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OPINION – Sitakanta Mishra

Towards Nuclear Ban Treaty: Universal NFU is the Catalyst

The UN First Committee Resolution A/C.1/71/L.41 (27 October 2016), which calls for negotiation on a “legally binding instrument to prohibit nuclear weapons leading toward their total elimination”, is amused as a “game-changer” in the global nuclear discourse. With 123 countries voted in favor, 38 against, and 16 abstained, the resolution mandated to convene a multilateral UN conference in 2017 to negotiate a Nuclear Ban Treaty to be adopted in 2018. The resolution titled “taking forward multilateral nuclear disarmament negotiations” was co-sponsored by 57 countries calling for the negotiations open to all members to arrive at a decision by majority.

As no NWS except North Korea, and interestingly not even Japan – the only nuclear weapons victim – did support the resolution, the initiative seems to be a futile attempt for a “parallel NPT” of the nuclear ‘have-nots,’ which likely to face the fate of Kellogg-Briand Pact that outlawed war itself. Given the apathy of the nuclear weapon states, it is pertinent to introspect if the treaty will have any practical legal impact. Above all, can mere imposition of dictums de-legitimize the possession of nuclear weapons, leading towards their eventual elimination?

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A game-changer?: The intended objective of the initiative is to accelerate the disarmament process of current stockpile of around 15,000 nuclear weapons leading to “reduce the proliferation-driving value attached to these weapons of mass destruction, prevent nuclear detonations, and deter further modernization”. Building upon the 1968 NPT it will pronounce legally binding disarmament obligations for both NPT and Non-NPT states.

If the First Committee vote is confirmed by the UNGA in December 2016, the negotiations for such a treaty will commence during the first half of 2017. As a matter of fact, all states are encouraged to participate but none will be given a veto power to block the

negotiations or decisions. The final instrument is expected to be adopted by the UN at a high-level meeting in 2018. Unless the nuclear weapon states gang up to derail it, which is most likely, such a treaty will come into existence. But, what would be the fate of the treaty if all nuclear weapon states just ignore it? Will it be a game-changer, and in what way? *First*, many would like to see a parallel, if not alternative, regime when there is no momentum in the NPT, CTBT, FMCT, and disarmament through CD. Therefore, the idea of the Nuclear Ban Treaty, says Michael Krepon, “exemplifies the pull of centrifugal forces in the arms control enterprise.” But the complexity is that all nuclear weapon states are critical about it which will culminate in a new tussle among the nuclear ‘haves’, ‘have-nots’, and ‘crypto’ nuclear powers (Japan, South Korea, some NATO allies), and fracture the international community deeply.

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Second, this seems to be “an attempt to decouple states’ perceived need to retain nuclear weapons from the broader strategic context” which may prove to be a futile exercise. Nuclear disarmament cannot be achieved in a vacuum. As long as the perceived utility of nuclear weapons remains high, any disarmament effort bound to fail. The myth that nuclear weapons are the ultimate guarantor of national security needs to be falsified, and the concept of nuclear deterrence needs to be revisited to establish firmly the fact that nuclear weapons do not help win a war.

The Nuclear Ban Treaty would be the first such legal instrument to pronounce all the ‘nuclear-haves’ as illegal possessors of banned weapons. It would certainly put pressure on NWS to move further towards nuclear disarmament, but what practical legal impact the treaty will have on them is not difficult to fathom.

Third, the idea of Nuclear Ban Treaty has emerged out of the frustration concerning half-hearted multilateral piecemeal disarmament approach. The ‘grand bargain’ between the ‘haves’ and ‘have-nots’ under the NPT was that the NNWS commit to forgo their nuclear weapons choice in return for their access to nuclear technology for a

peaceful purpose, meanwhile, the NWS in good faith will move towards gradual elimination of their arsenals. Ever since, many disciplinary actions are taken against nations for proliferation misconduct, while NWS have modernized their weapons and delivery systems without any hindrance. For example, the US CBO plan 2014 allocated \$355 billion to spend over the next 10 years to upgrade and develop the new generation of nuclear weapons. This is, in reality, a violation of “the affirmative obligation posited by the NPT”. Since the end of Cold War, though overall reduction in the number of nuclear warheads is achieved, the importance of nuclear weapons in national security strategies nevertheless remains intact; moreover, the warheads have become technologically more sophisticated and lethal.

Four, the Nuclear Ban Treaty, arguably, intends to bridge an existing gap in the international law for which nuclear weapons could not be outlawed the way it dealt with other WMDs (biological and chemical weapons). Even there exists no international legal regime to declare nuclear weapons illegal. The Nuclear Ban Treaty would be the first such legal instrument to pronounce all the ‘nuclear-haves’ as illegal possessors of banned weapons. It would certainly put pressure on NWS to move further towards nuclear disarmament, but what practical legal impact the treaty will have on them is not difficult to fathom.

Five, if the treaty fructifies, it will set a precedent that actionable nuclear disarmament debate can be undertaken outside the CD. This would mark a tactical shift of role and influence of the UNGA vis-à-vis the CD on nuclear matters. It would also dispel a long-standing gospel that only CD is the right platform to debate and work towards nuclear disarmament. Countries like India, UK, and many

others “firmly believe that the best way to achieve a world without nuclear weapons is through gradual multilateral disarmament negotiated using a step-by-step approach and within existing international frameworks.”

Is it feasible?: Three important motivations, identified by Michael Krepon, in regard to the Nuclear Ban Treaty are: (1) it is a moral imperative as nuclear dangers are increasing; (2) it will pressurize nuclear weapon states to go extra mile in their disarmament drive; and (3) it would strengthen essential norms against legitimacy of nuclear weapons. Though appreciated widely, the proposed treaty is speculative for an obvious reason: whether this initiative is feasible? Undoubtedly, the path to the treaty and pursuit of its vision would be bumpy.

