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## OPINION – Shyam Saran

### The Dangers of Nuclear Revisionism

The BJP's election manifesto triggered a major controversy over its references to the intent of a BJP-led government to "revise and update" India's nuclear doctrine in order "to make it relevant to challenges of current times". While no details were given, BJP sources are said to have hinted at the abandonment of the "no first use" and retaliation-only commitment that lies at the heart of the current doctrine. It is, therefore, reassuring that, subsequently, the BJP PM candidate, Narendra Modi, has categorically denied any such intent, saying: "No first use was a great initiative of Atal Bihari Vajpayee – there is no compromise on that. We are very clear. No first use is a reflection of our cultural inheritance."

Nuclear weapons are serious business; responsible governments, political parties, scholars and analysts should make declarations and statements about their purpose and use with extreme discretion and deliberation. These are not weapons of war in any meaningful sense. These are weapons of mass destruction – and the keyword here is "mass". Their use would render any credible war aim irrelevant. Some analysts have tried to cast doubt on the credibility of massive retaliation that the Indian doctrine envisages in response to an attack by so-called tactical nuclear weapons on military targets by an adversary. Why,

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it is argued, should one retaliate with all of one's nuclear assets if a tank brigade or some military installations are destroyed in a tactical nuclear attack, and thereby ensure the incineration of most of our cities and populace in a further and inevitable counter-attack using strategic nuclear weapons?

This is a fallacious argument for two reasons. One, the very distinction between strategic and tactical nuclear weapons is untenable, precisely because these are weapons of mass destruction. As pointed out by a US nuclear analyst, Richard Weitz: "Nuclear weapons have an inherent potential for rapid and dramatic destruction, shock and death, regardless of whether they yield one megatonne or 20 kilotonnes."

Distinguishing between 'strategic' and 'tactical' in that sense is more or less academic."Two, even if there is use of a tactical nuclear weapon with a relatively low yield to begin with, escalation to a strategic nuclear exchange is virtually inevitable. To quote another analyst familiar with war gaming, Henry S Rowen, any use of nuclear weapons at any level in multiple scenarios inevitably escalated to an all-out strategic exchange resulting in massive destruction and loss of life, making any notion of victory or loss a meaningless vulgarity. He points out: "All the options led to the same dead end of escalation, strategic retaliation and catastrophe."

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It is true that, during the Cold War, strategists of the NTO did wrestle with the uncomfortable paradoxes with which nuclear deterrence confronts any state with nuclear weapons. The theory of "flexible response" or "graduated response" posited the possibility of matching retaliation at each level of armed hostility, from a conventional threshold all the way up through the use of tactical weapons to an all-out strategic exchange. While neat and seemingly credible in theory, it was never implemented in operational terms precisely because of the contradictions involved.

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For example, in archives now available, President John F Kennedy and even his defence secretary, Robert McNamara, interpreted flexible response to require greater investment in conventional forces, so as to postpone as far as possible the threshold of the use of nuclear weapons in response to a Soviet conventional attack. In other documents, it appears that NATO allies initially wanted the deployment of tactical nuclear weapons on their soil precisely in order to have a trigger that would lower the threshold of nuclear use and ensure escalation to the strategic level and through this achieve more effective deterrence against a Soviet attack. In the 1980s, perceptions changed when the frontline

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Nato states realised that use of tactical weapons against advancing Soviet forces in their territories would leave them devastated even if the expected escalation could somehow be contained. In 1987, the Warsaw Pact and Nato concluded the INF treaty, which banned all US and Soviet ground-based ballistic and cruise missiles with ranges of 500 to 5,500 kilometres. It is ironic that Pakistani and now some Indian analysts, oblivious of this history, should be trotting out a bankrupt concept to lend an illusory muscularity to India's nuclear deterrent.

India has been well served by a doctrine that acknowledges that nuclear weapons are not weapons of war but can only serve as a deterrent. It is nevertheless true that the credibility of the nuclear deterrent demands the creation of tangible assets that are required by the doctrine that governs the use of these weapons. In the case of India, "no first use" and retaliation-only require the development and deployment of a strategic triad, including land-based, air-delivered and submarine-based nuclear assets. The last mentioned capability is the most significant in ensuring a second strike capability even after suffering extensive damage in a first strike.

The credibility of our deterrent is, therefore, linked to whether or not we have in place the capabilities and assets that are aligned with our doctrine. That has to be the main endeavour on the part of our political leadership rather than falling prey to the temptation, encouraged by ill-informed analysts, to make declaratory statements not backed by the capabilities and assets they require. The infrastructure required for a first use or flexible response doctrine would be very different from what we have so far invested in, and would require different command and control mechanisms. We should be mindful of the significant implications of any departure from the existing doctrine quite

apart from what it would signal to both our friends and adversaries.

The possession of nuclear weapons provides a potent instrument for deterrence against powerful and inimical adversaries. They also impose immense responsibility and demand prudence and sobriety in how we conduct ourselves in the community of nations. A Pakistani display of suicidal tendencies – real or feigned – must be met with a consistent and mature posture on our part, rejecting the notion that a nuclear war could be fought and won or that a limited nuclear war is at all credible. To say that our current doctrine is not credible to Pakistan is to fall into the trap of having our strategies and structure of forces being determined in Islamabad and not in Delhi.

First and foremost, our doctrine must carry credibility with our own people. We should constantly review and update our nuclear posture, but the objective of this exercise should be to strengthen the credibility of our existing doctrine rather than to seek its abandonment. The BJP PM who endorsed the current doctrine was a wise and sagacious leader. The party would do well not to tinker thoughtlessly with his legacy in this critical area of national security. Fortunately for us, Narendra Modi has made swift amends for his party's wobble on this score.

*Source: The writer is a former foreign secretary and chairman of the National Security Advisory Board <http://www.business-standard.com>, 22 April 2014.*

### OPINION – Manpreet Sethi

#### India and No First Use: Preventing Deterrence Breakdown

Several recent writings, including in the context of a possible revision of the Indian nuclear doctrine as mentioned in the BJP manifesto, have mentioned the need for a reconsideration of the NFU principle. Many argue that India's 'retaliation only' strategy may no longer be an effective deterrent in the wake of the recent developments in nuclear capabilities of its adversaries. The allegations against the NFU are that it is a pacifist, idealist, Gandhian strategy that has no role to play in the modern context.

Is this really true? Is a first use nuclear doctrine more credible and better at deterrence than NFU? Would the adoption of first use doctrine by India deter

Pakistan more and better? Militaries like to function according to SOPs – whether in peace or war. This inclines them towards offensive doctrines where they can stay with a pre-deliberated course of action while denying the adversary the advantage of playing out his moves. With conventional weapons, this may be a prudent approach, since the military can concentrate on the first phase of offense, thereby increasing its chance of victory. But the equation gets skewed with the entry of nuclear weapons.

In a situation where both sides have secure second strike nuclear capabilities, a first use of nuclear weapons, even in the form of a splendid first strike, cannot rule out the possibility of nuclear retaliation. Hence, the calculation of the first user cannot be limited to the damage it causes, but must also factor in the damage it will suffer from the response. Therefore, despite an offensive nuclear strategy, neither can victory be assured, nor the extent of damage (owing to the very nature of the weapon) be considered acceptable. Is it then useful, or even credible, to threaten first use of nuclear weapons?

In fact, even though conventional wisdom has us believe that first use is more liberating than a counter-strike strategy, serious thought to the actual execution of first use reveals the complexities involved in doing so. After all, the purpose of first use should be to deter by communicating that such use would substantially improve the situation of the user, making him emerge from the crisis looking better after use. This can only happen if there is no riposte to his action because if there is, then he can hardly 'look better' after suffering nuclear damage. Therefore, the essential question that the first user has to ask and answer is whether in a state of mutual vulnerability, the initiator can ever be in a better position?

An NFU strategy, on the other hand, concedes the onus of escalation to the adversary and surprisingly, becomes more liberating. Firstly, the military is not straining the nuclear leash on hair trigger alert that can easily fall prey to misadventure. Neither is there a need to perfect the logistics of first use, which is not easy considering that it requires coordinating a nuclear attack with speed and surprise to hit the adversary's forces before they can be launched or dispersed. Secondly, the political leadership is freed from the psychological pressure of having to decide when, at what stage of war, to use the weapon – a decision that is sure to weigh on him/her personally

for the damage caused, opprobrium earned, and retaliation invited and suffered.

First use postures based on projection of nuclear war-fighting require large arsenals of first strike weapons (such as accurate missiles with multiple independently re-targetable vehicles), nuclear superiority to carry out counter-force attacks, elaborate and delegated command and control structures to handle trigger readiness and coordinate simultaneous nuclear attacks from dispersed forces. None of this is easy. It is, rather, dangerous; raising the possibility of an accidental nuclear war based on a miscalculation, and also lowering the threshold of nuclear war in a crisis situation.

