Ideally, the new approach would not only reassure allies of their security but would also include North Korea, Pakistan, India and perhaps even China and Israel in broader discussions of nuclear weapons numbers and

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arms control measures. To do this, however, the United States will first have to recognize North Korea's nuclear capability. Many argue that granting Pyongyang the acknowledgment it desires would reward bad behavior. But the alternative solutions have proved ineffective, and ignoring the new status quo will not change it.

Source: <https://www.stratfor.com>, 26 July 2016.

OPINION – Kiran Stacey

Small Modular Reactors are Nuclear Energy's Future

As delays mount at large new nuclear power projects around the world, more attention is turning to smaller alternatives, which industry experts hope may help provide the next generation of electricity. So-called "small modular reactors" – miniature nuclear power plants with a capacity of less than 300 megawatts – could provide an alternative to mega-plants like the two 1.6 gigawatt reactors planned at Hinkley Point in Somerset.

The UK project is one of a number of delayed or abandoned nuclear power schemes, which have left policymakers around the world looking for cheaper, less risky options to meet electricity demand. SMRs are designed as shrunken versions of larger plants; they can be made in factories and moved by train, truck or barge to the site. Developers say that if enough are built in the same factory, costs per unit of energy output can be driven down well below those of larger plants. Small reactors are already used on nuclear submarines and in some developing countries such as India and Pakistan.

But only recently have the industry and politicians begun to take seriously the idea that they could be made economically on a large scale.

Anurag Gupta, nuclear director at KPMG UK, says: "SMRs promise all the benefits of nuclear – low cost and green power – but without the significant cost and schedule overrun issues that have beset conventional large nuclear projects." Since the invention of nuclear power, bigger has generally been seen to be better. Once a company had gone through the time and expense of securing a site along with planning approval and grid connections, most wanted to build as much capacity on that site as possible. But many of those stations have been plagued with problems, which some blame on their size. Plans by EDF, the French energy company, to build new reactors in France and Finland, for example, have gone billions of euros over budget – something many experts blame on the difficulty of making such large structures safe.

Tapani Virolainen, a Finnish nuclear regulator, recently told the *Financial Times*: "It took more time to build [these plants] because there are more huge structures [to protect] against aircraft crash and so many safety systems." Large projects such as these have also had trouble getting financed – one of the principal causes of delay at Hinkley Point has been the difficulty EDF is having raising the money needed for the £18bn project. For now, small-scale nuclear industry proponents are focused on proving the technology can work at costs low enough to make it competitive. The countries that are furthest along are, unsurprisingly, those with the most developed nuclear energy industries.

Russia is in the process of converting two small reactors which used to power icebreakers. They will eventually be placed on barges which can then be moved to where they are needed. We think we can get costs down – as long as

enough [SMRs] are commissioned. The US and the UK are both trying to catch up. The UK recently took a leaf out of the US book when it announced it would run a competition to find the best SMR design, with £250m on offer to help with research and development. "The US and the UK are in a race at the moment, and that is driving both forward," says Jared DeMeritt, programme director of MPower, an SMR developer. "We think 2025 is a realistic start date for the first small modular reactor in the west, which will be in one of these two countries."

MPower's design shows some of the ways that smaller plants can avoid the pitfalls of larger ones. In its case, MPower plans to bury all safety-critical equipment – including the reactor and the fuel vessels – underground, thereby minimising the

need for expensive physical defences. Despite the optimism among some in the industry, there remain significant hurdles to widespread use of SMRs. Firstly, even those building them privately admit the first ones will cost roughly the same per unit of electricity produced by a large reactor

until costs can be driven down. One executive says: "Over time, we think we can get the costs down – as long as enough of them are commissioned."

But advocates of SMRs say that even if they prove more expensive for the electricity produced, costs are less likely to escalate and more likely to be fully funded. David Hess of the World Nuclear Association says: "Financing is a huge policy risk, and SMRs reduce that. And if the project goes wrong, at least less money has been wasted."

Source: <http://www.ft.com>, 26 July 2016.

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OPINION – Caroline Lucas

Nuclear Weapons have Almost been Launched Accidentally 13 Times

The £100bn we use to uphold this Cold War relic could instead be used for schools, hospitals and guaranteeing new jobs in renewable energy for the 11,000 people whose jobs are currently dependent

on it. MPs will be making a decision that will define Britain's place in the world for generations to come. Either we replace our multi-billion pound Trident missile capability or we join the vast majority of other countries in the world and become a nuclear weapons-free state.

The vote takes place at a time of heightened tension across the world, and the security of our country should be at the forefront of every MP's mind when they walk through the voting lobbies this evening. It is my firm view, based on the best available evidence, that renewing Trident will not only fail to improve Britain's security, but in fact poses significant dangers to us. These weapons of mass destruction have the potential to cause death on an unimaginable scale, and they do nothing to hinder the real threat of lone gunmen or extremists. Their very presence here – and the transport of nuclear warheads on our roads – is not only a target for terrorism but a continued risk of accidents linked to human error or technical failure. A recent report from Chatham House confirms this threat, listing 13 occasions from across the world when nuclear weapons were nearly launched accidentally. These weapons present a huge risk – and there's no evidence to suggest they keep us any safer.

If we're serious about ridding the world of nuclear weapons and fulfilling our obligations under the international Nuclear Non-Proliferation Treaty, then genuine disarmament is non-negotiable. Keeping these weapons sends a dangerous signal to the rest of the world that security is dependent on being able to use weapons of mass destruction, and thus drives proliferation. The UN is currently working on a treaty to ban nuclear weapons. Britain can play a part in ridding

the world of these weapons, but not if we refuse to lay down our own nuclear arms.

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over £100bn on this Cold War relic we could invest in what our armed forces really need: the best possible safety equipment and decent homes for service families. And we could use the funds to bolster our ailing public services too: giving vital extra money to schools and hospitals. If we scrap

Trident, we need to guarantee the jobs and economic security of those working at Faslane, Aldermaston and elsewhere. A Defence Diversification Agency would help ensure a just transition for the 11,000 people whose jobs are directly dependent on Trident. And there is no shortage of alternative industry. Investing in renewable energy would create millions more jobs than nuclear weapons will ever will. The Clyde region – home to the UK's nuclear weapons system – is a hub in Scotland for the renewable energy industry. The West Coast of Scotland is by far the best site for wave technology in the UK.

Trident has become a totem in Britain. For many MPs it signifies safety and security, when it offers nothing of the sort. Arguments in favour of Trident are so bound to a particular, narrow view of "Britain's place in the world" that clear evidence is often dismissed out of hand. So before voting, I'd urge MPs to think about this: would you vote for

Trident isn't only a security risk. It's also a colossal waste of precious resources. Instead of spending over £100bn on this Cold War relic we could invest in what our armed forces really need: the best possible safety equipment and decent homes for service families. And we could use the funds to bolster our ailing public services too: giving vital extra money to schools and hospitals.

Trident if we didn't have it already? Imagine you were presented with plans for a brand new weapon that could kill millions but would never be used, that contravenes international treaties and that presents a genuine risk to our population,

and takes precious money away from our vital public services. Would you even consider voting for such a proposal if those weapons weren't already in place?

Britain's history as a nuclear weapons state does not have to dictate our future. These missiles shouldn't be our bargaining chip on the world stage. I am voting against Trident because I believe that we are safer without weapons of mass destruction in our country. I hope a majority of MPs join me in doing the same.

