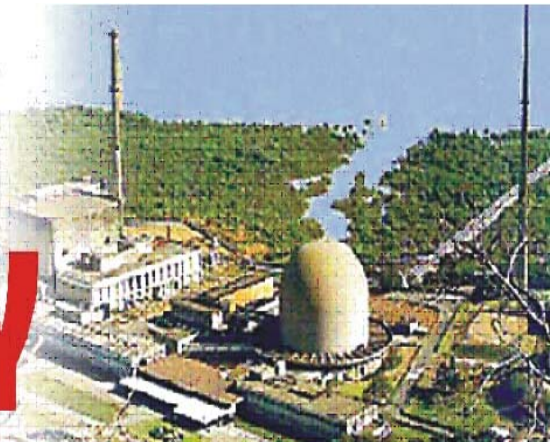
NUCLEAR SECURITY



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

vol. 7, no. 20, 15 August 2013

A TRIBUTE – Manpreet Sethi

The Nuclear Strategist with the Red Turban

Air Cmde Jasjit Singh AVSM, VrC, VM (retd) received the Padma Bhushan in 2006 for his outstanding service to the nation in the field of defence and strategic affairs. Indeed, he was a versatile expert whose understanding and writings traverse the expanse of aerospace power, challenges posed by Pakistan and China, higher defence organization, India's foreign policy, defence economics and modern forms of warfare air power, and even social issues impacting national security, counter-insurgency and many more.

However, India's nuclear future in both its dimensions – of the role that nuclear energy could play in the country's energy mix and the role that nuclear weapons should play in national security strategy – were particularly close to his heart. In fact, the next book that he was planning to write was *Counterstrike* to further the understanding of no first use, a much misunderstood concept, in India's nuclear strategy. Unfortunately, this was not to be. He left us on 04 August 2013 after having lived and breathed national security for over five decades of his active service – three of which were spent in think tanks.

I joined the IDSA in 1997, just a year before India tested its nuclear weapons. This brought me the opportunity to understand the many dimensions of this momentous event through my personal interactions with Jasjit Sir on the subject and through observing his many interlocutions with others of the Indian and international strategic community. As Director of IDSA then, it fell upon him to steer informed opinion making on India's nuclear policy during this turbulent period. He travelled across the length and breadth of the world to explain the Indian threat perception to opinion shapers and makers everywhere and thus subtly influenced their policies towards India. No wonder, so many in the world remember him as the man with the red turban who passionately but politely argued the case of India.

I still remember that happy day in 2003 when the Air Cmde called me in Jamnagar to say that we had obtained a project from the Department of Atomic Energy to examine the case of nuclear power and suggest solutions on how to get India out of the stranglehold of the non-proliferation regime. I was asked to produce a series of papers on the Nuclear Suppliers Group (NSG) – its functioning, limitations and possibilities of engagement with India. As part of this effort, we organized a national seminar in May 2004 in which we made the case of India on the basis of its uniqueness, and hence argued the need for a country-specific approach in its treatment by the NSG.

In October 2003, we also started the fortnightly newsletter *Nuclear Power*. It began as a short 8 page compilation of news and views. Despite all constraints of resources and manpower, Jasjit Sir was committed to bringing out the newsletter without interruption and to sending it *gratis* to policy makers and the members of the strategic community. During the time when the Indo-US nuclear deal was being negotiated we even sent special issues of the newsletter to Indian missions abroad and to many members of the Parliament. Hopefully, the endevaour made some small difference in shaping opinions, though Air Cmde Jasjit Singh was never bothered whether his actions were having an impact or not. He just believed in doing his karma – actions that arose from a strong power of conviction that he derived from a compass that always pointed to national security.

In 2006, *Nuclear Power* grew into *Nuclear Security* with an enhanced scope to cover the entire range of nuclear issues from nuclear power to nuclear strategy, non-proliferation and arms control and even missile defence. The newsletter has since been printed without missing a single issue (Jasjit Singh used to call the process of compilation of the newsletter as '*akhand paath*' – a continuous, unending task) and is distributed to over 400 people.

Yet another dimension of India's nuclear strategy that the Air Cmde was very passionate about was the pursuit of universal nuclear disarmament. He firmly believed that a world without nuclear weapons which was universal and verifiable was in India's interest since the presence of nuclear weapons complicated the country's security environment. In 1988, he was pivotal in the drafting of the Action Plan that was presented by then Prime Minister Rajiv Gandhi at SSOD-III. Twenty years later in May 2008, he planned and executed (despite having fallen seriously unwell in February that year) an international conference on the theme "Towards a Nuclear Weapons Free World" which was addressed by the Prime Minister and the Vice President of India and was attended by as many as 200 members of India's strategic community, including 12 international experts.

On Jasjit Singh's 75th birthday, K Subrahmanyam, the doyen of Indian strategic thought gifted him a watch with the words that since Singh had kept a constant watch over India's security for the last many decades, he deserved just such a gift. And indeed Jasjit Singh kept an eagle eye on the security of the nation. His deep insights born out of his extensive reading and sharp analytical acumen have stood the country in good stead over the last four decades. There is little doubt that he stands out amongst the Indian strategic community as much for his balanced analysis, as for his ethics and integrity to the profession.

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Jasjit Singh's constant endeavour was to instill a 'national security consciousness' among all sections of society. He was ever ready to engage with the uniformed, informed and the uninformed, the intelligentsia, the academia, and most of all with young students. In fact, his constant worry was that India was not investing enough in building 'intellectual capacity' to sustain its rise to power. Therefore, he encouraged new ideas from fresh, young minds and his room was open to all. He would often say that a think tank must remain ahead of the security challenges in its thinking if it is not to become a 'thought tank'.

Let me conclude with a short verse that I wrote for Jasjit Sir some years ago capturing the many aspects that I, and many other scholars, have learnt from him.

Clarity of thought and
precision with word
depth of a worm and
breadth of a bird
Common sense and logic
over verbiage and pretense
are what you need the most
to wade from 'fog' into sense

Being open to all
young and the old
always thinking beyond
what you have been told
These are only a few of the things,
we've learnt from you, Sir
They shall ever guide us
in our future research and writings, Sir.

▪▪▪

OPINION – Rajesh Rajagopalan

Fearing Nuclear Escalation, India limits its Response to Pakistan's Provocations

In the aftermath of yet another Pakistani transgression, we are back to the tired old arguments about whether or not India should be talking to Pakistan. Proponents argue that nothing has been gained whenever India stopped talking to Pakistan, as it did after every major provocation. Their opponents argue that dialogue has not stopped Pakistan's provocations.

Both sides are right and therein lies the simple truth that New Delhi refuses to acknowledge: dialogue or the lack of it has little impact on Pakistan. The reason Pakistan continues to provoke is that India has eschewed any retaliation for fear of nuclear escalation. Because Pakistan does not fear Indian retaliation, India's deterrence is dead. To prevent Pakistani provocations, India needs to resurrect its deterrence and that requires considering using military force.

Pakistan's nuclearisation has ended India's ability to deter Islamabad from provocations. Consequently, Pakistan has provided unprecedented levels of support to terrorist groups, which includes not only terrorist attacks in India but also against the Indian mission in Afghanistan. Fearing nuclear escalation, both the BJP and the UPA governments have limited their responses to diplomatic protests and calling off dialogue. These are ineffectual responses that only serve to illustrate Indian helplessness. Pakistan knows that India will eventually have to return to talks.

Strategic Stupidity: It is not as if Indian leadership has been unaware of the problem. After Kargil, then defence minister George Fernandes and army chief General VP Malik suggested that India could explore limited conventional war options that would punish Pakistan without risking escalation.

Unfortunately that idea has not been pursued. After Operation Parakram, the Indian Army proposed a "cold start" doctrine. It was a plan for faster mobilisation because one lesson of Op Parakram was that Indian military mobilisation took very long, which allowed international pressure and strategic second guessing to undermine the Indian leadership's will to order a military retaliation. But Cold Start envisaged a much larger war and it might not be an appropriate response for anything but a catastrophic terrorist attack. Also, Pakistan's introduction of short-range tactical nuclear weapons has increased New Delhi's apprehensions. In any case, at least formally, the Indian Army has discarded Cold Start.

Indian leaders have further undermined our deterrence by repeatedly proclaiming that they do not want war. This is the one point on which there is consensus in New Delhi but consensus is not wisdom. Even if war is not an option, taking it off the table is the height of strategic stupidity. As long as India is unable to threaten Pakistan with military retaliation, Pakistan has little incentive to stop supporting terrorist actions against India. Diplomacy provides few useful responses.

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Stopping the dialogue is a short term measure that will not deter Pakistan. Seeking international support is equally useless because even if the other powers support India diplomatically which itself is a mighty big if considering Pakistan's talent for leveraging its strategic location it will have little impact on Pakistan, as they have repeatedly demonstrated. Diplomacy can aid military power but it cannot replace it.

Retaliatory Option: India needs to consider all of its options, including the use of force. While force should not be the first option for all problems, force has to be an option at least in responding to attacks. The fear that any military operation would automatically result in nuclear escalation is half-baked wisdom from a superficial reading of Cold War history.

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The nuclear relationship between Washington and Moscow was very different because both sides

deployed nuclear weapons on a hair-trigger, which meant that the slightest disturbance had the potential to set off a nuclear conflagration. That is not the situation in South Asia where neither side deploys ready-to-use nuclear weapons. Pakistan refuses to join India in adopting a no-first-use of nuclear weapons pledge, which is understandable, given their inferiority in conventional military strength. But this is taken as an indication of Pakistan's irrationality, which only strengthens Pakistan's deterrence because it effectively paralyses the Indian leadership.

India does have the option of engaging in limited military retaliation, especially in PoK. Civilian and military leaders need to jointly reconsider the Fernandes-Malik proposals so that military retaliatory options are available to deter Pakistan and, if deterrence fails, to respond to Pakistan's provocations. Without it, we will be condemned to repeat the facile dialogue-no dialogue debate after the next provocation, which is surely coming.

Pakistan might have a first-use doctrine but it is first-use as last resort, much as Israel keeps nuclear weapons to ensure its survival. First use does not mean Pakistan will lob nuclear bombs as soon as the first Indian soldier crosses the border. As long as Indian action does not threaten the survival of the Pakistani state, it is unlikely that Pakistan will reach for nuclear weapons.

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Source: Economic Times, 09 August 2013.

OPINION – Arun Vishwanathan

Nuclear Signals in South Asia

India, Pakistan, and China have been dancing a nuclear tango of late, taking steps that have serious implications for the entire region. Pakistan has worked assiduously to expand its fissile material stockpile while threatening to lower its nuclear threshold, claiming that its short-range missile, Nasr/Hatf-IX, is nuclear capable. These Pakistani moves are apparently meant as a counter to India's Cold Start Doctrine, a plan for launching a conventional military attack on very short notice, even though New Delhi has denied its very existence. China, meanwhile, has continued to modernize its missile forces while fostering strategic ambiguity about its no-first-use nuclear policy. And in response to Pakistani and Chinese signals, India has publicly emphasized the survivability of its nuclear missiles, the extension of their range, and the deployment of a nuclear submarine, suggesting a powerful second-strike nuclear capability. A nuclear signaling game can be beneficial to both the sender and receiver of messages; if the signals are properly understood, they can reduce the likelihood of nuclear conflict by suggesting, ahead of time, just how unwelcome the results of military aggression would be. Poorly executed signals, however, can be misunderstood, heightening tensions and increasing the possibility of escalation during a conflict. The current round of South Asian signaling seems to be of the latter variety.

A nuclear signaling game can be beneficial to both the sender and receiver of messages; if the signals are properly understood, they can reduce the likelihood of nuclear conflict by suggesting, ahead of time, just how unwelcome the results of military aggression would be. Poorly executed signals, however, can be misunderstood, heightening tensions and increasing the possibility of escalation during a conflict. The current round of South Asian signaling seems to be of the latter variety.