If Pakistan is going down this route, it is raising dangers for itself too. The answer to this from India does not have to be adoption of first use, but to enhance the credibility of its NFU, through better communication of survivability measures that ensure retaliation. It will be the threat of punishment that far outweighs any advantages that Pakistan reaps from its first use that will stay its hand on the trigger.

Meanwhile, by continuing with a stabilising posture of NFU, India is only helping itself since such a strategy alleviates the adversary's insecurity that may tempt him towards a pre-emptive strike. By taking the 'use or lose' pressure off the adversary, India is helping its own cause of preventing deterrence breakdown. By letting the adversary make the difficult decision, while communicating punitive nuclear retaliation, India has wisely steered away from nuclear brinkmanship. And, by establishing the nuclear weapon as an instrument of punishment, it has encouraged the possibility of 'no use' instead of 'sure use' of the nuclear weapon.

Source: [www.ipcs.org](http://www.ipcs.org), 21 April 2014.

**OPINION – Michael Krepon**

**Nuclear Normalcy**

Nuclear weapons raise many questions and provide few answers. Can Pakistan become a normal state possessing nuclear weapons? How can this aspirational goal be translated into reality? And what is the best way to codify 'nuclear normal'? The George W. Bush administration ran interference for India to join the nuclear club by promoting a civil-nuclear agreement which the NSG approved. Is this route available to Pakistan, as well?

An important new book by Mark Fitzpatrick of the IISS in London proposes a path to nuclear normalcy for Pakistan. The author is a careful, respected chronicler of proliferation, so his recommendations carry weight. He reasons that Pakistan's gravest nuclear challenge is its competition with India, and that by signing the CTBT and by stopping production of bomb-making fissile material, this competition will be tamed. In return for Pakistan's help, the international community would treat nuclear-armed Pakistan as a 'normal' state.

This logic chain is sound, but it rests on questionable assumptions. These treaties could certainly change Pakistan's outlier status, but many Pakistanis don't think they advance national security. And how can Pakistan be considered 'normal' when the writ of the state shrinks while its stockpiles of weapons and fissile material grow?

Treaties would no doubt help defuse Pakistan's nuclear competition with India if both countries were willing to sign up. But neither is ready to close the door permanently on nuclear testing, and because they aren't sure how many nuclear weapons they need. The problem is circular: Treaties can help with security, but powerful domestic constituencies don't feel secure enough to sign up.

New Delhi will compete harder in the years ahead, which raises the question of whether Pakistan's

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decision-makers will, as well, or decide instead that they have enough nuclear firepower to protect against India. The biggest existential threat to Pakistan at present, as noted by civilian and military leaders, is violent extremist groups, not India. Nuclear weapons and fissile material are no help with internal security, and if protection of these crown jewels is not completely foolproof, they could be turned against civil and military authority.

The logic of Pakistan's nuclear build-up is plain: it can't compete with India on conventional military capabilities, but it can compensate by building nuclear weapons and their means of delivery. Over time, India will out-compete Pakistan here, as well. If Pakistan continues to compete, would it become safer? Not if internal security problems grow along with its nuclear arsenal.

**No offer of normalcy can succeed unless it addresses the underlying reasons for Pakistan's nuclear build-up. Pakistan doesn't compete with India in this domain to gain status, and acquiring the status of a 'normal' nuclear state won't lessen requirements until Pakistan feels safe and secure.**

At present, Pakistan and India are committed to nuclear postures that are almost mirror images of each other, linked in lock-step like flag-lowering ceremonies at the Wagah border. Pakistan and India are only part of what Fitzpatrick describes as a "unidirectional" nuclear competition. Pakistan competes with India, which competes with China, whose nuclear requirements are, in turn, influenced by the US. India will compete with China regardless of what Pakistan does. So Pakistan's choice is to continue the nuclear competition or to look for other ways to increase national security.

Would an offer of nuclear normalcy help Pakistan decide? Would it shape Pakistan's nuclear posture in stabilising ways? No offer of normalcy can succeed unless it addresses the underlying reasons for Pakistan's nuclear build-up. Pakistan doesn't compete with India in this domain to gain status, and acquiring the status of a 'normal' nuclear state won't lessen requirements until Pakistan feels safe and secure.

Will being designated a 'normal' nuclear nation be enough to convince Rawalpindi that it already has enough nuclear weapons? Nuclear normalisation doesn't seem possible unless and until relations with India are normal. This means that as long as India is perceived as an existential threat, and as

long as powerful domestic constituencies see the necessity of competing with India, normality will elude Pakistan.

Nor can Pakistan be considered a normal nuclear state as long as the writ of the state is shrinking. Nuclear normality begins at home and within the region; it cannot be bestowed by the US or the NSG. Fitzpatrick does not suggest a civil-nuclear deal to signify normalisation, like that offered to India. China has agreed to provide Pakistan with nuclear power plants at highly concessionary terms. No other country or nuclear power corporation will dispense with profit taking, so a civil-nuclear deal would not open up new investment opportunities and is not on the cards. Instead, the path to nuclear normalcy lies within Pakistan itself, by getting its house in order, by improving ties with its neighbours, and by finding non-nuclear ways to increase its sense of security.

*Source: Dawn, 24 April 2014.*

**OPINION – Happymon Jacob**

**Deterrence Debates and Defence**

The perceived failure of deterrence, despite the possession of nuclear weapons by India, could lead to greater instability in Indo-Pak bilateral relations should there be another crisis with Pakistan. India's DRDO is scheduled to conduct a ballistic missile interceptor test later this month which forms part of a series of tests to develop and deploy a limited BMD shield in the country, a project that has been in steady development since the mid-1990s. BMD pessimists — I used to be one myself — have traditionally argued that notwithstanding the fact that BMD is neither foolproof nor cheap, induction of such systems can be deeply destabilising between nuclear-armed adversaries.

However, the instability argument assumes the existence of a MAD-induced textbook deterrence dyad such as the US-USSR nuclear rivalry of the Cold War vintage. The deterrence stability of the Cold War years, premised on the existence of rational, unitary actors, does not exist in nuclear South Asia

and hence to believe that mutual vulnerability increases stability is dangerous. No matter how many nuclear warheads India makes and how often it reviews its doctrinal postures, New Delhi's deterrence dilemmas are likely to persist. India can, to a great extent, address these dilemmas by mainstreaming and articulating the strategic objectives of its BMD programme which, at the moment, does not form part of the country's politically articulated nuclear strategy.

**India's Deterrence Dilemmas:**

The deterrence effect of nuclear weapons is yet to mature in South Asia. More so, the South Asian nuclear contest is severely complicated by the presence of non-state actors and their ability to draw states into armed conflicts. These and other related issues have been posing multiple deterrence dilemmas for India.

First of all, there are fears in India about the potential implications of a situation where in Pakistan-based non-state actors gain control of Pakistan's nuclear assets. There is also speculation about the repercussions of rogue elements in the Pakistani armed forces engaging in unauthorised nuclear activities. It could be an unauthorised nuclear strike against India or similar to what the former American Ambassador to Pakistan, Anne Patterson argued: "Our major concern is not having an Islamic militant steal an entire weapon but rather the chance someone working in GoP [Government of Pakistan] facilities could gradually smuggle enough material out to eventually make a weapon." Besides, there could also be genuinely accidental launches of nuclear weapons.

**The Political Angle:** India's failure to respond to Pakistani aggression state sponsored, non-state actor attack, non-state sponsored, non-state actor

attack, or attack by rogue elements from within establishment has domestic political costs as well. The Indian government is widely criticised for not

responding to Pakistan adequately, not being able to see through Pakistan's ploy of using non-state actors and not showing enough resolve, among other aspects. This perceived failure of deterrence, despite the possession of nuclear weapons by India, could lead to greater instability in India-Pakistan bilateral relations should there be another crisis with Pakistan, especially if New Delhi has a right-wing government in power.

Despite the animated debate in India on the desirability of withdrawing the NFU pledge, any government in New Delhi is likely to think twice before doing so since its NFU pledge is key to its status of a "responsible nuclear power" which in turn has been aiding India's ongoing integration into the global nuclear order. Any move from the Indian side to renege on the NFU pledge or conduct a thermonuclear test to showcase its deterrent capability will only alienate the international community. Hence, New Delhi finds itself in a self-imposed normative bind wherein it is unable to doctrinally or materially pursue strategies to respond to Pakistani acts or behaviour which it thinks has undermined its deterrence capability.