Source: <http://www.independent.co.uk>, 17 July 2016.

NUCLEAR STRATEGY

PAKISTAN

Zardari Rules out Possibility of India, Pakistan Nuclear Clash over Kashmir

Former president and Pakistan People's Party Co-Chairman Asif Ali Zardari has ruled the possibility of a nuclear clash between India and Pakistan on the Kashmir issue, saying nuclear weapons are not an aggressive option and they mustn't be used. In an interview with *Russia Today*, Zardari said, "You can develop it (nuclear weapons), you can have it, you can display a photograph of it, but nuclear weapons are no joke."

Explaining the current tension in bilateral ties between India and Pakistan, Zardari said that it all revolves around the situation in Kashmir. "Look at it from the fact that how many Kashmiris are residing in Pakistan. In fact, our current Prime Minister is also a Kashmiri." The former president urged that "It's about time for the world to stop pointing fingers at each other and sit and think to see how we can

get rid of this menace". Over the issue of Panama papers, which mentioned the names of prime minister's family members, Zardari said that his party has criticised it.

When asked that PTI chief Imran Khan levels corruption charges on you as well, Zardari said that Imran's government in Khyber-Pakhtunkhwa has given Rs. 30 million to an institution associated with

the Taliban. Talking about the US-controlled drone strikes inside Pakistani territory, Zardari said that during his tenure he repeatedly asked for the drone technology to be handed over to Pakistan in order to achieve maximum results. "The effect is different if we are using it instead of the US. Currently we are using F-16s to bomb terrorist hideouts but we are short on those jets too." It won't make much of a difference, to US or any other country opposing it, if we are given an eight or so more fighter jets, Zardari maintained.

When asked to comment on the presence of Osama bin Laden near the Pakistan Military Academy, he said that Osama wasn't living across the academy. "He was living in Abbottabad city, it just like living any other big city where you can't just check every other house." "We don't have as many intelligence resources as United States, still they couldn't catch him [Osama] in Afghanistan where they carried out a massive manhunt. Then how come they expect us to locate him in a place where he slipped in despite all available US intelligence," said the former president. Commenting on the exit of Britain from European Union and how this development will affect Pakistan, Zardari said "it is a big issue as lots of things have to be tied up and trade deals to be re-negotiated"....

Source: <http://www.pakistantoday.com.pk>, 27 July 2016.

Britain's history as a nuclear weapons state does not have to dictate our future. These missiles shouldn't be our bargaining chip on the world stage. I am voting against Trident because I believe that we are safer without weapons of mass destruction in our country. I hope a majority of MPs join me in doing the same.

Talking about the US-controlled drone strikes inside Pakistani territory, Zardari said that during his tenure he repeatedly asked for the drone technology to be handed over to Pakistan in order to achieve maximum results.

UK

MPs Vote to Renew Trident Weapons System

The House of Commons has backed the renewal of the UK's Trident nuclear weapons system by 472 votes to 117. The MPs' vote approves the manufacture of four replacement submarines at a current estimated cost of £31bn. Defence Secretary Michael Fallon told MPs nuclear threats were growing around the world and Trident "puts doubts in the minds of our adversaries". Labour was split over the issue with 140 of its 230 MPs going against leader Jeremy Corbyn and backing the motion. A total of 47 Labour members voted against renewal, while others abstained.

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Although Labour MPs were given a free vote, many used the occasion to attack Mr Corbyn, who is a longstanding opponent of nuclear weapons. A succession of the party's MPs accused Mr Corbyn of opposing official party policy by arguing against it at this stage with one, Jamie Reed, calling his stance "juvenile and narcissistic".

Source: <http://www.bbc.com>, 19 July 2016.

USA

If the Obama Administration Adopts a 'No First Use' Nuclear Strategy, It Could Cripple US Security

The White House has declared that it may be revising United States nuclear policy during President Barack Obama's final months in office. A "no first use" policy would be a disaster for the U.S. and its allies. The Obama administration's consideration of the no first use policy is based on a lack of humility before U.S. historical experience and a failure of imagination with respect to the future international

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environment.

At its core, a no first use policy means that the United States would not be the first to use nuclear weapons under any circumstance other than to retaliate after a nuclear weapons attack. Currently, the United States maintains a level of ambiguity when it comes to specifying the circumstance under which nuclear weapons would be used. Such ambiguity is beneficial to U.S. national security and to that of allies because it leaves the adversaries guessing about U.S. strategy.

The first striking problem is that non-nuclear weapons, for example, biological and chemical, can cause as many fatalities as nuclear weapons. The United States needs to deter such attacks just as it needs to deter nuclear attacks. Both Russia and China have active biological and chemical weapons programs and chemical weapons were most recently used in the Syrian conflict. The administration underwent a comprehensive reassessment of U.S. nuclear weapons posture in its 2010 Nuclear Posture Review. The review recommended against adopting the no first use policy.

The Nuclear Posture Review's conclusion is even more significant considering it was based on very optimistic assumptions about the international environment – for example, that Russia is no longer an adversary and that the potential for conflict with Moscow is low. Since then, Russia has invaded another country, made nuclear threats against the U.S and its allies, and acted against U.S. interests in the Middle East. In short, the international security environment is a lot worse than the Obama administration assessed in 2010.

As defense expert Keith Payne points out, if the U.S. adopts a no first use policy, adversaries might feel safer to conduct devastating biological, chemical, and conventional attacks against the United States and its allies without a fear of the U.S. retaliating with the most threatening response available. As such, a no first use policy would weaken deterrence that has served the U.S. well since the end of World War II.

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The second problem with the no first use policy is that about 30 nations around the world, close U.S. allies like Japan or NATO allies, rely on U.S. nuclear weapons for their own security. They rely on the United States to deter their nuclear-armed neighbors.

North Korea habitually threatens South Korea with annihilation. North Korea's ballistic missiles can reach Japan, another close U.S. ally. Russia is pursuing increasingly aggressive revisionist policies on the European theater. U.S. nuclear weapons have kept nuclear programs of allies at bay – and that is a very good thing as the complexity of the nuclear environment and thus the potential for miscalculation increases the more nuclear-armed countries exist.

Facing dangerous neighbors and lacking U.S. assurances vis-à-vis devastating non-nuclear attacks, these countries would be undoubtedly more inclined to pursue their own nuclear weapons capabilities, complicating or thwarting U.S. nonproliferation efforts.

The third problem is a lack of imagination on the part of the Obama administration. In the past, the

U.S. found itself in the circumstance in which a nuclear weapon use was deemed necessary so that a conflict with Japan might end on terms favorable to the U.S. faster than if the United States continued to wage a conventional war. There is no way of telling if future presidents will not find themselves in the middle of a situation in which a nuclear weapons use might save American blood and treasure, however terrible such a situation would be.

The threshold for detonating nuclear weapons is incredibly high – and justly so. After all, they are some of the most devastating weapons mankind has ever invented. But this should not blind us to the fact that we use our nuclear weapons every day – we use them to deter large-scale attacks, conventional and weapons of mass destruction, every day; and have been since the dawn of the nuclear age. Nuclear ambiguity has served us well, as decades of Democratic and Republican administrations affirmed over and over. Now is not the time to adopt a no first use policy.

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Source: Article by Michaela Dodge, The Daily Signal, 29 July 2016.