Pakistan's Weak Signal: ... Despite widespread international consternation following Pakistan's claims about a supposed nuclear capability for the Nasr missile, New Delhi has gone its diplomatic way, pretty much as usual. This lack of reaction is largely due to several doubts about Pakistan's claim. First, a warhead that could fit into such a small, short-range missile system would likely have to be a plutonium-based, linear-implosion device. During its 1998 nuclear tests, however, Pakistan did not detonate a plutonium device. Second, given the low quality of Pakistan's natural uranium ore, there are also doubts whether it can produce enough fissile material to simultaneously stockpile uranium- and plutonium-based weapons. Last, and most important, Indian nuclear doctrine does not distinguish between tactical and strategic nuclear weapons. India continues to adhere to a no-first-use policy, but its nuclear doctrine clearly assures that it will engage in massive retaliation against any nuclear attack on Indian territory or on Indian forces, anywhere.

In sum, India doubts Pakistan's claim that its short-range Nasr is nuclear capable and, even if it were, India does not see a nuclear-capable Nasr as greatly changing the nuclear equation between the countries. Therefore, even though it has tested low-yield nuclear weapons, possesses the capability to miniaturize its nuclear warheads, and has a reliable delivery platform, India has not found it necessary to respond directly to the Pakistani threat. Even so, Islamabad should re-consider its gambit, which illustrates well how nuclear signaling can go off course. That's to say, Pakistani strategists should ask themselves this question: Is Pakistan's deterrent capability strengthened or weakened by an unpersuasive claim that the Nasr is nuclear capable and ready for tactical use? Though not to their liking, the answer is the latter, and surely, a weak deterrent cannot be in Pakistan's national interest. In particular, a capability that is perceived to be a bluff is unlikely to deter India from launching a conventional military attack on short or no notice.

The Signals out of Beijing and New Delhi: India and China share a disputed border where simmering tension periodically heats up, as seen in the recent stand-off in Ladakh. And of late, China has sent signals of its own, continuing modernization of its delivery platforms by migrating from liquid-fueled to solid-fueled missiles. Beijing has also been working to add multiple-warhead capability to its missiles, as the July 2012 test of its DF-41 intercontinental ballistic missile illustrates. Complicating this matter further is a defense white paper that the Chinese government published in April, raising questions as to whether China continues to follow a no-first-use nuclear weapons policy. Given the lack of a clear reference to the no-first use policy in the document, there has been a debate as to whether or not China has changed its nuclear policy away from that of a no-first-use. A doubt has thus been planted. Whether that doubt will be of benefit to China in a crisis situation, however, remains an open question.

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Until recently, India had maintained a studied silence in the nuclear realm, but of late New Delhi has come up with its own set of counters to signals emanating from Islamabad and Beijing. The first move took the form of a speech and a newspaper op-ed by Shyam Saran, chairman of the Indian NSAB. Saran highlighted steps taken by New Delhi – including establishment of a triad (nuclear weapons delivered by aircraft, missiles, and submarines) –that ensure the reliability, quality, and survivability of India's nuclear weapons. In the speech, Saran also said that Pakistan was making a mistake in threatening use of theater nuclear weapons to counter a conventional Indian military thrust. Because India does not distinguish between different types of nuclear weapons, Saran noted, any use of nuclear weapons against India would draw a nuclear response.

New Delhi's second move became clear in June, soon after Avinash Chander took over as the chief of India's DRDO, which designs and manufactures India's ballistic and cruise missiles. During his interactions with the media, Chander has departed from a tradition of nuclear secrecy, dropping several hints that pointed to Indian efforts to increase the survivability of its nuclear deterrent, without actually giving away how far India had progressed in these efforts. The ability to fire missiles from canisters mounted on mobile launcher trucks is part of such a strategy, as are efforts to develop technologies to carry multiple warheads on one missile. Chander has publicly confirmed India's interest in developing both capabilities.

During a recent interview, Chander also mentioned his mandate to bring down the response time of an Indian second strike to a few minutes. That interview seemed timed to coincide with the visit of Indian Defense Minister A.K. Antony to China. A hard-line PLA retired major general, Lou Yuan, quickly responded, advising New Delhi not to provoke "new problems and increase military deployments at the border area and stir up new trouble." It is unclear whether this response is reflective of the Chinese government's overall view, but it does point up the tension – and the signalling – between Beijing and New Delhi.

The Nuclear Future in South Asia: No matter how unbelievable it may seem, Pakistan's suggestion that it might pre-delegate authority for use of a nuclear-tipped Nasr to battlefield commanders greatly increases tension with India and the chances of nuclear conflict. The unresolved border dispute between India and China and Beijing's possible role in an Indo-Pak conflict continue to

keep Sino-Indian relations tense. Indian missiles with longer range and the Indian nuclear submarine *Arihant* will bring within reach targets across China. This expansion of the Indian nuclear deterrent could add stability to the Sino-Indian relationship – or simply increase tensions. India, Pakistan, and China need to engage if they are to understand the vocabulary and thinking that underpin one another's nuclear strategies. India will hold elections in 2014. Pakistan has just gone through a democratic transfer of power. China has a new set of leaders in place after its decadal leadership transition. It will be interesting to see whether and how the nuclear signaling game in South Asia changes, once new leadership is in place in all three countries.

Source: Bulletin of Atomic Scientists, 09 August 2013.

OPINION – KS Parthasarathy

News of the Death of Nuclear Energy is Highly Exaggerated

Some scientists have serious disagreements with nuclear power enthusiasts. A part of the disconnect is due to disinformation. Nuclear proponents must dispel it through healthy dialogue. Anti nuclear activists claim that the USA decided to halt the all-out nuclear programme after many Nobel laureates debated the issue. According to them, everyone started rethinking after the TMI – 1979 and Chernobyl (1986) accidents and that, post Fukushima (2011), most nations concluded 'that nuclear energy is a risk not worthy of taking.' These conclusions are wrong. In 1973, when the debate took place, US-companies operated 50 NPPs. Now they operate 104. Notwithstanding the TMI accident, US companies installed 50 out of these after the accident; nineteen more after the Chernobyl accident. Canada installed 14 NPPs and France 53 of its 59 NPPs post TMI accident.

Contrary to what the anti-nuclear activists want us to believe, there is universal consensus on disposal of high level nuclear waste in deep geological repositories; waste issues are political and not technological. Activists ignore the shining examples of Finland, Sweden and France which are ahead in solving the high level nuclear waste management problem. Some anti nuclear activist's state that the USA has plans to vitrify (incorporating radioactive waste into glass) spent fuel.

Post Fukushima accident, Pakistan, China, Iran and Russia have installed new reactors. US NRC granted combined construction and operation licences to four reactors. Construction of two has started. USA may not build more reactors as it has discovered plenty of shale gas which is cheaper now. In spite of setbacks in Germany, Switzerland and temporarily in Japan, nuclear programme progresses well in Russia, France, Finland, China and India. It is poised to start in 45 more countries. Beating US and French companies, South Korea won a contract to construct four nuclear reactors in UAE. It may be a game changer as South Korea has the technology and UAE the funds. Saudi Arabia plans to install 16 reactors. Activists ignore these developments. Contrary to what the anti-nuclear activists want us to believe, there is universal consensus on disposal of high level nuclear waste in deep geological repositories; waste issues are political and not technological. Activists ignore the shining examples of Finland, Sweden and France which are ahead in solving the high level nuclear waste management problem. Some anti nuclear activist's state that the USA has plans to vitrify (incorporating radioactive waste into glass) spent fuel. The USA has no such plan.

There are allegations that uranium mines are contaminated with radioactive argon; the actual contaminant is radon, a decay product of radium in the uranium series. Anti nuclear activists want Kudankulam reactors to be run on gas. "Convert all new reactors into steam turbines and coal fired boilers. Change to reactor-boilers when reactors are proved to be safe," activists argue. But can these systems be interchanged that easily?

Expensive Source: Our railways may collapse if it has to handle an additional 86 MT of coal needed by coal stations that replace new nuclear reactors. In 2011-2012, our ports barely managed to handle 135 MT of coal. Can it handle 86 MT more? "A 50 km x 50 km area in Rajasthan desert can produce 75,000 mw of solar power which can be fed into the national grid," some activists say. Solar power generators cannot provide power night and day. Technology to store large quantities of power does not exist now. Solar power is expensive. It may become cheap only if solar panels and the auxiliary equipment to maintain the stability of large scale power networks remain cheap.

To those opposed to nuclear power, 'fast breeder is a nasty piece of equipment' and almost 'all countries have lost hope in fast breeders.' Nuclear opponents paint a dismal picture of FBR technology. Facts are otherwise. About 20 FNR have already been operating, a few since the '50s, accumulating over 400 reactor-years of experience. Some supplies electricity commercially. All advanced countries carry out research to overcome the challenges in technology. At present, fast reactors are not cheap; they cannot compete with current thermal reactors.

As uranium is available, there is no incentive to invest in fast reactors.

... The activists' allegation that PM Manmohan Singh gave natural uranium reactors a holiday is incorrect. Four PHWR (Kakrapar 3&4 and Rajasthan 7&8) of 700 MWe are now under construction. Govt has planned or firmly proposed 14 similar reactors at Kaiga, Kumharia, Chutka, Bheempur, Banswada, Rajouli and Nawada. Regrettably, without verifying facts, even organisations such as the Kerala Sastra Sahitya Parishath, which promotes science and technology get carried away by disinformation campaigns.

Source: Deccan Herald, 09 August 2013.

OPINION – Iranga Kahangama

US and Pakistan: The Unlikelihood of a Civil Nuclear Deal

Despite US Secretary of State John Kerry's reinvigorated foreign policy approach to Pakistan, the likelihood of a recently mentioned potential civilian nuclear deal remains doubtful. Talks of a nuclear deal with Pakistan are often mentioned in comparison to the Indo- US civilian nuclear deal. This logic is flawed however, as the circumstances are different between both countries. Several motivators for the Indian deal don't apply here: expected US business and commercial benefits, security guarantees regarding nuclear technology, domestic political tensions and global strategic interests.

Talks of a nuclear deal with Pakistan are often mentioned in comparison to the Indo- US civilian nuclear deal. This logic is flawed however, as the circumstances are different between both countries. Several motivators for the Indian deal don't apply here: expected US business and commercial benefits, security guarantees regarding nuclear technology, domestic political tensions and global strategic interests.

The commercial activity stemming from the Indian deal has been virtually nonexistent and was rejected legislatively in India; the US would do well to learn its lessons in basing another argument along the same reasoning. Similarly, ongoing security concerns in Pakistan are unlikely to convince the US that the safety of nuclear technology would be protected as in India. Furthermore, given Pakistan's history of nuclear proliferation it would likely be seen as controversial if not almost tacit approval of such behavior.

With 60 votes needed these days to virtually pass anything in the US Senate, it is unlikely that this deal would get the strong bipartisan support needed. Between those in government mistrustful of Pakistan, particularly following the Bin Laden raid, and vocal nonproliferation supporters, any deal is likely to be quickly rejected. The White House too would be unlikely to further acquiesce on nuclear issues with Pakistan as it surprised many already by bringing drone strike negotiations out publically. The Obama Administration is unlikely to expose itself to criticism regarding this deal, as nuclear nonproliferation and global zero are considerable parts of its foreign policy. Rather, the administration is likely to push for securing nuclear weapons and reducing fissile materials as mentioned in its 2010 Nuclear Posture Review.