There have also been concerns about the robustness of the Indian nuclear deterrent for a variety of doctrinal and material reasons. As Admiral Raja Menon wrote in *The Hindu* ("A mismatch of nuclear doctrines," 22 January 2014), there are a number of "structural and operational

weaknesses in the Indian nuclear arsenal." For one, experts have questioned the use of "massive retaliation" in the Indian doctrine which is not a credible enough threat to deter Pakistani conventional or sub-conventional aggression. The other argument about the credibility of India's

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nuclear deterrence is the criticism that its command and control (C&C) structures are not yet sophisticated enough. Another related concern is regarding the credibility of India's declared nuclear capability. For instance, India claimed after the 1998 tests that its thermonuclear test was a success. However, this claim has been authoritatively challenged making the country's official claims concerning nuclear weapons look weaker. Then, there are also fears about the material performance failures of the Indian nuclear arsenal.

Doctrinal and material credibility about a state's nuclear weapons lie at the heart of the deterrence effect that it seeks to derive from its weapons. If so, there are a number of credibility issues attached to India's nuclear deterrent which it should address if it wishes to make its deterrent work. Merely doing away with NFU or conducting another round of tests cannot take care of these fundamental deterrence dilemmas that India faces today.

What, therefore, needs to be done urgently is a strategic review of the country's nuclear doctrine to make it more credible. But even more importantly, most of the deterrence dilemmas (mentioned earlier) that the country faces can be resolved by introducing enhanced strategic depth, political commitment and a sense of purpose into India's ongoing BMD programme.

Demonstrating that one can defend oneself strengthens deterrence. If Pakistan believes that it can take out New Delhi and with it a considerable amount of the latter's C&C systems and political leadership in a first strike, such a belief will weaken the deterrence stability in the region. On the other hand, if the Indian political leadership and its nuclear C&C can be made reasonably invulnerable from a decapitation strike, then deterrence stability increases considerably.

In this context, a limited BMD system increases deterrence by denial. The deterrence effect of BMD is not only applicable between rational state actors

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but also when non-state (rational or irrational) actors target state actors. For instance, if Pakistan-based non-state actors or rogue elements from the Pakistani armed forces target India with nuclear weapons, New Delhi considering that such an attack is most likely to be very limited will be able to properly comprehend and analyse the situation before contemplating an appropriate response. This is only possible if the political decision-making mechanisms and nuclear C&C in New Delhi survive such an attack.

More importantly, a limited BMD can also deter a state with revisionist intentions that would want to carry out a bolt-from-the-blue-strike. In other words, if generating dissuasion in the mind of the aggressor is central to nuclear deterrence, a limited BMD shield could potentially achieve that in the South Asian context.

The demands from within Indian strategic/political circles to give up on NFU and conduct another round of thermonuclear tests have one thing in common: the desire to make the Indian deterrent more credible. While it may be a fair demand in itself, New Delhi may not be able to do that precisely due to various normative constraints. A limited BMD is perhaps one way of positively responding to these demands without crossing the normative redlines. Not only are BMD developments in the country unlikely to face any normative opposition from the international community such as the US and its NATO allies, they may indeed be willing to collaborate with India on its BMD programme.

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***Managing Reputational Impact:***

A limited BMD capability aimed at providing area defence to the national capital and C&C

structures could be showcased as demonstrating the country's willingness and readiness to face any eventuality. The argument then would be that since the country is only going in for a limited BMD (as opposed to going in for a National Missile Defence system which would have given it invulnerability), if it ever becomes a success, it does not want to secure itself completely and then engage in a first strike. In other words, a limited BMD can reinforce

India's NFU posture as well as make it more credible. Those in India who critique the Indian NFU posture as an inadequate response to Pakistan can be assuaged by the argument that a limited BMD will provide the country with the necessary wherewithal to retaliate in all certainty thereby increasing its deterrence credibility.

Another potential implication of a limited BMD in India would be the continuation of the country's de-mated and de-alerted nuclear posture. Even as New Delhi remains steadfast in its commitment to continuing its de-mated and de-alerted posture, critiques have questioned the wisdom behind it. Such concerns can also be addressed by a limited BMD which provides an assured capability for retaliation thereby strengthening deterrence. Therefore, those demanding the withdrawal of NFU should consider the potential of a limited BMD system in strengthening India's deterrence rather than advocating the adoption of offensive doctrines and technologies.

Source: *The Hindu*, 21 April 2014.

**OPINION – Thomas Sowell**

**Liberal Approach to Disarmament Makes a Victim of Ukraine**

Liberals can be disarming. In fact, they are for disarming anybody who can be disarmed, whether domestically or internationally. Unfortunately, the people who are the easiest to disarm are the ones who are the most peaceful and disarming them makes them vulnerable to those who are the least peaceful. We are currently getting a painful demonstration of that in Ukraine. When Ukraine became an independent nation, it gave up all the nuclear missiles that were on its territory from the days when it had been part of the SU.

At that time, Ukraine had the third largest arsenal of nuclear weapons in the world. Do you think Russian President Vladimir Putin would have attacked Ukraine if it still had those nuclear weapons? Or do you think it is just a coincidence that nations with nuclear weapons don't get

invaded? President Obama has refused Ukraine's request for weapons with which to defend itself.

As with so many things that liberals do, the disarmament crusade is judged by its good intentions, not by its actual consequences. Indeed, many liberals seem unaware that the consequences could be anything other than what they hope for. That is why disarmament advocates are called "the peace movement." Whether disarmament has in fact led to

peace more often than military deterrence has is something that could be argued on the basis of the facts of history but it seldom is.

Liberals almost never talk about disarmament in terms of evidence of its consequences, whether they are discussing Gun control at home or international disarmament agreements. International disarmament agreements flourished between the two World Wars. Just a few years after the end of the First World War, there were the

Washington Naval Agreements of 1921-1922 that led to the US actually sinking some of its own warships. Then there was the celebrated Kellogg-Briand Pact of 1928, in which nations renounced war, with France's Foreign Minister Aristide Briand declaring, "Away with rifles, machine guns, and cannon!" The "international community" loved it.

In Britain, the Labour Party repeatedly voted against military armaments during most of the decade of the 1930s. A popular argument of the time was that Britain should disarm "as an example to others." Unfortunately, Adolf Hitler did not follow that example. He was busy building the most powerful military machine on the continent of Europe. Nor did Germany or Japan allow the Washington Naval Agreements to cramp their style. The fact that Britain and America limited the size of their battleships simply meant that Germany and Japan had larger battleships when World War II began.

What is happening in Ukraine today is just a continuation of the old story about nations that disarm increasing the chances of being attacked by nations that do not disarm. Any number of empirical studies about domestic gun control laws tell much the same story. Gun control advocates seldom, if ever,

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present hard evidence that gun crimes in general, or murder rates in particular, go down after gun control laws are passed or tightened. That is the crucial question about gun control laws. ...

Source: Thomas Sowell is a senior fellow at the Hoover Institution <http://washingtonexaminer.com/>, 21 April 2014.

**OPINION – Akhtar Ali**

**N-Power Economics**

Up to now, a general impression has been that the nuclear power is a competitive energy source, if not the cheapest, which has remained a contentious issue in the US Debate has been around for hidden subsidies and internalising or lack of including externalities such as accident costs, etc. Supporters of nuclear power manage to prove that it is competitive, if not the cheapest and opponents also manage to prove their case that it is expensive and uncompetitive. An additional factor that has come up recently is very high capital cost of the safer Gen-II nuclear power plants costing in excess of 5000 USD per KW. Pakistan is acquiring ACP-1000 nuclear power plants which are a variant of AP-1000 Gen-III reactors - Westinghouse type reactors. In this section, we will do a survey of similar projects in other countries with a view to examine the cost structure there and compare it with potential costs in Pakistan.

The proposed K2-K3 project would cost 9.50 billion USD with a Chinese low interest loan of USD 6.5 billion which appears to be the EPC cost as well. Admittedly nuclear power plants have become extremely expensive; 4000-5000 USD/KW vs 1600-2000/KW for conventional plants. Interest during construction in the case of nuclear power plants is usually very high due to the long time it takes (5-7 yrs) to put up a nuclear power plant. Actual financial cost would depend on the interest rates charged by Chinese, of which much has not been revealed. Chinese Finance companies have started behaving like any other western financing agency. They are requiring 4% or so of insurance charge on the lines of EXIM Bank of the US. Reportedly, on some projects (wind power) China has exempted Pakistan of this rather hefty charge. Usual net interest rates for such

projects should be around 5%, especially as against a Libor of lower than 1%. Where would Pakistan bring the required equity of 3-3.5 billion USD from and at what rates (which appears to be the owners cost and interest during construction) is an open question?

