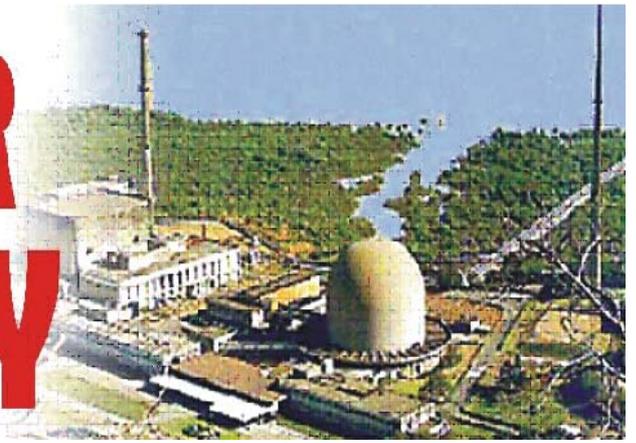


NUCLEAR SECURITY



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

Vol. 8, No. 05, 01 January 2014

OPINION – Khaled Ahmed

With A Little Help from Pakistan

After Pakistan began its pursuit of nuclear weapons, many Pakistanis thought the nuclear bomb would be an Islamic bomb, in line with the country's "creation myth" that it would have a pan-Islamic vision. In 1998, Pakistan tested its bomb, officially saying it was an India-specific weapon in response to India's own development and testing of one, which India swore was not Pakistan-specific. But no one believed it was strictly a "bilateral" bomb. There is evidence that, far from being an Islamic bomb, Pakistan had produced a "Sunni bomb" that threatened Iran.

There was a moment in Pakistan's funny history of bomb-making when the nuclear egg it was going to lay would be a Sunni bomb. Post-revolution Iran was scared of the old Pak-Saudi equation as it eyed the coast across the Gulf once known as the Persian Gulf. It saw Pakistan's developing bomb as a trigger of Iran's vulnerability. It knew that General Zia, gestating the radioactive foetus, was greatly beholden to the Saudis and had probably signed a secret defence deal with the Gulf Cooperation Council (GCC) created by Saudi Arabia in 1980. It got in touch with second-in-command to Zia, General Aslam Beg, and the "father" of the Pakistan bomb, A.Q. Khan, and secretly purchased nuclear secrets that would put Iran on the nuclear road. The rest is history, including the mysterious death of General Zia, who could have been about to become wise as to what a general serving under him and an uncontrolled proliferating nuclear scientist had done: causing a Shia bomb to be born.

As Ray Takeyh of the Council on Foreign Relations notes in his book ; Hidden Iran: Paradox and Power in the Islamic Republic (2006), Iran was disturbed about a nuclear Pakistan falling to Arab-funded, Shia-hating al-Qaeda, as assisted by the deep state in Pakistan. In 1998, when Iran and the Pakistan-backed Taliban government nearly came to blows on the Iran-Afghanistan border, Tehran got even more scared.

Takeyh writes: "The possibility of the collapse of the current military government [General Musharraf] and its displacement by a radical Sunni regime with access to nuclear weapons is something Iran feels it must guard against. Pakistan's nuclear test in 1998 caused considerable anxiety in Tehran, with Rafsanjani stressing, 'This is a major step towards proliferation of nuclear weapons. This is a truly dangerous matter and we must be concerned.' Foreign minister Kamal Kharrazi also mused, 'This was one genie that was much better to have stayed confined. Along with Iraq, Pakistan is a potential threat that Iran must take into consideration as it plots its defence strategy.'" The latest news is that Saudi Arabia is about to call in its secret cards and ask Pakistan to give it some bombs from the arsenal of over 100 bombs it has in the attic while people agitate on the streets for bread.

This month (December 2013), the Wall Street Journal quoted Prince Al Waleed bin Talal bin Abdulaziz Al Saud as saying that "If Iran does go nuclear, Saudi Arabia may not be far behind. It has options. Riyadh underwrote Pakistan's atomic-bomb programme and keeps the country's economy afloat with its largesse. The arrangement with Pakistan is too strong to dismiss an almost overnight nuclearisation of the Arab peninsula with their help. Pakistani Prime Minister Nawaz Sharif, who returned to power in June 2013, lived in Saudi exile after a 1999 military coup. Nawaz Sharif, specifically, is very much Saudi Arabia's

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man in Pakistan.”

Saudi Arabia’s anger against the US was on a low boil for a long time. The Americans facilitated Iran by destroying the Saudi-aided Taliban in 2001, then destroyed Saudi and Gulf-funded Saddam Hussein, followed by walking out in 2013 of a commitment to punish the Iran-supported Assad regime in Syria.

Will Pakistan proliferate for Saudi Arabia too? Pakistan’s nuclear physicist Pervez Hoodbhoy no Islamist-with-a-flowing-beard and no bomb-maker thinks it won’t. In a recent article, he stated: “Perforce, Saudi Arabia will turn to Pakistan for nuclear help. This does not mean outright transfer of nuclear weapons by Pakistan to Saudi Arabia. One cannot put credence on rumours that the Saudis have purchased nuclear warheads stocked at Kamra air force base, to be flown out at the opportune time.” Members of the NPT will pounce upon Saudi Arabia and Pakistan if that were to happen without Russia and China helping the Saudis, despite China’s recent investments in Saudi Arabia.

He notes that the Saudis gave free oil to the Nawaz Sharif government faced with empty coffers after the 1998 test; a prince also visited Kahuta, where A.Q. Khan was already proliferating to his heart’s content. Saudi Arabia has the money to buy a lot of nuclear reactors for electricity generation whose spent fuel can yield plutonium to make the bomb. But despite its many world-class universities, it won’t have the scientific manpower needed to complete the cycle. It will borrow Pakistani manpower seduced by astronomical salaries but putting it down to religious passion of the Sunni variety from Pakistan’s nuclear complex: the Pakistan Atomic Energy Commission, Khan Research Laboratories, and the National Defence Complex.

All this looks impossible to achieve. The Saudis may not get the reprocessing outfit with the West watching it closely. What, then, is the final way out for the Saudis, who are furious at the Americans for letting Iran get the upper hand in the region by half-accepting Tehran’s Shia bomb? One can imagine only one scenario, even if it looks tough today: get Pakistan to give a nuclear shield to Saudi Arabia; the Pakistani bomb will deter an Iranian bomb. But something will need to happen before this happens.

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Pakistan will have to be “conquered” by al-Qaeda and its Taliban warriors.

People say the world won’t let this happen, but we are looking at Pakistan’s population actually shifting its loyalty to the Taliban from a dysfunctional state, based on an all-party conference resolution against American drones in favour of “peace talks” with the terrorists that many observers think is

disguised surrender. The Shia-killing sectarian mayhem is on while the nation speaks with one voice against America and any general who says Pakistan is threatened from within may be in danger of being killed by his own officers, as Musharraf found out after he became America’s partner in the war against terror.

Former Iranian president Ahmadinejad, who implied that the Iranian bomb will be Israel-specific, is gone and the Iranian bomb doesn’t threaten Israel any more in fact, it never did. Now that the Saudis think it threatens them, a Shia-killing Pakistan, on the brink of bankruptcy, may have to re-target its nukes from east to west under a Taliban caliphate. But if the Saudis get a bomb from Pakistan, the Israeli bomb will perk up too and the world might have to deal with four bombs in the region.

Arch-conservative American politician Patrick J. Buchanan thinks what we are seeing today is the “Second Period of Islamic Power” as predicted by Catholic apologist Hilaire Belloc in 1938. The Shia bomb of Iran will show the underside of this second period: Muslims will indefinitely kill and possibly, finally, annihilate fellow Muslims with nuclear weapons, while the West and America “decline nicely” for another 500 years.

Source: Author is consulting editor with ‘Newsweek Pakistan’, <http://www.indianexpress.com/>, 21 December 2013.

OPINION-A.H. Nayyar, Parvez Hoodbhoy and Zia Mian

Nuclear Karachi

This will be by far the largest nuclear construction project ever in Pakistan. It is not too late to ask a few basic questions so that people, especially those living in Karachi, know what they may be letting themselves in for. Everyone

knows the new reactors are being purchased from China. They will be designed and built by the China National Nuclear Corporation (CNNC).

What people may not know is that the reactors will be based on a design known as the ACP-1000 that is still under development by this Chinese nuclear power company. In effect, Pakistanis are buying reactors for the Karachi site that so far exist only on paper and in computer programmes there is no operating reactor in China based on this design. It was reported in April 2013 that the CNNC, the developer of the ACP-1000, had completed a "preliminary safety analysis report", and was "working on construction design".

This means so far there is not even a complete design. Since the new Karachi reactors will be the first of a kind, no one knows how safe they will be or how well they will work. The 20 million people of Karachi are being used as subjects in a giant nuclear safety experiment. The Fukushima nuclear accident has shown that safety systems can fail catastrophically. The accident in 2011 struck Japanese reactors of a well-established design that had been operating for decades. Still, all kinds of things happened that were not expected by the reactor operators or managers or by nuclear safety authorities.

An important lesson of Fukushima is that nuclear establishments underestimate the likelihood and severity of possible accidents. Another important lesson is that these same establishments overestimate their ability to cope with a real nuclear disaster. At Fukushima, the nuclear authorities failed dismally despite Japan's legendary organisational capability, technological sophistication and social discipline.

Nearly 200,000 people living close to the Fukushima reactors were evacuated and some may never be allowed

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All of Karachi falls within 40km of the reactor site. So far, there have been no public hearings or discussions of the suitability of the site for the new Karachi reactors. There is no report of an Environment Impact Assessment for the proposed new Karachi reactors. Neither the PAEC nor the Pakistan Nuclear Regulatory Authority has explained what will happen in case of an accident at the proposed reactor.

to return. Radiation was blown by the wind and contaminated the land to distances of over 30 km. The US suggested its citizens living in that area of Japan move at least 80km away from the reactor. The government of Japan considered forced evacuation of everyone living within 170km of the reactor site and organising voluntary evacuation for people living as far as 250km from the plant. Contaminated food and water was found at distances of 250k.

The financial cost of the clean-up so far is estimated to be about \$100 billion and could eventually be much higher. So how big, how dangerous

and how costly is the nuclear experiment about to be carried out in Karachi? An analysis undertaken in 2011, by the science magazine Nature and Columbia University in New York showed that the nuclear reactor site in Karachi has more people living within 30km than any other reactor site in the world.

It found that in 2011, there were eight million Karachi citizens living within this distance of the reactor. All of Karachi falls within 40km of the reactor site. So far, there have been no public hearings or discussions of the suitability of the site for the new Karachi reactors. There is no report of an Environment Impact Assessment for the

proposed new Karachi reactors. Neither the PAEC nor the Pakistan Nuclear Regulatory Authority has explained what will happen in case of an accident at the proposed reactor.