BALLISTIC MISSILE DEFENCE

EUROPE

Missile Defense in Europe Needlessly Provocative

Russia has long been suspicious of United States and NATO missile defense installations in Europe. In what amounts to a tacit admission of how

limited missile defense is, the United States insists it is disingenuous for Russians to think the systems are targeted against them. Missile defense doesn't stand a chance against Russia's large arsenal; it is intended for a starter nuclear-weapons program like the United States thought Iran was developing at one time. The United States, however, overlooks and chooses to ignore, the awe in which Russia holds its ability to develop and perfect technology.

At The Hill, Greg Thielmann writes: "Given the technical inability of Europe-based EPAA interceptors to engage Russian strategic forces, Moscow's accusations seem either insincere or paranoid." But as explained by Andrey Kortunov, director general of the Russian International Affairs Council, NATO continuing to work on Aegis missile defenses makes it appear to Moscow "that the system was directed against Russia from the very outset and not against Iran or any other hypothetical threat in the Middle East." He adds: "This Iranian factor creates additional anti-Western momentum in Russia, which is widely used by state propaganda." "Given that missile defense has been a driver of tensions between Moscow and Washington since Ronald Reagan launched his Star Wars plan to render ballistic missiles 'impotent and obsolete,'" writes Thielmann, "one of the best ways to achieve reassurance and avoid provocation would be to alter the existing timetable for deploying more capable missile defenses in Europe." Slow it down, that is. Better yet, dismantle missile defense, both because it is lucky if it could work against one anti-ballistic

missile and because it makes Russia think we are creating a shield behind which to launch a surprise attack. Thus is Russia motivated to build more nuclear weapons and delivery systems to compensate for those that might be intercepted.

Source: <http://fpif.org>, 26 July 2016.

Greg Thielmann writes: "Given the technical inability of Europe-based EPAA interceptors to engage Russian strategic forces, Moscow's accusations seem either insincere or paranoid." that the system was directed against Russia from the very outset and not against Iran or any other hypothetical threat in the Middle East." He adds: "This Iranian factor creates additional anti-Western momentum in Russia, which is widely used by state propaganda.

The Ballistic missile defense system is a critical link in our strategic defense, and is also an important chip in the contest between big powers. It makes a world of difference whether you have it or not." while the US insists the system is to defend South Korea from possible attacks from North Korea, Chinese officials have condemned its planned deployment, saying it threatens China's security.

CHINA

China Releases Footage Concerning Ballistic Missile Defense System Test

Chinese authorities have released footage of the first-ever test authorities conducted for ballistic missile interception system 6-years ago. PLA researcher Chen Deming says the system itself is one of the keys of China's

domestic defense capabilities. "The Ballistic missile defense system is a critical link in our strategic defense, and is also an important chip in the contest between big powers. It makes a world of difference whether you have it or not."

The anti-missile system has undergone more successful tests since 2010, including another test in January of 2013. Footage of the original test has been released on the heels of the US and South Korea agreeing to deploy the advanced US THAAD anti-missile system before the end of next year. While the US insists the system is to defend South Korea from possible attacks from North Korea, Chinese officials have condemned its planned deployment, saying it threatens China's security. China's Foreign Minister has warned his South Korean counterpart the THAAD deployment also diminishes the level of trust between the two countries.

Source: <http://english.cri.cn/>, 25 July 2016.

POLAND

Poland Eyes Expanded Missile Defense amid Fear of Russia

Poland's ministry of defense has highlighted bolstering missile defense as one of the priorities of its ongoing military modernization in the years 2017 to 2022. The country has accelerated efforts to enhance its missile-defense capability following Russia's annexation of Crimea.

Warsaw aims to spend some \$10 billion to acquire mid-range air- and missile-defense systems, and over \$5 billion on short-range air-defense systems, according to Polish Deputy Defense Minister Bartosz Kownacki. Poland's Defense Minister Antoni Macierewicz has said that the country will most likely sign a deal with the US government and Raytheon to acquire Patriot interceptors. The announcement came following the signing of a letter of intent between the manufacturer and Poland's state-owned defense group PGZ. Meanwhile, local observers point out that the Polish acquisition plans could be seen as a reaction to Russia's upgrade of its missile capabilities in Kaliningrad, a Russian exclave that borders Poland and Lithuania, through the deployment of 9K720 Iskander short-range ballistic missiles.

According to various estimates, the Russian missile system could be enabled with a maximum range of 500 km, allowing to strike both Poland's and Lithuania's capitals. "We also need to have an answer to it. Those Iskander missiles can hit Poland but also Germany," Macierewicz said May 17, as earlier reported by

Defense News. That said, Poland is unlikely to obtain the first Patriot systems any earlier than 2022, local analysts say.

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Warsaw is also to host elements of the Aegis Ashore program, the land-based component of the Aegis BMD system. Aegis Ashore is to be deployed on Polish soil in 2018 as part of the Phased Adaptive Approach (PAA) Phase III. This technology will use Aegis BMD 5.1 and the SM-3 Block IB and IIA interceptors to cover northern Europe, according to the Missile Defense Agency (MDA).

Source: <http://www.defensenews.com/>, 25 July 2016.

USA

US Army and MDA Inaugurate Missile Defence System Data Terminal in New York

The US Army and Missile Defense Agency (MDA) has inaugurated the in-flight interceptor communications system (IFICS) data terminal at Fort Drum, New York, US. The IFICS data terminal receives messages from exo-atmospheric kill vehicles (EKV) while they are in flight, enabling constant target updates. It can also transfer the data from the EKV back to a ground-

The IFICS data terminal receives messages from exo-atmospheric kill vehicles (EKV) while they are in flight, enabling constant target updates. It can also transfer the data from the EKV back to a ground-based midcourse defense (GMD) fire control system. The GMD can engage and destroy intermediate and long-range ballistic missile threats.

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MDA and integration programme executive brigadier general William T. Cooley said: "This state-of-the-art facility has enhanced our ability to deter or defeat the limited use of long-range ballistic missiles against our

nation. It is a vital asset provided to US Northern Command to execute their critically important homeland defence mission." The data terminal facility was designed by Black and Veatch and constructed by Black Horse Group, under the supervision of the US Army Corps of Engineers.

Membership of the NSG would create a predictable environment for the large investments required for setting up nuclear power plants in India, inter alia, to meet India's Intended Nationally Determined Contribution pledge of 40 per cent of its power capacity coming from non-fossil sources by 2030," Sushma Swaraj added.

Construction on the data terminal began in August 2013, and the site was approved for use by the US Northern Command in December 2015. There are currently five similar facilities at Fort Greely and Shemya, Alaska; and Vandenberg Air Force Base, California, US. MDA aims to develop, test and field an integrated, layered, ballistic missile defence system to defend the US and its allies against ballistic missiles

Source: <http://www.army-technology.com>, 26 July 2016.

NUCLEAR ENERGY

INDIA

India Imported 600 tonnes of Uranium from Russia, Canada Last Year

Under bilateral civil nuclear cooperation agreements, India imported over 345 tonnes of uranium from Russia and 250 tonnes from Canada during 2015-16 to fuel Indian nuclear plants, parliament was told on 20 July, 2016.