Practically the treaty will have to devise strong enforcement mechanisms and disciplinary provisions against those who would not oblige. It is difficult to imagine at this juncture any disciplinary action against the P-5 countries, and if they will heed to it at all. Evident is the recent reactions of the P-5 countries: On behalf of France, the UK, and the USA, Alice Guitton, the French permanent representative to the CD, said that although the commitment of the three countries to a world without nuclear weapons remained “unshakeable”, a treaty prohibiting nuclear weapons would not move toward that goal; instead it would “distract attention” from more practical and verifiable disarmament steps. On the other hand, Russian Foreign Ministry official argued that the hasty adoption of a legally binding prohibition would be “destructive”, “catastrophic”, “treacherous”, and “thrust the world into chaos and instability”. The US mission to NATO had urged alliance members “to vote against negotiations on nuclear weapons ban, not to merely abstain” primarily because the ban treaty will fundamentally be at odds with NATO’s basic policies on deterrence.

Unquestionably, de-legitimization of nuclear weapons is desirable but not as symbolism or

through the outright imposition of principles which will not sustain incidentally. The imperative is to bring about an unambiguous universal realization that nuclear weapons are useless, therefore be discarded. As long as nuclear weapons remain lucrative for national security considerations, no form of jurisprudence can offset their perceived importance.

Lastly, de-legitimization of nuclear weapons leading to their eventual elimination cannot be achieved overnight. A time-bound phased disarmament process has to be put in place to embrace by all. Recall former Indian PM Rajiv Gandhi Action Plan of 1988 for “Ushering in a Nuclear-Weapon-Free and Non-Violent World Order” placed before the UNGA, that was unfortunately sidelined by the world community as ‘unrealistic’. It is doubtful if the deterrence-

driven world order in vogue is ready now to honor and entertain another such attempt?

The Test Ban Treaty initiative may draw provisions from the Rajiv Gandhi Action Plan whose following basic features are fully salient. “First, there should be a binding commitment by all nations to eliminating nuclear weapons in stages ... [may be the year 2025 at the latest. Secondly, all nuclear-weapon states must participate in the process of nuclear disarmament. All other countries must also be part of the process.

What would be its Contours?: One wonders, what would be the contours of the Nuclear Ban Treaty, if it finally emerges despite all odds? According to Rebecca Johnson, its provisions would be based on “the “thirteen steps” adopted by NPT states in the 2000

NPT Review Conference and other relevant steps advocated by arms controllers and Global Zero to be monitored and verified through an appropriate form of nuclear weapons convention when that becomes feasible.” This format for the treaty would be handy, but not devoid of the risk of carrying forward the persisting NPT-related grievances to the new regime leading to “pit the ban treaty against the NPT, to detriment of both.” The dissenters of NPT would not like to see the discriminatory legacy prolonging.

Besides, the Test Ban Treaty initiative may draw provisions from the Rajiv Gandhi Action Plan whose following basic features are fully salient. “First, there should be a binding commitment by all nations to eliminating nuclear weapons in stages ... [may be the year 2025 at the latest.

Secondly, all nuclear-weapon states must participate in the process of nuclear disarmament. All other countries must also be part of the process. Thirdly, to demonstrate good faith and build the required confidence, there must be tangible progress at each stage towards the common goal. Fourthly, changes are required in doctrines, policies and institutions to sustain a world free of nuclear weapons. Negotiations should be undertaken to establish a comprehensive global security system under the aegis of the United Nations."

Above all, the ban treaty should be all inclusive, not to be negotiated in a vacuum, and not devoid of reality. In the current security environment, nuclear weapons are still seen as the centerpiece of survival by many nations. The attempt to decouple the perceived need to retain nuclear weapons from broader strategic context may result in further polarization of an already entrenched debate.

What could be the Catalyst?:

Many commissions have been constituted for arms control, non-proliferation, etc. but not a single commission ever been tasked to inquire into the fundamental question – can a nuclear war be fought to win a meaningful military victory? Only the realization that a nuclear war cannot be fought to win a meaningful military victory will lead the world towards de-legitimization and eventual elimination of nuclear weapons.

The world must draw lessons from the process and rationale behind the NFU agreement of Chemical Weapons in 1925 (Geneva Protocol).

Even after the promulgation of the Geneva Protocol, chemical weapons were used; but ultimately the conclusion was that they could only kill people; they did not help win a war. The Germans used it and the Allies retaliated. Saddam Hussein used it against Iran and the Iranians retaliated. When it came to WW II, though gas masks were distributed widely in case chemical weapons were used, neither side used them. Largely, by that time, both sides were convinced that if one side used chemical weapons, there would be retaliation, and will not help win the war. That was the basic reason why nations agreed to NFU of chemical weapons and

finally in 1993 the Chemical Weapons Convention was adopted. It took 68 years to move from the NFU-stage to elimination-stage. While aspiring for nuclear disarmament, have we pursued the proposition that nuclear weapons may not help win a war? Will fighting a nuclear war bring a meaningful military victory? According to K. Subrahmaniam, once a nuclear war starts it will get out of control easily. Once the first weapon is fired, the other side will retaliate. Each side will be under tremendous compulsion either to use their weapons or lose them; therefore, both sides will fire all that they have at once leading to total devastation in both sides. Who wins over whom?

As a starting point, serious thought should be given to propagate the fact that a nuclear war cannot be fought meaningfully in a military sense. Meanwhile, the world should advocate for a universal NFU of nuclear weapons as the catalyst for their de-legitimization and elimination of

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chemical weapons. Therefore, the Nuclear Ban Treaty initiative must set up a commission first to establish the futility of nuclear weapons and the rationale of opting for a universal NFU treaty.

Source: <http://www.indrastra.com/>, 09 November 2016.

OPINION – John Tierney

Why are US Nuclear Missiles Still on High-Alert?

Both former Secretary of Defense William Perry and former National Security Adviser Zbigniew Brzezinski have spoken about middle of the night phone calls they received in response to purported incoming nuclear strikes. Though the alerts were quickly determined to be false alarms, what if they had happened during a time of crisis, like the Cuban Missile Crisis or Russia's invasion of Crimea? What if the President was forced to make a decision before the full situation could be assessed?

Imagine having minutes - perhaps as few as six by the time the issue is brought to the President's attention - to determine the fate of every living person on the planet. Military infrastructure is reporting that intercontinental ballistic missiles with trajectories directed at the US have been launched. A nuclear strike seems imminent. Your advisers recommend a full-scale retaliatory attack immediately - before you are hit. What do you do? Give the go-ahead order even though it could be a false alarm? You know false alarms have happened before, but the clock is ticking. The world hangs in the balance and it is your move.