However, nuclear fuel is cheap, costing 1.0 cent or slightly more per kWh as opposed to 16 cents for oil or 4 cents for gas. Also, due to a high capacity factor of 80- 90%, it gives more electricity per MW than other power plants e.g., twice that of hydel power plants and 30% more than other conventional plants.

The lowest COGE is in case of Indian-Russian design NPPS such as Kudankulam (India) commissioned recently with a price tag of 6.5 USc only, as opposed to 19.4 USc of the new Western supplied NPPs based on AP1000 technology of Westinghouse. DAE India is quite concerned over such costs although they have entered into advance implementation agreements. Most common estimates of COGE of NPPs in many countries hover around 12-15 USc. This data,

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however, belies the general impression that nuclear power is cheap. Capital Cost (CPP) alone is costing USc 10 or even more per kWh in DAE India is, however, rather desperately, trying to get arrangements under which nuclear electricity costs out of AP1000 power plants comes out to be 10-11 cents. The situation is even worse in the US California Energy Commission (CEC) predicts much higher COGE for Gen-III power plants.

Admittedly, there are methodological differences in costing. Gen-III reactors are being designed for 60 yrs as opposed to 30 yrs earlier. Table 1 gives NPP cost data from Western vendors that ranges around 5000 USD/kW. ...Cost data from China, Russia and India shows CAPEX is nearly half that of Western countries. Quality differences, financing rates and higher manpower cost may be responsible for such differences. One may note that China is asking for Western prices of around 5000 USD/kW from Pakistan. There appears to be a scope for friendly negotiations as both sides do not have much choice. The Pak-China deal could be around the same terms as Indo-Russian deal for roughly the comparable technology, Russians having more experience. Russians have also provided 80-85% finance at 4% as

well. If deal were structured around this cost data, one would have expected nuclear electricity from K2 reactors to be around 7 cents per unit, quite an affordable figure. In present case as the deal has been reported, it may be 70% higher, indeed quite uncompetitive and rather unaffordable.

A common theme would be apparent in the data on India and Pakistan. CAPEX both in India and Pakistan doubled every 10-12 years or with change in generation i.e. from generation I to II and now III. Up to generation-II reactors, nuclear power was competitive both in India and Pakistan i.e. gradually escalated to around 10 cents level. With the Gen-III reactors unit CAPEX has again doubled to 5-6000 USD/kW level bringing CPP (Capital Cost component) of COGE to be over 10 cents. With 1.25 cents for fuel cost and another 1.25 cents for O&M, the total COGE hovers around 15 cents. In order to address this situation, many buying countries are resorting to negotiations seeking discounts and other measures. India managed to get a 30% discount from Russia, while Turkey negotiated based on a long term tariff of 12.5 cents/kWh in its recent deal with Russia for its Akkuyu project.

Unfortunately, our Chinese friends are charging the full US price which nobody else may be able to offer in the international market. Pakistan can get nuclear reactors and the associated finance from China only for a variety of reasons, while due to rather lower credibility, no other country would buy nuclear reactors from China. Hence, sympathetic negotiations are required. China has installed similar reactor in Sanmen at a cost of USD 3000/kW, as we have indicated in the adjoining table. If prices of K2 and K3 are brought down to this level or slightly more, the nuclear power would become competitive. Otherwise the cost scenario would be inadequate. Pakistan has to bring down its cost of production to be able to solve its Circular Debt problem, as there is very little room to enhance power tariff anymore.

Chashma I had a tariff of Rs 5.00 per unit (later enhanced to Rs 7.00) approved by NEPRA, while Chashma II is reportedly producing at close to Rs 10.0 per unit. Hydro is the cheapest (5 cents), followed by Natural Gas (Rs 5.00 at currently prevailing low gas prices, the situation would change drastically with the induction of LNG), Coal (7-8 cents). Nuclear Power would lie between Oil and others. Hydro and Thar Coal appear to be the most optimum choices for Pakistan in this scenario.

PAEC claims that K2's electricity would cost slightly lower than 10 rupees per unit (levelized-average). Initial costs may be twice as high during the period when financial repayments are being made. A new factor in nuclear energy economics is the long lives of NPPs extending up to 60 years. The real cost would depend on the financing rates; interest rates charged by China and other parties. If the interest rates remain under 5%, it would be possible to achieve the cost figures claimed by PAEC. Indians are worried about the fate of similar projects being supplied by the US and France to their country. It is patently clear that Nuclear Power today is not as cheap as it used to be. It may at best be competitive with more expensive sources such as oil and LNG.

***Nuclear Liability and Insurance Cover:*** Finally, Nuclear Power Economics may not be adequately covered without discussing the accident liability and insurance issues. Normal insurance policies do not provide coverage to third parties in case of nuclear accidents. Most nuclear nations have adopted national laws regarding protection to third party victims in case of nuclear accidents. This includes, the US, European Union countries, India and even China. The US has been pioneer in this respect with Price Anderson Act providing for a liability-insurance cover totalling 12.6 Billion USD covering all nuclear installations in the US. No government contribution is involved in it. Amended Vienna-IAEA convention and Joint Protocols provide the legal basis of similar arrangement in Europe. Nuclear liability has been limited to a total of USD 480 under Vienna protocols to be funded in some ratio with nuclear operators and respective governments. China is not a member of any international instrument in this respect, but has instituted national scheme covering nuclear liability and insurance. India has also introduced a similar arrangement under national legislation providing for an identical amount of USD 480 million USD.

However, there is an innovative and yet controversial inclusion in the Indian Law which passes on the liability to the vendor of the nuclear equipment, which in most cases are of foreign origin. All other national legislations hold nuclear operator to be solely responsible. Pakistan should also move in this direction and introduce national legislation along similar lines. Foreign Direct Investments would be discouraged if such legislation is not introduced. Also, the potential victims of nuclear accidents in the country should get some

reassurance as, especially, when such controversial nuclear siting decisions such as of K-2 in Karachi are being taken. It may not affect nuclear power economics in a major way, as the actual premium payments per year may be around one million USD or so, if membership to an adequate international insurance pool is obtained.

Pakistan has more than one reason to add nuclear power. There is a large nuclear establishment that has to be maintained and paid for. Lowest cost may not be the sole criterion to shape a country's energy options. Nuclear power would add diversity to its energy profile. It may be advisable to creatively explore ways and means of reducing the capital cost ala - Turkey-Russia deal i.e. permitting Chinese to own the nuclear plants and sell electricity at an affordable price. Easy financial terms like 4% interest and 20 years repayment period after commissioning may be explored, if there is no discount on EPC prices. It may not be a bad idea to flirt with

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Russians to get a competitive quote to be able to negotiate with Chinese. Also PAEC may be well advised to contain its programme to 8000 MW only by 2030, keeping this rather discouraging price scenario in mind. They would be doing a job, if they achieve this target. In India and Pakistan, making large claims and unachievable targets for nuclear energy is part of patriotism. It may not be a bad idea to appear unpatriotic some time and be realistic.

*Source: Business Recorder, 02 April 2014.*

**STATEMENT – P5 Beijing Conference**

**Enhancing Strategic Confidence and Working Together to Implement the Nuclear Non-Proliferation Review Outcomes**

The P5 reviewed significant developments at the 2013 Preparatory Committee for the 2015 NPT Review Conference and in the context of the NPT since the 2013 Geneva P5 Conference. The P5 reaffirmed that the NPT remains the essential cornerstone for the nuclear nonproliferation regime and the foundation for the pursuit of nuclear disarmament, and they remain committed to

strengthening the NPT. They emphasized the importance of continuing to work together in implementing the Action Plan adopted by consensus at the 2010 NPT Review Conference, and reaffirmed their commitment to the shared goal of nuclear disarmament and general and complete disarmament as provided for in Article VI of the NPT. The P5 intend to continue to seek progress on the step-by-step approach to nuclear disarmament, which is the only practical path to achieving a world without nuclear weapons and in keeping with our NPT obligations.

The P5 intend to strengthen P5 engagement to advance progress on NPT obligations and 2010 NPT Review Conference Action Plan commitments. The P5 advanced their previous discussions on the issues of transparency, confidence-building, and verification, and welcomed the achievement under France's leadership of P5 consensus on a reporting framework. They introduced to each other their national reports consistent with this reporting

framework and Actions 5, 20, and 21 of the 2010 NPT RevCon Final Document, with a view to reporting to the 2014 PrepCom. They encourage other NPT States Party to submit reports, consistent with Action 20 of the NPT RevCon Final Document.