In a written reply to the Lok Sabha, Minister of State for Atomic Energy Jitendra Singh said that India has earlier imported 297 metric tonnes of uranium in 2014-15 also from TVEL, the fuel company of Rosatom, Russia's state-run atomic energy corporation. During 2014-15, 283.4 MT of uranium was imported from the state-run Kazatomprom of Kazakhstan, the minister added. In connection with the related issue of the latest Indian bid for a NSG membership, that would allow it to trade in nuclear materials and technology, parliament was told that

Foreign Minister Sushma Swaraj told parliament. "We are trying to engage with China. We haven't stopped. Doesn't mean they won't agree, if they didn't once," the minister said while refuting the opposition's accusation that India mishandled its bid for membership of the group that controls access to sensitive nuclear technology.

India's plea tabled at the NSG's Vienna meeting in May was foiled by China on the grounds that New Delhi has not signed the NPT.

"While no nation explicitly opposed India's membership, one country raised procedural objections ostensibly on grounds of India's non-NPT status," External Affairs

Minister Sushma Swaraj told the Lok Sabha in a written reply on 20 July, 2016.

"The broad sentiment was to take the matter forward. Consultations on the issue of membership are ongoing within the NSG," she added. "It is important for us to be part of the 'rule making' in the NSG rather than be in a position of 'rule taking,'" the minister said.

"Membership of the NSG would create a predictable environment for the large investments required for setting up nuclear power plants in India, inter alia, to meet India's Intended Nationally Determined Contribution pledge of 40 per cent of its power capacity coming from non-fossil sources by 2030," Sushma Swaraj added.

Source: <http://www.business-standard.com>, 20 July 2016.

Sushma Swaraj Hopes China will Drop Opposition to NSG

The BJP government hopes to persuade China to drop its opposition to India joining the Nuclear Suppliers Group or NSG, Foreign Minister Sushma Swaraj told parliament. "We are trying to engage with China. We haven't stopped. Doesn't mean they won't agree, if they didn't once," the minister said while refuting the opposition's accusation that India mishandled its bid for membership of the group that controls access to sensitive nuclear technology.

In June, at an NSG meeting in Seoul, China led a bloc of nations that said because India has not signed the main global arms pact or NPT, it should not be granted entry to the NSG. Opposition leaders have said that the government should have handled India's application with more behind-the-scenes strategy than the high-profile push that included a last-minute appeal from Prime Minister Narendra Modi to President Xi Jinping at a regional summit in Tashkent that brought no breakthrough.

"It is wrong to say we created hype. When we gave our application (in May), we kept it low-key. Yes, we made full effort after that. But China created a procedural hurdle," Ms Swaraj said in parliament. According to Indian media, China's blocking of India's bid has been read by analysts as Beijing's determination to curtail the influence of India and demonstrate its power to the US, which has volubly pushed India's cause. America, which has a nuclear cooperation deal with India, considers it a nuclear power that plays by the rules and is not a proliferator, and wants to bring Asia's third largest economy into the 48-member group.

Source: <http://nation.com.pk>, 20 July 2016.

Russia Biggest Support in Creating Uranium Reserve for India

Russia is the biggest contributor to India's 'strategic uranium reserve'. India's Prime Minister's Office, in a written reply to Parliament, said "Russian firm JSC TVEL Corporation is supplying uranium to India. In 2015-16, India imported 303.78 megatons of Natural Uranium Di-oxide Pellets while 42.15 megatons in the form

of Enriched Uranium Di-oxide Pellets from Russia. In 2014-15, imports from Russia totaled 296.54 megatons." Apart from Russia, Kazakhstan and Canada also supply uranium to India. India imported 250.74 megatons of Natural Uranium Ore-Concentrate from the Canadian firm Cameco in 2015-16. No consignment arrived from Kazakhstan during the same period.

Sources say that India is planning to create 15,000 megatons of strategic uranium reserve for its nuclear reactors. Apart from the Hyderabad Nuclear Fuel Complex, India is also building another nuclear fuel complex in its western part. India has 21 working nuclear power reactors, with an installed generating capacity of 5,780 MWe. Out of these, 13 reactors comply with IAEA safeguards and are eligible for imported fuel.

Apart from these 21 nuclear reactors, Dr Jitendra Singh, Minister of State for the Prime Minister's Office says, "the Kudankulam Unit-2 also attained first criticality (start of controlled self-sustaining nuclear fission chain reaction in the reactor for the first time) on July 10, 2016. This unit also uses imported fuel."

Source: <https://in.rbth.com>, 22 July 2016.

UK

U.K. Holds Up \$24 Billion Nuclear Plan after EDF Approval

The British government cast doubt on the future of a controversial 18-billion pound (\$24 billion) project to build Britain's first nuclear power plant in more than 20 years, pledging to review the deal

According to Indian media, China's blocking of India's bid has been read by analysts as Beijing's determination to curtail the influence of India and demonstrate its power to the US, which has volubly pushed India's cause. America, which has a nuclear cooperation deal with India, considers it a nuclear power that plays by the rules and is not a proliferator, and wants to bring Asia's third largest economy into the 48-member group.

Russia is the biggest contributor to India's 'strategic uranium reserve'. India's Prime Minister's Office, in a written reply to Parliament, said "Russian firm JSC TVEL Corporation is supplying uranium to India. In 2015-16, India imported 303.78 megatons of Natural Uranium Di-oxide Pellets while 42.15 megatons in the form of Enriched Uranium Di-oxide Pellets from Russia.

just hours after the board of France's state-run utility gave the go-ahead.

U.K. Business and Energy Secretary Greg Clark said that the government would carefully consider the project before deciding on it in "early autumn." Critics have said the plan represents poor value for money for consumers, who will pay Electricite de France SA billions of pounds in subsidies to operate the plant for 35 years.

The U.K.'s decision to hold up Hinkley Point follows a meeting between Theresa May and Francois Hollande earlier where Britain's new prime minister was non-committal about the project, according to people present at the private talks. May's predecessor David Cameron had enthusiastically backed the project, arguing construction would create jobs and allow Britain to meet its carbon reduction goals.

Earlier, the French company's board had voted to sign contracts for the construction of two nuclear reactors at Hinkley Point in southwest England, a project that would take 10 years to build and eventually supply about 7 percent of Britain's electricity.

... A decision by May's government to back away from the project would mean abandoning Britain's policy of using nuclear stations to replace aging reactors and ensure the country meets its commitments to cut emissions. It would also end the biggest Franco-British industrial project in a generation as the U.K. looks to reconfigure relationships with its continental neighbors after last month's vote to leave the European Union.

... China General Nuclear Power Corp., which is funding a third of the project, understands the U.K. government's position and is ready to push forward with the development, it said on its Weibo account following EDF's approval. The company didn't say in its statement when it would approve its share of the investment. A CGN spokesman didn't immediately respond to requests for comment on Friday.

End Debate: EDF's management had hoped that the board meeting would end debate about the project's merit. At Flamanville in France, where

the company is building a reactor of the same design proposed for Hinkley Point, costs have more than tripled to 10.5 billion euros (\$11.6 billion) and construction is six years behind schedule.

French officials met to discuss EDF's position following Hollande's talks with May and their debate stretched until about 4 a.m., a person with knowledge of the matter said, declining to be identified because the meeting was private. The two leaders then spoke by telephone on Wednesday night, with Hollande seeking further assurances about the project from May, the person added.