This may sound like a philosophical thought experiment, but under current policy, this scenario could happen to the President of the US at any moment. In fact, there are approximately 450 silo-based nuclear weapons in North Dakota, Montana, Wyoming, Nebraska, and Colorado that remain on high-alert status, a Cold-War relic that allows the

President to fire nuclear weapons, each at least 20 times more powerful than Hiroshima, within minutes of a warning. Because the existing system mandates that these weapons are "launched-on-warning," the military chain of command has less than 30 minutes to assess a nuclear threat, brief the president for a decision, and if the order is given, launch the weapons in response to a pending nuclear attack.

With a recorded history of false alarms and other mishaps, keeping our nuclear missiles on high-alert only serves to increase the risk of nuclear accident, miscalculation, or exchange. Removing this "launch-on-warning" status would remove one of the most dangerous remnants of a Cold War nuclear posture - without harming our

deterrent whatsoever. Our formidable nuclear deterrent is comprised of three separate legs, together known as the "nuclear triad." We have nuclear missiles beneath the ground in silos and onboard submarines roaming undetected beneath the oceans. We also maintain air-launched

cruise missiles, and nuclear gravity bombs that can be delivered via stealthy aircraft.

Proponents of "launch-on-warning" proffer old shop-worn arguments based on far-fetched scenarios. They argue that on-alert land-based missiles are necessary because, without them, there would be fewer targets for a nuclear-capable opponent. Therefore, they posit, a reduced number of targets might tempt a nuclear power in a crisis to surprise attack our bombers and non-deployed submarines, betting that whatever command authority remains in the US would not retaliate with the remaining weapons, particularly nuclear-tipped ballistic missiles on deployed SSBN (whose whereabouts would be unknown to any adversary).

Such a specious assertion remains as implausible today as it was during the Cold War. It is a certainty that any adversary that attacked the US would face

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devastating retaliation, both with nuclear weapons and our superior conventional forces, therefore deterring an attack in the first place. Even if siloed ICBMs were eliminated, the US would retain a formidable deterrent with bombers and submarines containing many hundreds of strategic weapons capable of destroying any adversary. Ending a "LoW" policy, even if ICBMs were not eliminated, or were only partially eliminated, would add stability and set the appropriate example for the rest of the world at a time when we should be leading the way on a path toward more nuclear safety and eventual elimination.

Additionally, with a nuclear overhaul and maintenance plan set to cost \$1 trillion over 30 years, the US should not simply overhaul every existing nuclear missile and warhead already in place. Instead, it should be strategic in refurbishing only those components absolutely necessary for a safe and effective deterrent. Otherwise, such an expensive plan will come at the expense of our conventional forces (which remain the bulwark of our security) and our nation's economic viability (which the Joint Chiefs of Staff acknowledge is essential to our national security).

As Professor Dan Wirls (a Council for a Livable World Board Member) notes, the US is heading down an immensely expensive and dangerous path of nuclear excess, mostly just because. Because nuclear policy is on autopilot. Because it has had a nuclear triad for more than half a century. Because all the forces with a material interest in its perpetuation are paying attention. Because nearly everyone else is not. Without "LoW," and even without the ICBM leg of the triad, future presidents could be fully confident, with the world's most potent and secure submarine and bomber fleets, that no adversary would contemplate nuclear brinksmanship.

Given the particularly impoverished debates about national security during the presidential campaign, this kind of proposal is essential for the American public to consider, and it has been endorsed by, among others, former Secretary of Defence William Perry. The next president and Congress must take nuclear policy off autopilot before the current path becomes irreversible.

Source: <https://flipboard.com/>, 04 November 2016.

OPINION – Charles Digges

Distrust of Nuclear Energy not Helping to Solve Environmental Problems in Russia

Russian society's perception of the building and use of nuclear power plants, the cooperation between nonprofits and the atomic industry and the effects of public opinion on nuclear issues is one of the most disputed questions in the environmental movement. So said Russian environmental leaders gathered at Bellona's yearly All Russia Conference of Ecological Activists. This 2016's conference is titled "Reality and Perspectives for the Environmental Movement in Russia. It gathered some 100 ecologists from all corners of the country.

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Alexander Nikitin, chairman of the Environmental Rights Center (ERC) Bellona, said Russians were generally afraid of anything mentioning the word "atomic," a fear buttressed by accidents at nuclear power plants. Moreover, said Nikitin, Russians are wont to trust anything at all, from the government to informed specialists to the nuclear industry as a whole. Distrust is an ailment of contemporary Russia, which doesn't believe anyone," said Nikitin. "If we're looking at the nuclear industry, this [distrust] is facilitated by a lack of public mechanisms to influence or be heard on projects undertaken by the nuclear industry – such mechanisms are at present only nascent."

According to Andrei Ozharovsky, a nuclear industry

expert with Bellona, falsehoods perpetuated by the nuclear industry substantiate the distrust of nonprofits and the public alike. Ozharovsky pointed to irregularities in numerous public hearings, which are required by the government for any nuclear construction project to be legal. He singled out information provided for a public hearing concerning running one of the reactors at the Kola Nuclear Power Plant at 107 % capacity. The information provided by the nuclear industry incorrectly indicated that the Murmansk Region, where the plant is located, had no wind energy plants, a direct contradiction of information furnished by the Kola branch of the Russian Academy of Sciences. "Examples of such lies passed off to local population for their consideration in public hearings] are plentiful," said Ozharovsky.

Nuclear Stations and Nuclear Waste:

If populations throughout Russia respond without protest to nuclear power plant build outs, then the issue of building temporary or permanent sites for the storage of nuclear waste excite disagreement. The "not in my backyard" principle seems to be the rule. According to Oleg Bodrov, head of the Decommission network, radioactive and nuclear waste should be buried in the region where it was produced as such regions have or do receive nuclear energy use benefits from the government. Bodrov said forcing a region to accept nuclear waste produced in another is unacceptable.