The P5 reviewed the work carried out by the Working Group on the Glossary of Key Nuclear Terms under China's leadership, and in this regard, noted the success of the Second Experts' Meeting of the Working Group held on 26-27 September 2013, in Beijing, which established milestones for the completion of the first phase of the Glossary effort for the 2015 RevCon. The progress made in this effort provides a solid foundation for the Working Group to submit its outcome on the terms currently under discussion to the 2015 NPT Review Conference. The P5 stressed again the importance of this work, which is increasing mutual understanding and will facilitate further P5 discussions beyond 2015 on nuclear issues.

The P5 had an exchange of views on their nuclear doctrines, strategic stability, and international security from their individual country perspectives to gain better understanding and build strategic

trust. They also discussed the importance of verification in achieving progress towards further disarmament and ensuring the success of nonproliferation efforts. The P5 welcomed briefings by the Russian Federation and the US on aspects of the New START Treaty's implementation, as well as on implementation of the Agreement Between the Government of the US and the Russia the Disposition of Highly-Enriched Uranium Extracted From Nuclear Weapons..., and its related Protocol on HEU Transparency Arrangements. The P5 shared further information on their respective experiences in verification and resolved to continue such exchanges.

The P5 visited the Chinese National Data Centre for the implementation of the CTBT, as an endeavor to enhance transparency and mutual understanding. They recalled their commitment in the 2010 NPT RevCon Final Document to promote and take concrete steps towards early entry into force of the CTBT and its universalization. They called upon all States to uphold their national moratoria on nuclear weapons-test explosions or any other nuclear explosions, and to refrain from acts that would defeat the object and purpose of the treaty pending its entry into force. The P5 intend to continue their cooperative work to strengthen the CTBT verification regime. The P5 confirmed their support for the ad referendum arrangement for collaborative work by their CTBT technical experts towards improved critical on-site inspection techniques and technology.

The P5 supported efforts to revitalize the CD and continue to be concerned with the impasse at the CD. They discussed efforts to find a way forward in the CD and reiterated their support for a comprehensive program of work, which includes the immediate start of negotiations in the CD on a legally binding, verifiable international ban on the production of fissile material (FMCT) for use in nuclear weapons or other nuclear explosive devices on the basis of CD/1299 and the mandate contained therein. The P5 participated fully in the first session of the UN Group of Governmental Experts (GGE) on FMCT, established in UNGA/A/RES/67/53, and look forward to further engagement in this group.

In reaffirming the historic contribution of the pragmatic, step-by-step process to nuclear disarmament and stressing the continued validity of this proven route, the P5 also emphasized their shared understanding of the severe consequences of nuclear weapon use and their resolve to continue to give the highest priority to avoiding such contingencies, which is in the interests of all nations.

The P5 shared their views on topical proliferation issues and remain concerned about serious challenges to the nonproliferation regime. They pledged to continue their efforts in different formats and at various international fora to find peaceful diplomatic solutions to the outstanding issues faced by the nonproliferation regime... The P5 shared their views on how to prevent abuse of NPT withdrawal (Article X). They resolved to make efforts to broaden consensus among NPT States Party on the withdrawal issue at the 2014 PrepCom, thus making a further contribution to the NPT Review Process.

The P5 reviewed their efforts to bring about the entry into force of the relevant legally binding protocols of nuclear-weapon-free zone treaties as soon as possible. They also reiterated their support for the early convening of a conference, to be attended by all the States of the

Middle East, on the establishment of the Middle East zone free of nuclear weapons and all other weapons of mass destruction, on the basis of arrangements freely arrived at by the states of the region.

The P5 noted that they are now more engaged than ever in regular interactions on disarmament, arms control, and nonproliferation issues. The P5 pledged to continue to meet at all appropriate levels on nuclear issues to further promote dialogue and mutual confidence. In addition to meeting at all appropriate levels, the P5 intend to hold a sixth P5 conference. The P5 welcomed the offer by the UK to host this conference in London in 2015.

*Source: <http://www.state.gov/>, 15 April 2014.*

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## NUCLEAR STRATEGY

### USA

#### **US Navy Deploys Standard Missile-3 Block IB for First Time**

In partnership with the Missile Defense Agency, the US Navy deployed the second-generation Standard Missile-3 Block IB made by Raytheon Company for the first time, initiating the second phase of the Phased Adaptive Approach. "The SM-3 Block IB's completion of initial operational testing last year set the stage for a rapid deployment to theater," said Dr. Taylor W. Lawrence, president of Raytheon Missile Systems. "The SM-3's highly successful test performance gives combatant commanders around the world the confidence they need to counter the growing ballistic missile threat." In 2009, the administration announced the US's decision to adopt a new, more flexible approach to missile defense of both the US and Europe. The Phased Adaptive Approach (PAA) Phase 1 began in March 2011 when the USS Monterey deployed carrying SM-3 Block IAs....

In October 2013, ground broke in Romania on the first operational Aegis Ashore site, which will be capable of launching SM-3 Block IAs, IBs and IIAs. The site continues on track for 2015 deployment as part of PAA Phase 2. Along with deployed Aegis Ballistic Missile Defense ships, Romania's Aegis Ashore site will provide additional ballistic missile coverage of NATO countries. The first Aegis Ashore test with the SM-3 Block IB and upgraded Aegis BMD Weapons System will take place this year at the Pacific Missile Range Facility, Kauai, Hawaii.

Source: <http://online.wsj.com/>, 23 April 2014.

## BALLISTIC MISSILE DEFENCE

### PAKISTAN

#### **Ballistic Missile HATF-III Launched Successfully**

Pakistan conducted a successful training launch of short range surface-to-surface ballistic missile Hatf III (Ghaznavi), which can carry nuclear and conventional warheads upto 290 km. The successful launch concluded the Field Training Exercise of Strategic Missile Group of Army Strategic Forces Command. ...Addressing the troops in the exercise area, the Chairman Joint Chiefs of Staff Committee commended the troops on achieving technical and operational excellence in operating the state-of-

the-art weapon system. He expressed his satisfaction over the training goals achieved during the exercise and expected that the officers and men entrusted with the task of deterring aggression would continue to maintain professional excellence.

General Rashad Mahmood also congratulated all the scientists and engineers for the successful launch of Ghaznavi missile, as another milestone, which has further strengthened the defence potential of Pakistan, besides assuring peace in the region. The successful test has also been warmly appreciated by the President and PM, who congratulated the participating troops, scientists and engineers on their outstanding achievement.

Source: <http://www.brecorder.com/>, 24 April 2014.

## NUCLEAR ENERGY

### BELARUS

#### **Belarusian NPP Gets Full License to Construct First Power-Generating Unit**

The Belarusian nuclear power plant has received the full license for the construction of the first power-generating unit, BelTA learned from the Nuclear and Radiation Safety Department (Gosatomnadzor) of the Belarusian Emergencies Ministry. ...The Belarusian nuclear power plant sent all the documents necessary for the license to the Gosatomnadzor in February 2013. The documents on the nuclear and radiation safety of the Ostrovets nuclear power plant (including level 1 probabilistic safety assessment) were reviewed by the experts according to the procedure established by the legislation. The examination was performed by the Joint Institute for Power and Nuclear Research – Sosny of the National Academy of Sciences of Belarus. In particular, the experts examined if the safety of first power-generating unit was fully proven and met the requirements of the Belarusian and Russian laws and the international recommendations regarding the use of nuclear energy and the sources of nuclear radiation.

Besides, the commission of experts formed by the Gosatomnadzor assessed the organizational and technical capabilities of the Belarusian nuclear power plant according to the terms and requirements of the license. The pouring of concrete into the foundation of the facilities for the first power-generating unit started in November

2013. The Belarusian nuclear power plant will have two power-generating units with the total generating capacity of up to 2,400MW (1,200MW each). The Russian design AES-2006 has been chosen to build the power plant. The design is fully compliant with international standards and IAEA recommendations. The Russian company OAO NIAEP – ZAO Atomstroyexport (ASE) is the general designer and the general contractor for building the power plant. The timeline for the project is stipulated by the general contract. The first power-generating unit of the nuclear power plant is scheduled for launch in November 2018...

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Source: <http://news.belta.by/>, 24 April 2014.

## CHINA

### China to Launch Some Nuclear Power Projects

China's nuclear-related stocks rallied after the Chinese government said it will embark on construction of some nuclear power projects. According to a statement posted on the government's website Premier Li Keqiang said it is now the time to launch a batch of major power generation projects so as to help enhance energy self-sufficiency and upgrade energy structure.

This is good news for the whole -nuclear power sector and our company as well, as we also develop and sell materials applied in nuclear radiation,"... Shares of Shenzhen-listed Woer saw the biggest surge after the announcement, jumping 6.59 percent during trading. It closed at 9.26 yuan (\$1.49) per share, up 1.76 percent, while the Shenzhen Component Index nudged down by 1.37 percent.