Despite US Secretary of Defense Chuck Hagel's comments in 2006 as a US Senator that a US-Pakistan nuclear deal was possible, these views were specifically his own and not the government's. The Pentagon's priority remains eliminating terrorist groups and militant threats, particularly ones that disrupt US forces in Afghanistan. From the Pakistani perspective, the current political climate demands action against US drone strikes. Cooperation along these two lines will be America's biggest bargaining tool and likely the furthest engagement the Pentagon would be willing to address currently. Any capitulation on drone strikes is highly likely to not also be accompanied by a nuclear deal.

Think tanks and South Asia analysts mention a possible deal as a gateway towards normalizing Indo-Pak relations by placing both on the same level in the global nuclear order. While a deal legitimizing Pakistan's nuclear program would theoretically elevate them to the NPT level and force India and Pakistan to be more stable vis-à-vis deterrence, these bilateral agreements only really circumvent the NPT. It also does not address a primary issue between both nations, which remains Kashmir.

The US-India deal was seen as a move to support India as a counterweight to rising Chinese power. At the time of ratification, there was global support for the India deal including from the NSG, a 46-country body that overseas the international transfer of nuclear materials. Currently, as China escalates its nuclear power cooperation with Pakistan, it has avoided getting a waiver from the NSG. China and Pakistan lack the global support for commercial nuclear activity, deterring the US from being induced into any sort of deal with Pakistan to avoid Chinese involvement.

Furthermore, alternative energy assistance to Pakistan from the US already exists and is likely to be the major way forward, rather than a nuclear deal. By focusing on

hydroelectric power and USAID projects that focus on minimizing power loss and theft, the US can promote energy without rocking the nuclear boat. Current funding under the Kerry-Lugar bill gives billions of dollars to power generation in Pakistan but largely focuses on developing smarter grid technology, more accurate meters, mechanisms for revenue collection and overall increased efficiency of power distribution.

Alternatively, the arrival of a new Nawaz Sharif government more keen to normalize relations with India provides an opportunity to consolidate two of Pakistan's largest problems. As both sides look to reduce tension, increased trade particularly in the energy sector would go a long way. While admittedly far short of any sort of long-term energy solution, the current environment may be a ripe way to marry two issues in a productive manner.

While a large part of Islamabad's interest in a civilian nuclear deal lies in its desire to be placed on the same global stage as India in 2005, the US is unlikely to heed that request. Recent discussions to open up civilian nuclear talks are perhaps an attempt by Kerry to leave every option available as a new strategic dialogue begins. Instead, the US may focus on providing direct alternative energy assistance and more broadly focus on drone strike negotiations to curb terrorism. As US interests decline in Afghanistan, it may not seek to prolong a complicated engagement in South Asia by bringing up such a nuclear deal. Instead they are likely content with its strategic Indian partnership and will promote less controversial ways of energy assistance in Pakistan.

Source: Author is Research Intern at RCSS, Eurasia Review News and Analysis, 10 August 2013.

OPINION – Peter G. Cohen

Time for a Convention to Abolish Nuclear Weapons

We now know that nuclear winter, ozone layer destruction, phytoplankton reduction and other effects of a nuclear exchange would massively affect health and life everywhere on Earth. How can we respond to something so overwhelming, so huge, so threatening that there is nowhere to hide except in denial? We've been trying that for almost 70 years. The numbers of weapons are down, their accuracy and lethality are up. It is time to try something new.

After the disaster of Fukushima, several nations, including Germany, abandoned nuclear generation because of its dangers. But 13 nations are now constructing new power reactors. The problem is that the refinement of nuclear reactor fuel, if carried further, becomes weapons-grade highly enriched uranium. The operation of nuclear plants results in the by product of plutonium, which also can be used to make a bomb. Since 1970, the NPT has succeeded in slowing the proliferation of nuclear weapons. The original deal was that the nuclear weapons states would work at abolishing their weapons, while the nuclear weapons-free states would refrain from obtaining them. However, the weapons-free states are growing increasingly impatient with the deal, as they realize that they are endangered and that the nuclear weapons states are making little progress toward abolition.

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Since 9/11/01 the US has been following a policy of expanding its influence through military bases around the world, particularly in Central Asia, Africa and the Pacific. This process is greatly aided by the presence of our vast stockpile of nuclear warheads and far-reaching delivery systems, a fearful "deterrent" to any potential resistance. At the same time, the manufacture and maintenance of nuclear warheads and the missiles, planes and submarines to deliver them anywhere in the world has grown into a huge business. In excess of $50 bn a year, this business – including Air Force bases, nuclear laboratories, manufacturing plants and other facilities – employs people in almost every congressional district, though far more Americans could be employed rebuilding infrastructure teaching, or providing health care if an equivalent sum were spent creating those jobs. The corporations that manufacture and manage these facilities spend millions a year in campaign contributions and lobbyists persuading our representatives in Congress not to cut the budget from any part of this huge "defense" conglomerate.

For other nations of the Nuclear Nine, the possession of nuclear weapons supplements their limited conventional forces when compared to those of a potential enemy. They will resist relinquishing their nuclear weapons, unless there is a reduction in all military forces. But it can be managed. In 1996 the ICJ considered nuclear weapons and concluded that their use was illegal, except as the last resort of an endangered nation. We now know that

any use of these weapons threatens life on Earth. It would be useful if the nuclear weapons-free states could persuade the court to label the manufacture, maintenance, support and any and all preparations for the use of nuclear weapons to be criminal activities. It seems obvious that any activity that threatens the indiscriminate incineration or poisoning of human beings is a crime against humanity. For the millions involved in this work, or profiting from it, it is high time that they face the criminal nature of their employment, management, study or investment. This potential suicide of the human race cannot be disguised as a military deterrent, a patriotic duty or an acceptable activity for any reason. It is a crime beyond all measure. It must be stopped!

There is now a draft convention for the abolition of nuclear weapons at the UN, similar to those that ended chemical and germ warfare. As the step-by-step disarmament process has resulted in the current "modernization" of existing weapons, it is time to take another approach. The more than 180 nuclear weapons-free nations should move to finalize this convention with or without the nuclear weapons states' participation. In the final analysis, if the nuclear nations continue to resist abolition, they may be subject to sanctions of the nuclear weapons-free states. There is no time to hesitate on the abolition of these weapons. As more nations get nuclear plants, refined uranium fuel and basic technology, the NPT will lose its force and the number of nations having nuclear weapons will increase. ...

Source: Author was freshman at the University of Chicago when Fermi developed the chain reaction, was on a troopship bound for Japan when the bomb was detonated over Hiroshima. http://m.host.madison.com, 07 August 2013.

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NUCLEAR STRATEGY

INDIA

Reactor of India's First Indigenous Nuclear Submarine INS Arihant Goes 'Critical'

The miniature reactor on board India's first indigenous nuclear submarine INS Arihant has gone "critical", which marks a big stride towards making the country's long-awaited "nuclear weapons triad," an operational reality. Sources, in the early hours of 10 August, said the 83 MW pressurized LWR attained "criticality" after several months of "checking and re-checking" of all the systems and sub-systems of the 6000-tonne submarine at the secretive ship-building centre at Visakhapatnam. INS Arihant, till now, was being tested in the harbor on shore-based, high-pressure steam. With the reactor going critical now, the submarine will eventually head for open waters for extensive "sea-acceptance trials", which will include firing of its 750-km range K-15 ballistic missiles. The sea trials will take at least another 18 months before INS Arihant can become fully operational.

When that happens, India will finally get the long-elusive third leg of its nuclear triad – the capability to fire nuclear weapons from the land, air and sea. The first two legs – the rail and road-mobile Agni series of ballistic missiles and fighters like Sukhoi 30MKIs and Mirage-2000s capable of delivering nuclear warheads – are already in place with the armed forces. The capability to deploy SLBMs is crucial since India has a declared "no first-use policy" for nuclear weapons, and hence needs a robust and viable second-strike capability.

Source: Times of India, 10 August 2013.

RUSSIA

Yasen-class Nuclear Attack Submarines to Give Russia Major Edge

Large-scale construction of the next-generation Project 885 Yasen-class multi-purpose nuclear attack submarine, armed with Onyx supersonic cruise missiles has begun in Russia. The ships will compete with the latest American Seawolf-class nuclear submarines in terms of their noise profile and will be world leaders in terms of fire power. Moscow plans to acquire at least 10 of these boats by 2020.

Large-scale construction of the next-generation Project 885 Yasen-class multi-purpose nuclear attack submarine, armed with Onyx supersonic cruise missiles has begun in Russia. The ships will compete with the latest American Seawolf-class nuclear submarines in terms of their noise profile and will be world leaders in terms of fire power. Moscow plans to acquire at least 10 of these boats by 2020. The fourth

submarine in this class was laid down in Severodvinsk on the eve of Navy Day, which was celebrated on 28 July. The Project 885 nuclear submarine is the quintessence of everything the Russian military industrial complex has achieved in over half a century of building submarines. The vessel has a hull made from high-resilience low-magnetic steel, and so can dive to a depth of more than 600 metres (conventional boats cannot go deeper than 300 metres), which effectively puts it out of reach of all types of modern anti-submarine weapons. Its maximum speed is more than 30 knots (about 60 kilometres per hour). The nuclear submarine is equipped with an escape pod for the whole crew. The Russian designers say that the Yasen is not only quieter than the Project 971 Akula, but also quieter than the latest American Seawolf nuclear submarine. Moreover, unlike those vessels, the new missile submarine will be more functional thanks to the weapons at its disposal (several types of cruise missile and torpedo) and will be able to fulfil a wide range of roles at sea.

The Akula nuclear submarine is currently the most important of the Russian multi-purpose attack submarines designed for raiding operations against sea lanes. Virtually inaudible in the depths of the ocean, they are equally effective against transport vessels and warships, and can also hit the enemy's coastal infrastructure with cruise missiles. Akula submarines were recently spotted within the 200-mile zone of the coasts of the US and Canada, which caused a serious commotion among the countries' respective militaries. Having discovered the presence of these 'guests,' neither of them was able to track their movement, which naturally caused serious concern. After all, the Akula carries on board 28 Kh-55 Granat cruise missiles, the equivalent of the American Tomahawk, which can fly 3000 km and deliver 200-kt nuclear warheads to their targets. ...

Source: Dmitry Litovkin, Russia & India Report, 09 August 2013.

UK

United Kingdom's Liberal Dems Seek to Disarm Nuclear Subs

The United Kingdom's Liberal Democrats will hold a party vote on September on a plan that would move to disarm nuclear-missile submarines on patrol, Press Association's Mediapoint reported. The planned vote at a Glasgow conference would come on the heels of a recent review of alternatives to the UK Trident nuclear weapons program. The government assessment found it feasible to put in place an alternative to today's policy, which calls for having at least one nuclear missile-equipped submarine on patrol constantly, but such an option would be unlikely to save money or offer the same level of defense. The Liberal Democrat plan would send vessels to sea with unarmed missiles, while a smaller warhead cache would remain stored for potential redeployment. The party also proposes to maintain something less than around-the-clock vessel deployments.

The proposed plan would reduce the manufacture of new submarines; reports are that the party could move specifically to cut the current fleet of four vessels down to two. The LD regard the plan, if adopted, as a significant act of de-escalation by a world nuclear power.

Party leaders are skeptical that constant patrols are necessary and are "wholly unconvinced that Britain needs to renew its submarine-based nuclear weapons system on the same Cold War scale as the system designed in 1980, nor do we believe that the nation can afford to do so," according to the party motion up for vote in September. The proposed plan would reduce the manufacture of new submarines; reports are that the party could move specifically to cut the current fleet of four vessels down to two. The LD regard the plan, if adopted, as a significant act of de-escalation by a world nuclear power.

Source: National Journal, 06 August 2013.