Before EDF can start pouring cement, the U.K. government needs to ratify a contract that would subsidize prices for the electricity generated. As the U.K. delays a decision on the project, EDF also faces opposition to the plant at home. The financial risks were highlighted in March when former Chief Financial Officer Thomas Piquemal resigned because of concerns the company's balance sheet was too stretched to handle construction, despite the projected return once Hinkley is operational

Levy responded with a plan to sell 10 billion euros of assets by 2020 to help fund the project, and shareholders on Tuesday approved the sale of 4 billion euros of new shares by early 2017. The French government owns 85 percent of EDF.

EDF reported new income, excluding non-recurring items of 3 billion euros in the first half of the year, beating analyst estimates. The company is also in talks with reactor-builder Areva to create a company called New Areva, in which EDF would hold at least 51 percent of the shares. EDF shares rose as much as 8 percent in Paris trading to 11.88 euros.

Double Price: EDF's CGT, FO and CFE-CGC labor unions are seeking a court decision to void the board's decision as they want the project to be delayed by about three years to give the company time to complete the construction of similar reactors in France and China, which are several years behind schedule.

If ratified by the U.K., the Hinkley Point contract would result in EDF being paid 92.50 pounds for every megawatt-hour of electricity it produces for 35 years, more than twice the current market price. That would generate an annual rate of return of 9 percent if the plant is built on time and budget, according to Levy.

EDF, which has already spent 2.5 billion pounds on Hinkley Point, would risk losing the contract if it were to delay the project for years, the CEO has said. The state-controlled company needs the project to maintain its know-how and prepare for the retirement and renewal of its aging French and British nuclear fleet, according to Levy. The main suppliers to build the two reactors at Hinkley Point include Areva SA, General Electric Co., Bouygues SA, Laing O'Rourke Plc, and Kier Group Plc, according to EDF.

Source: <http://www.bloomberg.com>, 29 July 2016.

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Nagasaki, Japan 71 years ago. With that reality in mind, a round table will consider the renewed tensions in the world and some of the most recent changes geo-politically.

The changing situation in Turkey is of key concern. Edwards says the NATO nuclear weapons in that country were under the oversight of a man now under detention for his alleged part in the recent coup attempt. Turkish

authorities acted quickly encircling the base, cutting off the power supply and temporarily closed the airspace around Incirlik as they resisted the coup launched on July 15th, 2016. Edwards says, "It's really crucial we get rid of these weapons, everybody agrees to that proposition but we do not have the collective will to bring it about." The official declaration, however, from the NATO summit in July held in Warsaw, Poland, said, "As long as nuclear weapons exist, NATO will remain a nuclear alliance," And any decisions about NATO's nuclear weapons have to be made unanimously by all 28 member states.

NUCLEAR DISARMAMENT

GENERAL

World Social Forum to Focus on Nuclear Disarmament

The World Social Forum will be taking place in Montreal from August 9th to the 14th. The 12th edition is happening in a northern country for the first time, and nuclear disarmament will be one of the key issues in the spotlight. "Once a nuclear war starts, there's no way to limit it"

Gordon Edwards, president of the Canadian Coalition for Nuclear Responsibility says the "world is teetering back towards the cold war syndrome and towards an escalation of the nuclear threat." The opening of the WSF on August 8th will commemorate the nuclear bombing of

he opening of the WSF on August 8th will commemorate the nuclear bombing of Nagasaki, Japan 71 years ago. With that reality in mind, a round table will consider the renewed tensions in the world and some of the most recent changes geo-politically.

The Canadian Network to Abolish Nuclear Weapons will be actively raising the issues during the forum. Edwards says, as the Physicians for the Prevention of Nuclear War, Nobel Peace Prize winners in 1985, pointed out, the pursuit and possession of nuclear power is like a drug addiction: The Canadian Network to Abolish Nuclear Weapons is planning to bring pressure to bear on Prime Minister Justin

Trudeau, "to really stand up for the future of the planet, and to really play a leadership role in bringing about a true abolition of nuclear weapons." Gordon Edwards says.

"Right now, not only the Americans, but the Russians, the Chinese, all the nuclear weapons states are prepared to spend billions and trillions

of dollars in modernizing, “modernizing” their nuclear arsenals.” Edwards says, “If we embark upon a trillion dollar expenditure in the United States alone, to modernize these weapons systems, then the world is going to be that much scarier and the risk of an accidental nuclear war is going to be that much greater.” He says one of the goals in modernizing nuclear weapons is trying to make the weapons more precise, destroying the “enemy’s” response capability.

Source: <http://www.rcinet.ca>, 26 July 2016.

NUCLEAR NON-PROLIFERATION

IRAN

No Missile Provisions in JCPOA, Resolution 2231

The U.S. and some of its Western allies claim that Iran’s missile tests are a breach of the UN Security Council Resolution 2231 which endorsed the JCPOA. The JCPOA and UN Resolution 2231 include no terms and conditions or even provisional commitments which can be used as a basis for halting Iran’s defense program,” said Hossein Dehqan. These are “all excuses,” he noted. Earlier Dehqan had said that Tehran would keep upgrading its deterrent capability, not yielding to the enemy’s media hype.

The minister linked recent comments on Tehran’s missile plan to presidential election campaigns in the U.S. and pressures by Saudi and Israeli lobbies. “They keep raising the missile debate as an excuse now for domestic use as the presidential election is approaching. Also, the missile excuses of these countries (the ones objecting to Iran’s missile agenda) are made as a response to requests by reactionary Arab states led by Saudi Arabia and the Zionist regime,” the brigadier general remarked. After the signing of the nuclear deal between Iran and global powers, the threat of missile debate leading to a second political confrontation between the two looms large. Early July, Chancellor Angela Merkel told the German

parliament that missile launches by Iran earlier this year were inconsistent with a UN resolution.

Also, in his first bi-annual report to the 15-member Security Council on the implementation of remaining sanctions and restrictions on July 18, the UN secretary general said, “I call upon Iran to refrain from conducting such ballistic missile launches since they have the potential to increase tensions in the region.” However, Iranian officials have deemed the concerns unwarranted as none of the missiles test-fired by Iran were designed to carry nuclear warheads, rejecting them as “unfounded” and “hackneyed.”

Source: <http://www.tehrantimes.com>, 25 July 2016.

NUCLEAR PROLIFERATION

NORTH KOREA

North Korea Warns of ‘Terrifying Price’ Over Nuclear Tensions

North Korea warned the United States on 26 July, that it will pay a “terrifying price” if the Korean Peninsula sinks into deeper tensions, stepping up its rhetoric hours after U.S. Secretary of State John Kerry blasted Pyongyang for its nuclear program.

Kerry told a regional security conference being hosted by Laos that North Korea’s pursuit of nuclear weapons – when the world

is trying to rid itself of them – is “very provocative and deeply concerning.” He urged the country to follow the lead of Iran, which hammered out a deal to end its nuclear program in return for the lifting of sanctions.

However, North Korea was slapped with new U.N. sanctions in March, and Kerry urged the international community to fully enforce those and previous sanctions. In North Korea’s typical fashion of unleashing rhetorical threats, its foreign minister, Ri Yong-ho, told the same conference, known as the ASEAN Regional Forum,

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that it is ready to face any sanctions and took them into account when it took the "inevitable strategic decision" to develop nuclear weapons to counter the "never-ending nuclear blackmails of the U.S."