Nevertheless, legislation guiding the handling of radioactive waste indicates that it must be put into certified points for storage of radioactive waste. This, according to Nikitin, means waste can be buried, dug up and transported between regions. "All points of storage are controlled and have the feature of reverability – that means that in the circumstances of force majeure, radioactive waste can be repacked, resituated and reburied," said Nikitin. According to this legislation, radioactive waste is divided into two categories: historic, or that waste produced before 2011, and

that which was produced later.

"Before 2011, some 500 million cubic meters of radioactive waste was produced," said Nikitin. "Its situation at points of waste storage is paid out of the federal budget because it's impossible to establish who produced it – nuclear power stations, the military, the medical establishment and so on." According to activist Vitaly Servetnik, who is an opponent of nuclear power, the relationship nuclear power plants and radioactive waste handling must be taken into account at the level of planning and engineering when new nuclear installations are considered.

"People must understand that they are taking on themselves not only the risks of a nuclear plant itself, but the risks of dealing with its radioactive waste," Servetnik said. "The region that uses or produces nuclear power must be responsible for storing radioactive waste.

Using nuclear power and dealing with its waste must be viewed together." As concerns public participation in approving or rejecting dangerous nuclear projects, Yury Kavsha, head of the Telman municipality in the heavily nuclear Leningrad Region, said public input is a must and dangerous buildouts should be decided on the level of popular referendums.

"All else is baloney," he said. "City councils can't make these decisions – councils are comprised of a few dozen deputies who can be bought and willingly sold," said Kavsha. He added that the situation had devolved to a level where people themselves have to make their interested know to contractors of nuclear projects at public hearings. Often that involved inconvenient travel. Unless there are serious objections to the construction of a dangerous installation, said Kavsha, such hearings usually only draw about 10 to 15 people.

Source: <http://bellona.org/news/nuclear-issues/nuclear-russia/2016-11-22191#bio-4146>, 01 November 2016.

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OPINION – Paul Soyez

Can France Still Afford Nuclear Weapons?

France has a deep and abiding relationship with nuclear technology. French policy-makers have based France's energy and military independence around nuclear programs. However, as the French government attempts to justify its budget policies in the lead-up to the presidential election in April 2017, calls for a public debate on the cost of military nuclear deterrence are increasing. This debate encompasses three main questions. Should France still base its global defence strategy on nuclear deterrence? If yes, how should nuclear deterrence be conducted? Finally, how should the state efficiently budget for this strategic investment?

Questions about the future of the nuclear program come from the growing cost of France's nuclear deterrent. France's nuclear arsenal is currently fully operational but will soon require a complete modernisation. Within the next 30 years, French forces will need new submarines, aircraft and missiles. To achieve this, France's current military nuclear expenditure of €3.4 bn a year, which equals 10% of the French Ministry of Defense's total budget, will need a significant increase. By 2025, nuclear deterrence will cost French taxpayers an estimated €6 billion a year or more. Where will future French governments find €120 billion over 20 years?

Even faced with budgetary constraints, it seems very unlikely that France will give up the modernization of its nuclear program, which is key to its defence strategy. French public opinion and policy-makers are deeply attached to maintaining France's strategy of sovereignty and independence, as explained in the most recent

French Defense White Paper in 2013. However, some French policy makers have criticised Paris' reliance on nuclear deterrence, asserting that a modernization of the equipment constitutes vertical proliferation. By doing so, it's argued, France would contradict its commitment to nuclear non-proliferation and send the wrong signal to Asian nuclear powers.

Nonetheless, if France chooses to maintain its nuclear arsenal, how should it be composed? President Hollande has explained that France plans to maintain the two elements of France's nuclear strike: submarines and jet aircraft. That decision is contested by Major General Vincent Desportes, a French

professor of strategy who believes that France should modernize its nuclear submarine program but should fully dedicate its airpower to conventional operations. That would reduce nuclear costs and provide more equipment to support the troops. The new French President will have to choose to either support modernization studies of both nuclear armed submarines and aircraft, or to choose one.

If, as seems likely, the next government decides to renew its SSBNs, DCNS should start building France's third generation of deterrent submarines by 2019. The costs will be considerable, since Paris will have to modernize its nuclear missiles and communication capabilities for command and control. These new missiles would then be delivered by 2035 with the first new submarine. Moreover, if France were to decide in 2017 to renew its airborne nuclear delivery capability as well, the country would have to dedicate a significant part of its airpower to nuclear deterrence. After all this movement Paris would have two options to manage its defense budget.

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The first option would be to reduce the budget dedicated to conventional forces. In a context of considerable terrorist threats and French involvement in several military operations in the Middle East and Africa, that option would deeply challenge France's security policies. It seems difficult to imagine how the state could make more cuts to the defense budget, which has already been reduced by 20% between 1980 and 2014, with troop numbers recently reduced from 330,000 to 275,000. Moreover, in 2015, François Hollande increased the defense budget and put an end to troop cuts, arguing that France, faced with critical threats to its security, needed a stronger army. Further weakening French conventional forces would then seem dangerous.

The second option would be to substantially increase the defense budget as a whole in order to maintain funding to conventional forces while modernizing the nuclear arsenal. France currently spends 1.78% of its GDP on military expenditure, but would need to increase spending to at least 2% in order to fully finance the modernization of its nuclear arsenal. This option is politically difficult to implement because public opinion would criticise any government cutting €120 billion from education or other public services over the next two decades.

Discussions about the future of nuclear deterrence have been rare. 'It has been 50 years that French people are not consulted on the matter. There is a sort of soft consensus,' explains Major General Desportes. But that unquestioned acceptance of deterrence programs is beginning to be challenged. It will be interesting to see if French deputies and senators will be allowed by the next President to debate such a crucial issue, for the sake of France's democracy.

Source: <http://nationalinterest.org/>, 07 November 2016.

OPINION – Sarah Zhang

America's Nuclear-Waste Plan is a Giant Mess

The fateful explosion that shut down America's only permanent nuclear-waste storage site happened on Valentine's Day 2014. The facility, called the Waste Isolation Pilot Plant or WIPP, is a series of salt caverns 2,000 feet below the New Mexican desert. Radioactive waste from US's nuclear weapons comes to WIPP, drum by drum, to be entombed underground. One such drum ruptured on that February 2016 evening. Radioactive material spewed through the caverns, some of it leaking aboveground as well. The original cause turned out to be downright comical: Contractors packing the drum at Los Alamos National Laboratory used the wrong type of cat litter—wheat-based rather than clay—to soak up the liquid radioactive waste, which then reacted with other chemicals inside the drum to explode. Yes, cat litter.