USA

First ANG Bomb Wing Certified for Nuclear Operations

The Air National Guard celebrated a historic milestone on second week of August as the 131st Bomb Wing, the US's only Guard unit to fly and maintain the B-2 Spirit, was certified to conduct the nuclear mission upon completion of their initial nuclear surety inspection. With this certification, the 131st BW reached full operational capability with the B-2, bringing to conclusion a six-year journey that began with the unit's transition from the F-15 Eagle mission in 2007, said Maj. Gen. Steve Danner, the adjutant general of Missouri.... This momentous event marks the first time in the history of the Guard that a bomb wing has been certified in the delivery of nuclear weapons. As part of the Air Force's Total Force Integration initiative to combine active-duty with Guard Airmen, the

The Air National Guard celebrated a historic milestone on second week of August as the 131st Bomb Wing, the US's only Guard unit to fly and maintain the B-2 Spirit, was certified to conduct the nuclear mission upon completion of their initial nuclear surety inspection.

two wings were integrated in 2007 when the 131st BW received its new operational mission. The unit became a classic associate with the active duty's 509th Bomb Wing, enabling the 131st BW to become the first Guard unit to fly the B-2.

The integration efforts began seven years ago on Feb. 27, 2006, when the secretary of the Air Force and chief of staff of the Air Force approved Total Force Initiative Phase II, which directed the creation of a classic association with the 509th BW and the 131st BW. In 2008, the wing had fewer than 60 members stationed at Whiteman AFB, when they conducted the first all-Guard B-2 sortie, which included both the launch and operation of the aircraft. Today, nearly all 800 members are based at Whiteman AFB, with completely integrated maintenance crews and almost three times the number of qualified pilots....

The first combat total force integration mission the wings conducted came in March 2011, when three B-2s flew over Libya, dropping 45 joint direct attack munitions to destroy hardened aircraft shelters, crippling Muammar Gaddafi's air forces and helping enforce the UN' no-fly zone....

Source: http://www.af.mil, 09 August 2013.

DRDO's hunger for technological innovation remains unsatisfied. It has recently declared its plan to intercept missiles with over 5,000 km ranges, closing in on ICBM ranges. These systems would be called AD-1 and AD-2 and would aim to counter missiles with far more velocity, up to Mach 12-15. DRDO has plans to extend the range of the "swordfish" radars to 1,500 km. In the future, a series of geo-stationary satellites may also be used for deduction of enemy missiles.

BALLISTIC MISSILE DEFENCE

INDIA

India's Missile Defense: Is the Game worth the Candle?

On November 23, 2012, Indian scientists achieved a major milestone in missile defense: simultaneous interceptions of ballistic missiles at altitudes of 30 and 120 kms respectively. Such a feat put India on the map of a select group of nations, such as the US and Israel, who have the capability of engaging multiple hostile projectiles. These tests, declared India's premier defense research organization – the DRDO – were done in a deployment mode with higher echelons of the Indian Army and IAF in attendance, making a strong case for eventual induction of this system into country's defenses. However, with India's missile defense capability advancing, questions abound on its strategic and regional fallout.

... In its current iteration, India's BMD is a two-layered system. PAD is supposed to tackle incoming missiles at ranges of 80-120 km (exo-atmospheric interception). On the other hand, the AAD mainly consists of Akash SAM that can intercept incoming missiles at ranges of 15-30 km (endo-atmospheric interception). If the PAD system is devised for mid-course interception, the AAD is a terminal phase interception system which can only counter incoming missiles after their entry into the atmosphere. In their present configuration, these systems are designed to counter missiles with range close to 2,000 km traveling at speeds ranging from Mach 3 to 8. For tracking and guidance, it relies on its "swordfish" radar system developed in conjunction with Israel and capable of simultaneously tracking more than 200 objects with diameters of no less than two inches at a range of 600-800 km. However, DRDO's hunger for technological innovation remains unsatisfied. It has recently declared its plan to intercept missiles with over 5,000 km ranges, closing in on ICBM ranges. These systems would be called AD-1 and AD-2 and would aim to counter missiles with far more velocity, up to Mach 12-15. DRDO has plans to extend the range of the "swordfish" radars to 1,500 km. In the future, a series of geo-stationary satellites may also be used for deduction of enemy missiles.

Many factors have motivated India's quest for missile defense. First, Pakistan's inclinations to pursue low intensity conflicts and foment terrorism under the shield of its nuclear arsenal have made India extremely uncomfortable with the strategic situation in the region. The Kargil War, 2002 attack on the Indian parliament and 2008 Mumbai attacks were symptomatic of this strategic imbroglio. Many in Delhi hope missile defense will provide India a space for limited wars against Pakistan. Another motivating factor was the fear that there could be an unintended launch of a ballistic missile, especially given Pakistan's vacillation between being ruled by a trigger happy military and being overrun by jihadi extremists. Lastly, India also realized that a limited BMD, especially to secure its political leadership and nuclear command and control against a first strike, would augment the credibility of its second-strike nuclear posture.

These motivations notwithstanding, perhaps one of the most important factor in advancing India's BMD capability was the election of a Republican government headed by

George W. Bush in the US. In his May 1, 2001 speech at the NDU, the new American president announced plans to abrogate the ABM treaty. Moving away from the Cold War concept of nuclear deterrence, the superpower was now endorsing defense against nuclear weapons. India saw this policy reversal as an opportunity to develop its own capabilities. Having been shunted to the backwaters of international nuclear politics, as underlined by its absence from the NPT, India grabbed this opportunity with both hands, becoming the first nation to publicly endorse Bush's new plans. Missile defense became the new mantra for cooperation between the two nations.

Since 2002, India and the US have actively engaged each other on missile defense. The subject has been a source of agreement between the two nations at nearly every meeting of the US-India defense policy group. India's scientists and military have been regular participants in missile defense shows in the US, Israel and Japan. If the Bush administration facilitated dialogue with India on missile defense, no policy reversal can be observed under the Obama administration. In fact, the engagement has only increased with the US now proposing ideas such as the joint development of missile defense technology, and softening its stand on sale of Arrow missile defense systems to New Delhi.

Logically, only a limited missile defense complements India's nuclear doctrine, which relies on "assured retaliation" for the purposes of nuclear deterrence. A nationwide missile defense could create concern among India's adversaries that it is preparing for a first strike; a perception which may ultimately prove disastrous for nuclear stability in the region.

Current State of India's BMD: Still, India's ballistic missile program is far from problem-free. Confusion and doubts surround India's much trumpeted success in missile interception. Though one can observe DRDO's declarations of deployment of a BMD in Delhi and Mumbai since 2008, no considerable progress on the front has been made. This should warrant particular concern in light of the scientific community's tendency to exaggerate its technical accomplishments. There is also some confusion over the accuracy of these interceptions. DRDO claims a 90 percent accuracy level. Civilian analysts, on the other hand, greet this claim with a heavy dose of skepticism; after all, even the most technologically advanced countries have an interception accuracy of 70 percent.

Also, some critics have questioned the DRDO's claim that the system is ready to be deployed. As skeptics point out, the system has only been tested in controlled environments. Moreover, the intercepted missiles targeted in these exercises are slow moving Prithvi-class missiles. They also argue that when analyzed against missiles that travel at far greater speeds based on solid fuel booster mechanisms, DRDO's claims of an effective BMD system seem exaggerated. In other words, DRDO's capabilities are far from proven when pitted against Chinese ICBMs, such as the DF-41.

Would India's BDM Actually Create Security?: The ultimate shape of the missile defense is also a venue of debate. It is not clear to what extent the DRDO can expand the missile defense shield with its growing technical capability. However, expanding the missile defense to shield large parts of the country may be counter-productive. Logically, only a limited missile defense complements India's nuclear doctrine, which relies on "assured retaliation" for the purposes of nuclear deterrence. A nationwide missile defense could create concern among India's adversaries that it is preparing for a first strike; a perception which may ultimately prove disastrous for nuclear stability in the region. Second, development of a pan-national missile interception capability is beyond India's economic means. Still, it is important to acknowledge that a midcourse interception capability, which is India's primary intention, can also be employed at a broader level. With increasing capabilities in the booster strength of its ballistic interceptors and of its ground radars, it is hard not to foresee mission creep in India's ballistic missile interception program.

These issues intersect with potential negative strategic ramifications of India fielding a BMD program. Pakistan is acutely sensitive to any perceived military edge, current or future, that India may be developing. For example, Pakistan's nuclear force expansion is believed to have been accelerated as a direct response to India's conclusion of a civil nuclear agreement with the US in 2008. Although the civil nuclear agreement could only potentially affect Indian nuclear force development by broadening its access to the international nuclear fuel market, and freeing up its domestic uranium for nuclear force expansion – a possible but hypothetical scenario – this was apparently enough cause for Pakistan to ramp up its nuclear force production.

A limited fielding of a partly unproven Indian BMD capability, as DRDO is planning, could similarly be enough to compel Pakistan to grow its nuclear arsenal – with all the potential dangers that this entails. For instance, this would elevate threat perceptions in both New Delhi and Islamabad. The disparity in Pakistan's growing nuclear

arsenal size, compared to India's more halting efforts, was enough for Jaswant Singh, a former Minister for External Affairs and nuclear negotiator, to call in 2011 for an end to the central tenet of NFU in India's nuclear doctrine. Ending NFU would also dispel the atmosphere of restraint pervading the doctrine, and signal to Islamabad that New Delhi was increasingly comfortable with the use of force in the next crisis, protected by a lower nuclear threshold and a BMD shield. Given that Pakistan would develop its own sub-conventional, conventional and nuclear means to counteract these shifts, the price of fielding BMD capabilities would be a tenser strategic environment.

An Indian BMD system could also provoke a Chinese reaction. The BMD capabilities fielded by the US are the subject of certain neuralgia among Chinese strategists, who continually worry that these will provide Washington with a first-strike capability against China's deliberately small nuclear forces. More broadly, Washington's interest in India's BMD projects could validate suspicions in Beijing – especially prevalent in the wake of the 2008 civil nuclear agreement – that the US and India are attempting to contain Chinese great power aspirations. As shown in the Sino-Indian border stand-off in April, in which Chinese troops occupied and then refused to abandon positions they had taken within Indian territory for a prolonged period, China has not been shy in reacting to Indian activities that are of far less concern to China than the BMD issue. At a time when India and China are making a renewed effort to secure a long-term agreement on the status of their borders, BMD developments could therefore worsen the trajectory of their relationship, all while offering India uncertain returns.

US aid has contributed to the development of the Arrow 3 system, which is designed to intercept ballistic missiles in space. It has also helped fund the lower-tier Arrow 2 interception program, as well as David's Sling, designed to shoot down intermediate-range rockets and cruise missiles, and the Iron Dome system for short-range threats.

Thus, the BMD program provides India with the prospect, albeit still distant, of blocking or reducing an offensive missile strike, and also serves as an area where American and Indian defense scientists can collaborate – building important bridges between the two states that could later transfer over into other areas. However, these benefits need to be weighed against the likely negative regional reactions. At the same time, it also is likely to raise tension and perhaps have unintended second and third order consequences in India's relations with China and Pakistan. Thus, instead of being wholly consumed by the technical aspects of BMD, Indian policymakers need to also ask themselves whether the game is still worth the candle.

Source: Frank O' Donnell and Yogesh Joshi, The Diplomat, 02 August 2013.

ISRAEL

Israel Willing to Forgo Some US Missile Defense Aid, Says Report

Israel has offered to waive nearly $55 million in US aid for its missile defense programs... . Defense officials in Israel declined to comment on the report. According to US-based Defense News, in light of the considerable cuts Washington has made to its defense budget, Jerusalem has sought to shoulder its part in the new, harsher financial reality. The US cut $37 billion from its defense budget this fiscal year and is expected to cut $52bn in 2014. The Israeli offer came despite a commitment by US President Barack Obama to leave aid for Israeli missile defense programs untouched. US aid has contributed to the development of the Arrow 3 system, which is designed to intercept ballistic missiles in space. It has also helped fund the lower-tier Arrow 2 interception program, as well as David's Sling, designed to shoot down intermediate-range rockets and cruise missiles, and the Iron Dome system for short-range threats.