North Korea says it needs nuclear weapons to cope with what it sees as U.S. military threats. The United States stations about 28,500 troops in South Korea and regularly holds joint military drills with South Korea. Pyongyang has long demanded Washington withdraw its troops from South Korea and stop the joint drills, which it calls an invasion rehearsal. "We are ready to show that even a (powerful) country will surely not be safe if it tries to torment and harm a small country," Ri said, according to the text of his speech released to the media. "The United States will have to pay dearly a terrifying price."

Some analysts say North Korea has developed a handful of crude nuclear devices and is working toward building a warhead small enough to mount on a long-range missile capable of reaching the continental U.S. However, South Korean defense officials say the North has neither such a miniaturized warhead nor a functioning intercontinental ballistic missile. Kerry said if Iran can give up nuclear weapons so can North Korea. "But North Korea alone ... the only country in the world defying the international movement towards responsibility, continues to develop its own weapon, continues to develop its missiles, continues the provocative actions," he said.

"North Korea in January did another nuclear test. In February, March, April, May, continually they have done missile tests," he said. "So together we are determined, all of us assembled here – perhaps with one exception

assembled here – to make absolutely certain the DPRK understands that there are real consequences for these actions."

Source: <http://www.chicagotribune.com>, 27 July 2016.

N. Korea Must Prove Sincerity Before Any Denuclearization Talks

North Korea must first prove it is sincere about denuclearization if the country wants to resume talks with South Korea and other neighbors, Seoul's point man on the long-stalled six-nation talks on denuclearizing the communist country said 26 July, 2016.

"If North Korea wants a serious dialogue, it should demonstrate its commitment to sincerely carrying out denuclearization," said Kim

Hong-kyun, special representative for Korean Peninsula Peace and Security Affairs, who is also the top negotiator representing in the six-party talks involving the two Koreas, the United States, China, Russia and Japan. Kim made the remark while giving a keynote speech at a meeting of international security experts in Seoul.

Some analysts say North Korea has developed a handful of crude nuclear devices and is working toward building a warhead small enough to mount on a long-range missile capable of reaching the continental U.S. However, South Korean defense officials say the North has neither such a miniaturized warhead nor a functioning intercontinental ballistic missile.

The once-promising denuclearization forum has been stalled for nearly eight years, with South Korea and the U.S. insisting that North Korea should completely commit itself to getting rid of its nukes before the disarmament-for-reward dialogue can resume. "North Korea should change its strategic calculations so it can return to the denuclearization dialogue," the diplomat stressed.

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to the denuclearization dialogue," the diplomat stressed.

The remarks come as South Korea is stepping up

its diplomatic efforts to prod North Korea to give up its United Nations Security Council-banned nuclear weapons program in the on-going meetings of Southeast Asian countries in Laos. North Korea's nuclear weapons development goes against the international trend, Kim pointed out, citing Myanmar's recent political and economic changes as one example. "North Korea is the only nuke-testing country in the 21st century and it's irresponsible to dismiss their threats of pre-emptive nuclear attacks as mere bluffs," Kim noted.

North Korea's nuclear ambition is the biggest security threat in the region and "if North Korea's nuclear ambitions are not stopped, (the region) will have to cope with a nuclear-armed North Korea," according to the ambassador. Kim also called on the international community to demonstrate its determination to denuclearize North Korea, saying "the environment should be created in a way that there are no other options than Pyongyang's abandonment of its nuclear program."

Source: <http://english.yonhapnews.co.kr>, 26 July 2016.

NUCLEAR COOPERATION

CHINA-KAZAKSTAN

Kazakh Atomic Company and China Strengthen Nuclear Cooperation

The CEO of Kazakhstan's National Atomic Company Kazatomprom, Askar Zhumagaliyev, met with the CEO of CITIC GROUP Corporation Chang Zhenming. The heads of the companies discussed further implementation of joint Kazakhstan-China projects as well as the attraction of investments to the nuclear sector of Kazakhstan, Kazatomprom

said, *Times of Central Asia* report.

During the visit, the head of Kazatomprom also met with the Chairman of the Board of China National Nuclear Corporation Sun Qin and the Director General of CITIC GROUP Corporation in Kazakhstan Sun Yang. The parties discussed such issues as natural uranium transit from Kazakhstan through the territory of China, fuel pellets supplies to China, joint uranium mining, conversion plant construction in Kazakhstan, and application of nuclear technologies in medicine.

At the invitation of the Chinese colleagues, Askar Zhumagaliyev visited the conversion plant in Hengyang, Hunan province, where he got acquainted with the technology of uranium hexafluoride production. The head of Kazakhstan's national atomic company also met with the

Director General of China General Nuclear Power Corporation Zhang Shanmin to discuss bilateral cooperation. Kazatomprom and Chinese CGNPC earlier signed the Agreement of commercial terms for design and construction of FA production plant in Kazakhstan. Based on the

Ulba Metallurgical Plant, the new enterprise is expected to produce fuel assemblies for Chinese nuclear power plants, with a capacity of 200 tons of FA per year.

Source: <http://www.theasian.asia>, 21 July 2016.

EGYPT-SAUDI ARABIA

Parliament Ratifies Egypt-Saudi Nuclear Energy Agreement Despite Criticism

The House of Representatives Legislative Committee ratified on 24 July, 2016 an array of agreements in different fields, state-run news agency MENA reported. Among the agreements

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was one between Egypt and Saudi Arabia on the beneficial uses of nuclear energy, signed by both countries in early April. The agreement, which was signed during King Salman bin Abdulaziz Al-Saud's visit to Cairo, aims to increase cooperation between both countries in nuclear energy use, as well as the research, treatment, maintenance, and operation of nuclear reactors, ensuring environmental safety. This agreement is expected to extend for 10 years.

Nuclear energy is part of Egypt's future mix of energy sources, according to Minister of Environment Khaled Fahmy. He said the new mix includes 5% nuclear energy, 15% coal, and 33% renewable energy in addition to alternative fuels. This decision to expand nuclear energy use

in Egypt has alarmed several environmentalists. In a joint study published by the Egyptian Centre for Economic and Social Rights (ECESR) and the Heinrich Böll Foundation in late March, it was found that nuclear energy is not a viable part of a future energy mix for Egypt. "It is the most expensive pathway available, costing \$23.7bn, and potentially posing extreme risks to human lives and the environment in Egypt," the study stated. Those costs are attributed to the lack of uranium in Egypt and connecting power plants to the national grid.

According to the study, nuclear power plants are highly regulated, state-driven entities that must be monitored and maintained meticulously. Furthermore, nuclear power plants take an average of seven years to be constructed, leaving the possibility that nuclear power would not contribute to the new mix of energy sources until 2022 or possibly later. It would thus be used as

merely a mid-term solution for the energy mix.

Source: <http://www.dailynewsegypt.com/>, 26 July 2016.

USA-MEXICO

US, Mexican Nuclear Energy Collaboration

The Presidents of the United States and Mexico, Barack Obama and Enrique Peña Nieto, on 22 July, 2016 discussed efforts to promote stronger nuclear energy cooperation between both countries. Both men agreed to promote the use of nuclear power technology following Peña Nieto's meeting with Obama at the White House. The greater collaboration will help the

U.S. and Mexico strive towards clean energy goals and combat climate change. "Both of our nations are committed to ensuring that the historic Paris agreement is fully implemented," said Obama at a joint press conference. "And we are going to keep on working toward the goal announced in

June in Ottawa, generating half of the electricity in North America through clean power by 2025."