A preliminary study by one of the authors found that the plume of radioactive material that could be released from a severe

nuclear accident could be blown eastward by the wind over the city, engulfing the most populous areas of Karachi. There is also no information on the terms for the supply of nuclear fuel, such as how long the very hot, intensely radioactive spent nuclear fuel will stay at the site and how will it be safely stored until it is returned to China, if it is returned at all...

Finally, there is no information on what emergency plans, including for possible evacuation, have been drawn up as part of preparing for these large new reactors. There is no information whether such plans even exist. Here is a question for those in charge of Karachi, in charge of Sindh and the federal authorities in Islamabad: how do you propose to evacuate many millions of people from Karachi in case of a severe nuclear accident at the new reactors? One expects mass panic, with people deciding to save themselves and their families as best as they could, clogging the roads, and delaying the escape of others closer to the reactor. Can any planwork in such an environment?

The US\$9.1 billion deal of two nuclear reactor sale, to be installed in Karachi coast, will be done through 82 per cent financing by China. This sale as claimed by China to be under the grandfathering clause, would be in addition to the sale of nuclear reactors for Chashma 1 and 2, the one which was expressly provided and had been agreed upon in a pre-NSG Sino- Pak nuclear cooperation agreement on 04 May, 2004 before China joined the NSG in 10 June 2004.

Finally, there is the cost in terms of money. Reports suggest the two reactors may cost \$9-10 billion. They will be paid for by taking loans from China. There is little information on the details of the financing of the reactors, including the final cost of decommissioning and waste disposal. There is not even a publicly available government study showing that these reactors are the least-cost option for producing the expected amount of electricity.

The issue of cost also must include the consequences of accidents. If there is an accident at the new Karachi reactors due to a problem with the reactor design or the construction, who will pay the vast sums needed to cover the damage and clean-up — Pakistan or China? The people of Karachi have a right to know the answers to these questions. It is time they started asking.

Source: <http://www.dawn.com/>, 16 December 2013.

OPINION - Manish Vaid

China's Reactor Sale to Pakistan: A Nuclear Mistake?

By moving ahead with its plan to sell its nuclear reactors to Pakistan, China has put the cat among the pigeons. The deal between the China and Pakistan is said to be unique on two counts; first, this will constitute the first ever foreign sale by China's indigenous 1,100 MW nuclear reactor series, called Advanced China Pressurised- 1000

(ACP-1000) and second, the same has been smartly re-engineered by China after it got hold of the technology during the first nuclear reactor sale by the US's Westinghouse to them in 2007. The US\$9.1 billion deal of two nuclear reactor sale, to be installed in Karachi coast, will be done through 82 per cent financing by China. This sale as claimed by China to be under the grandfathering clause, would be in addition to the sale of nuclear reactors for Chashma 1 and 2, the one which was expressly provided and had been agreed upon in a pre-NSG Sino- Pak nuclear

cooperation agreement on 04 May, 2004 before China joined the NSG in 10 June 2004. But the concern is that China, who, while joining this group has pledged to accept NSG guidelines by not selling any nuclear reactors to Pakistan, has actually contravened the same with this sale of ACP-1000. Though, open assertion behind such deal by China and Pakistan in recent times is linked to Pakistan's severe energy crisis and Chinese Premier Li Keqiang's commitment to support for this cause during his visit to Pakistan further testify this, yet the same is believed to be largely meant to balance India's ties with the US and Japan which are now extending on nuclear energy front as well. In case of Japan, for instance, the article titled, "India gets close to Japan at its own peril", published in Communist Party backed Global Times, clearly pinpoints the Chinese belief of India's strategy of getting closer to Japan as a balancing tactics against China. But, the sketch of China's aggressive posture on its nuclear policy with Pakistan in South Asian region has already been drawn post the Indo-US civil nuclear deal.

Renmin Ribao, China's leading political daily, while accusing Washington of being soft on India and deriding the NPT, stated, "A domino effect of nuclear proliferation, once turned into reality, will definitely lead to global nuclear proliferation and competition." China's concerns are more with India becoming a rising power and Indo-US nuclear deal further strengthens its dream to become a big power. This was aptly stated in People's Daily Online, "...the US has explicitly proposed in the agreement that it would not hamper or intervene in the development of India's military nuclear plan, which will also help the country to achieve its

its goals to be a nuclear power". These instances of China's view towards Indo-US nuclear deal was despite of its appreciation of the fact that the same could have the potential to support and strengthen India's energy security. But for India the next goal was to gain a waiver from NSG to carry forward nuclear trade with the US, followed by opening avenues with other nuclear states.

It took more than three years for the Indo-US civil nuclear deal to come to fruition. The former US President Bush and India's PM Singh announced their intention to enter into the nuclear agreement on 18 July 2005 and it was only on 10 October 2008, when the deal, also known as 123 Agreement became operational. In this process it had to cross two big hurdles, namely; IAEA approval of safeguard agreements with India and granting of waiver by 47-member NSG to access civil nuclear technology and fuel from other countries. It was on 01 August 2008, that IAEA board members paved a way for allowing India to add facilities over time to be placed under IAEA safeguards. This was followed up by the waiver to India on 06 September 2008 with consensus, after China along with few other countries acceded to the same.

Following its concerns on Indo-US civil nuclear deal, China continued to criticise the US efforts to provide a "clean waiver" for India at IAEA and NSG. And despite of the fact China endorsed the deal by saying, 'that it will not stand in India's way in the NSG' while granting waiver to India, the Chinese staged a walkout at the eleventh hour in NSG meeting in Vienna to the displeasure of India. Beijing which later unwillingly took a softer line on such waiver, appealed for similar such favour to Pakistan indirectly as stated by Cheng Jingye, Head of Chinese delegation in NSG meeting, "It is also China's hope that the NSG would equally address the aspirations of all parties for the peaceful use of nuclear power while adhering to the nuclear non-proliferation mechanism".

But given the past nuclear history of Pakistan both the US and NSG have already refused to provide a similar status to Pakistan, hitting hard on the aspirations of China's balancing act in South Asia. It was largely due to such isolation that China agreed on assisting Pakistan in building two more atomic reactors, the Chashma-3 and 4, during the visit of Pakistan's then President Zardari to Beijing in October 2008. This was clearly in response to US repudiation of similar such deal with Pakistan and just a month after NSG granted waiver to India.

The problem thus starts here when Beijing claims that the Chashma-3 and 4 too have grandfathered, as its deal was signed with Pakistan before China become a member of NSG. Mark Hibbs, an atomic energy expert in the Carnegie Endowment, states that China's list of nuclear items, which it intends to provide Pakistan did not include additional power reactors beyond those already agreed upon, i.e. Chashma-1 and 2. Therefore, sale of additional reactors to Pakistan was contrary to the guidelines of NSG, and China therefore, ignored taking the permission of all NSG members.

It could be one of these reasons why China is also against India's entry as NSG member as any sale of nuclear material requires approval of each member and India is expected to play a spoil sport for any nuclear exports by China to Pakistan, unless the later too becomes a member of NSG.

Recent developments around border tensions between India and Pakistan and India's nuclear diplomacy towards countries like Japan and Australia too is shaping China's perception towards India in this region. India's recent border tensions with Pakistan resulting from consistent ceasefire violation, for instance, has stalled all the CBM that had been taken by these countries just before Nawaz Sharif became Pakistan's PM. Sharif, who at present feels incompetent to stop consistent ceasefire violations, is feeling the heat, particularly after the halt of all crossborder energy trade, which India had offered to Pakistan, amidst its severe energy crisis under CBM mechanism.

This compelled Pakistan to look aggressively towards China for its support towards crippling energy sector, which is in dire straits. China was quick to support Pakistan in its hunt of energy needs and spearheaded its nuclear trade. But it was India's recent diplomatic efforts couple with those of Japan and Australia, which had further repercussions in China's strategy towards its nuclear trade with Pakistan.

With more countries aligning their nuclear interest with India, the Chinese could get more antagonistic towards India and closer to Pakistan on the nuclear front. Further, more than China's relentless support towards Pakistan's nuclear goal, India is worried about nuclear materials going into the hands of terrorists on whom Pakistan has no control. This suspicion intensifies when Pakistan, despite keeping its specific nuclear reactors under IAEA's safeguards, fails to demarcate its civil and nuclear programs. As far as China's support in meeting Pakistan's energy needs, India would hardly be having any problem,

as it was already negotiating the energy deals with Pakistan in recent times.

In the context of nuclear reactor sale to Pakistan, the crux of the problem lies in the guidelines of the NSG, which has faced consistent challenge, particularly with respect to export of nuclear reactors by China to Pakistan. As mentioned before, China wants Pakistan to have similar status and be at par with India with respect to civil nuclear trade and commerce. India, due to its excellent non-proliferation record has been awarded exemption from NSG from comprehensive safeguards standard.

But India along with the US does not see any reason for granting of a similar status to Pakistan as it cannot be in any way comparable to that of the latter. India's export control framework matches the global standards while its additional commitment places it in "NPT plus" category besides increasing confidence in the international community. India being the only non-NPT country has shown its commitment towards the non-proliferation objective by signing an additional protocol.

But as far as NSG guidelines are concerned it has somehow failed to stop China from exporting nuclear reactors, which cited the grandfather clause to justify its planned assistance to Pakistan's nuclear energy program, particularly in case of Chashma-3 and 4 reactors. Due to inherent ambiguity of being a voluntary multilateral arrangement the guideline itself is not enforceable. It has no mechanism to resolve disputes about differing interpretations of the guidelines and its provisions do not penalise a member country in case it violates those guidelines.

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It may be noted that all the safeguards agreements concluded by Pakistan are governed under the Safeguards Document INFCIRC/66/Rev.2, which is a model for countries not party to NPT. This exempts Pakistan from undergoing Comprehensive Safeguards Agreement (CSA). This also allows Pakistan to freely choose the provision of the Additional Protocol, a mechanism enlarging the scope of IAEA to check for clandestine nuclear activities.

However, with new NSG guidelines in place, export of ENR technology has become conditional. It excludes those countries which don't have catch-all requirement of full scope safeguards and are non-signatory to NPT. This clearly will bring greater degree of control on Sino-Pak nuclear trade. But India due to its waiver from NSG is out of its scope and with assurances of countries like the US and France which keeps India in a unique

position which puts to rest India's future nuclear trade concerns. (It may be noted that all the safeguards agreements concluded by Pakistan are governed under the Safeguards Document INFCIRC/66/Rev.2, which is a model for countries not party to NPT. This exempts Pakistan from undergoing Comprehensive Safeguards Agreement (CSA). This also allows Pakistan to freely choose the provision of the Additional Protocol, a mechanism enlarging the scope of IAEA to check for clandestine nuclear activities.) Therefore, with an introduction of these new guidelines, Pakistan would automatically be placed under CSA, while bringing its civil and nuclear facilities under IAEA safeguards and fulfilling subjective criteria.