The US gave Israel $211m for development of the Arrow 3 system in 2012 and will transfer $269m. In 2013 it has earmarked a further $250m to contribute to the production of four Arrow 3 batteries and is expected to examine a request for four more batteries at a cost of $680m. Future batteries of the system are expected to have more interceptors, making them more expensive. In recent months (2013), amid tension with Iran, Israel has stepped up the Arrow 3's development and production rate. According to *Defense News*, Israel was also slated to receive $213.9m for David's Sling. In June 2013, PM Binyamin Netanyahu said Israel would not object to a five-percent cut in its annual military assistance from the US.

Source: Yaakov Lappin, The Jerusalem Post, 05 August 2013.

NUCLEAR ENERGY

CHINA

China Long Term Nuclear Strategy and Closing the Fuel Cycle with Fast Reactor and Pyro-processing

A study considers three nuclear expansion scenarios to estimate China's future uranium demand. The first scenario is the reference case and is based on China's current long-term nuclear power development plan, which

anticipates that nuclear power will have a 20% share (the current world nuclear share) of the total national installed capacity by 2050. The second scenario is a high-growth scenario, which anticipates continuous nuclear expansion and a 30% nuclear share of installed capacity by 2050. The third scenario is the low-growth scenario, which anticipates a 10% nuclear share by 2050. China has justified its decision to reprocess its spent nuclear fuel on the grounds that it needs to create a secure source of fuel for nuclear power generation. It's worth examining how China's access to uranium resources is expected to match up with demand in the coming decades.

These scenarios all assume that nuclear growth will take the form of additional 1 GWe PWR and that Generation IV reactors will be developed to the point that they are commercially deployable by 2040. The study assumes that the nuclear portion of the installed generating capacity will be 150 GWe, 300 GWe, and 450 GWe for the three different growth scenarios, respectively. These projections are comparable to those in China's 863 Energy Plan. Existing and planned PWRs achieve a burn-up rate of about 50 GWd/t, with a capacity factor of 85%. The newly designed Gen III PWRs are assumed to achieve a 65-GWd/t burn-up rate, while existing PWRs from before are assumed to operate with a 50 GWd/t burn-up rate. The annual MOX fuel load for the CEFR is 0.5 ton and the annual MOX fuel load for one CDFR is 7.5 tons, based on an 850-MWe power level, a 100-GWd/t burn-up rate, a 33% thermal efficiency, and an 80% capacity factor. The cost of MOX fuel fabrication is $1,950 per kgHM, while the cost of traditional LEU fuel is $1,640 per kgU, assuming a natural uranium price of $100 per kilogram.

The availability of nuclear fuel is unlikely to constrain future nuclear expansions, in China or elsewhere. China could still look to progress to closing the fuel cycle to ensure lower dependence on imported materials for energy. It is possible to close the nuclear fuel cycle using fast neutron reactors and the INPRO method.

Nuclear fuel costs are only about 5% of the total generating costs of a reactor, while fuel costs for coal-fired and natural gas-fired plants make up to 40% and 60% of costs. The availability of nuclear fuel is unlikely to constrain future nuclear expansions, in China or elsewhere. China could still look to progress to closing the fuel cycle to ensure lower dependence on imported materials for energy. It is possible to close the nuclear fuel cycle using fast neutron reactors and the INPRO method. The fuel fabrication for the CNFC-FR system should be based on the mixed powder route. Mixed oxide could be made by co-processing and co-precipitation and this mixed oxide product may be suitably diluted by adding UO2 powder to make the fuel for multiple compositions of FR core. Since U–Pu separation is not envisaged, several process steps are eliminated resulting in a reduced number of process equipment, tankage and operations leading to significant reduction in the processing cost.

The advanced reprocessing operation of the reference plant involves recovery of unused and bred fissile materials as well as recovery of minor actinides (MAs) and selected high heat producing or long-lived fission products (LLFP) in a form suitable for immediate recycling in the reactor or co-located transmutation systems. It is assumed that advanced aqueous processes can be used for the tentative burn-up of 200 GWd/t and a 360 days cooling period of the discharged fuel. Used fuel will be reprocessed using electrometallurgical processes (so-called pyro-processing) and plutonium will not be separated but will remain with some highly radioactive isotopes. Pyroprocessing is also said to have several advantages for fast reactors which greatly simplify waste management. It may be mentioned that in the aqueous route of reprocessing, extremely high separation factors (also called decontamination factors) of 107 and high recovery rates over 99.8 % are routinely achieved. For the reference CNFC-FR system the stipulated Pu recoveries are 99.95 % or more.

Recently, several new extractants have been reported. To achieve actinide-free status for high level waste, recovery levels of MA are assumed to be 99.9 %. The overall conclusion of the INPRO economic assessment is that a nuclear energy system consisting of a series of fast reactors incorporating improvements to be developed within the next 10 to 20 years will meet INPRO's economic basic principle, i.e. the nuclear energy system CNFC-FR will be affordable and available in 10 to 20 years in the countries mastering this technology.

Source: http://nextbigfuture.com, 05 August 2013.

INDIA

Only Nuclear and Solar Power can Meet India's Needs: Kakodkar

Only the nuclear and the solar power can meet the mammoth energy requirements of India, former chairman of AEC Dr Anil Kakodkar said here on 11 August 2013 while attending the second convocation at Indian Institute of Technology, Gandhinagar (IIT-Gn). "If India has to emerge as an economic power then per capita electricity production has to be brought on par with that in the advanced countries," he said. "Today the scenario is such that compared to advanced countries we are 14-15 times

behind. The average per capita electricity production in an industrially advanced nation is at around 10,000 units, where as in India it is at around 800 units per person," ... "Energy is also very important for any economic progress... We can't run industrial houses, if we don't have energy," he said. The Planning Commission has set a target of adding over 88,000 MW of power generation capacity in the 12th Five Year Plan period (2012-2017).

Source: The Hindu, 11 August 2013.

SOUTH KOREA

Nuclear Power Turns Off South Koreans after Fukushima

For Seoul residents, South Korea's decision to keep four nuclear reactors offline because of faked safety reports means power shortages and a summer of sweltering homes and offices.... Opposition to atomic power in South Korea ... gained more support when an investigation found nuclear plants were using components with faked safety certificates. That cost Kim Kyun-seop his job as head of state-run Korea Hydro & Nuclear Power Company, which runs the 23 operating reactors.

The anti-nuclear lobby is forcing President Park Geun-hye to take note. Her administration said it would review the role of nuclear power to reflect "social acceptability" in its energy plan due by the end of 2013. The government had planned to build more reactors to cope with electricity demand it forecast to surge almost 60% by the year 2027. Surveys show nuclear power is becoming increasingly socially unacceptable. Sixty-three percent of respondents to a March survey by pollster Hangil Research said they consider domestic reactors unsafe. That compared with 54% in a poll conducted in 2012 by the non-profit Korean Federation for Environmental Movement. In Yangnam, Lee, head of the local branch of Nonghyup, the nationwide co-operative federation of farmers, says safety concerns about nuclear power are damaging sales of the area's rice and other farm produce....

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When then-president Lee Myung-bak said in 2008 that nuclear plants would supply 59% of the nation's power by 2030, up from 36% then, his administration called it "an inevitable choice" in the face of high oil prices and the need to reduce carbon emissions. To bolster the case for atomic power's efficiency and low cost, the government said consumer prices had almost tripled over the previous 25 years, while electricity bills had only climbed 11.4 per cent. But critics say those statistics are misleading because the government controls power prices and sets them at lower rates than the cost of producing the electricity. With the government keeping electricity prices low, the nation gorges on it. South Korea consumes power at almost twice the OECD average relative to the size of its economy, according to Hyundai Research Institute. But with the shutdowns of reactors in May, demand may exceed supply by 1.98 GW during peak demand periods this month, "an unprecedented level", the energy ministry said in May.

The government now needs to focus on alternative energy, said Kim Ik-jung, a microbiology professor at Dongguk University and head of research at Gyeongju Environmental Movement Federation. Wind, solar and other alternatives accounted for only 1.3% of South Korea's power supply in 2010, compared with 10% in the US and Japan, and 14% in France, according to Hyundai Research.

Source: South China Morning Post, 10 August 2013.

USA

Subsidies and Taxes Complicate the Future of Nuclear Power

Rising maintenance costs and a sharp decrease in natural gas prices have put the future of some nuclear power plants into question. But other plants face retirement under the burden of specific taxes and anti-competitive green energy subsidies. Mark Cooper, a senior fellow at the Vermont Law School, recently published a report identifying the problems facing America's fleet of nuclear reactors. Forced to compete with coal and natural gas in

Rising maintenance costs and a sharp decrease in natural gas prices have put the future of some nuclear power plants into question. But other plants face retirement under the burden of specific taxes and anti-competitive green energy subsidies. Faced with rising maintenance costs and looming safety upgrades mandated after the 2011 Fukushima accident in Japan, some nuclear power plants have lost their competitive edge.

deregulated electricity markets, some nuclear power plants struggle to keep pace. The KNP Station in Wisconsin closed in 2012 on economic grounds, and Cooper thinks that KNP could be the "figurative canary in the coal mine," forecasting future closings. Faced with rising maintenance costs and looming safety upgrades mandated after the 2011 Fukushima accident in Japan, some nuclear power plants have lost their competitive edge.

Is this an indication that nuclear power is uneconomic? Not necessarily. Cooper's list includes three reactors which face closure under the burden of bad energy policy:

The Vermont Yankee plant is subject to nuclear-specific taxes, despite the fact that it is the only nuclear reactor in the state (and generates 65%t of Vermont's electricity). Radiological emergency response payments instituted in 1983, an education property tax created in 1997, and required contributions to the CED Fund beginning in 2006 have driven a successful plant to the brink of shuttering. In real dollars, the tax burden on Vermont Yankee from state taxes between 1990 and 2010 increased by more than a factor of 10, a difference of about $13 million.

While Japan's idled nuclear power reactors are largely responsible for the "sluggishness" in uranium prices, July's victory of the pro-nuclear Liberal Democratic Party in Japan's upper legislative house is expected to "be positive" for uranium producers

Connecticut's Millstone plant, like Vermont Yankee, also made Cooper's list for tax reasons. The 2011 CEG Tax assessed a temporary 0.25% kwh tax on all electricity generation. Of the $70 mn collected state wide in the tax's first year, $42 million was paid by Millstone's owner, Dominion Energy. Finally, the Clinton plant in central Illinois is also struggling to compete with anti-competitive wind subsidies. When electricity demand is low, Clinton bids against local wind turbines for the grid to take their power. However, with a wind production tax credit that pays 2.3% kwh, wind producers can pay the grid to take their electricity and still make money.

The bottom line is simple: Government interference in electricity production kills jobs and increases electricity prices for American families. Anti-competitive subsidies meant to cut CO_2 emissions might accomplish the exact opposite if they shut down nuclear power plants, which generate 64 % of the nation's carbon-free electricity. It's not the government's job to pick energy's winners and losers; as made clear by Kewaunee, the market does an effective job of that already.

Source: Robert Geringer, The Foundry, 07 August 2013.

URANIUM PRODUCTION

GENERAL

Japanese Developments a 'Positive' for Uranium Producers: Cameco

While Japan's idled nuclear power reactors are largely responsible for the "sluggishness" in uranium prices, July's victory of the pro-nuclear Liberal Democratic Party in Japan's upper legislative house is expected to "be positive" for uranium producers, Cameco said on 1st August. The company, in a report on its second-quarter financial results, said "there has been some progress" in restarting Japan's reactors. ...