WIPP has been closed for cleanup since the accident, and it's since blown past one deadline to reopen. The DoE, which operates the plant, is now working to ready WIPP by December 2016. In

anticipation of WIPP resuming operations, the energy department recently filed for a permit to build temporary storage aboveground. The plan would add several concrete vaults to hold the waste drums, designed to be tornado and earthquake proof. More on-site storage would give WIPP a buffer if, for example, the caverns have to ever be temporarily closed for maintenance. But the plan is already drawing criticism from the community. "There's nothing inherently wrong with having some buffer storage," says Greg Mello, executive director of the Los Alamos Study Group, a non-profit that works on nuclear issues in New Mexico. "But the management of this waste program has hardly been stellar."

The accidents exposed lapses in the handling of nuclear waste at WIPP. But the subsequent

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cleanup hasn't inspired much confidence either. In August 2016, the federal watchdog agency, the GAO, chided the DOE for an unrealistic cleanup plan, noting that the DOE had a "less than one % chance" of meeting its original deadline. In fact, the report went on to read, "DOE has a history of exceeding its cost and schedule estimates and then creating new baselines." The long-term cost of the accident, according to a *LA Times* analysis, could top \$2 billion. And to think, just a few years ago, WIPP was a relative bright spot in the US's dysfunctional nuclear waste disposal plan. Zooming out, the problem is much bigger than just WIPP. Making of the country's nuclear warheads created tons of radioactive waste, which has nowhere to go.

The original plan, drawn up decades up, was to send low-level transuranic waste like gloves and tools used to handle plutonium and uranium to WIPP, where salt caverns are supposed to eventually collapse and entomb the material. High-level radioactive waste, like spent reactor fuel, would be buried even deeper underground at Yucca Mountain in Nevada. WIPP opened 1999, but Yucca Mountain hasn't even been built. And it's unclear it ever will due to political opposition in Nevada. So instead, high-level radioactive waste sat at the old factories where it was produced during the Cold War—especially at Hanford in Washington and Savannah River in South Carolina. Those tanks and storage facilities were never designed to hold high-level waste for so long. The sites suffered from leaks and environmental contamination. And the cleanup efforts at Hanford and Savannah River are dogged by their own delays and cost overruns. (The report was not kidding around when it called criticized the DOE for a "history of exceeding its cost and schedule estimates.") Since a repository at Yucca Mountain doesn't exist, there is sometimes talk of sending this high-level waste to WIPP, which was designed to only handle low-level waste.

So in this world of mission creep for storage sites,

where temporary storage becomes indefinite, New Mexicans are not eager to add more aboveground storage to WIPP. Adding more storage also adds another layer of complexity to the handling of nuclear waste. "Workers have to handle these containers more, so you have more risk of accidental release," says Don Hancock, director of the nuclear waste safety program at the Southwest Research and Information Center and a longtime critic of WIPP. Hancock would prefer the waste never come to WIPP, staying put at the locations where it already is.

The DOE's application for aboveground storage is now in the hands of New Mexico's environment department. Public comment is open until December 2016. In this light, the breakdown of trust in the site's management could make it harder to get new construction improved, which could in turn make it harder for the site to

operate efficiently, and so on and back and forth. This above ground storage plan is just the latest in the push-and-pull between a national agency and the local community. Whatever one's personal opinion of nuclear weapons, Americans have all benefited from living in a country whose military might is backed by those weapons. But the costs of producing them has fallen disproportionately on specific locations—at Hanford and Savannah River and now at the sites where the waste is stored. The waste has to be go somewhere, but where? And who will want it if the government can't promise to get it right?

Source: <http://www.theatlantic.com/>, 02 November 2016.

OPINION – Pelle Neroth

Europe's Atomic Age Continues

Germany is continuing to phase out its nuclear plants as per the decision made after Fukushima. Yet other countries are sticking to nuclear and the EC predicts this kind of energy will remain

prominent even in 2050. Good news for nuclear engineers: the EC has just predicted that nuclear will be part of the European energy mix in 2050 to an extent not very different from today: between 10-15% of the total. The prediction appears in the EC's just-published new Reference Scenario on developments in energy and transport, and is relevant ahead of the UN climate conference in Marrakesh.

The Fukushima nuclear disaster five years ago created a huge public opinion backlash in Europe against nuclear power. Germany's Angela Merkel responded swiftly with an announcement that Germany was to close down all its nuclear power plants in order to transition to renewables. Belgium, Sweden and Switzerland made similar noises. Laudable, you might say, but renewables have an intermittency problem. Germany's CO₂ emissions have reportedly not fallen much, if at all, as energy lost by the shutdown of nuclear reactors has – to a large extent – been replaced by the burning of highly polluting coal.

Perhaps we are seeing a backlash against the backlash. China is doing its own thing, having built six of the eight new nuclear plants in the world in 2015, and being responsible for eight of the ten reactors restarted in 2015. Yet in Europe too, signals sent are showing that nuclear power continues to be important – not just in always-more-pro-nuclear France and Britain. They are still pressing ahead with a new generation of reactors, at Flamanville and Hinkley Point C, but elsewhere even among the nuclear sceptics.

Experts say that the Swiss government is likely to ignore the referendum vote to speed up the closing of its nuclear plants. Germany keeps investing in nuclear research, while Brussels continues to encourage EU research funding to

be spent on improving what it proudly says is "Europe's technological superiority" in reactor design. Euratom, the European Atomic Energy Community, is as alive as ever. Sweden is a good example of a country that has backed away from a previously unequivocal stance to phase out nuclear. The country changed course after the government realised the commitment to phase out nuclear power plants – where Sweden was second only to France in the take-up – clashed somewhat with its commitment to move the country to run entirely on renewables by 2040.