The deal in Ottawa was made during "The Three Amigos Summit" between Obama, Peña Nieto, and Canadian Prime Minister Justin Trudeau. Among the North American states only 37 percent comes from renewable energy sources

and nuclear power. Yet between 20 and 25 percent of Mexican energy comes from clean sources such as wind, solar and nuclear. Another challenge may arise from a wide-ranging energy reform to break up the Pemex oil monopoly but also the privatization of the electricity sector. Pedro Guerra Morales, the Electricity Service Coordinator for the

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Mexican Energy Secretariat, in July underlined the importance of nuclear energy for the government. Currently, nuclear energy powers 4 percent of Mexico's total use, but the official hopes to add two nuclear reactors "on the medium-term" and three more from 2028 to 2030. Doing so, he claimed, would help Mexico reach the goal established in June in Ottawa.

In the meantime, Obama noted that representatives of the North American states anticipate meeting this autumn to discuss energy issues including greater use of nuclear power. "With that goal in mind we are pursuing an agreement this year on sharing civilian nuclear technology," Obama said. "This fall our new U.S.-Mexico Energy Business Council will meet for the very first time to strengthen the ties between our energy industries."

Source: <http://oilprice.com>, 22 July 2016.

NUCLEAR SECURITY

TURKEY

Turkey Coup Attempt Raises Fears over Safety of US Nuclear Stockpile

The attempted coup in Turkey on 15 July, 2016 and the subsequent closure of the Incirlik airbase in the south of the country have raised fresh questions about the wisdom of the US stationing the biggest stockpile of nuclear weapons in Europe at such a vulnerable site. Even before the abortive putsch, the potential terrorist threat to the base, 68 miles from the Syrian border, led to a significant upgrade in the security perimeter around the designated Nato area, where an estimated 50 B61 nuclear bombs are stored in 21 vaults. 15 July's events have increased concerns over whether any such security enhancements can mitigate the risks of holding on to such a dangerous arsenal in such

a volatile location.

The Turkish government claimed that some of the coup plotters were based at Incirlik and flew aircraft out of the shared base. It consequently closed air traffic out of the base and cut off its power supply, temporarily stopping US air operations against Islamic State extremists in Syria. "I think the key lesson is that the benefits of storing nuclear weapons in Turkey are minimal

but the risks have increased significantly over the past five years," said Hans Kristensen, a nuclear weapons expert at the Federation of American Scientists. "I would say that the security situation in Turkey and in the base area no longer meet the safety requirements that the United States should have for storage of nuclear weapons. You only get so many warnings before something goes terribly

wrong. It's time to withdraw the weapons."

There are thought to be a total of 180 B61 bombs in Europe, in Germany, Italy, Belgium and the Netherlands as well as Turkey. The tactical weapons are legacies of the cold war and largely seen as militarily obsolete. However, in the absence of a Nato consensus on removing them, they remain in place as tokens of US commitment to Europe's defence. Recently they have been earmarked for an expensive upgrade as the era of post-cold-war non-proliferation comes to a halt.

Ian Kearns, the director of the European Leadership Network think tank, said: "If they are stationed at a place base that intelligence suggests is a target of terrorists attacks and prone to instability, it is no longer reasonable to keep them there." The coup and the involvement of Incirlik also raises wider questions about Turkey's role in Nato. "It says a lot about the ability of Turkey to operate in coalition operations if its army can't be trusted," said Aaron Stein, a resident

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senior fellow at the Atlantic Council think tank. "To have rogue air force commanders flying around Turkey poses a lot of scenarios that Nato hasn't planned for." ...

Source: <https://www.theguardian.com>, 17 July 2016.

NUCLEAR SAFETY

BELARUS

Belarusian Energy Ministry explains 'Accident' at Nuclear Power Plant Construction Site

An off-nominal situation occurred during rigging operations at the site where a reactor vessel of the Belarusian nuclear power plant was stored, the press service of the Belarusian Energy Ministry told BelTA. A number of Internet sources released news stating that "a reactor was dropped during its installation into the reactor compartment at the construction site of the Belarusian nuclear power plant on 10 July 2016".

"De facto according to the general contractor Atomstroyexport, an off-nominal situation took place at the site where the reactor vessel was stored as the reactor vessel was being rigged and moved in a horizontal plane," said representatives of the Belarusian Energy Ministry. The state enterprise Belarusian Nuclear Power Plant, which is the customer of the project, immediately requested all the necessary documents and information from the general contractor. The situation is still being analyzed. "After Belarusian specialists have thoroughly studied the information provided by Atomstroyexport the relevant decision will be made. The Belarusian side will primarily take into account the need to ensure the unconditional safety of the future nuclear power plant," stressed the source. Earlier the ASE group of companies, which is the general contractor in the project for

building the Belarusian nuclear power plant, stated that "Internet reports about an alleged accident, which has damaged the reactor vessel, fly in the face of reality".

Speaking about the substance of the issue, Atomstroyexport representatives said that the reactor vessel is outside the reactor compartment. There are no technical obstacles that impede the reactor vessel's installation into its intended position. The general contractor is waiting for the oversight agencies to give a go-ahead to installation operations.

Source: <http://eng.belta.by>, 26 July 2016.

IAEA-RUSSIA

IAEA Enhances Cooperation with Russian Radiation Safety Authorities

The IAEA has signed agreements with two Russian regulatory authorities to cooperate in enhancing the country's national radiation safety standards and the implementation of international safety standards. The agency signed a similar agreement with Rosatom last year

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The IAEA announced that it signed 'practical arrangements' with Russia's Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being (Rospotrebnadzor) and the Federal Medical and Biological Agency (FMBA) on 18 July in Moscow. The agreements were signed by Juan Carlos Lentijo, IAEA deputy director general and head of its department of nuclear safety and security; Rospotrebnadzor head Anna Popova and FMBA head Vladimir Uyba. The IAEA said the signing of the practical arrangements "will commence a process whereby concrete actions to achieve higher standards of radiation safety across all levels in the nuclear field will be implemented".

In particular, the IAEA and Rospotrebnadzor will develop cooperation in the field of medical radiation exposure; radiation exposure of the public and workers from natural radiation sources (including radon); and in the control of radionuclide concentrations in food and drinking water. Meanwhile, the IAEA and FMBA will cooperate in the application of safety standards for controlling exposures to workers and the public of naturally-occurring radioactive materials; studying the incidence of cancer among the population of the East Urals; remediation of nuclear legacy sites; and an assessment of the intake of radioactive gas-aerosol mixtures.

Lentijo said, "These agreements establish a cooperation framework to strengthen coordination for the application of radiation safety and monitoring programs in Russia." Miroslav Pinak, head of the IAEA's radiation safety and monitoring section, said: "With the signing of the latest practical arrangement, the IAEA has completed procedural formalities to establish cooperation with the prime radiation regulatory authorities of Russia." In a statement, Rospotrebnadzor said, "Implementation of the practical arrangements will encourage exchange of existing considerable Russian knowledge and best practices in the specified areas with the IAEA member states and the development of international safety standards involving our country, as well as the development of joint

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science projects."

The IAEA noted the two new agreements complement those it signed in September 2015 with Russian state nuclear corporation Rosatom in the area of occupational radiation safety. The so-called practical arrangements constitute a bilateral agreement to extend cooperation in radiation safety to include all projects conducted by the two parties. The IAEA put forward the initiative to sign the arrangements with all Russian organizations

currently collaborating with the agency in radiation safety. Rosatom was the first Russian company to sign them.