The government is likely to accelerate the approval and construction of nuclear plants. And companies from industries like equipment manufacturing, engineering construction and power distribution will benefit from the construction in terms of capacity relief," Han told the Global Times. According to a report released by the WNA earlier in April 2014, China's planned reactors will lift the country's nuclear capacity to at least 58 gigawatt electric (GWe) by 2020, then 150 GWe by 2030. There are 20

**China's planned reactors will lift the country's nuclear capacity to at least 58 gigawatt electric (GWe) by 2020, then 150 GWe by 2030. There are 20 nuclear power reactors in operation in China, and 28 under construction.**

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The Chinese government hopes the cost-efficient nuclear power can replace coal-fired plants for the sake of environmental protection, Lin Boqiang, director of the Center for Energy

Economics Research at Xiamen University, told the Global Times. Overseas nuclear power companies have already seen massive potential in China, flocking into the market in great numbers.

Delegates from the Canadian Nuclear Association reached a cooperation agreement on nuclear power development with a nuclear enterprises alliance in Haiyan, East China's Zhejiang Province, on 11 April 2014. US-based Westinghouse Electric Co reportedly plans to sell its third-generation Westinghouse AP 1000 reactors to Chinese companies and may sign contracts next year.

Lin noted that the surplus capacity pressure is unlikely to be relieved soon, as the government still appears to be very prudent with the approval of new nuclear plant projects, making enterprises to wait for several years for final construction of new reactors. Domestic major nuclear power companies may find some opportunities overseas with their gradually mature technologies and price advantage, said Han

Source: Zhang Ye, <http://www.globaltimes.cn/>, 22 April 2014.

### China Currently Operating 20 Nuclear Reactors

China's National Development and Reform Commission has laid out goals to raise the percentage of China's electricity produced by nuclear power from the current 2% to 6% by 2020. As of March 2014, the Chinese mainland was operating twenty nuclear power reactors at six separate sites. 28 reactors are under construction and still more about to start construction. Additional reactors are planned, including some of the world's most advanced, to give more than a three-fold increase in nuclear capacity, to at least 58 Gigawatts of electricity output by 2020. That number will then be raised to 150 Gigawatts by 2030.

Most nuclear power plants in China are located on the coast and generally use seawater for cooling. The first two nuclear power plants in Chinese mainland were built in the 1980s at Daya Bay near Hong Kong and Qinshan, south of Shanghai.

Source: <http://english.cntv.cn/>, 17 April 2014.

**China Sets New Thorium Reactor Project Deadline For 2024**

According to an article in the South China Morning Post, the Chinese government has brought forward by 15 years the deadline to develop a nuclear power plant using the radioactive element thorium instead of uranium. The SCMP says the team of Shanghai-based researchers working on the project has now been told it has 10 instead of 25 years to develop the world's first such plant. The project has been given new urgency by the increasing problem of air pollution across the country, mainly caused by coal-fired electricity generation.

"In the past, the government was interested in nuclear power because of the energy shortage. Now, they are more interested because of smog," Professor Li Zhong, a scientist working on the project, told the Hong Kong-based newspaper. An advanced research centre was set up in January 2014 by the Chinese Academy of Sciences with the aim of developing an industrial reactor using thorium molten salt technology.

China has 20 uranium-fuelled nuclear plants in operation and another 28 under construction, but wants to take advantage of the relative abundance of thorium to develop a separate method of nuclear generation. The Chinese Academy of Sciences claims the country now has "the world's largest national effort on thorium", employing a team of 430 scientists and engineers, a number planned to rise to 750 by 2015. The team plan to fire up a prototype solid fuel thorium reactor in 2015 and by 2017, the Shanghai Institute of Applied Physics expects to have one that uses the more

advanced but problematic fuel, molten thorium fluoride.

Source: <http://www.hazardexonthenet.net/>, 15 April 2014.

**China's Nuclear Power Installed Capacity to Reach 88 GW By 2020**

China's nuclear power installed capacity, including that in operation and under construction, is predicted to top 88 gigawatts by 2020, said Zhang Huazhu, head of the China Nuclear Energy Association (CNEA).... Nuclear power will

play a bigger role in improving the country's energy structure, coping with climate change and controlling air pollution, he said earlier this week at an industry event. China generated about 51.3 billion kwh of nuclear electricity in 2013, which translates into 55 million tons of carbon dioxide emissions reductions, Zhang said.

Source: <http://english.people.com.cn/>, 20 April 2014.

**China Seen Buying Westinghouse Reactors for \$24b Nuclear Energy Projects**

China has vowed to more than double the installed nuclear generation capacity to 58 gigawatts by the end of the decade. China may sign as early as next year the first of several contracts for eight new nuclear reactors from Westinghouse Electric, as the government presses ahead with the world's biggest civilian nuclear power expansion since the 2011 Fukushima disaster in Japan. China's main nuclear power companies are moving forward with talks to buy the third-generation Westinghouse AP1000 reactors,..., China managing director of the US-based company. The eight projects, including machinery and services, are expected to cost \$24 billion....

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**Nuclear Boon:** ...China has vowed to more than double the installed nuclear generation capacity to 58 gigawatts by the end of the decade. Nuclear installed capacity currently stands at 15.69 GW, according to the latest official data. The eight new Westinghouse reactors will

be built at four locations including Sanmen, in the coastal Zhejiang province, and Haiyang in northeastern Shandong province, where another four Westinghouse AP1000 reactors are under construction. Sanmen's first unit is expected to be connected to the grid in 2015....

CNNC and China General Nuclear Power Group are also holding talks to buy four additional reactors, which will be built in Xudapu in Liaoning province and Lufeng, in southern Guangdong province, Collier said. The projects have already been approved by the government. China's nuclear expansion is attracting many equipment suppliers, including French power firms Alstom and Areva. Candu Energy, a subsidiary of SNC-Lavalin Group, is also working with CNNC to start converting two Candu 6 reactors at Qinshan in Zhejiang province, to burn reprocessed uranium fuel. ...China suspended in 2011 approvals for new nuclear power stations for more than a year and ordered comprehensive ch

proved a basic energy plan that calls for nuclear energy to be a key baseload power source as long as its safety can be assured. The Japan Atomic Industrial Forum (Jaif) said on 21 April 2014 that the plan sees nuclear energy as "a quasi-domestic energy source" offering excellent supply stability and efficiency, along with low operational costs that barely fluctuate. Nuclear also emits no greenhouse gases in the process of generating energy, the plan says.

The plan was released earlier this year in draft form, but at the time Jaif said "adjustments" needed to be made with coalition ruling parties, after which the final plan was discussed and decided upon by the full Cabinet. The final plan says decisions by the NRA on whether or not individual nuclear plants meet safety standards will be respected and that "operations will be resumed accordingly".

Regulatory officials will compile reports on a handful of prioritised plants. The reports will then be put forward for public comment for an additional four

weeks, a statement said. The NRA will also hold town hall meetings in local communities where plants are based to field any scientific and technical questions. Japan has 50 commercial nuclear reactors, but only two, Kansai Electric Power Company's Ohi-3 and Ohi-4, have been restarted since the Fukushima-Daiichi accident. They have since been taken offline for scheduled refuelling and maintenance. The NRA is in the process of reviewing reactors to confirm that they meet new nuclear safety standards, which came into force on 8 July 2013.

Source: <http://www.nucnet.org/>, 21 April 2014.

## **UAE**

### **UAE Nuclear Program Gains Momentum**

With an ambition to generate up to 25 percent of its electricity needs — or 5.6GW — through nuclear means by 2020 nuclear energy has gained momentum in the UAE. The peaceful nuclear power program has been going ahead with various initiatives. The related government departments, has been running programs to educate the public while the body responsible for the project has started recruiting talented Emiratis in different positions. The Federal Authority for Nuclear Regulation (FANR) hosted a public forum in Dubai to provide a better insight into their mission, vision and core values to the public.

Mariyam Fathima, an Emarati house-wife, told Arab News that the public forum was useful as it provided accurate information about the peaceful nuclear program. "Clean and efficient nuclear energy is a must for the future and the authority should conduct such awareness programs in every nook and corner of the country," she said while talking Arab News after the event.... A total of four nuclear energy plants will be constructed by 2020, pending regulatory approvals. The first two plants are already under construction, with the first plant

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scheduled to commence commercial operations in 2017, pending further regulatory approvals. The UAE's peaceful nuclear energy program is one of the most ambitious and exciting projects undertaken by the UAE in the last 40 years, and the development of a skilled and dedicated workforce is critical to its success," ...The new simulators, which are among the world's most advanced nuclear training devices and the first of their kind in the Middle East, will complement ENEC's comprehensive training program and help ENEC to prepare its scholarship students to attain Reactor Operator (RO) and Senior Reactor Operator (SRO) certifications.