The spot price of U3O8 slid nearly 20% between early January to late July, from $43/lb to $34.50, according to reports by TradeTech and Ux Consulting. Market analysts have said in interviews during this period that the virtual lack of any buying by Japanese nuclear reactor operators has been a significant factor in the uranium spot price decline this 2013. Cameco reported that its share of uranium production at its five North American facilities in Q2 declined by 17%, to 4.4 million lb from 5.3 million lb in Q2 2012. The company attributed the reduced uranium production to output declines of 18% and 56% at its McArthur River/Key Lake and Rabbit Lake, Canada, facilities, respectively, which were undergoing planned maintenance shutdowns.

Cameco reported Q2 earnings on an adjusted basis of C$61 million (US$59.01 million), compared to C$31 million in Q2 2012. The company attributed the rise in part to increased uranium sales. Tim Gitzel, Cameco's president and CEO, said in the statement that the company looks "forward to Cigar Lake starting production later this 2013." Cameco expects to begin production at its Cigar Lake project in northern Saskatchewan during the fourth quarter and to produce about 600,000 lb U3O8 by end of 2013, company spokesman Rob Gereghty said in a June 19 interview.

Cameco received a license from the Canadian Nuclear Safety Commission June 13 to operate the mine, and will take about 50% of the production, reflecting its ownership in the Cigar Lake Joint Venture Partnership, Gereghty said.

Areva has a 37% ownership stake in the partnership, while Idemitsu Canada Resources and Tepco have stakes of 8% and 5%, respectively, according to a posting on Cameco's website. Production is expected to increase to about 3.9 million lb U308 in 2014 and 18 million lb by 2019, according to a technical report Cameco issued in February 2012. Through 2027, Cigar Lake is expected to produce more than 213 million lb U308, the report said. Cameco's McArthur River project in northern Saskatchewan is the world's largest U308-producing facility, with annual production of 19.48 million lb in 2012, Gereghty said in a June 20 email.

Source: Platts Mcgraw Hill Financial, 02 August 2013.

USA

Uranium Mining Begins at Lost Creek in SW Wyoming

Wyoming's newest uranium mine is up and running. Littleton, Colo.-based Ur-Energy Inc. announced on 06 August that production at its Lost Creek mine in southwestern Wyoming began on 02 August after it received a final approval from the US Nuclear Regulatory Commission. The mine has been in the works for eight years. The opening comes three months after Cheyenne-based Cameco Resources opened the North Butte uranium mine in Campbell County.... Ur-Energy says it has long-term contracts to sell the uranium to several US-based nuclear utility companies. Wyoming produces more uranium than any other state — about 1.6 million pounds a year, or close to one-third of all US production. Casper-based Uranerz Energy Corp. also plans to open a new uranium mine in Wyoming. Cameco, a subsidiary of one of the world's largest uranium producers, also intends to add three satellite mines in the area of its Crow Butte Mine nearCrawford in western Nebraska. In Wyoming, it plans to develop another satellite mine near Smith Ranch-Highlands and a new mine in the Gas Hills area about 60 miles west of Casper.

Source: abcnews, 06 August 2013.

NUCLEAR COOPERATION

INDIA-USA

Unfortunate that Indo-US Nuclear Trade has Stalled, Says Washington

The Indo-US civilian nuclear deal was billed as the corner stone of the burgeoning strategic partnership between the countries. However, five years later, the deal has not gone according to the script, and the US says the nuclear commerce has not benefitted the Americans who did most of the global diplomatic heavy lifting. India's people-friendly nuclear liability regime has reportedly irked the US. "The nuclear issue is complex. US is not frustrated but India's nuclear liability law is a concern and it is unfortunate that nuclear trade has not commenced," said Richard Stratford, director of nuclear energy, safety and security at the US state department. However, Mr Stratford says he is hopeful that the first contract will be inked soon, even though the "solution to the nuclear liability imbroglio is yet not known".

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Sources say the Indo-US relationship has hit a plateau. It has been more than five years since the bonhomie of the Indo-US civilian nuclear deal brought the world's oldest and largest democracies together, but since then the commercial benefits emerging out of the nuclear deal have eluded the US; the French and Russians have both benefitted from the deal. There is however hope in the air that 'a small contract' will be inked when PM Manmohan Singh and President Barrack Obama meet in September in Washington. Mr Stratford emphatically says "there will be no repeat of Tarapur atomic fiasco" and insists that the "Indo-US relations are stronger than before".

Source: Pallava Bagla, NDTV, 09 August 2013.

IRAN–RUSSIA

Iran to Sign New Nuclear Power Plant Deal with Russia – Minister

Iran intends to sign an agreement with Russia soon on the construction of a new nuclear power plant in the Islamic Republic, Iran's semi-official Mehr news agency reported on 11 Aug 13, citing Iranian Foreign Minister Ali Akbar Salehi. ... Iran's foreign minister said the Islamic Republic needed nuclear power for electricity generation, and also for medicine. Iran's newly-elected President Hassan Rouhani said during his first press conference after his inauguration that the Islamic Republic would continue negotiations with Russia on nuclear power development in the country. Rouhani said Iran needed to produce 20,000 MW of nuclear power and planned to build new nuclear power plants and continue cooperation in this sphere, in particular, with Russia.

Russian parliament speaker Sergei Naryshkin said on August 4 during his visit to Iran to attend Rouhani's inauguration ceremony that Russia hoped for holding consultations with Iran on expanding cooperation in civilian nuclear power after the Islamic Republic's first nuclear power plant at Bushehr was fully commissioned in September. ...

Source: http://en.ria.ru, 11 August 2013.

Signalling a willingness to break the nuclear cooperation deadlock, Water and Power Minister for Khawaja Asif said on 01 August that visiting US Secretary of State John Kerry had suggested that Pakistan and the US consider cooperation in civil nuclear technology to meet Islamabad's energy needs.

PAKISTAN–USA

Energy Crisis: Civil Nuclear Deal Back on Pakistan, US Agenda

Signalling a willingness to break the nuclear cooperation deadlock, Water and Power Minister for Khawaja Asif said on 01 August that visiting US Secretary of State John Kerry had suggested that Pakistan and the US consider cooperation in civil nuclear technology to meet Islamabad's energy needs. "We have informed the visiting secretary of state that the crippling energy crisis is a bigger threat than the war on terror. Hydel and nuclear energy are on our priority list and we can consider a civil nuclear deal like India," Asif told a joint press conference with Kerry after holding talks on energy cooperation. Providing details of his discussions with Kerry, Asif said that the US government asked for possible areas where energy cooperation would be possible, including nuclear energy. He added that while the government was seeking cooperation in wind, solar, hydel and Fnuclear energy sectors, the government would hold further detailed discussions on the issue of nuclear cooperation in follow-up meetings.

Referencing the civil nuclear energy deal with India, Asif said that with the energy crisis destroying economic output and fuelling instability, the US should consider giving similar technology to Pakistan. "The whole world is focusing on the war on terror, which is a local issue for Pakistan, while our biggest threat is the energy crisis which is causing a loss of Rs1,000 billion each year," said Asif. He said overcoming load-shedding would lead to accelerated economic growth, employment opportunities and would reduce terrorism in the country. Appreciating the efforts of USAID in improving the energy sector in the country, Asif said that the government had also played its part by clearing the Rs500 bn circular debt, resulting in power production reaching 16,000 MW.

Meanwhile, US Secretary of State John Kerry said that the importance of energy was critical to the future of Pakistan. He added that USAID had provided technology to indentify accurate data of power supply, line losses and power theft. "We underscore our vital relations with Pakistan and emphasise the importance of energy is future of Pakistan," said Kerry, adding that the US Congress had approved over $7 billion aid for Pakistan under Kerry Lugar Bill, which included support for the energy sector. Kerry added that out of the total aid, the US had so far disbursed $3.5 billion, highlighting that the US government was committed to providing energy to Pakistan. "Change in power subsidy and efficiency in energy sector are must for improvement in power system and I will go to Washington with increased number of energy projects," said Kerry. Highlighting the wide range of economic initiatives being undertaken by the US through its aid program, Kerry said that his government was so far funding projects which will add 1,200 MW of electricity to the national grid.

Source: Zafar Bhutta, The Express Tribune, 02 August 2013.

RUSSIA–USA

Russian and US Nuclear Experts Sum up Cooperation Results under Megatons to Megawatts Program

Chief executives and specialists of the Mayak Production Association, one of the biggest nuclear facilities in Russia, met with US observers. The meeting in the city of Ozersk, Chelyabinsk region, has finalized Russian-US cooperation under the Megatons to Megawatts Program. The bilateral cooperation under this program lasted 20 years, since the governments of the US and Russia signed in February 1993 an agreement on the use of high enriched uranium extracted from dismantled nuclear weapons. US observers are visiting the first Russian nuclear enterprise the 90st time. During the meeting the partners summed up the results of work under this program, as reported by the press service of regional governor on 01 August.

The program envisages conversion of HEU to LEU by dilution for further use as fuel for US nuclear reactors. Total amount of high enriched uranium, which was subject to conversion, has made 500 metric tons for all enterprises, which were involved in the agreement. That is the equivalent to eliminating 20,000 nuclear warheads.

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conversion, has made 500 metric tons for all enterprises, which were involved in the agreement. That is the equivalent to eliminating 20,000 nuclear warheads. The agreement was being implemented through a system of contracts, all the revenues from which were transferred in the Russian budget. Russia was committed to deliver to the US the low enriched uranium converted from 500 tons of high enriched uranium for 20 years. The US was committed to receive, pay and use this amount of nuclear fuel in the reactors at the nuclear power plants. ...

Source: Russia & India Report, 01 August 2013.

A US research center says North Korea appears to have doubled the size of a key uranium enrichment facility in a possible effort to further expand its nuclear arms program. The ISIS said on 07 August new construction at the Yongbyon nuclear complex could allow for twice as many uranium-enriching centrifuges to be installed there.

NUCLEAR PROLIFERATION

IRAN

Former MI Chief Yadlin Cautions over Iran's Plutonium Program

Former Military Intelligence chief Amos Yadlin warned that the West's one dimensional perception of Iran's nuclear program, focusing solely on the uranium enrichment path to a nuclear weapon, could enable the Islamic Republic to build a plutonium bomb without detection. Yadlin ... argued that uranium enrichment is one of only three dimensions to Iran's nuclear strategy, a fact that those who enter into negotiations with Iran must take into account.

"A second dimension is Iran's progress toward a quick 'breakout capability' through the stockpiling of large quantities of low-enriched uranium that could be further enriched rapidly to provide weapons-grade fuel. Third, Iran also appears to be pursuing a parallel track to a nuclear capability through the production of plutonium. If there is going to be a nuclear deal with Iran, all three parts of its strategy must be addressed," Yadlin and Golov warned.

Iran's heavy-water reactor being built in Arak could become operational next year, a move that would allow it to make serious progress toward a plutonium-fueled weapon, the article stated. "A functioning nuclear reactor in Arak could eventually allow Iran to produce sufficient quantities of plutonium for nuclear bombs," Yadlin said, adding that Western negotiators should demand the Arak reactor be shut down. "This is crucial because the West would likely seek to avoid an attack on a 'hot' reactor, lest it cause widespread environmental damage. Once Arak is operational, it would effectively be immune from attack and the West would be deprived of its primary 'stick' in its efforts to persuade Iran to forgo a military nuclear capability." ...

Source: http://www.jpost.com, 09 August 2013.

NORTH KOREA

Report: N. Korea Expanding Yongbyon Nuclear Site

A US research center says North Korea appears to have doubled the size of a key uranium enrichment facility in a possible effort to further expand its nuclear arms program. The ISIS said on 07 August new construction at the Yongbyon nuclear complex could allow for twice as many uranium-enriching centrifuges to be installed there. North Korea revealed its uranium enrichment program three years ago. It said the plant contains 2,000 centrifuges that are only being used to produce low enriched uranium for energy generation – a claim questioned by some analysts. The ISIS report said weapons-grade uranium could have been made at the Yongbyon plant. Or it said the uranium produced at the facility could have been further enriched at a secret centrifuge site.