Source: <http://world-nuclear-news.org>, 26 July 2016.

KENYA

IAEA Want Kenya to Enact Policy for Radiation Safety

Implementation of the practical arrangements will encourage exchange of existing considerable Russian knowledge and best practices in the specified areas with the IAEA member states and the development of international safety standards involving our country, as well as the development of joint science projects.

The IAEA mission in Kenya has recommended development of a policy and a strategy for radiation safety to address emerging issues. The mission team handed over to the Ministry of Health a preliminary assessment report, which also recommends effective

independence of the Radiation Protection Board (RPB) from operators and other entities that may have interests to influence its decision making in radiation safety. "Ensuring effective independence of Kenya's regulatory body for decision making in radiation safety will help it meet

its commitment to strengthen the oversight of all radiation related facilities and activities in the country," said the team leader Javier Zarzuela.

The 12-member team comprising of experts from France, Hungary, India, Ireland, South Africa, Spain, Sri Lanka and Zimbabwe lauded Kenya for voluntarily inviting the Integrated Regulatory Review Service (IRRS) to assess her regulatory framework to ensure consistency with IAEA safety standards. "Our Kenyan hosts did an excellent job in preparing for the mission and cooperated fully with the IRRS team in a very open and transparent manner," the team leader said. They team has also advised the government to revise and complete the national legal framework to ensure consistency with IAEA safety standards.

The Radiation and Protection Board (RPB) was advised to establish regulations that will systematically cover all types of practices with radiation sources, including the transport of radioactive materials as well as developing policies and procedures for consistent and stable regularity control of radiation-related facilities and activities. The RPB is also required to establish and implement an integrated management system consistent with IAEA safety standards.

"I welcome Kenya's decision to invite the IRRS mission. I'm confident that its recommendations and suggestions, when implemented will contribute to a significant strengthening of the country's regulatory framework of radiation safety," said Peter Johnson, Director of Radiation, Transport and Waste Safety in the IAEA Department of Nuclear Safety and Security. The IAEA team of experts has been meeting representatives of the RPB from 11th to 20th July 2016 to conduct an Integrated Regulatory Review Service (IRRS) mission, whose purpose is to review the Kenya regulatory framework for radiation

safety.

The team has carried out review in the following areas; responsibilities and functions of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; development and content of regulations and guides; emergency preparedness and response; occupational radiation protection, control of medical exposure, public and environmental exposure control and transport of radioactive material. It is expected that the mission will facilitate regulatory

improvements in Kenya and other member states from the knowledge gained and experiences shared between RPB and IRRS reviewers and through the evaluation of the effectiveness of the Kenya regulatory framework for nuclear safety and its practices.

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The Radiation Protection Board Chairman, Professor Erastus Gatebe, said RPB is a regulatory body of Kenya mandated to advise the Cabinet Secretary of Health on the protection of the public and radiation workers from dangers arising from the use of devices or material capable of producing ionizing radiation and for connected purposes. The Assistant Chief Radiation Protection Officer, Arthur Koteny added that RPB has offices in Nairobi, Mombasa, Kisumu, Eldoret, JKIA and Mwingi and its main purpose is to ensure the public and health workers dealing with radiation gadgets are safe.

Source: <http://www.health.go.ke>, 20 July 2016.

INDIA

Russia Ensures Greater Safety for Upcoming Units of KNPP

Prodded by India, Russia has ensured greater safety parameters for the upcoming third and fourth units of the KNPP than the first two. Even

the first two units of the KNPP in Tamil Nadu have been found to be ready to withstand a disaster like the one that hit the Fukushima-Daiichi Nuclear Power Plant of Japan on March 11, 2011.

But Rosatom, the state-owned nuclear energy corporation of Russia, has agreed to further raise the safety parameters for the third and fourth units, following a request from the Nuclear Power Corporation of India Limited. "The Indian side requested us to review the possibility of enhancing certain parameters and we also undertook the effort of analysing and enhancing them. So Units 3 and 4 are designed for even higher seismic, climatic and technical impact (than Units 1 and 2)," Vladimir Angelov, Director (India) of Atomstroyexport (ASE) Group of Companies—the engineering arm of Rosatom—told DH. He said that KNPP was the first nuclear power plant in the world where "the post-Fukushima safety enhancement requirements" had already been implemented and is being operated successfully. "We analysed the basic technical design of Units 1 and 2 in terms of the lessons (learnt) from (the disaster at) Fukushima. We came to the conclusion that they would have withstood the Fukushima-like incident.

However, we are enforcing even stricter requirements," said Angelov. India and Russia signed the General Framework Agreement for the third and fourth units of the KNPP in April 2014. The construction works for the new units of the power plant commenced in February 2016. Angelov said that the KNPP units were designed to withstand the "impact of earthquake, tsunami, tornado and hurricanes" and "even fall of an aeroplane".

"There are number of the advanced active and passive safety systems which ensure unprecedented design level of nuclear and ecological safety of the NPP. Double localising and protecting containment, passive heat removal system from reactor plant, core catcher, and closed industrial water intake

for the power plant are some of them," he said.

In the event of a mishap, the passive heat removal system will ensures cooling of the steam generator in automatic mode, without energy supply and participation of personnel. The core catcher prevents penetration of the core melting into the ground and environment, thus containing radioactive contamination, said the top official of the Atomstroy export.

Source: <http://www.deccanherald.com>, 26 July 2016.

NUCLEAR WASTE MANAGEMENT

SOUTH KOREA

Approval for Korean Repository Expansion

Plans to more than double the current capacity of South Korea's low- and intermediate-level radioactive waste disposal facility at Gyeongju have been approved by the government. Construction of the second phase of the facility is expected to be completed in 2019. The Korea Radioactive Waste Agency (KORAD) announced that the Ministry of Trade, Industry and Energy has approved the construction of the second phase of the Gyeongju facility in North Gyeongsang province.

Preparatory groundwork for the expansion of the repository will begin soon, KORAD said. However, approval from the South Korean nuclear regulator – the Nuclear Safety and Security Commission (NSSC) – must be obtained before full-scale construction of the new facility can start. Phase II of the facility – costing some KRW 100 million (\$88,000) – will cover an area of some 120,000 square meters and will have the capacity to hold 125,000 drums of waste. Construction of the surface facility is scheduled to be completed in 2019.

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The site selection process for the KRW 1.56 trillion (\$1.5 billion) facility began in 1986, eight years after South Korea's first nuclear power reactor – Kori unit 1 – began operating. Construction of the first phase of the repository started in early 2006 and was completed in June 2014. That phase consists of six underground silos, each 40 metres high and with a diameter of some 24 metres. This first phase can hold up to 100,000 barrels of radioactive waste.

The NSSC gave approval in December 2014 for full operation to begin at the facility's first phase. The first waste – 16 drums of waste within a

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concrete disposal container – were put within one of the facility's silos last July. Ultimately, the Gyeongju facility will be used to dispose of a total of 800,000 barrels of waste. Low-level waste is typically composed of, for example, clothes, filters, and equipment used routinely at nuclear sites. It is usually placed in drums that are then compacted.

Intermediate-level waste contains, for example, resins, chemical sludges and metal fuel claddings which have higher levels of radioactivity and require shielding.

Source: <http://www.world-nuclear-news.org>, 26 July 2016.



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

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