Source: <http://www.eurasiareview.com>, 17 December 2013.

OPINION – Yu Ligong

Why is China Entering a Nuclear Security Pact with Ukraine?

China and Ukraine on 05 December 2013 signed a cooperative agreement which included this article: China, according to the UNSC Resolution 984 and the Chinese government statement on providing security guarantees to Ukraine on 04 December 1994, promises unconditionally not to use or threaten to use nuclear weapons against non-nuclear Ukraine, and to provide security guarantees to Ukraine if Ukraine is attacked by nuclear weapons or threatened by such

aggression. Clearly, this is a guarantee for strategic alliance and an unusual nuclear protection umbrella. Ukraine is far from China and in no way affects the latter's national security. What, then, is the need for such an agreement?

First, we need to examine UNSC 984, which promotes nuclear non-proliferation and encourages denuclearization. To achieve its goals, the agreement not only requests the Security Council to regulate countries who may carry out nuclear attacks or threaten to do so, but also promises to offer emergency assistance to their targets. Emergency assistance may refer to non-military aid, but a security guarantee definitely means military support. Second, the Chinese government's announcement about offering security guarantees to Ukraine didn't mention nuclear attacks or the threat thereof, but this time its guarantees focus on nuclear weapons. Therefore, the two are quite different.

Then, under the agreement, against the threat of which party will China offer security guarantees to Ukraine? As we know, bordering Ukraine is Russia, a nuclear power and Belarus, which had 81 nuclear missiles stationed in its territory at the collapse of the Soviet Union in 1991, though these were all transferred to Russia by 1996. Ukraine inherited 5,000 nuclear weapons when it gained independence and may still

Ukraine inherited 5,000 nuclear weapons when it gained independence and may still have some nuclear weapons undestroyed. Under such circumstances, the NATO would not dare to attack Ukraine. It is likewise inconceivable that Russia would start a military conflict with Ukraine, because the Kiev region was once the cradle of the common culture of Russia, Belarus and Ukraine as early as in the ninth century.

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On the surface, Ukraine does have some pro-US forces demanding to move closer to the EU as soon as possible. In fact, some of the western Ukraine's youth groups trained and aided by some western NGOs have yet to reach the status of possibly destroying their cultural connection and race recognition. Therefore, chances for their collaboration with foreign forces to result in the case of military tension are also very slim.

Then, what's Beijing's real intention? I believe its main purpose is to amend its consistent position of "no first use of nuclear weapons." This is probably the reason why countries in the East China Sea and South China Sea have dared to provoke China in recent years over territorial claims. Since Xi Jinping and Li Keqiang took office, they have repeatedly taken new measures that are in contrast to Beijing's previous low-profile move to conceal its capability that's probably because it's a reaction provoked by other neighboring countries or an inevitable result after it has significantly raised its compound power.

Source: <http://www.wantchinatimes.com/>, 15 December 2013.

OPINION -Prashant Reddy Thikkavarapu

The Safety Imperative

One would expect a country that has witnessed an industrial disaster like the Bhopal gas tragedy to be especially sensitive to the issue of regulating dangerous industries and untested technologies. Unfortunately, India remains a country where the financial markets and telecom markets are better regulated than the nuclear, biotech or pharmaceutical industries. The government virtually acknowledged the abysmal condition of its safety regulators when it was forced to introduce the following legislations in Parliament: the Nuclear Safety Regulatory Authority of India (NRSA) Bill,

2011, the Biotechnology Regulatory Authority of India (BRAI) Bill, 2013 and the Drugs and Cosmetics (Amendment) Bill, 2013 (D&C bill), which will create the Central Drug Authority (CDA). Each bill is long overdue and has been a reaction rather than proactive action.

Let's start with India's current nuclear regulator. The Meckoni Committee Report had recommended a statutory regulator for the nuclear industry way back in 1981. The recommendation was studiously ignored by the country's nuclear establishment. To the international community, it claimed that the AERB, which was set up through an executive order, met the standards of independence required by the Convention on Nuclear Safety (CNS). The AERB was anything but independent as it was answerable

to the authorities responsible for the promotion of nuclear energy which constitutes a conflict of interest. It took the nuclear disaster in Fukushima in 2011 for the prime minister to crack the whip and force the introduction of an NRSA Bill, 2011....

The main issue with most Indian safety regulators is the fact that they were created by executive orders rather than parliamentary legislation. When the executive creates an organisation, it tends to exercise control over it. This is not necessarily a fault because control is also a form of accountability. Problems arise when the goals of the Central government clash with the regulatory goals of safety. These "conflict of interest" scenarios can be of two kinds.

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First, where the Central government is the industry operator that is being regulated. Take the nuclear industry, where both the regulator and the industry fall under the purview of the DAE. Or the Directorate General of Civil Aviation, which falls under the purview of the ministry of civil aviation, also responsible for overseeing the operation of Air India. Second, when the regulator's decision on safety can have an adverse impact on the government's economic policies. For example, if the drug regulator were to crack down on the Indian pharmaceutical industry, it would severely affect its brand value in lucrative foreign markets....

From our little experience with judicial independence, we know that the power to appoint, transfer and remove the top brass among regulators will be crucial in determining the independence of safety regulators. But unlike judicial institutions, which are only required to adjudicate disputes, regulatory authorities have a mandate to formulate policies, lay down standards and enforce the law against erring industries. A single policy decision by a regulator can shut down entire industries.

A single drug banned by the drug regulator or a single pesticide banned by the insecticide board could result in the loss of thousands of crores but ensure greater safety for Indians. A vindictive regulator could prosecute a firm

into bankruptcy before it proves its innocence. Should such authorities, which have powers of both policy formulation and prosecution, remain completely insulated from our political establishment or should our elected representatives have some power to influence them? Just

how much regulatory independence is required to ensure the safety of Indians in the face of increasingly awesome yet dangerous technologies? The answer is not clear. Perhaps we will have more clarity once our parliamentarians decide to start debating these bills.

Source: The writer is an intellectual property lawyer, The Indian Express,

18 December 2013.

NUCLEAR STRATEGY

CHINA

China Develops New ICBMs, Adds to Nuclear Stockpile

China's military is advancing the development of a new ICBM and increasing its stockpile of nuclear warheads, an ambitious step to block US engagement in the Asia-Pacific region by boosting not only its naval and air forces, but also its nuclear missile capabilities. The Chinese military conducted a second test launch of its newest ICBM, the Dong Feng-41 (DF-41), from the Wuzhai missile launch center in Shanxi Province to western China on 13 December 2013, according to the US website Washington Free Beacon, which cited Pentagon officials.

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...Tensions are escalating between the US and China over the air defense identification zone that China unilaterally announced in the East

China Sea last month (November 2013) and a near collision reported earlier this month between a US guided missile cruiser and a Chinese warship. The US ship is believed to have been monitoring the Liaoning, China's sole aircraft carrier, in the South China Sea. China's test firing of the missile, along with its attempts at gaining air supremacy and the command of the sea, are apparently aimed at checking the US.

...The Chinese PLA's Second Artillery Corps, in charge of ballistic missiles, already deploys DF-31A missiles, which have a range of 11,200 kilometers. A DF-31A is capable of carrying three to five warheads, whereas a DF-41 can carry up to 10. A US Air Force research institute in a May 2013 report said the number of Chinese warheads capable of reaching the US will increase to 100 or more over the next 15 years after factoring in the development of the DF-41 missile.

The Chinese military is said to be close to deploying the Julang-2 (JL-2), a second-generation submarine-launched ballistic missile. When JL-2 missiles are installed in China's state-of-the-art nuclear-powered Jin-class submarines, they would be capable of hitting the US mainland from the Chinese coastal areas.

Source: <http://the-japan-news.com/>, 25 December 2013.

China on the Move: New Nuke Threats

The Obama administration's determination to reduce the number of deployed US nuclear warheads looks all the more foolish in light of China's drive to modernize and expand its nuclear arsenal. This month brought the second flight test of China's new road-mobile Dong Feng-41 ICBM. US intelligence agencies expect the DF-41 to be able to carry up to 10 independently targetable warheads far enough to strike the United States. They worry that it's intended as a "first strike" weapon despite "China's professed nuclear doctrine of not being the first to use nuclear weapons in a conflict," The Washington Free Beacon reports.

If these new missiles are deployed with a reload missile for each launcher, each DF-41 unit could have 120 to 240 warheads, according to Rick Fisher, senior fellow at the International Assessment and Strategy Center. He says that makes the

The Obama administration's determination to reduce the number of deployed US nuclear warheads looks all the more foolish in light of China's drive to modernize and expand its nuclear arsenal. This month brought the second flight test of China's new road-mobile Dong Feng-41 ICBM. US intelligence agencies expect the DF-41 to be able to carry up to 10 independently targetable warheads far enough to strike the United States.

Obama administration's push to further reduce US warheads "simply irrational." The DF-41, along with China's modernization of its submarine-launched nuclear missiles, must be viewed in the larger context of China's rising aggression —Japan and the Philippines over island and maritime claims, and against the US Navy, in a Dec. 5 South China Sea confrontation against that forced an American guided missile cruiser to maneuver abruptly to avoid colliding with a Chinese tank landing ship. With the Chinese threat increasing, this is no time to diminish

America's nuclear deterrent.

Source: <http://triblive.com/>, 20 December 2013.

INDIA

India Test-Fires Nuclear-Capable Ballistic Missile

India on 23 December 2012 carried out a test of a domestically developed ballistic missile with a range of more than 3,000 kilometers (1,800 miles). The Agni-III missile was launched from a rail-based mobile launcher deployed on Wheeler Island, in the Bay of Bengal, off the coast of Odisha. The test was the second in a series of user trials by the Indian army and sixth overall. "The missile reached an altitude of 380 kilometers and withstood searing temperatures as it re-entered the atmosphere and impacted the target point after flying for about 800 seconds," the *Hindu* said.

Agni-III is a two-stage solid-fuel ballistic missile developed by India's DRDO. According to the Indian military, the Agni-III is equipped with an advanced navigation system to ensure a high degree of accuracy, and it has already been commissioned by the army. The Agni-III is part of India's indigenous family of MRBM and ICBM. As of 2008, the Agni missile family comprises three operational variants; two more, the Agni-IV and Agni-V, are still in testing phase. The DRDO is reportedly working on the development of the sixth missile in the Agni family, the Agni-VI, with an estimated range of up to 10,000 kilometers

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(6,200 miles).