Some Western nations suspect the uranium program will give North Korea an easier way to build more nuclear bombs. The North is also believed to have enough plutonium to make six to 12 nuclear weapons. The ISIS report was based on recent satellite photos that it says showed construction at the Yongbyon centrifuge building beginning in March 2013. Around that time, North Korea announced it would "readjust and restart all nuclear facilities in Yongbyon," including a uranium enrichment plant and a five megawatt graphite reactor. ISIS says the announcement may have been an "oblique effort" to reveal the new construction.

Source: Voice of America, 08 August 2013.

NUCLEAR NON–PROLIFERATION

JAPAN

Nagasaki Mayor Slams Abe's Nuclear Policy on Anniversary

Nagasaki's mayor has slammed Japan's government for its refusal to sign an international nuclear disarmament accord as the city marked the 68th anniversary of its bombing by the US. The Japanese government's refusal to sign a statement rejecting nuclear weapons usage was condemned on

The Japanese government's refusal to sign a statement rejecting nuclear weapons usage was condemned on 09 August by Nagasaki's mayor as the city remembered its bombing by the US at the end of World War II.

09 August by Nagasaki's mayor as the city remembered its bombing by the US at the end of World War II. Mayor Tomihisa Taue said Japan as the only nation actually bombed - at Hiroshima and Nagasaki in August 1945 – was "betraying the expectations of global society" by not signing the agreement. "This stance contradicts the resolution that Japan would never allow anyone else to become victims of a nuclear bombing," Taue said at 09 August's ceremony at the peace park close to the 1945 epicenter. Taue said a statement prepared in April for the next NPT review meeting had already been signed by 80 countries. It rejects the unconditional use of nuclear weapons.

Anti-nuclear sentiment is resurgent in Japan following the 2011 tsunami-induced nuclear plant disaster at Fukushima, with most of the country's reactors switched off. Taue also offered his city's support for reconstruction around Fukushima. He also criticized a Japanese nuclear cooperation deal with India. "Japan's cooperation with India would also provide North Korea, which withdrew from the NPT and is committed to nuclear development, with an excuse to justify its actions," he said. **Japan has responsibility, says Abe.** About 6,000 people, including ageing survivors and US ambassador John Roos, attended 09 August's remembrance ceremony in Nagasaki, where 74,000 residents were killed on August 9, 1945. PM Abe, who has pushed to export Japanese nuclear plants and technology to emerging countries such as Turkey and Vietnam, said Japan had a "responsibility to realize a world free of nuclear weapons." ...

Source:http://www.dw.de/nagasaki-mayor-slams-abes-nuclear-policy-on-anniversary/a-17008775, 09 August 2013.

After installation of the infrasound station at Kunming is complete, 10 of the 11 CTBTO monitoring stations hosted by China will have been installed, at a total cost of around US$ 11 million. None of these stations are connected so far to the CTBTO's International Data Centre in Vienna.

NUCLEAR DISARMAMENT

CHINA

China's Commitment to Comprehensive Nuclear-Test-Ban Treaty

The Executive Secretary of the Preparatory Commission for the CTBT Organisation, Lassina Zerbo, met with Chinese Foreign Minister Wang Yi during his trip to China on the second week of August... Wang also stressed China's continued commitment to the Comprehensive CTBT in line with China's policy to achieve a world free of nuclear weapons. Zerbo thanked Wang for China's continued support and the excellent cooperation with the organization. He said that China's disarmament credentials were a "strong basis for China to demonstrate leadership and pave the way for the remaining eight countries to ratify the CTBT, enabling the Treaty's entry into force." Zerbo expressed his confidence that intensified technical and scientific cooperation with China would further strengthen the CTBT's verification regime. He hoped that this would influence ratification of the Treaty by China.

Progress on CTBTO Stations Hosted by China: Zerbo also met with Zhang Yulin, Deputy Minister and Head of the GAD in the Ministry of Defence, which oversees the country's technical and scientific cooperation with the CTBTO. Zhang similarly assured Zerbo of China's full support and commitment to cooperate with the organization. During the meeting it was agreed to proceed with the provision of data from the CTBTO's monitoring stations in China to the organization's International Data Centre in Vienna. This is part of the testing and evaluation process that marks the first formal step towards certification (formal acceptance) of the monitoring stations in China.

Installation of Infrasound Station at Kunming: In a ceremony marking the installation of an infrasound station at Kunming in southwest China, one of the last monitoring stations in the country to be installed, Zerbo noted: "Kunming is the first CTBTO station that I have visited as the organization's Executive Secretary. To me, it is a symbol of the renewed momentum in our cooperation to ensure the completion of the CTBT's verification regime".

Chinese Support for On-site Inspection Capabilities: In support of the CTBTO's capabilities to conduct on-site inspections, China will host a technical workshop in Yangzhou, Jiangsu Province, in November 2013. The workshop is being organized in preparation for the next major on-site inspection exercise, the Integrated Field Exercise 2014, in Jordan. China has also developed and contributed mobile equipment for detecting radioactive noble gas during CTBT on-site inspections.

Background: .... After installation of the infrasound station at Kunming is complete, 10 of the 11 CTBTO monitoring stations hosted by China will have been installed, at a total cost of around US$ 11 million. None of these stations are connected so far to the CTBTO's International Data Centre in Vienna. The CTBTO and the competent Chinese authorities have held discussions over the last two years

(2011-2012) in order to overcome technical and other issues related to the provision of the monitoring data.

Source: *http://www.scoop.co.nz, 09 August 2013.*

JAPAN

Abe Vows Utmost Effort for Elimination of Nuclear Weapons

At a ceremony on 06 August marking the 68th anniversary of the US atomic bombing of Hiroshima, PM Shinzo Abe vowed to try his utmost to realize a nuclear-free world and to offer better support to atomic-bomb survivors fighting radiation-caused health problems. In his speech at the ceremony at the Peace Memorial Park near Ground Zero, Abe also said Japan will maintain its three non-nuclear principles of not producing, possessing or allowing nuclear weapons on Japanese territory to avoid repeating the devastation of atomic bombing. "We, the Japanese, are the only atomic bombed citizens in war. We bear the responsibility to steadily realize a world without nuclear weapons," Abe said in front of about 50,000 participants in the annual event. This 2013 commemoration comes as Abe's ruling Liberal Democratic Party, which won a landslide victory in last month's upper house election, seeks to restart nuclear power plants, sell Japanese nuclear technology abroad and change the nation's pacifist Constitution.

Hiroshima Mayor Kazumi Matsui expressed worries over the government's drive to strike a civil nuclear cooperation deal with nuclear-armed India, saying even if such an agreement "promotes their economic relationship, it is likely to hinder nuclear weapons abolition." Calling atomic bombs "the ultimate inhumane weapon and an absolute evil," Matsui urged the national government to strengthen its ties with nations pursuing the abolition of nuclear weapons, noting a growing number of countries calling for such action. Matsui made the remark after Japan recently declined to back a statement urging that nuclear weapons never again be used under any circumstances. The statement was prepared in April at a preparatory committee session in Geneva for the next NPT review meeting.

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... But Matsui stopped short of clarifying the city's stance on the appropriateness of nuclear power as an energy source and the issue of constitutional revision. Abe also did not touch on the issue of nuclear energy that stays contentious following the Fukushima nuclear disaster. Matsui said, "Hiroshima is a place that embodies the grand pacifism of the Japanese constitution," and "We urge the national government to rapidly develop and implement a responsible energy policy that places top priority on safety and the livelihoods of the people." Nearly all of Japan's 50 commercial nuclear power reactors remain offline following the Fukushima plant crisis that began in March 2011....

Source: Global Post, 06 August 2013.

PAKISTAN

Pakistan Says World without Nuclear Weapons is 'Feasible'

Pakistan has said nuclear disarmament is feasible and should be pursued in a universal manner, echoing the mayor of Hiroshima's call for peace and the abolition of nuclear weapons ahead of the 68th anniversary on 06 August of the atomic bombing of the city. "We sympathize with the citizens of Hiroshima – one of the only two cities in the world to have faced the horrific catastrophe of nuclear bombing," Aizaz Ahmad Chaudry, spokesman for the Pakistani Foreign Ministry, said in a recent interview with Kyodo News. "We acclaim the resolve and steadfastness of its people who have rebuilt the city from bottom up. We express our sincere best wishes for the people of Hiroshima," he said. "We all have to address the root cause of conflict and insecurities world over, and settlement of all outstanding disputes peacefully," he added.

... Every mayor of Hiroshima has promoted the "No More Hiroshima" campaign since 1947, urging all countries to abandon nuclear testing and end the nuclear weapons threat. "Global nuclear disarmament is feasible if we ensure equal and undiminished security for all states in a world without nuclear weapons. Nuclear disarmament has to be pursued in a non discriminatory, universal and verifiable manner," Chaudry said. Chaudry said Pakistan and India, which remain outside the NPT, have started several "nuclear CBM's," including the establishment of a hotline between the foreign

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secretaries of the two countries, agreements on advance notification of ballistic missile tests and prevention of accidents related to nuclear weapons.

Source: Global Post, 05 August 2013.

NUCLEAR SAFETY

INDIA

'Kudankulam Nuclear Plant Perfectly Safe'

Making a strong pitch for nuclear power, Principal Scientific Adviser to the Govt R. Chidambaram on 03 August 2013 said all safety measures had been examined by the AERB committees at the Kundankulam nuclear power plant which is "perfectly safe". "Not only Kudankulam ... so many reactors are operating throughout the world ... all are safe," he told reporters on the sidelines of a convocation at the NIT here. The first unit of the Kudankulam nuclear power plant attained criticality on July 3. Commissioning of the Indo-Russian joint venture in Tamil Nadu's Tirunelveli district was delayed due to anti-nuclear protests doubting the safety of such plants.

He said nuclear power is not only important but inevitable to meet the growing energy demand for the country. Even China was now accelerating nuclear power generation. The UAE had set up four nuclear power plants of 1400MW each. He claimed India would not become a developed nation unless the per capita electricity consumption increased by six to eight times from the present level. "So, all the energy options are necessary and important." In the next 20 years, he said growth will come on account of substantial reduction in coal consumption by thermal power plants with development of new technologies. A consortium of IGCAR, BHEL and NTPC were working on developing new technologies for the purpose.

Source: India Today, 04 August 2013.

JAPAN

Japan Says Fukushima Leak Worse than Thought, Govt. Joins Clean-Up

Highly radioactive water from Japan's crippled Fukushima nuclear plant is pouring out at a rate of 300 tonnes a day, officials said on 07 August, as PM Shinzo Abe ordered the government to step in and help in the clean-up. The revelation amounted to an acknowledgement that plant operator Tepco has yet to come to grips with the scale of the catastrophe, 2 1/2 years after the plant was hit by a huge earthquake and tsunami. Tepco only recently admitted water had leaked at all. Calling water containment at the Fukushima Daiichi station an "urgent issue," Abe ordered the government for the first time to get involved to help struggling Tepco handle the crisis. The leak from the plant 220 km northeast of Tokyo is enough to fill an Olympic swimming pool in a week. The water is spilling into the Pacific Ocean, but it was not immediately clear how much of a threat it poses. As early as January 2013, Tepco found fish contaminated with high levels of radiation inside a port at the plant. Local fishermen and independent researchers had already suspected a leak of radioactive water, but Tepco denied the claims.