Source: <http://www.arabnews.com/>, 24 April 2014.

## **NUCLEAR PROLIFERATION**

### **IRAN**

#### **Iran Missiles Not On Nuclear Talks Agenda: Russia**

Iran's missile program has never been discussed in the talks between Tehran and the P5+1 group, and is not part of the Geneva interim deal, the Russian foreign minister says.

The missile program of Iranians was never part of the discussion, and it was not part of the deal signed in Geneva last November," Sergey Lavrov said in an interview with *Russia Today*...

Iran and the six world powers the US, France, Britain, Russia, China and Germany – sealed the interim deal in Geneva on November 24, 2013, to pave the way for the full resolution of the decade-old dispute over the Islamic Republic's nuclear energy program. The deal came into force on 20 January 2014. In February 2014, Wendy Sherman, the US top nuclear negotiator at the talks with Iran, said during a Senate hearing that the Islamic Republic's ballistic missile program would be addressed as part of a comprehensive nuclear deal.

White House National Security Council (NSC) Spokeswoman Bernadette Meehan also told the Washington Free Beacon website in February 2014 that the US aims to stop Iran's missile tests under a final deal over Tehran's nuclear energy program.

**The UAE's peaceful nuclear energy program is one of the most ambitious and exciting projects undertaken by the UAE in the last 40 years, and the development of a skilled and dedicated workforce is critical to its success.**

However, Iranian officials have time and again stressed that the nuclear issue will be the only subject on the agenda of the talks between Iran and the six powers and that Tehran will not negotiate over its missile capabilities. ...The Russian diplomat said that every time a

deal is signed, "the Americans start to put the blame for any delay on others or, even worse, they start to throw in new demands which absolutely contradict the reached consensus."

Source: <http://www.presstv.ir/>, 24 April 2014.

### **NORTH KOREA**

#### **North Korea Could Conduct Fourth Nuclear Test 'At Any Time' To Protest Obama's Visit to Seoul, South Says**

South Korea has warned that the North could be planning a fourth nuclear test to ramp up tensions ahead of President Barack Obama's forthcoming visit to Seoul.... "North Korea is at a stage where it can conduct a surprise nuclear test at any time depending on the decision of leader Kim Jong-un," he said. The military is aware the movement at the site could be a bluff, he added.

South Korean President Park Geun Hye sought China's help dissuading North Korea from any nuclear test, after signs of preparations at the North's test site. She discussed the activity at the Punggye-ri site with Chinese President Xi Jinping over the phone and asked him to try to persuade Kim Jong-un's regime not to conduct a test, her office said in a statement on its website.

Convincing North Korea to renounce its nuclear program is a centerpiece of US policy in Asia, and Obama will discuss the issue when he meets separately with Park and Prime Minister Shinzo Abe of Japan, which is within range of the North's ballistic missiles. ...Commercial satellite imagery shows increased activity at North Korea's nuclear test site but not enough to indicate an underground atomic explosion is imminent, a US research institute said. Satellite imagery from recent weeks indicates increased activity in the main support area of the test site, 38 North said on its website.

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In its analysis, 38 North said that in addition to the materials seen outside two tunnel entrances in the south of the site, over the past six weeks, there's been an uptick in activities at a support area at Punggye-ri that was used for managing operations for the last test. An 19 April 2014 image also shows a large trailer truck travelling down the road away from the test site. The level of activity "falls short" of what has been observed immediately before previous tests, according to 38 North, which is run by the US-Korea Institute at the Johns Hopkins School of Advanced International Studies.

A test during Obama's visit to Seoul "may be possible but appears unlikely based on the limited commercial satellite imagery available and observations of past North Korean nuclear tests," 38 North said. "Recent operations at Punggye-ri have not reached the high level of intensity in terms of vehicle, personnel and equipment movement that occurred in the weeks prior to past detonations."

Obama is visiting Seoul as part of an Asia tour, and it has been speculated that the North may stage a provocation to coincide with the trip. Obama's visit to South Korea coincides with an April 25 holiday in the North to celebrate the founding of its army, a day generally marked by military parades showing off the regime's latest weapons. North Korea fired 87 missiles during February and March to partly coincide with joint US and South Korea military drills, which the country denounced as a dress rehearsal for an invasion. Opening a four-country swing through the Asia-Pacific region, Obama is aiming to promote the US as a committed economic, military and political partner.

Another test explosion would deepen international concern about the North's development of weapons of mass destruction, and doubtless anger and embarrass China. Washington and its allies would push to tighten UN sanctions against Pyongyang. The regime conducted its last nuclear test in February 2013, three weeks after the UN increased sanctions against it following the launch of a long-range rocket and satellite the previous December. The nuclear device had an estimated yield of 6 to 7 kilotons, bigger than previous tests in 2006 and 2009....

Source: <http://news.nationalpost.com/>, 23 April 2014.

NUCLEAR NON PROLIFERATION

GENERAL

P5 Nuclear Non-Proliferation Conference Concludes

P5 delegates the five nuclear weapon states who are signatories to the Nuclear Non-Proliferation Treaty (Britain, China, France, Russia, the US) — met in Beijing on April 14 and 15 for a nuclear non-proliferation conference. The focus of this year's meeting was "Enhancing Strategic Confidence and Working Together to Implement the Nuclear Non-Proliferation Review Outcomes." At the conclusion of the meeting, the P5 issued a joint statement.

**Another test explosion would deepen international concern about the North's development of weapons of mass destruction, and doubtless anger and embarrass China. Washington and its allies would push to tighten UN sanctions against Pyongyang.**

"The P5 had an exchange of views on their nuclear doctrines, strategic stability, and international security from their individual country perspectives to gain better understanding and build strategic trust. They also discussed the importance of verification in achieving progress towards further disarmament and ensuring the success of nonproliferation efforts." During the conference, Russia and the US provided briefings on the status of the New START Treaty's implementation and on the implementation status of the Agreement Between the Government of the US of America and the Government of the Russian Federation Concerning the Disposition of Highly-Enriched Uranium Extracted From Nuclear Weapons.

Delegates discussed issues of transparency, confidence-building, and verification. In an "endeavor to enhance transparency and mutual understanding," the P5 reported that delegates "visited the Chinese National Data Centre for the implementation of the CTBT."

The P5 expressed concern regarding states that have not yet entered into the nonproliferation regime, and urged those states to do so in accordance with UN Security Council resolutions and in collaboration with the IAEA. Member states voiced their support for the convening of a conference for Middle East states focused "on the establishment of a Middle East zone free of nuclear weapons and all other weapons of mass destruction, on the basis of arrangements freely arrived at by the states of the region."

Source: JC Finley, <http://www.upi.com/>, 16 April 2014.

**UAE**

**Praise for UAE Stand on Non-Proliferation**

The UAE can help lead the discussions to establish a Middle East zone free of nuclear weapons and weapons of mass destruction, said a senior official at the Japan Atomic Energy Commission. Nobuyasu Abe, the organisation's newly appointed commissioner, said the UAE could play a role on a non-proliferation aspect. "It has signed and ratified the IAEA additional protocol and the US-UAE nuclear cooperation agreement which commits the UAE not to work on uranium enrichment or plutonium separation....

"Insofar as the UAE can contribute to constructive discussions, it should be encouraged to do so," he said. "UAE efforts within the Gulf, within the Arab League, and within the broader region to help construct a practical agenda in which all parties have a stake in participating in WMD discussions should be accelerated." Hamad Alkaabi, ambassador to the IAEA, said the Emirates contributed to the establishment of a WMD-free zone in the Middle East.

Although Egypt led the idea of such a zone in the previous review conference of the NPT, no progress has been made.... "The UAE is a model of nuclear best practices in the Middle East .... It has agreed to forgo uranium enrichment and plutonium reprocessing, it is being very diligent about developing nuclear regulations, and at The Hague Nuclear Security Summit, it signed on to a new initiative to fully implement IAEA nuclear security recommendations."

Other countries at the summit, including Jordan and Saudi Arabia, did not sign the initiative. "So the UAE is showing that it is a responsible nuclear leader in the region," Mr Luongo said.

Source: <http://www.thenational.ae/>, 19 April 2014.