Source: RIA Novosti, 23 December 2013.

Agni-3 Launch, a Flawless Mission

The Strategic Forces Command (SFC) fired the long range Agni 3 missile with a range capability of over 3000 kms from Wheeler Island, off the Odisha coast today. The trajectory of the trial was tracked by a battery of sophisticated radars, telemetry observation stations, electro-optic instruments and naval ships from its launch till the missile hit the target area with pin point accuracy. Agni 3 missile is equipped with advanced high accuracy navigation system and guided by an innovative guidance scheme. Quoting an SFC spokesman, "Such successful training launches clearly indicate our operational readiness to meet any eventuality as also establishes the reliability of this deterrent component of India's Strategic arsenal".

Source: <http://www.security-risks.com/>, 24 December 2013.

RUSSIA

Russian Military to Decide on Missile Deployment at NATO Borders

A decision on whether to deploy tactical ballistic missiles near borders with NATO countries will be made only following a threat assessment by the Russian military. There is an attempt to provide a reliable assessment of the risks to Russia's national security that would be posed by the European segment of the US global missile shield. The deployment of Iskander-M (SS-26 Stone) nuclear-capable missile systems near NATO borders could eventually be part of Russia's response to NATO missile defense plans. At least 10 Iskander systems had been identified by satellite photos in Russia's Baltic exclave of Kaliningrad and along its border with Baltic states and NATO members Estonia, Latvia and Lithuania.

The deployment of Iskander-M (SS-26 Stone) nuclear-capable missile systems near NATO borders could eventually be part of Russia's response to NATO missile defense plans. At least 10 Iskander systems had been identified by satellite photos in Russia's Baltic exclave of Kaliningrad and along its border with Baltic states and NATO members Estonia, Latvia and Lithuania.

However, on 19 December 2013 President Putin denied the reported deployment of such Iskanders, saying the Russian leadership had not yet made such a decision. The Russian Defense Ministry said in an ambiguously worded statement that Iskander missiles had been stationed in Russia's Western Military District, which includes Kaliningrad as well as much of the European part of Russia.

Following the statement, representatives of a number of NATO nations expressed concern that if true, the move would represent a deepening of tensions with Russia that could demand a NATO response. The US said the move would be destabilizing to the region. Polish authorities said on 19 December 2013, however, that the Iskander deployment reports had not been confirmed by the country's military.

Source: <http://en.ria.ru/world/>, 20 December 2013.

UNITED STATES

US Tests Another Nuclear-Capable Missile

On 17 December 2013, a Minuteman 3 ICBM, which is capable of carrying multiple nuclear warheads, was launched from Vandenberg Air Force Base into a 4,200 mile flight over the Pacific to a target on the Kwajalein Atoll in the Marshall Islands. The US Air Force claims the test-launch program increases Washington's ability to maintain a strong nuclear deterrent as a key element of its national security and the security of its allies.

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The test launch of the nuclear-capable missile, which caused anger in Europe, comes as the US agreed in 2010 to destroy thousands of its nuclear weapons. Sorensen has been instrumental in reviving global interest in the groundbreaking work of the late American nuclear physicist Alvin Weinberg. It was Weinberg who led research into molten-salt cooled reactors and thorium when he ran Oak Ridge from 1955 to

weapons." On 21 September 2013 another nuclear-capable ICBM was launched by the US Air Force just hours after the conclusion of the International Day of Peace.

...In September, 2012 it was reported that the US government was planning to undertake the costliest modernization of its nuclear arsenal in history. Washington currently has about 5,000 nuclear weapons....

Source: <http://www.presstv.ir/>, 18 December 2013.

BALLISTIC MISSILE DEFENCE

RUSSIA

Russia Says It Will Deploy New Railway-Based Intercontinental Ballistic Missile

The Russian military says it's developing a new ICBM mounted on a railway car. Col. Gen. Sergei Karakayev, the chief of the military's Strategic Missile Forces, said in remarks carried by Russian news agencies on 18 December, 2013 that the new weapon will be much easier to camouflage than its predecessor. The Soviet-designed railway missiles were scrapped in 2005. Karakayev said that the Yars missile intended for the project could be put inside a regular refrigerator car unlike its predecessor, which required a heavier and bigger car that could be detected by enemy intelligence. Missiles hidden inside railway cars are far more difficult to spot and destroy compared to other land-based missiles. The Kremlin has vowed to develop new types of weapons in response to US-led NATO missile defense in Europe.

Source: <http://www.foxnews.com/>, 18 December 2013.

NUCLEAR ENERGY

CHINA

The US Government Lab Behind China's Nuclear Push

Scientists in Shanghai are attempting a breakthrough in nuclear energy: reactors powered by thorium, an alternative to uranium. The project is run by the Chinese Academy of Sciences, a government body with close military ties that coordinates the country's science-and-technology strategy. The academy has designated thorium as a priority for China's top laboratories.

Scientists in Shanghai are attempting a breakthrough in nuclear energy: reactors powered by thorium, an alternative to uranium. The project is run by the Chinese Academy of Sciences, a government body with close military ties that coordinates the country's science-and-technology strategy.

The program has a budget of \$350 million. And it's being spearheaded by the influential son of a former Chinese president.

But even as China bulks up its military muscle through means ranging from espionage to heavy spending, it is pursuing this aspect of its technology game plan with the blessing - and the help - of the United States. China has enlisted a storied partner for its thorium push: Oak Ridge National Laboratory. The US government institute produced the plutonium used for the Manhattan Project and laid important groundwork for the commercial and military use of nuclear power.

The Tennessee lab, as it happens, helped pioneer thorium reactors. The Pentagon and the energy industry later sidelined this technology in favor of uranium. The Chinese are now enthusiastically tapping that know-how, in an example of how the rising Asian superpower is scouring the world for all sorts of technology needed to catch up to America in a broad array of scientific fields.

Thorium's chief allure is that it is a potentially far safer fuel for civilian power plants than is uranium. But the element also has possible military applications as an energy source in naval vessels. A US congressman unsuccessfully sought to push the Pentagon to embrace the technology in 2009, and British naval officers are recommending a design for a thorium-fueled ship. In a further twist, despite the mounting strategic rivalry with China, there has been little or no protest in the United States over Oak Ridge's nuclear-energy cooperation with China.

"The US government seems to welcome Chinese scientists into Department of Energy labs with open arms," says physicist and thorium advocate Robert Hargraves. He and other experts note that most of the US intellectual property

related to thorium is already in the public domain. At a time when the US government is spending very little on advanced reactor research, they believe China's experiments may yield a breakthrough that provides an alternative to the massive consumption of fossil fuels.

The technology's immediate appeal for China, both Chinese and

American scientists say, is that thorium reactors have the potential to be much more efficient, safer and cleaner than most in service today. The Chinese plan to cool their experimental reactors with molten salts. This is sharply different from the pressurized water-cooling systems most uranium-fueled nuclear plants. The risks of explosions and meltdowns are lower, proponents say. "If a thorium, molten-salt reactor can be successfully developed, it will remove all fears about nuclear energy," technology works in theory, and it may have the potential to reshape the nuclear power landscape, but there are a lot of technical challenges."

Other advocates agree on thorium's peaceful promise. Republican Senator Orrin Hatch and Senate Majority Leader Harry Reid, a Democrat, introduced legislation in 2010 calling on the US government to share its thorium expertise. The unsuccessful bill said it was in US "national security and foreign policy interest" to provide other countries with thorium fuel-cycle technology, because doing so would produce less long-lasting waste and reduce the risk of nuclear proliferation. Oak Ridge has been free to proceed in spite of that bill's failure.

What China is attempting is to turn the nuclear clock back to the mid-1960s, when Oak Ridge successfully operated a reactor with fuel derived from thorium and cooled with molten salts. The lab also produced detailed plans for a commercial-scale power plant. Despite considerable promise, the thorium test reactor was shut down in 1969 after about five years of operation. Research was effectively shelved when the Nixon Administration decided in the 1970s that the US nuclear industry would concentrate on a new generation of uranium-fueled, fast-breeder reactors. For a range of technical and political reasons, not least the public's fear of nuclear plants, these new uranium reactors have yet to come into widespread commercial use.

The die was cast against thorium much earlier. In the early 1950s, an influential US Navy officer, Hyman Rickover, decided a water-cooled, uranium-fueled reactor would power the world's first nuclear submarine, the USS Nautilus. Rickover was instrumental in the 1957

commissioning of a similar reactor at Shippingport, Pennsylvania - the world's first nuclear-power station. Admiral Rickover was a towering figure in atomic energy and became known as the father of the US nuclear navy. He had clear reasons for his choice, engineers say. The pressurized water reactor was the most advanced, compact and technically sound at the time. More importantly, these reactors also supplied plutonium as a byproduct - then in strong demand as fuel for America's rapidly growing arsenal of nuclear warheads. "The short answer is that uranium was good for bombs and thorium wasn't," says Kirk Sorensen, president of Flibe Energy, a privately held thorium-technology start-up based in Huntsville, Alabama. With the launch of the Nautilus in 1955, a course was set that is still followed today, with most of the world's nuclear power generated from this type of reactor.

Although it does not yield byproducts that can be readily used to make weapons, thorium does have military applications. The fuel could be used to power Chinese navy surface warships, including a planned fleet of aircraft carriers. China's nuclear submarine fleet has struggled with reactor reliability and safety, according to naval commentators, and thorium could eventually become an alternative. Top British naval engineers last year proposed a design for a thorium reactor to power warships. Compact thorium power plants could also be used to supply reliable power to military bases and expeditionary forces.

Thorium also has military potential for the United States, experts say. But the world's most powerful military is reluctant to pursue alternatives to its uranium-fueled reactors, because it has operated them successfully for almost six decades. Joe Sestak, a former US congressman and retired two-star admiral, failed in an effort to get the Pentagon to reconsider thorium in 2009. "It is very hard to effect a change in something that has been established for a long time," he says. Sestak says he was unaware of the extent of cooperation between the US and China on thorium technology.

Flibe Energy's Sorensen, a former NASA engineer, has plans to build thorium-fueled reactors for commercial use in the United States. Sorensen has been

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instrumental in reviving global interest in the groundbreaking work of the late American nuclear physicist Alvin Weinberg. It was Weinberg who led research into molten-salt cooled reactors and thorium when he ran Oak Ridge from 1955 to 1973. Weinberg was eventually fired for his persistent thorium advocacy. But he had some powerful supporters. In his last scientific paper, published shortly after his death in 2003, nuclear-weapons pioneer Edward Teller called for the construction and testing of a small, thorium-fueled reactor.