... But the escalation of the crisis raises the risk of an even longer and more expensive clean-up, already forecast to take more than 40 years and cost $11 billion. The admission further dents the credibility of Tepco, criticised for its failure to prepare for the tsunami and earthquake, for a confused response to the disaster and for covering up shortcomings. ...Tatsuya Shinkawa, a director in METI's Nuclear Accident Response Office, told reporters the government believed water had been leaking for two years, but Yoneyama told Reuters it was unclear how long the water had been leaking at the current rate. Shinkawa described the water as "highly" contaminated. The water is from the area between the crippled reactors and the ocean, where Tepco has sought to block the flow of contaminated water by chemically hardening the soil. Tetsu Nozaki, head of the Fukushima fisheries federation called for action to end the spillage. "If the water was indeed leaking out at 300 tonnes a day for more than two years, the radiation readings should be far worse," Nozaki said. "Either way, we have asked Tepco to stop leaking contaminated water into the ocean."

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Abe Steps In: Abe ordered his government into action. The contaminated water was "an urgent issue to deal with", he told reporters after a meeting of a government task force on the disaster. "Rather than relying on Tepco, the government will take measures," he said after instructing METI Minister Toshimitsu Motegi to ensure Tepco takes appropriate action. The PM stopped short of pledging funds to address the issue, but the ministry has requested a budget allocation, an official told Reuters. The *Nikkei* newspaper said the funds would be used to

freeze the soil to keep groundwater out of reactor buildings – a project estimated to cost up to 40 bn yen. Tepco's handling of the clean-up has complicated Japan's efforts to restart its 50 nuclear power plants. All but two remain shut since the disaster because of safety concerns. That has made Japan dependent on expensive imported fuels. An official from the newly created nuclear watchdog told Reuters on 05 August that the highly radioactive water seeping into the ocean from Fukushima was creating an "emergency" that Tepco was not containing on its own.

Source: The Times of India, 08 August 2013.

TAIWAN

Taiwan Says Nuclear Plant may have Leaked Toxic Water

A nuclear power plant in Taiwan may have been leaking radioactive water for three years, according to a report published by the government's watchdog, adding to uncertainty over the fate of a new fourth nuclear power plant. The First Nuclear Power Plant, located at Shihmen in a remote northern coastal location but not far from densely populated Taipei, has been leaking toxic water from storage pools of two reactors, said the watchdog, called the Control Yuan. An official of Taipower, which operates the island's nuclear power plants, said the water did not come from the storage pools, but may have come from condensation or water used for cleaning up the floor. "We have explained to the Control Yuan, but they turned it down. They asked us to look into if other causes were involved," said the official. He declined to be identified as the matter is sensitive.

Britain's ageing nuclear submarines have been issued with 'Code Red' safety warnings after inspectors found radioactive leaks and a chronic shortage of Royal Navy engineers trained to repair faulty reactors.

In any case, the water has been collected in a reservoir next to the storage pools used for spent nuclear rods and has been recycled back into the storage pools, and so poses no threat to the environment, the official added. The Control Yuan said there had been a catalogue of errors, including a lack of a proper plan for how to handle spent nuclear materials, and did not believe the explanations from Taipower. "The company has yet to clearly establish the reason for the water leak," it said. The use of nuclear power on resource-poor Taiwan has long been controversial, not least because the island is comparatively small and any major nuclear accident would likely affect its entire land area. Nuclear power accounts for 18.4 percent of electricity production. Plans to build a fourth nuclear plant - located close to the one at Shihmen - have been held up for years, and have been subject to mass protests on the streets of the island.

Scuffles broke out between legislators at a parliamentary debate on the plant the second week of August. Currently, Taiwan has three operational nuclear power plants and six reactors. Taiwan has also had problems on what to do with its nuclear waste, which for many years was dumped on a small island off its southeast coast, to the anger of its aboriginal inhabitants. Taiwan has previously considered sending its nuclear waste to the Pacific Ocean state of the Marshall Islands and even North Korea.

Source: Reuters, 09 August 2013.

UK

Revealed: Shock 'Code Red' Safety Report on British Nuclear Subs as Fleet is Hit by Leaking, Cracked Reactors and Lack of Trained Staff

Britain's ageing nuclear submarines have been issued with 'Code Red' safety warnings after inspectors found radioactive leaks and a chronic shortage of Royal Navy engineers trained to repair faulty reactors.... An official watchdog discovered major safety issues with both the UK's nuclear-powered submarines and facilities used to repair nuclear missiles, raising the risk of a catastrophic accident involving radioactive material. On 02 August, experts described the Defence Nuclear Safety Regulator (DNSR) report for 2012-13 as the most worrying they had seen.

The document, obtained by the Mail, reveals:

• Cracks in reactors and nuclear discharges are directly attributable to the Royal Navy's oldest Trafalgar Class SSNs remaining in service beyond their design date.

• Faults with the new Astute Class submarines will delay their entry into service, forcing the Navy to continue sailing the ageing and potentially dangerous Trafalgars.

• The Atomic Weapons Establishment failed to notice or rectify corrosion to a nuclear missile treatment plant in Berkshire.

• Nuclear-qualified engineers are quitting the Navy in droves over poor pay and conditions, creating a skills crisis.

Head of the DNSR Dr Richard Savage wrote: 'Significant and sustained attention is required to ensure maintenance of adequate safety performance and the rating reflects

the potential impact if changes are ill-conceived or implemented. 'The inability to sustain a sufficient number of nuclear suitably competent personnel is the principal threat to safety. Vulnerabilities exist in core skill areas, including safety, propulsion, power and naval architects. 'Due to build delays with the Astute Class, there has been a requirement to extend the Trafalgar Class beyond their original design life in order to maintain the SSN flotilla at a fully operational level. Some of the emergent technical issues affecting the Trafalgar Class over the last few years can be directly attributed to the effects of plant ageing.'

The report also raises concerns over whether the UK's nuclear fleet and its inland nuclear establishments could withstand an earthquake on the same scale as the one that struck the Fukushima reactor plant in Japan in 2011. The document notes that facilities which form part of Britain's Defence Nuclear Programme (DNP) require 'continued priority attention' to reach recommended safety standards. On 02 August night, nuclear expert John Large told The Mail that the DNSR report revealed a crisis in Royal Navy nuclear safety. He said: 'This is the most self-damning and concerning report that I have seen. We're talking about a ticking time-bomb, with a higher risk to the public and the environment than we previously feared. 'The combination of a lack of nuclear engineers, the Astute submarines being so far behind schedule and the Trafalgar Class sailing beyond their design date is very worrying.

'The Trafalgars, including HMS Tireless, the oldest boat of the class, should be withdrawn immediately.' HMS Tireless, which entered service in 1984, suffered damage to its circuits earlier this 2013 resulting in a radioactive leak. The nuclear sub was patrolling off South-West England when the problem arose, forcing its captain to return to Devonport. A more serious leak was avoided because of swift remedial action. Nuclear materials – including Trident missiles – are brought to the AWE's site at Aldermaston, Berkshire, for assembly, maintenance and decommissioning.

These processes include 'uranium polishing' – the removal of impurities from the material in order to extend its life cycle as a component in nuclear missiles. The DNSR report states: 'Inspection programmes have not been as comprehensive as regulators would expect. As an example, corrosion in the structural supports of a building was not identified as early as would be expected which resulted in the Office for Nuclear Regulation issuing a Safety Improvement Notice.'

On 02 August night the AWE admitted corrosion had affected its uranium component manufacturing facility, but added repairs had been completed. An MoD spokesman said: 'We would not operate any submarine unless it was safe to do so and this report acknowledges that we are taking the necessary action to effectively manage the technical issues raised by the regulator. 'It also highlights that the MoD is committed to maintaining expertise in submarine technology and operation – underlined by last month's operational handover of the first two Astute Class submarines.'

Source: Mark Nicol, The Mail, 03 August 2013.

USA

Nuclear Power Plant in South Carolina at Risk for Shutdown

Maintaining older nuclear power plants can be very expensive. So much so that plants in California (San Onofre) Wisconsin and Florida have been shut down or are slated for retirement. These kinds of plants generate tremendous amounts of energy, but repair costs and decreasing costs of other forms of power are causing them to be seen as increasingly unfavorable.

A nuclear power plant located near Hartsville, South Carolina is at risk for being shut down, according to a research study conducted at the Vermont Law School. However, the plant has a license to operate until 2030 and operators Duke Energy say they have no plans to retire it early. Maintaining older nuclear power plants can be very expensive. So much so that plants in California (San Onofre) Wisconsin and Florida have been shut down or are slated for retirement. These kinds of plants generate tremendous amounts of energy, but repair costs and decreasing costs of other forms of power are causing them to be seen as increasingly unfavorable. (Also, a plan for a new, smaller nuclear plant in Iowa was called off.) The alarming events at Fukushima were probably a sentinel call for the public to wake up to perils associated with aging reactors. Actually, the whole history of problems linked to such power plants including at Three Mile Island and Chernobyl might be influencing the overall attitude towards them.

The plant at Hartsville had two fires a while back and a shutdown. While the plant might be safe in its structures and technology, human error is still a factor at any nuclear plant, and the consequences can be very significant. There is also a chance – albeit a very tiny one – that terrorists could take over a nuclear plant and try to release radiation into the environment in an urban area where there are

many residents. Additionally, a plane could be flow into a plant with the goal of setting off explosions and starting fires in order to also release radiation. These scenarios are extremely unlikely, but so was 911 before it happened. The H.B. Robinson Nuclear Power Plant employs one Westinghouse 735 MW pressurized water reactor. There are nearly 900,000 people living within about 50 miles of it. Of course, there are also many domesticated and wild animals in the area as well. Alternative energy seems to be frowned upon by South Carolina's energy providers. It has been reported that they also have a monopoly on energy production there.

Source: Clean Technica, 08 August 2013.

The aim of the Kozloduy project is to create a radioactive waste treatment plant based on plasma technology, which significantly reduces the volume of this type of waste by subjecting it to temperatures of up to 5,000 degrees centigrade. The application of such high temperatures produces a liquid waste which, when cooled, vitrifies into a solid form whose volume is reduced by as much as 80 times. This is then packed into containers and encased in concrete.

NUCLEAR WASTE MANAGEMENT

SPAIN & BELGIUM

Innovative Radioactive Waste Treatment Plant Completes Final Testing

Spanish Iberdrola Ingeniería, and Belgoprocess, a Belgian company that offers integrated nuclear waste management and decommissioning services, have successfully completed final testing on their plasma technology-based radioactive waste treatment plant, an initiative that could revolutionize the nuclear energy industry. Belgoprocess carried out these tests over a two-day period at the Europlasma Inertam facilities in Morcenx, in the south of France. The second test was attended by representatives from relevant industry enterprises interested in developing projects using this technology. Following these tests, Iberdrola Ingeniería will now move the plant to its final destination, the Kozloduy nuclear plant in Bulgaria, 200 kms from the capital Sofia, where it is to be permanently installed.

The aim of the Kozloduy project is to create a radioactive waste treatment plant based on plasma technology, which significantly reduces the volume of this type of waste by subjecting it to temperatures of up to 5,000 degrees centigrade. The application of such high temperatures produces a liquid waste which, when cooled, vitrifies into a solid form whose volume is reduced by as much as 80 times. This is then packed into containers and encased in concrete. The Kozloduy plant opens up new opportunities in the nuclear energy sector, since it allows for significant reductions in the amounts of low and intermediate level nuclear waste generated during the operation of nuclear power plants. ...

Source: The Daily Fusion, 05 August 2013.

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 Cmde Jasjit Singh, AVSM, VrC, VM (Retd).

Centre for Air Power Studies
P-284
Arjan Path, Subroto Park,
New Delhi - 110010
Tel.: +91 - 11 - 25699131/32
Fax: +91 - 11 - 25682533
Email: diroffice@aerospaceindia.org
Website: www.aerospaceindia.org

Editor: Director General, CAPS
Editorial Team: Dr. Sitakanta Mishra, Hina Pandey, Arjun Subramanian, Archana Mishra
Composed by: Md. Azam