The Swedes then realised they would face some of the same problem of intermittency as everyone else. Non-intermittent and carbon-free nuclear is back on board again, with the announcement that the phase out and its replacement by renewables

now a "long term" goal and the 2040 cutoff just a symbolic target. "This 2040 date is a goal, not a cut-off date that would prohibit nuclear power and it does not mean either the end or the closure of nuclear power," energy minister Ibrahim Baylan told reporters recently. "This is a traditional Swedish compromise."

The Swedish government announced the repeal of a tax on nuclear energy

that severely cut into generating companies' profits. They also opened up a legal regime that will allow utilities to build up to 10 reactors on existing sites to replace the ones coming offline. There will be no subsidies of nuclear, yet Swedish company Vattenfall demonstrated its confidence in the decision by immediately providing safety upgrades to three of its nuclear plants to enable them to operate well past 2020. There is a lot of debate in Europe on whether or not renewables can power the entire grid. Germany is going all out on the bet that it is, while Sweden is saying that nuclear power – maybe through a new generation of smaller, modular plants – is a useful

Swiss government is likely to ignore the referendum vote to speed up the closing of its nuclear plants. Germany keeps investing in nuclear research, while Brussels continues to encourage EU research funding to be spent on improving what it proudly says is "Europe's technological superiority" in reactor design. Euratom, the European Atomic Energy Community, is as alive as ever. Sweden is a good example of a country that has backed away from a previously unequivocal stance to phase out nuclear.

and extremely important measure in the support of this long-term idealistic goal. Brussels, in predicting a continued role for nuclear power, seems to be siding with the pragmatic – some might say hedging – Swedish position.

Source: <https://eandt.theiet.org/>, 07 November 2016.

NUCLEAR STRATEGY

INDIA

Why Bind Ourselves to 'NFU Policy', Says Defence Minister

Defence Minister Manohar Parrikar on 10 November 2016 said that it was his personal opinion that having a stated policy on the use of nuclear weapons would be tantamount to giving away "strength." He asked why India shouldn't simply say it wouldn't use its nuclear capabilities irresponsibly, instead of committing to a 'NFU policy.' "If a written-down strategy exists or you take a stand on a nuclear aspect, I think you're actually giving away your strength in nuclear," Parrikar said.

"Why should I bind myself? I should say I am a responsible nuclear power and I will not use it irresponsibly," Parrikar said, explaining the need to be unpredictable in warfare strategy.

Parrikar clarified that this was his own opinion, and that government policy hadn't changed. India declared a "no first use" nuclear policy after the nuclear weapons test in 1998. "This is my thinking. Some may say that Parrikar says nuclear doctrine has changed. It has not changed in any government policy. As an individual I also get feeling(s). I am not saying you have to use it first, any hoax can be called off," he explained.

Within minutes, the Ministry of Defence also clarified that Parrikar's comments reflected his own personal opinion, and not "an official position." "What Defence Minister Manohar

Parrikar said was that India, being a responsible power, should not get into (the) first use debate," the ministry tweeted. Parrikar on 10 November 2016 also commented on the effect the surgical strikes had had on Pakistan's sabre-rattling. India used to get threats from Pakistan's Defence Minister that it would use a tactical nuclear weapon if threatened, but no such threat had come since the Army conducted the strikes, Parrikar said.

Source: <http://timesofindia.indiatimes.com/>, 10 November 2016.

BALLISTIC MISSILE DEFENCE

USA–JAPAN–SOUTH KOREA

US, Japan, South Korea Conduct Joint Anti-Ballistic Missile Exercise

South Korea, the US, and Japan began on 9 November a two-day naval exercise simulating the detection and tracking of ballistic missiles, a spokesperson for South Korea's Ministry of National Defense told *IHS Jane's*. While the spokesperson declined to provide details about the number of warships involved in the drill, he confirmed a Yonhap news agency report stating that the exercise involved Aegis-equipped destroyers from the three nations. North Korea has test-fired around 20 ballistic missiles in 2016. The trilateral exercise is the second of its kind in less than five months.

Source: <http://www.janes.com/>, 09 November 2016.

NUCLEAR ENERGY

CHINA

Chinese Nuclear Ambitions are Getting Scaled Back but Still Outsize US Plans

China is scaling back plans to build numerous new nuclear power plants, but the communist country's nuclear ambitions are still larger than the US's.

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Construction delays have seemingly made the country's nuclear power targets impossible to meet. Four Chinese nuclear reactors are running three to four years behind schedule, causing a planned scale back of construction. However, China plans to spend \$570 billion building more than 60 nuclear power plants over the next decade, which has energy experts worried the US could be left behind on nuclear power.

China's scaled back plans would double the amount of nuclear power while building extremely advanced molten-salt reactors, a concept America developed, but abandoned in the 1970s. By 2050, China intends to have more than 350 GWs of nuclear power, having spent over a trillion dollars in nuclear investment. A GW of power provides enough energy for roughly 700,000 homes. China intends to bring 58 GWs of nuclear generating capacity into operation by 2020, up from the current capacity of roughly 27 GWs, according to WNN. China plans to follow this up with 150 GWs of nuclear power by 2030, according to the WNA. In comparison, America currently plans to have 100 GWs of nuclear power in 2030.

China currently operates 30 nuclear reactors, from which it derives 2.5 % of its electricity. The country plans to build another 24 reactors and will accelerate construction of a large commercial scale reprocessing plant to reprocess spent nuclear fuel. Globally, installed nuclear capacity is expected to grow 60 % by 2040, according to the IAEA, while American capacity will likely only grow by 16 % over the same time period. Of the 59 new nuclear reactors under construction worldwide to help meet increasing demand for electricity, only four of them are being built in the America — just

enough to compensate for shutting down aging nuclear reactors.

Source: <http://dailycaller.com/>, 01 November 2016.

China Starts to Build its First Floating Nuclear Power Reactor

By 2050, China intends to have more than 350 GWs of nuclear power, having spent over a trillion dollars in nuclear investment. A GW of power provides enough energy for roughly 700,000 homes. China intends to bring 58 GWs of nuclear generating capacity into operation by 2020, up from the current capacity of roughly 27 GWs.

China has started to build its first floating nuclear power reactor, which it plans to deploy off its coast by the end of the decade. State-controlled CGN has begun construction of the ACPR50S reactor, and will acquire the reactor pressure vessel that encloses the reactor core

from Dongfang Electric, CGN said in a statement on 4 November 2016. The 200-MW reactor will help power offshore facilities in China's open sea and island reefs, CGN said, adding that offshore energy supply is an issue that China has to overcome in order to become a naval power.