Oak Ridge remains the intellectual home of this technology. The US Department of Energy lab still has a small research project under way on the use of molten-salt coolants for uranium-fueled reactors. The Energy Department is also funding related research at the University of California, Berkeley, the University of Wisconsin and the Massachusetts Institute of Technology. But the ambitious project under way in China could be the best bet to unlock thorium's promise of safe, cheap and abundant nuclear fuel.

Jiang Mianheng, son of former Chinese president Jiang Zemin, visited Oak Ridge in 2010 and brokered a cooperation agreement with the lab. The deal gave the Chinese Academy of Sciences, which has a staff of 50,000, the plans for a thorium reactor. In January 2011, Jiang signed a protocol with the Department of Energy outlining the terms of joint energy research with the academy. An electrical engineer trained at Drexel University in Philadelphia, Jiang told a conference on thorium in Shanghai last year China's thorium project "is 100 percent financed by the central government." The protocol stipulates that intellectual property arising from the joint research will be shared with the global scientific community. It excludes sharing commercially confidential information and any other material that the parties agree to withhold. The pact also specifically rules out any military or weapons-related research. "All activities conducted under this protocol shall be exclusively for peaceful purposes," it says.

Jess Gehin, a nuclear-reactor physicist at Oak Ridge, says the pact allows the two sides to share information about determined and programmed to move forward with this technology," Gehin said. "Right now we agree that we should meet routinely, maybe a couple of times a year."

Jiang did not respond to requests for comment. In a statement posted on the Chinese Academy of Sciences website, he said China and the United States "should boost mutual trust and carry out complementary and mutually beneficial cooperation in the study of thorium-based salt reactors, hybrid energy systems and other cutting edge science and technology."

Beijing's long-term goal: commercialize the technology by 2040, after building a series of increasingly bigger reactors. The Shanghai Institute of Applied Physics is recruiting nuclear physicists, engineers, project managers and support staff, according to a regular stream of job advertisements it publishes online. Its team is expected to expand to 750 by 2015 and eventually include 1,000 researchers.

A director at the Shanghai Institute, Li Qingnuan, and other senior researchers are wooing top young talent across China to join the project. After lecturing on molten-salt reactor technology at Sichuan University in April, Li invited students from the audience to apply for positions at the institute, according to a report on the university's website.

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China's sprawling network of nuclear-research and industrial companies are gearing up to assist. In early June, the China National Nuclear Corporation, the body overseeing all Chinese civilian and military nuclear programs, announced that state-owned China North Nuclear Fuel Company had signed an agreement with the Shanghai Institute to research

and supply thorium and molten salts for the experimental reactors. The push into thorium is part of a broader national energy strategy. The government wants to reduce its dependence on coal-fired power plants, which account for about 80 percent of the nation's electricity but have darkened its skies. Nuclear energy is a big part of the plan: China aims to have 58 gigawatts of nuclear power on the grid by 2020, an almost five-fold increase from 12.57 gigawatts ...

Thorium is a hedge on that nuclear bet. China has 15 conventional nuclear reactors online and 30 under construction. But energy authorities are also investing in a range of different technologies for the future, including

advanced pressurized water reactors, fast-breeder reactors and pebble-bed reactors. China has little uranium but massive reserves of thorium. So, the prospect of cheaper nuclear power with secure supplies of fuel is a powerful attraction. At last year's Shanghai thorium conference, Jiang described how clean nuclear power would allow China to make a "revolutionary" move towards a greener economy. The bet on unconventional nukes, he said, explains "why China is the first one to eat a crab" - citing an old Chinese proverb about the individual who dares to make a discovery important to civilization.

Source: Article by David Lague and Charlie Zhu, Reuters, 20 December 2013.

RUSSIA

Russia Invests in Nuclear

Russia has allocated RUB80.6 billion (\$2.4 billion) as 'in-kind' contributions to the growth of its nuclear industry with a large portion of this assigned to foreign projects, including the Akkuyu plant in Turkey. Rosatom is the state corporation that includes every significant commercial enterprise in the country's nuclear power industry. It actually drafted the directive which was approved on 19 December 2013 by PM Medvedev...

Balancing this state payment, Rosatom's profits flow back to the state from the power generation at 33 nuclear reactors as well as the sales of reactors, fuel and services to other countries. The country has an overall policy of maximising low-carbon power from domestic hydro and nuclear in order to decarbonise electricity supplies and free natural gas for export.

The Russian government noted: "The main objectives of Rosatom are to facilitate the accelerated development of the nuclear power industry for ensuring Russia's energy security by launching new standard serial nuclear power generating units, promoting products and services of Russian nuclear fuel cycle organisations on international markets, and engaging in the construction and operation of nuclear power plants outside of Russia."

An important project for Rosatom is the construction of four units at the Akkuyu site in Turkey. Rosatom will build, own and operate the plant as part of a long-term power purchase agreement with the Turkish state grid operator. Similar projects are in development with Bangladesh and Vietnam, while Russia is building reactors on more routine commercial terms in Belarus, China and India... Funds will be transferred to the Akkuyu project company, which will use them to purchase shares in Rosatom subsidiaries Atom Story Export and Rusatom Overseas. Separately another decree will see the Russian state buy a stake in Technopark-Technology. Rosatom is the sole shareholder of the firm, which is one of 30 innovative companies to have developed at Rosatom's Technopark 'Sistema-Sarov'.

Source: World Nuclear News, 20 December 2013

Rosatom Set For Larger Share in Global Nuclear Energy Market

Rosatom, the Russian state nuclear corporation, has concluded a record number of transactions this year for the construction of nuclear power plants.

Rosatom will build the first nuclear power plants in Bangladesh and Jordan, expand its presence in China and India with the help of new power units, and build the Hanhikivi-1 nuclear power plant (NPP) in north-west Finland. The company is also negotiating an agreement on co-operation with South Africa.

Rosatom also started new construction work in 2013: the Akkuyu NPP in Turkey, a nuclear power plant in Belarus and a plant for the production of nuclear fuel

in Ukraine. The Russian company offers its customers new reactors that are innovative in terms of security. For example, passive safety systems in the VVER-1200 reactor used in the NPP-2006 plant can guarantee that the so-called Fukushima scenario in Japan will never happen again. Rosatom has 19 orders for the installation of similar reactors abroad and is building eight such reactors in Russia.

...These range from the establishment of research and education centres and the development of medical isotopes

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to a reactor and an enterprise for nuclear fuel production. In addition, Russian companies can provide up to 85% financing for nuclear power plant projects through export credits.

...Moscow can be a reliable partner for London in the field of peaceful nuclear energy, just as it has been for Washington for decades. On 10 December 2013, Russia and the US completed a Megatons to Megawatts agreement on the supply of enriched uranium converted from nuclear warheads for use in American nuclear power plants. Russia has been supplying uranium to the US for 20 years and it is likely that, without this contract, the American nuclear power generation industry would have ceased to exist....

Source: <http://indrus.in/>, 18 December 2013.

UNITED STATES

Fifty New Nuclear Plants Could Be Goal in Official Energy Plans

Up to 50 nuclear power stations could be built under plans being looked at by the government.

The remarkable figure 10 times the number the government is openly discussing is revealed in documents submitted to the Department of Energy and Climate Change by one of its own advisory bodies.

The documents are likely to raise questions as to what extent the government's energy policy is weighted in favour of nuclear and away from renewables such as wind turbines. It comes as Brussels begins an investigation into whether Britain is providing up to £17bn of potentially illegal public guarantees for the first nuclear power plant in a generation, Hinkley Point C in Somerset, which aims to provide 7% of the country's electricity. In a submission to a consultation on geological waste disposal, the Committee on Radioactive Waste Management has said an upper limit of 75 gigawatts of nuclear power is "being examined" by the DECC in London.

The current programme announced by ministers is to build

12 reactors to supply 16 gigawatts at five sites. The higher figure equates to more than 50 new large-scale modern reactors. The committee has been given the task of assessing the number of disposal facilities that might be required for the waste that will be produced by new

nuclear power stations. It notes that the 16-gigawatt programme is only the "first tranche" and is "substantially below the 75 gigawatts upper limit being examined in [the Department of Energy and Climate Change]".

The upper limit echoes a scenario outlined by the energy department in a 2011 report, outlining its vision for a low-

carbon future. It suggested 75 GW of nuclear power – enough to provide 86% of UK electricity – could be brought on line by 2050. "Nuclear energy is vital for our energy security and we want it to be part of the energy mix in the future, alongside renewables and clean coal and gas," a department spokeswoman said. "It's important to model potential scenarios to plan for our future energy needs, but we haven't set any targets for the amount of new nuclear to be developed." But Dr David Lowry, an environmental policy consultant and nuclear specialist, said the 75-gigawatt scenario was a "nuclear fantasia at it worst", and failed to explain how huge amounts of radioactive waste generated by the plants would be stored.

Source: <http://www.theguardian.com/>, 21 December 2013.

URANIUM PRODUCTION

GENERAL

The Supply And Demand Fundamentals of Uranium

The uranium spot price has undergone two boom and bust cycles during the past 10 years, both largely driven by increasing demand for nuclear fuel that caused speculation followed by parabolic collapse. The first cycle began in mid-2003 when the spot price climbed above its long-term base of \$10/lb to peak at \$135/lb in mid-2007 before crashing to \$40. This classic rise was largely driven by hedge-fund speculation and the fall was exacerbated by the global economic crisis of 2008-2009...

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Prior to the Fukushima incident, there were 55 operating nuclear power plants in Japan. They accounted for 12% of the world's 443 electricity-producing reactors and an equivalent amount of U3O8 demand. Now all of Japan's 50 remaining operable plants are idled, and only 14 have applied for restarts. It is undetermined whether any will produce electricity in 2014.

The uranium spot price that peaked at over \$70/lb is now half of that, about \$35. This fall in price is largely due to the drop in fuel demand caused by the Japanese government's forced shutdown of all reactors pending safety reviews, mandated modifications, and permits to restart. With reactors mothballed and no current domestic demand, Japanese power companies have deferred buying of uranium and purchased more expensive alternative sources of energy supplies, especially LNG. Perhaps some have sold stockpiles into the spot market to fund these purchases. Deferral of purchases has lessened immediate demand but has also become a buying opportunity for other large utility companies, sovereign funds, and governments to cover their short-term uranium needs at lower cost. With depressed prices and short-term utility demand covered, traders and speculators have largely left the market, putting additional downward pressure on the spot price. The net result is a buyers' market with little short-term demand, small volume trades, and discretionary spot buys.