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**NUCLEAR SAFETY**

**FRANCE**

**French Nuclear Watchdog Singles Out 3 Plants for Safety Shortfalls**

France's nuclear watchdog singled out three of EDF's 19 nuclear power stations for having a below-average safety performance in its annual safety report, which also asked for more enforcement powers such as the ability to impose fines. The watchdog said the state of nuclear safety in France in 2013 was satisfactory overall but said the French utility's Bugey, Chinon and Civaux plants had recurring problems that required improvements. "These plants are not dangerous, but they have shortfalls," Pierre-Franck Chevet, head of the ASN nuclear safety authority, said at a news conference.

There were 127 level-1 incidents on the 7-level INES in France in 2013, ASN said, and two level-2 incidents. Level-1 incidents are minor procedural infringements and level-2 incidents can refer to cases of minor exposure to radiation. The plant in Chinon, in western France, was below average in terms of nuclear safety and impact on the environment, he said. ...The Bugey plant near Lyon had more one-off problems related to the piloting of the site during a few weeks last summer, he said, while the Civaux plant in the west had procedure breaches, including in the reporting of incidents, Houdre said.

The watchdog also mentioned shortfalls in terms of radiation protection at Cattenom near the German border and in terms of impact on the environment at Belleville in the Loire valley, Chooz near Belgium, and Chinon. Chevet said the ASN needed a more graduated array of sanction powers on operators such as EDF. The watchdog can at anytime stop operations at a nuclear plant if it considers it presents a danger for the public and can also issue public warnings, but Chevet said an ability to impose fines for each day of safety breaches would be

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useful. "We clearly lack intermediary sanction tools, for when shortfalls last for one, two, three years, but don't require a shutdown of the plant," he said....

Source: <http://af.reuters.com/>, 16 April 2014.

## USA

### **New Mexico's Radiation Leak at Nuclear Waste Dump Caused By Poor Management, Eroding Safety Culture**

Poor management, an eroding safety culture, ineffective maintenance and a lack of proper oversight are being blamed for a radiation release that contaminated 21 workers and shuttered the federal government's nuclear waste dump two months ago in southeastern New Mexico, Associated Press reports.

The series of shortcomings are identified in a report to be released by the US Department of Energy's Accident Investigation Board and are similar to those found in a probe of truck fire in the half-mile-deep mine just nine days before the 14 February 2014 radiation release from the Waste Isolation Pilot Project (WIPP) near Carlsbad.

With the source of the leak still unknown, the Department of Energy's investigation focused on the response to the emergency and to the safety and maintenance programs in place. Shortcomings were found at almost every step, from a more than 10-hour response to the initial emergency alarm to a bypass in the filtration system that allowed the radiation to escape above ground.

... The report also found that much of the operation failed to meet standards for a nuclear facility; a lack of proper safety training and emergency planning; lagging maintenance; and a lack of strategy for things like the placement of air monitors. Problems with oversight by the Department of Energy also were cited. Bob McQuinn, who took over as head of the contractor that runs the plant shortly after the release, acknowledged mistakes by Nuclear Waste Partnership. He also detailed a series of changes in management, training and operations to "assure that every hazard that is posed by WIPP is examined" and proper safeguards are put in place to make the operation "a world-class nuclear operation."

Crews are still working to identify the source of the leak, which sent low levels of radiation into the air

around the plant, but officials believe it occurred in the area where toxic waste was last being handled...Waste at the plant is stored in panels, which are a series of rooms cut out of underground salt beds. Five of those panels are full and have already been sealed. Panel 6 is full but has not yet been sealed. Panel 7 is the current active storage area, where contamination was found last week.

A team made it back into Panel 7, but did not find any evidence of a roof collapse or damaged waste containers. The dump is the federal government's only permanent repository for waste from decades of building nuclear bombs. Workers at a nuclear waste plant in the US state of New Mexico would enter the facility's underground dump next week to investigate the cause of a radiation leak that had shut down the facility last month, US media reported....

The US Department of Energy said an initial crew of eight workers were scheduled to be sent down the Waste Isolation

Pilot Plant (WIPP) early next week, local TV KOB reported. The WIPP was shuttered on 14 February 2014 when air sensors detected unusually high levels of radioactive particles on its underground levels. It had been kept closed as reports came that small amount of radiation was detected both at the underground and surface levels. Previously 17 workers were confirmed positive for radiation. Four more workers were undergoing additional tests to see if they were exposed, according to the Energy Department.

The prolonged closure of the repository has forced Los Alamos National Laboratory, a nuclear weapons manufacturing facility in New Mexico which used to store its refuse at the plant, to relocate its radioactive waste to Texas. The cause of the radiation leak still remained unknown. A truck fire was reported at the underground site on 05 February 2014 and prompted evacuations, but officials said the fire was in a different part of the site and did not seem related to the leak.

The repository stores "transuranic waste" leftover from nuclear weapons research and testing from the nation's past defense activities, according to the Energy Department. The waste includes clothing,

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tools, rags and other debris contaminated with radioactive elements, largely plutonium. Workers at US nuclear waste plant to probe leak in toxic dump next week

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Source: <http://voiceofrussia.com/>, 24 April 2014.

**NUCLEAR WASTE MANAGEMENT**

**CANADA**

**Planned Nuclear Waste Facility Raises Fears for Great Lakes**

Some materials that would be stored in a proposed underground nuclear waste facility less than a mile from Lake Huron are hundreds of times more radioactive than was told to Canadian government officials considering the site. That revelation was brought to light by Frank Greening, a nuclear scientist

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**The new findings heighten the concerns many have over the nuclear waste facility's proximity to the Great Lakes, from which 24 million US residents get drinking water and that makes possible Michigan's \$2-billion fishing, \$4-billion boating and \$18-billion tourism industries.**

who once worked for Ontario Power Generation, the utility seeking the deep geologic repository to store low- to intermediate-radioactive waste in Kincardine, Ontario, about 111 miles northeast of Port Huron on the Canadian side of Lake Huron.

Greening's finding, along with a February 2014 accident at a similar underground nuclear waste storage facility in New Mexico that left workers on the surface exposed to radiation, has Canada's joint review panel

Left asking new questions about the viability of the Kincardine project, and residents up in arms.

The new findings heighten the concerns many have over the nuclear waste facility's proximity to the Great Lakes, from which 24 million US residents get

drinking water and that makes possible Michigan's \$2-billion fishing, \$4-billion boating and \$18-billion tourism industries. The understated radiation levels involved pressure tubes, a component of nuclear reactors through which nuclear fuel moves. "Of all the wastes the nuclear industry has to deal with, fuel is the worst — but that

is known and it's treated differently," Greening said. "The next is things like pressure tubes."

The products created during atomic fission can deposit on the tubes, he said. With one type of radioactive fission by-product in particular, the metal cesium, OPG's numbers "are 1,000 times lower" than the actual radioactivity level that can be expected, Greening said. The Nuclear Waste Management Organization, a government agency responsible for long-term management of Canada's spent nuclear fuel, has provided OPG with technical expertise on its application for the underground nuclear waste storage site.

Paul Gierszewski, the director of the organization's safety and licensing division, responded to Greening's letter "with the concurrence of OPG" and agreed with him that several pressure tube-related radioactivity estimates "were underestimated by more than a factor of 100." But that doesn't change the ultimate conclusion that the repository will be

safe, OPG spokesman Neal Kelly said. "We have checked the revised radioactivities, and the safety case remains valid," he said.

Greening questions that conclusion. ...The Joint Review Board also is asking OPG whether its worst-case scenarios for "accidents, malfunctions and malevolent acts" need to be revised in light of an incident at the Waste Isolation Pilot Plant, or WIPP, near Carlsbad, N.M., a facility similar to the one proposed in Kincardine. ...The cause of the incident is still under investigation, and OPG officials are awaiting its findings, Kelly said. "As information becomes available, OPG will review and determine what the implications or lessons learned would be for our proposed Deep Geologic Repository project," he said.

The utility has already planned for contingencies, such as an underground vehicle fire that occurred at the New Mexico facility nine days before the release of radiation. Safety measures would include fire suppression technology on vehicles and throughout the underground facilities, Kelly said. Once the Joint

Review Panel reviews OPG's responses, it will schedule additional public hearing days for input on the new areas of inquiry, panel spokeswoman Lucille Jamault said.

After a closing comments period for "registered participants" and OPG, the Joint Review Panel will submit an environmental assessment report to Canada's Minister of the Environment "outlining its conclusions, rationale, and recommendations," Jamault said. After the minister decides on the significance of any adverse environmental effects, the Federal Cabinet will decide whether those effects are justified. The Joint Review Panel could then be authorized to make a decision on OPG's application, Jamault said. The government decision is expected within four months of the submission of the panel report to the Minister of the Environment, she said. Meanwhile, lawmakers on the Michigan side of Lake Huron continue to voice concerns about the project....

*Source: <http://www.freep.com/>, 13 April 2014.*



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