The ACPR50S project was approved by the National Development and Reform Commission, the country's state economic planner, earlier this 2016, together with plans for CNNC's ACP100S floating reactor and China Shipbuilding Industry Corp's proposal to turn an offshore military nuclear facility into a floating power station for civilian use. In July 2016,

The 200-MW reactor will help power offshore facilities in China's open sea and island reefs, CGN said, adding that offshore energy supply is an issue that China has to overcome in order to become a naval power.

Chinese state media said China aims to launch a series of offshore nuclear power platforms to promote development in the South China Sea, soon after an international court ruled Beijing had no historic claims to most of the waters.

Sovereignty over the South China Sea is contested by China, the Philippines, Vietnam, Malaysia, Brunei and Taiwan, and any move to build nuclear reactors is bound to stoke further tension in the region. Floating reactors were first proposed in

the US in the 1970s but then abandoned. The first demonstration of the technology is due to be launched in Russia in 2017.

Source: <http://timesofindia.indiatimes.com/>, 07 November 2016.

JAPAN

Japan's Renewed Nuclear Fuel Recycling Dream Faces Obstacles

After finally acknowledging the failure of its fast-breeder reactor, Japan plans to continue pursuing nuclear fuel recycling in a French project, but this program also faces an unclear future. Jean-Marie Carrere, manager of the Advanced Sodium Technological Reactor for Industrial Demonstration program, said the French Alternative Energies and CEA will decide in 2019 on whether to build the fast demonstration reactor. The decision, he said, will be based on the results of 1 billion Euros in research and development.

Carrere told Japanese reporters in Marcoule, southern France, on Oct. 14 that the CEA has no intention to scrap the ASTRID project, and that it was looking forward to Japan's financial contributions. But he did suggest the ASTRID project would require many changes following Japan's decision to decommission the Monju prototype fast-breeder reactor in Fukui Prefecture. The CEA, lacking a fast reactor in operation in France, had planned to conduct some of its fuel-burning experiments at Monju.

Carrere indicated the CEA could possibly seek a partnership with Russia, which has a fast reactor the size of Monju. The money-losing, problem-plagued Monju reactor was one of the pillars of Japan's efforts to create a nuclear fuel recycling program. The plan was to reprocess spent nuclear fuel to extract plutonium, which would be burned in nuclear reactors. Fast-breeder reactors, such as Monju, are supposed to produce more

plutonium than they burn. According to Carrere, the concept for ASTRID has been completed, and it is now in its preliminary design phase. If the decision is made to build the reactor, the goal would be to put it into operation around 2030, he said.

The fast reactor is expected to generate 600 MWs of electricity. Relevant Cabinet members have discussed Japan's direction in this field in a "committee for fast reactor development." Some expect joint research in the ASTRID project would

allow Japan to keep alive its fast reactor research and maintain its nuclear fuel recycling policy, even if Monju is scrapped. However, a senior science ministry official said in September 2016 that Japan could end up serving as a cash cow for the French project.

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Source: <http://www.asahi.com/>, 02 November 2016.

UKRAINE

Ukraine to Produce its Own Nuclear Fuel

The Ukrainian government has approved the production of nuclear fuel and some of its components within Ukraine, an Ukrinform correspondent reports citing Ukrainian Energy and Coal Industry Minister Ihor Nasalyk who presented a relevant resolution at a meeting of the Cabinet of Ministers of Ukraine. "The resolution provides for adopting a decision on the approval of the State Special Program of the Development of Ukraine's Nuclear and Industrial Sector until 2020, allowing for the production of nuclear fuel and its components in Ukraine to ensure supply diversification, import substitution and provision of Ukrainian nuclear power plants with domestically produced fuel in full," Nasalyk said.

A reminder that the Ukrainian Energy and Coal Industry Ministry has reported earlier that Ukraine is holding talks with potential investors to finance nuclear fuel production in the country. However,

Westinghouse did not confirm this information, although the company was mentioned as a potential investor for plant construction. Meanwhile, the ministry confirmed their intent to produce fuel for nuclear power plants within Ukraine and made a draft program. The project is viewed as an element of reducing Ukraine's dependence on Russia in this energy sector.

Source: <http://www.ukrinform.net/>, 09 November 2016.

VIETNAM

Vietnam Scraps Plans for its First Nuclear Power Plants

Vietnam's government has decided to scrap its long-delayed plan to build the country's first nuclear-power plants because other energy sources have become cheaper and demand for power has slackened due to slowing economic growth. The government will submit its proposal to cancel the project to the country's lawmaking body, the National Assembly, which is expected to ratify it later this November 2016, the official VNA reported. Vietnam was among the first countries in Southeast Asia to embark on plans to develop nuclear power, once considered essential for its fast-growing economy, which mainly relies on coal and hydropower for electricity.

The National Assembly in 2009 ratified the plan to build two nuclear power plants with a combined capacity of 4,000 MWs in the central province of Ninh Thuan. The government had chosen Russian nuclear-energy company Rosatom and Japan Atomic Power Co. to build the plants, and signed a deal to borrow \$8 billion from Russia for building the first facility. Construction was initially scheduled to begin in 2014, but has been delayed several times. Early in 2015, officials said construction would be delayed until at least 2019, citing safety concerns following the accident at the Fukushima Daiichi plant in Japan.

"Nuclear power is now less competitive than other power sources and is not urgently needed," Duong Quang Thanh, chairman of the state-run Electricity of Vietnam Group that was overseeing the project, told local media. Mr. Thanh said oil and coal are much cheaper today than at the time when the project was proposed. Domestic crude-oil and coal prices have fallen by around 50% since 2010, according to state media reports. Economic growth has also been slower than previously forecast, resulting in lower-than-expected demand for power, Mr. Thanh said. Electricity consumption is now forecast to grow 11% a year between 2016 and 2020, compared with a previous forecast of 17% to 20% growth, he said.