Uranium Spot Price in Actual, 2000, and 2009 Dollars

Ux Consulting estimates that over 40% of world uranium mine production loses money at the current spot price below \$40. However, the spot market is actually a small part of the overall supply of U3O8, in 2013 accounting for about 20% of global nuclear fuel demand. Most uranium supplied to utilities is via long-term off-take contracts with mine producers, governments,

reprocessors, and other suppliers. According to Ux Consulting's estimates, the current long-term contract price has fallen from \$75 to \$50/lb since early 2011, putting it 30% higher than the spot price. Furthermore, most off-take agreements currently in place were negotiated during a time of much higher uranium prices and far exceed the current term price of \$50.

The demand scenario that drove uranium prices up over the past decade also has driven production significantly higher, from less than 36,000 tonnes U in 2003 to over 58,000 tonnes U in 2012, a gain of 61%. Nearly 80% of new production over the last 10 years has come from Kazakhstan ISR projects, which now supply over 35% of annual mined uranium. Uranium mine production has not met annual nuclear fuel demand for the past 25 years. Although mine production has been closing this gaping supply deficit, a substantial shortfall still exists between mined uranium and reactor demand.

Since 1993, the Russian-USA "Megatons to Megawatts" program has mostly filled that shortfall, supplying about 9000 tonnes of Uranium per year by converting highly-enriched uranium from USSR atomic bombs into low-enriched uranium for nuclear fuel. This uranium has provided 1 of 10 Americans with electricity over the past 20 years...Sales from US Department of Energy uranium stockpiles and other governments' inventories and increasing contributions from recycling and reprocessing facilities have also delivered significant amounts of fuel to meet reactor demand.

Speculation on the lowering of demand elsewhere in the world since Fukushima has also affected market prices. But this fact remains: The world's nuclear power build-out continues unabated, especially in emerging market countries. Worldwide, there are 71 reactors currently under construction, 173 on order or planned, and 314 proposed.

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For reference, these numbers are up from 62 and 156, and slightly down from 322 in February 2011. With the complete shutdown of Japan's nuclear energy fleet, 11% of the world's electricity is now produced from nuclear power, down from about 14% pre-Fukushima.

With uranium prices well below the breakeven point for many producers and little short-term demand, current mines are shutting down or cutting back, and new mines and developments are being postponed or cancelled. The net result is primary production will likely to drop significantly in 2014 and even more so in 2015. When combined with the removal of about 13% of world supply from the HEU-LEU program, the mid- to long-term supply of uranium is in jeopardy of not meeting reactor demand.

Any new mine developments in market economy countries require higher prices to be profitable and therefore, to be developed. There is considerable skepticism in the industry that Kazakhstan can continue to maintain production levels. Its easily-developed ISR fields are maturing and decline curves are setting in. New developments are going after deeper deposits with uranium that is technically more difficult and costlier to recover...

Source: <http://www.uraniumseek.com/>, 17 December 2013.

NUCLEAR COOPERATION

CHINA- PAKISTAN

China Commits \$6.5 bn for Pakistani Nuclear Project

China has committed \$6.5 billion to finance the construction of a major nuclear power project in Pakistan's port city of Karachi as it seeks to strengthen ties with its strategic partner, Pakistani officials said. Reuters reports that, China National Nuclear Cooperation (CNNC) has promised to grant a loan of at least

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6.5 billion dollars to finance the project and also waived a 250,000 dollars insurance premium on the loan. The major nuclear power project would have two reactors with a capacity of 1,100 megawatts each.

Ansar Parvez, chairman of the Pakistan Atomic Energy Commission, which runs the civilian nuclear programme, said China has complete confidence

in Pakistan's capacity to run a nuclear power plant with all check in place. He said the performance and capacity of nuclear power plants in Pakistan was far better compared to non-nuclear plants. Parvez said it would be completed by 2019 and each of the two reactors would be larger than the combined power of all nuclear reactors now operating in Pakistan. Pakistan and China, both nuclear-armed nations, consider each other close friends and their ties have been underpinned by common wariness of India and a desire to hedge against US influence in South Asia.

Reuters said Pakistan sees nuclear energy as key to its efforts to solve power shortages that have crippled its economy, because it only generates about 11,000 Megawatts of power while total demand is about 15,000 Megawatts.... Pakistan under its long-term energy plan, hopes to produce more than 40,000 MW of electricity through nuclear plants by 2050.

Source: <http://businessdayonline.com/>, 24 December 2013.

China Defends Nuclear Ties with Pakistan

China on Monday indicated it will continue providing support for civilian nuclear energy projects in Pakistan, despite concerns voiced by some countries that recent agreements have violated international guidelines governing nuclear trade. The Foreign Ministry here said, referring to a new nuclear power project inaugurated last month in Karachi, that "relevant cooperation between China and Pakistan helps alleviate power shortage in Pakistan and serves the interests of local people".

China National Nuclear Cooperation (CNNC) has promised to grant a loan of at least 6.5 billion dollars to finance the project and also waived a 250,000 dollars insurance premium on the loan. The major nuclear power project would have two reactors with a capacity of 1,100 megawatts each.

"China will continue to help Pakistan tackle the shortage of power as its capacity allows," said spokesperson Hua Chunying.

Last month, Pakistan formally inaugurated two 1,100 MW projects at the second and third phases of the Karachi nuclear power project. The deals follow Chinese support to the nuclear complex at Chashma, where two reactors have been constructed with Beijing's assistance. The agreements for third and fourth reactors in Chashma, signed in 2009, triggered controversy as they were the first deals signed by China following its joining of the Nuclear Suppliers Group (NSG). The nuclear trade body forbids members from transferring technology to countries that have not signed the Nuclear Non-Proliferation Treaty (NPT). India obtained a waiver from the body only after undertaking various commitments.

While Chinese officials defended the deals by arguing they had been "grandfathered" under the earlier Chashma agreement that predated China's membership of the NSG, even some strategic analysts in Beijing privately acknowledge that it is far more difficult to make a case for the new Karachi agreements. Hua, the spokesperson, however, defended the deals, saying the two countries' "relevant cooperation, which is totally for peaceful purposes, meets their respective international obligations and is subject to the safeguards of the International Atomic Energy Agency (IAEA)". "I also want to point out", she added, "that China takes issues concerning the peaceful use of nuclear energy seriously.

Under the precondition of nuclear non-proliferation, we carry out active cooperation and communication with relevant countries and the IAEA in the peaceful use of nuclear energy and provide assistance for other developing countries in developing nuclear energy."

Source: Article by Ananth Krishnan, Hindu, 23 December 2013

RUSSIA - HUNGARY

Talks with Russia on Nuclear Energy Cooperation "In Advanced Stage"

Talks are in advanced stage between the Hungarian government and Russia on extending cooperation in nuclear energy, the head of the PM's office, János Lázár, said...

The price of electricity is one of the hardest issues in Hungary because it influences economic competitiveness, Lázár told national news service MTI after a meeting of parliament's economic and information technology committee which was boycotted by opposition MPs.

...The current blocks of the power station are scheduled to be decommissioned in 2037, so consultations have been started on future options at professional level and at state level with Russia, further stating that if the government does not make a move now, the power station will stop working after that time, "the utility fee cut will be unviable and the Hungarian economy will lose its chance to have inexpensive electricity."

While Chinese officials defended the deals by arguing they had been "grandfathered" under the earlier Chashma agreement that predated China's membership of the NSG, even some strategic analysts in Beijing privately acknowledge that it is far more difficult to make a case for the new Karachi agreements.

"In line with parliament's authorization, talks are directed at maintaining capacities, which is why we have started the relevant negotiations with

Russia...Maintaining capacities is an area where the government and Russia are close to reaching an agreement. The next step will be to sign an inter-state contract that will need to be approved by parliament...

Source: <http://www.bbj.hu/politics/>, 18 December 2013.

RUSSIA - SOUTH AFRICA

South Africa to Sign Civil Nuclear Energy Agreement with Russia

Russia and South Africa will sign an intergovernmental agreement for cooperation in the peaceful use of nuclear energy, South African Energy Minister Ben Martin told journalists. All the internal formalities for the approval of the agreement will be completed in South Africa by February 2014... The head of Rosatom, Kiriienko of Russia said Russia is ready to provide concessional financing to South Africa for the construction of new nuclear power facilities.

A strategic partnership between the two countries would facilitate the joint implementation of the national program for the development of nuclear energy in South Africa. The key project calls for the construction of new plants (up to 8 units) with Russian VVER reactors with a total capacity of up to 9.6 GW. In addition, the parties intend to build a

research reactor using Russian technology. The sides will also jointly produce and market isotope products in the international market. Russia will also assist South Africa in the development of its nuclear industry and train personnel to operate the country's nuclear installations, which will be used for peaceful purposes. The 20-year agreement between the BRICS partners can be extended with mutual consent....

Source: <http://indrus.in/>, 19 December 2013.

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military and missile sites. Head of the Atomic Energy Organization of Iran Ali-Akbar Salehi said, "the agency's inspectors have no right and (no) responsibility to do it. There is no authority in the world for inspecting such facilities, and there is no treaty in that regard either"...

According to an agreement between Iran and the IAEA

reached on 11 November 2013 Iran would allow the UN nuclear watchdog's inspectors to visit central Arak heavy water plant and Gachin yellow cake mine in the south. A team of inspectors of the IAEA visited Arak heavy water reactor on 08 December 2013. A letter sent to IAEA DG Amano from EU foreign policy chief Catherine Ashton on behalf of the P5+1 group, concerning the Joint Plan of Action agreed with Iran on 24 November 2013 in Geneva, highlighted the important role of the IAEA in the verification of the nuclear-related measures which were agreed in Geneva.

Under the Geneva deal, the US and its allies shall afford Iran with limited relief of sanctions on its oil, gold, petrochemicals, auto industries and civil aviation with an estimated value of about 7 billion US dollars. In exchange, Iran shall halt uranium enrichment above 5 percent and neutralizing its stockpile of near 20 percent uranium by means of dilution or converting. It also agreed not to advance its activities at Natanz and Fordow enrichment plants and at the Arak reactor. Regarding the 11 November 2013 agreement, Amano said "some points are not

mentioned which had been referred to in our previous reports." his remarks were an allusion to the limited access to Iran's nuclear infrastructure, pointing out that the deal omitted inspection of Iran's Parchin military complex, to which the IAEA has repeatedly requested access

Source: <http://news.xinhuanet.com/>, 21 December 2013.

UNITED STATES – TAIWAN

Taiwan, US Sign Agreement on Nuclear Energy Cooperation

Taiwan sealed a deal with the US to ensure supplies of nuclear fuel and facilities for the island's power plants. The new agreement, signed between the Taipei Economic and Cultural Representative Office in the US and the American Institute in Taiwan, will replace the pact the two countries had inked in 1972, which was amended in 1974 and will expire 22 June 2014.

Taiwan and the US take their cooperation on the peaceful use of nuclear energy seriously, according to King Pu-tung, the Republic of China's representative to the US. The agreement, which took a year to negotiate, is just the start of such partnership and will not take effect until it is approved by lawmakers in both countries, the representative office said. Once it is given the green light, the agreement will remain in effect indefinitely unless some significant incident occurs, the office said. Other Asian countries such as South Korea and Vietnam are also hammering out similar pacts with the US.

Source: <http://focustaiwan.tw/>, 21 December 2013.

NUCLEAR PROLIFERATION

IRAN

IAEA Not Allowed Access to Iran's Military Sites: Atomic Chief

Iran's atomic chief had clarified on 21 December 2013 that IAEA inspectors will not be granted access to Iran's

Taiwan sealed a deal with the US to ensure supplies of nuclear fuel and facilities for the island's power plants. The new agreement, signed between the Taipei Economic and Cultural Representative Office in the US and the American Institute in Taiwan, will replace the pact the two countries had inked in 1972, which was amended in 1974 and will expire 22 June 2014.

IAEA to Visit Gachin Uranium Mine Soon: Salehi

The Iranian nuclear chief says the IAEA inspectors will soon visit the Gachin uranium mine in Bandar Abbas, southern Iran. Speaking to reporters, Head of the Atomic Energy Organization of Iran (AEOI) Ali Akbar Salehi said the exact date of the inspection, however, has not been determined yet. "Inspection of the Gachin mine is in fact the implementation of one of the six articles of the recent agreement between Iran and the IAEA," Salehi said, adding, "The agency's request to visit the Arak heavy water facility, which was carried out recently, was [also] among the articles of the agreement."

The AEOI head noted that experts from Iran and the UN nuclear agency are scheduled to discuss ways to proceed with the implementation of the agreement in late January. In November, Iran and the IAEA agreed on a roadmap based on which Iran would, on a voluntary basis, allow IAEA inspectors to visit the Arak heavy water plant and the Gachin uranium mine in Bandar Abbas, in southern Iran, despite the fact that Tehran is under no such obligation to do so under the Safeguards Agreement. The voluntary move is a goodwill gesture on the part of Iran to clear up ambiguities over the peaceful nature of its nuclear energy program. Salehi further expressed hope that Iran's move to accept the agency's requests would lead to the IAEA chief, Yukiya Amano's more positive reports about Tehran's nuclear energy program in the future.

"We intend to continue this approach to build mutual confidence and for the cooperation between the International Atomic Energy Agency and the Atomic Energy Organization of Iran to complement political talks between Iran and the P5+1 [group of six major world powers]," Salehi pointed out.

Salehi further announced Iran's plan to produce medical isotopes at the Arak heavy water plant and expressed hope that the country would succeed in taking greater steps towards producing medical equipment. The United States, Israel, and some of their allies have repeatedly accused Iran of pursuing military objectives in its nuclear energy program. Iran rejects the allegation, arguing that as a committed signatory to the NPT and a member of the IAEA, it has the right to use nuclear technology for

peaceful purposes. The IAEA has conducted numerous inspections of Iran's nuclear facilities, but has never found any evidence showing that Iran's civilian nuclear energy program has been diverted toward non-civilian purposes.

Source: www.globalsecurity.org, 24 December 2013.

NORTH KOREA

Images Show North Korea Efforts to Restart Nuclear Complex

Satellite imagery suggests North Korea is making "wide-ranging, extensive" efforts to fully reactivate its main nuclear complex, a US think tank said in line with Pyongyang's vows to strengthen its weapons programme. Recent images show work at the Yongbyon nuclear compound apparently aimed at producing fuel rods to be used in a plutonium reactor, Johns Hopkins University's US-Korea Institute said.

Analysis of the imagery identified one "probable fuel fabrication plant" for the 5-megawatt plutonium reactor that reopened earlier this year 2013, researcher Nick Hansen wrote on the institute's blog, 38 North. The isolated communist state staged its third nuclear test in February 2013 its most powerful to date after two previous tests in 2006 and 2009. Two months later, it boasted that it would reopen the Yongbyon nuclear compound in the northwest that had been shut since 2007, in order to bolster its atomic arsenal.

"The soot on the new roof shows that a heating process had occurred, such as the use of metal casting furnaces necessary to complete the heat treatment during the fuel rod assembly," Hansen wrote. A white stain on the roof of the facility was believed to be hydrofluoric acid used to produce fuel rods.

The shock execution of North Korean leader Kim Jong-Un's powerful uncle two weeks ago raised concerns over potential instability in the North or military provocations such as an atomic test aimed at rallying domestic unity.

A nearby venue that appears to be a dumping site showed a large amount of "grey materials" suspected to be ash from the fuel rod production process, he added..

In November, Iran and the IAEA agreed on a roadmap based on which Iran would, on a voluntary basis, allow IAEA inspectors to visit the Arak heavy water plant and the Gachin uranium mine in Bandar Abbas, in southern Iran, despite the fact that Tehran is under no such obligation to do so under the Safeguards Agreement.

"The identification of these facilities indicates a more wide-ranging, extensive effort by North Korea to modernise and restart the Yongbyon complex... than previously understood," he wrote. Pyongyang's current stockpile of nuclear materials mostly plutonium is variously estimated as being enough for six to 10 bombs.

South Korean defence and intelligence chiefs however ruled out the possibility of imminent atomic test despite continued preparations. Nam Jae-Joon, chief of the South's intelligence agency, told lawmakers on Monday that the North was capable of staging another atomic test anytime but had so far showed no signs of doing so.

Source: <http://www.hurriyetdailynews.com>, 24 December 2013.

PAKISTAN

Pakistan Closer to Completing Fourth Nuclear Reactor at Khushab

According to a US think tank Pakistan has nearly completed external construction of a fourth reactor building at the Khushab nuclear complex that produces plutonium for the country's nuclear weapons programme. The Institute for Science and International Security, which has used commercial satellite imagery to monitor developments at the Khushab complex for years, said in a report that images from 01 November 2013 clearly show that "the external construction of the fourth reactor building appears nearly complete".

The Khushab complex, located 200 km south of Islamabad, is dedicated to the production of plutonium for nuclear weapons. Pakistan is working to ramp up production at the complex so that it can build more miniaturised plutonium-based nuclear weapons. Pakistan is "believed to have depended on illicit procurements" for the four reactors at Khushab.

A nearby venue that appears to be a dumping site showed a large amount of "grey materials" suspected to be ash from the fuel rod production process, he added. "The identification of these facilities indicates a more wide-ranging, extensive effort by North Korea to modernise and restart the Yongbyon complex.

According to an ISIS report of April 2011, Pakistan was allegedly operating an illegal network in the US to procure goods, including switching and radiation detection equipment and nuclear-grade resin, for its Chashma plant and possibly other reactors including those at Khushab. Another recent ISIS report on the "The Future World of Illicit Nuclear Trade" stated Pakistan is expected to "maintain or improve its nuclear arsenal via illicit nuclear trade".

The Khushab site originally had one heavy water reactor in the 1990s and Pakistan began work on a second reactor during 2000-02, a third one in 2006 and the fourth one in 2011. "The expansion of the Khushab nuclear site with the addition of reactors 2, 3 and 4 appears to be part of a strategic effort by Pakistan to boost weapon-grade plutonium production". This increased capability would

allow Pakistan to build a larger number of miniaturised plutonium-based nuclear weapons in order to complement its existing arsenal of highly enriched uranium weapons.

Source: <http://news.in.msn.com/>, 22 December 2013.

UNITED STATES

US to Build Two Secret Underground Plutonium Production Labs: Analyst

The US is planning to build two new underground plutonium production labs that will expand plutonium production for the next decades, an analyst says. "The Senate two days ago voted to authorize the creation of two new huge

secret underground plutonium production labs that will expand plutonium production for the next 150 years," Brian Becker, national coordinator of the A.N.S.W.E.R Coalition, told Press TV...Becker also said the location of the new labs is in Los Alamos.

"This was going to be in Los Alamos, the nuclear facility in New Mexico and the US government has just announced in spite of environmental impact statements, in spite of everything, to rush forward for the creation of two new plutonium factories, modules that will be producing

plutonium for as decades and decades to come," the analyst said. "That is to enrich and enhance nuclear weapons. The US is moving nuclear weapons into outer space that is one of the big projects. They see nuclear weapons and nuclear weapons possession as a form of creating dominance. It is not keeping the world safe," he explained.

Becker pointed out to President Barack Obama's plans for the US nuclear weapons complex that will cost the country about \$355 billion over the next decade. "The US uses nuclear technology and nuclear weapons in order to bully their countries," he said.

"The new expansion by the US, the upgrade, the new generation of nuclear weapons is an expansion and it is a clear violation of the NPT which states clearly that there is an affirmative obligation by all of the nuclear powers to begin the process of nuclear disarmament so that the other countries could be dissuaded from getting nuclear technologies themselves," he added.

Source: <http://www.presstv.ir/>, 25 December 2013.

NUCLEAR SAFETY

INDIA

Harsh Criticism for India's Nuclear Safety Regime

A parliamentary committee report stated that India's nuclear safety regime is "fraught with grave risks", and that the country's nuclear regulator was weak, under-resourced and "slow in adopting international benchmarks and good practices in the areas of nuclear and radiation operation". The bipartisan Public Accounts Committee tabled a scathing 81-page report in India's parliament, critical of the decades-long delay in establishing an independent regulator for the nuclear-armed country.

...But the parliamentary committee said India's AERB was not an independent statutory body but rather a subordinate agency of the government. "The failure to have an autonomous and independent regulator is clearly fraught with grave risks, as brought out poignantly in the report of Fukushima Nuclear Accident Independent Investigation Commission." "Although AERB maintains liaison with international nuclear organisations, it has been slow in adopting international benchmarks and good practices in the areas of nuclear and radiation operation."

The new expansion by the US, the upgrade, the new generation of nuclear weapons is an expansion and it is a clear violation of the NPT which states clearly that there is an affirmative obligation by all of the nuclear powers to begin the process of nuclear disarmament so that the other countries could be dissuaded from getting nuclear technologies themselves

The regulator cannot set or enforce rules for radiation and nuclear safety in India, the committee found. In many cases there are no rules. Despite an order from the government in 1983, the AERB has still not developed an overarching nuclear and radiation safety policy for India. "The absence of such a policy at macro level can hamper micro-level planning of radiation safety in the country". As a result, India was not prepared for a nuclear emergency. "Off-site emergency exercises carried out highlighted inadequate emergency preparedness even for situations where the radiological effects of an emergency origination from nuclear power plants are likely to extend beyond the site and affect the people around..."

This is not the first time the safety of India's nuclear industry has been questioned. The committee's comments echo those of the government auditor-general, who in 2012 found that 60 per cent of regulatory inspections for operating nuclear power plants in India were either delayed with some up to 153 days late or not undertaken at all. For power plants under construction, the number of regulatory inspections delayed or not undertaken was 66 per cent.

Smaller radiation facilities operate across the country with no licences and no oversight at all. India's 20 nuclear power plants have never had a major disaster, though some minor accidents have occurred. And the country remains committed to a nuclear future. Indian PM pointed out..." Nuclear energy will remain an essential and increasingly important element of our energy mix".

Source: *Excerpted from The Sunday Morning Herald, 20 December 2013.*

JAPAN

Fukushima Nuclear Operator TEPCO to Shut Two More Reactors

The operators of the crippled Fukushima nuclear power plant in Japan are to decommission two reactors that were not badly damaged by the earthquake and tsunami in 2011. They have bowed to public pressure that the plant be shut permanently. Workers are still struggling to stem leaks of contaminated water, and have begun to remove fuel rods from a storage pond at a reactor building. Four reactors were severely damaged by the disaster that struck in March 2011.

Tokyo Electric Power (Tepco) had delayed making a final announcement on the fate of reactors number 5 and 6 at Fukushima while negotiations continued about the financing of the decommissioning process. The executive board has now accepted the inevitable and acknowledged there will be no attempt to generate electricity from the plant again.

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The announcement came as Japan posted a big jump in its trade deficit for November 2013 to \$12bn - the result of a huge increase in energy imports... After the disaster, Japan is still without any nuclear power. It used to supply about 15% of the country's energy needs. The public remains divided over the future of nuclear power, but the increasing trade deficit helps increase the pressure to turn nuclear power stations back on. Experts estimate that it could take three or four decades to clean up the site at Fukushima and decommission all the reactors.

Source: <http://www.bbc.co.uk/>, 18 December 2013.

Liability for Nuclear Damage

Japan is not party to any international liability convention but its law generally conforms to them. Two laws governing them are revised about every ten years: the Law on Compensation for Nuclear Damage and Law on Contract for Liability Insurance for Nuclear Damage. Plant operator liability is exclusive and absolute, and power plant operators must provide a financial security amount of JPY 120 billion (US\$ 1.4 billion) – half that to 2010. The government may relieve the operator of liability if it determines that damage results from “a grave natural disaster of an exceptional character”, and in any case liability is unlimited.

For the Fukushima accident in 2011 the government set up a new state-backed institution to expedite payments to those affected. The body is to receive financial contributions from electric power companies with nuclear power plants in Japan, and from the government through special bonds that can be cashed whenever necessary. The government bonds total JPY 5 trillion (\$62 billion). The new institution will include representatives from other nuclear generators and will also operate as an insurer for the industry, being responsible to have plans in place for any future nuclear

accidents. The provision for contributions from other nuclear operators is similar to that in the USA. The government estimates that Tepco will be able to complete its repayments in 10 to 13 years, after which it will revert to a fully private company with no government involvement. Meanwhile it will pay an annual fee for the government support, maintain adequate power supplies and ensure plant safety.

In January 2012 Tepco deposited with the Tokyo Legal Affairs Bureau

JPY 120 billion (about \$1.56 billion) as insurance coverage for the company's nuclear energy facilities. The utility was formerly covered by the Japan Atomic Energy Insurance Pool, an industry organization established by 23 non-life insurers. However, the pool said in August 2011 that it would not renew Tepco's contract after it expired in mid January 2012. (Japanese nuclear utilities are required by law to secure JPY 120 billion in accident liability coverage.) Tepco is seeking coverage from private-sector insurers. In relation to the 1999 Tokai-mura fuel plant criticality accident, insurance covered JPY 1 billion and the parent company (Sumitomo) paid the balance of JPY 13.5 billion.

In November 2013 the Minister for Foreign Affairs said that “Recognizing the importance of participating in the establishment of an international nuclear damage compensation system, the Japanese Government has decided to conclude a “Convention on Supplementary Compensation for Nuclear Damage (CSC)” so as to provide an environment that facilitates involvement of foreign companies with expertise regarding the decommissioning and contaminated water measures of the Fukushima Daiichi Nuclear Power Plant...

Source: <http://www.world-nuclear.org/>, 12 December 2013.

UNITED STATES

Controversial Entombment of Illinois Nuclear Power Plant

In January, 2014 Energy Solutions will begin the most crucial part of its 10-year dismantling of the shuttered Zion nuclear power plant: Safely removing its radioactive fuel rods. The project is the largest in the history

of the US nuclear power industry and the first in which a plant's owner has turned over its license to a third party for the purpose of dismantling it. Utah-based Energy Solutions is staking its future on the project. How it handles the most expensive and risky phase of the project will be crucial to it winning other such work going forward.

The Zion plant, owned by Chicago-based Exelon Corp., the parent of Commonwealth Edison, generated electricity on the shores of Lake Michigan for close to a quarter of a century. By the time the project is complete, it will have taken nearly as long to destroy it. Four 10-man teams will work around the clock for a year to remove 1,500 tons of nuclear waste from pools of water where some of it has sat for 40 years. Zion's nuclear waste, which will remain on site indefinitely, will be packed into 61 steel canisters, then sealed in concrete, garage-size casks. The casks, each weighing 150 tons, will sit atop a concrete pad and are designed to withstand 360-mph winds, missiles, flooding, fire and earthquakes. The plant itself is being scrapped and hauled off in rail cars to Utah for disposal at a low-level radioactive waste facility owned by Energy Solutions.

Zion is the country's first decommissioning project to take place in a deregulated electricity market, according to the US Nuclear Regulatory Commission. As a result, state regulators will not have authority to question how the dismantling is performed or Energy Solutions' spending decisions. The company is drawing down on an approximately \$800 million fund Com Ed ratepayers paid into for the decommissioning. The NRC oversees safety-related issues but not spending. By law, any money left over after the northern Lake County plant is taken down must be returned to Com Ed customers.

A group of local citizens has filed suit over the financial handling of the project, claiming there are no safeguards to ensure that Energy Solutions isn't wasting ratepayer money. For its part, Energy Solutions says it is only using the funds for expenses related to decommissioning. The suit asks that a court-appointed third party manage the trust fund, which ComEd customers paid into from 1998 to 2006. A judge with the US District Court for the Northern District of Illinois Eastern Division dismissed that case in July. An appeal is scheduled to be heard in January 2014 in the US

Court of Appeals for the 7th Circuit.

Source: <http://nuclear-news.net/>, 15 December 2013.

The project is the largest in the history of the US nuclear power industry and the first in which a plant's owner has turned over its license to a third party for the purpose of dismantling it.

NUCLEAR WASTE MANAGEMENT

CANADA

Danger in Transporting Canadian Radioactive Trash to South Carolina

Critics say it's unusual to ship weapons-grade uranium as far as Columbia sometime in 2014. A convoy is expected to begin delivering shipments of highly radioactive liquid waste containing

weapons-grade uranium from Canada to the Savannah River Site near Aiken. It's not so unusual for SRS, once home to the manufacture of nuclear weapons parts, to receive nuclear materials or to process radioactive waste. What makes these shipments controversial, and according to one environmental activist, unprecedented, is that they are being shipped so far and with such a lethal cargo.

Tom Clements said he doesn't understand why the two nations are taking the dangerous step of shipping the waste so far when it could be disposed of in Canada... "This is being driven by waste dumping on Canada's side and DOE wanting to get the money on the US side because of budget pressures increasing"...

It's the older tank full of waste, what environmental groups say amounts to 23,000 liters, that's at issue. According to the Canadian government, the older vessel is inside a vault and shielded by thick concrete walls. The waste, officials say, is under high-level security, and is monitored for temperature, pressure and chemical composition. The plan is to load batches of the liquid in smaller, special casks for shipment, with the transport of the casks taking place over a period of years.....

The concern is risk in shipping, with an accident or leakage of some sort but also there is a concern for the Savannah River Site because it's going to add some volume, though not a lot, of high-level waste into the already strained system at the site," Clements said. "Instead of bringing in more waste for disposal, they should be dealing with what's at the site."....

Clements said he also is bothered by what he said appears to be a shopping mission by DOE for foreign nuclear waste. US officials have announced a program to retrieve US-origin highly enriched uranium from other countries that have used the materials in a variety of

research projects..."The concerns are in transport, adding waste to the system and also opening the door for receipt of unusual nuclear waste materials that would end up being dumped in South Carolina"...

Source: <http://nuclear-news.net/>, 22 December 2013.

JAPAN

Japanese Govt to Select Places for Nuclear Waste Permanent Dump

Japan has decided to take matters into its own hands to find appropriate domestic locations to permanently store highly radioactive nuclear waste, after waiting in vain for more than a decade for an offer from a regional government. The Industry Minister said on 17 December 2013 "The government will play an active role in choosing a permanent place,"... Japan, which currently doesn't have any final disposal sites for high level radioactive waste, has 17,000 metric tons of domestically spent nuclear fuel that dates back to the 1970s. Most of the current waste is stored in a facility in Rokkasho, a small village in Aomori prefecture in northern Japan, where it is mixed with liquid glass to let it consolidate in big cylindrical bins.

The prefecture only allowed the facility to be established after the government promised the fuel would be moved

elsewhere 30 to 50 years later. Under the new system, which will take effect in April, 2014 the government will come up with a list of places that would be suitable for permanent storage. It will use scientific data that takes geological and seismological concerns under consideration, radioactive waste management. Since the government would first need permission from any prospective location before storing the waste there, finding a municipality willing to house the controversial, dangerous materials is likely to be a significant problem."The nuclear waste problem has been exacerbated by the accident at Fukushima in March 2011.

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Japan started in 2002 inviting municipalities to indicate whether they were interested in storing highly radioactive nuclear waste permanently and offered accompanying subsidies for applying. The government was offering ¥1 billion (\$9.7 million) to go through the first paper screening, which wouldn't require a firm commitment to store the waste. Only the small town of Toyo in Kochi prefecture, western Japan, officially submitted its candidacy to the government in 2007. But the town quickly withdrew its application after

the local population expressed fierce opposition to the idea. Among major nuclear power using countries, only Finland and Sweden have decided where to permanently store nuclear waste.

Source : <http://nuclear-news.net/>, 17 December 2013.



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