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Vietnam's economic growth averaged 5.84% a year between 2011 and 2015, below the government's targeted growth of 6.5% to 7.0%. The government in October 2016 lowered its growth target for this 2016 to between 6.3% and 6.5% from 6.7% earlier. The country's rising public debt, which is nearing the

government's ceiling of 65% of the gross domestic product, was another reason for the project's cancellation, said Cao Si Kiem, a National Assembly member and the former governor of the country's central bank.

"Going ahead with the plan would be a big pressure for public debt because Vietnam would have to borrow foreign funds for the construction of the plants," he said. The Ministry of Industry and Trade earlier this November 2016 said Vietnam will be more reliant on coal for power generation for several years. Coal-fired power plants are expected to account for around 55% of the country's total installed power-generation capacity in 10 years from about 30% currently, according to the ministry.

Source: <http://www.wsj.com/>, 10 November 2016.

NUCLEAR COOPERATION

CHINA-UK

China, UK Step up Nuclear Cooperation in "Golden Era"

A nuclear research centre, led by both China and UK, was launched in London with a total investment of 50 million pound. The UK National Nuclear Laboratory and the state-owned CNNC jointly funded the centre for a period of five years. "It is the first nuclear energy research platform supported by a Western government that is willing to cooperate with us. We will cooperate in advanced fuels and manufacturing, reactor decommissioning, radioactive waste treatment and nuclear regulations," said Xie Jiajie, vice president of CNNP.

The UK-China Nuclear Joint Research and Innovation Centre started in 2015 and is based in Manchester. The cooperation is another important step marking China-UK cooperation in the nuclear power industry, after the Hinckley C nuclear power project signed in September 2016. Meanwhile, the British PM Theresa May has welcomed more Chinese investments to the country during a meeting with Chinese Vice Premier Ma Kai in London on 9 November 2016. Both the PM and Ma agreed that China-UK ties are now in a "Golden Era." Ma Kai traveled to UK to co-chair the eighth China-Britain Economic and Financial Dialogue with British Chancellor of the Exchequer Philip Hammond.

Source: <http://english.cri.cn/>, 10 November 2016.

INDIA-JAPAN

Japan has Option to Scrap N-deal

India on 11 Nov 2016 signed a historic civilian nuclear deal with Japan during the annual

bilateral summit held in Tokyo. Sealing of the deal marked the high point of the ongoing visit of Japan by Prime Minister Narendra Modi who issued a media statement describing it as a 'historic step'.

The nuclear deal which will help India access Japan's nuclear market, had been under negotiation for six years and was firmed up during the 2015 visit of Prime Minister Shinzo Abe to India when the principles of the agreement were frozen. However, the final seal on the text had to wait legislative clearance from Japan, which has 13 civil nuclear agreements with countries such as France and the U.S. India is the first non-member of the NPT to have signed such a deal with Japan.

Negotiations which began in 2010 during the UPA government were stuck on India's non-NPT status as Japan sought assurances that the deal would be used for peaceful purposes. The last stage of negotiations was keenly watched due to a "nullification clause" which seeks automatic cancellation of the deal if India resorts to nuclear testing. "If India conducts a nuclear test, Japan shall stop its cooperation," Yasuhisa Kawamura, press secretary of the Japanese Foreign Ministry had told The Hindu earlier in written comments explaining the "nullification clause" in the agreement.

Foreign Secretary S. Jaishankar told the media in Tokyo that the India-Japan civil nuclear agreement is "broadly in line" with other such deals New Delhi has signed so far. However, Japan Times has reported that the deal includes the option that Japan can give a year's notice before terminating it in case India breaks the nuclear testing moratorium that it had extended to the Nuclear Suppliers Group in 2008.

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The deal is significant as it will help guarantee Japan's continued support to India's civil nuclear programme. Apart from the Russian reactors, the planned nuclear reactors with France and the U.S. depend on Japanese parts. That apart, GE, Westinghouse, and Areva, the companies planning reactors in India have important ownership stakes of Japanese companies Hitachi Ltd, Toshiba and Mitsubishi, that were stopped from doing business with India without a final nuclear deal.

The deal is also likely to revitalise Japanese nuclear majors that are yet to recover from the setback of the Fukushima accident. That apart, the deal will bring Japan into the Indian nuclear market where France and Russia have already have a strong presence. ...

Source: The Hindu, 12 November 2016.

IRAN-ITER

Iran, ITER Sign Confidentiality Agreement

Launched by Europe, US, China, India, Japan, Russia and South Korea 10 years ago, the ITER project aims to build the world's largest experimental reactor, or Tokamak. It would generate energy through nuclear fusion, rather than the fission process currently used in nuclear power stations around the world. Fusion could prove cleaner, safer and more efficient, according to Reuters. "Under the document the two sides agreed to keep confidential each other's information during their cooperation," said Salehi.

Salehi, a nuclear physicist, also said a second agreement has already been drafted which details bilateral cooperation between the two sides which will be signed in the near future. He gave no date. "We hope to sign the agreement in the near future," he added. Earlier in July 2016, Salehi visited the ITER headquarters in southern France, saying there was "general agreement" for cooperation on the ITER. While details of the future cooperation document are unknown, a full

membership to the project should not be the case, as Bigot told Reuters in an interview in July 2016.

"After that they told us they had a long-standing interest in fusion and they would like to consider how to join the ITER project, but clearly not as a full member," he said. Full members provide experienced engineers and scientists and substantial financial contributions. "They felt that full membership is not best for them, but consider association in some specific areas or fields where

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they can contribute. Now it's up to them to make up their mind," Bigot said. Bigot's July 2016 comments, whoever, are thrown into doubt by Salehi who said Iran will enter into a l l - e n c o m p a s s i n g cooperation on the project.

"The project is an executive, technical, and

scientific one which demands extensive scientific activity. That is why we enter into an all-encompassing cooperation," he added. Iran's participation in the project is an outcome of the nuclear deal it concluded with six world powers in July 2015, formally known as the JCPA. Under the deal, EU and E3+3 countries and international participants will engage in joint projects with Iran, including through IAEA technical cooperation projects, in the field of peaceful nuclear technology, including nuclear power plants, research reactors, fuel fabrication, agreed joint advanced R&D such as fusion.

Source: <http://www.tehrantimes.com/>, 05 November 2016.

RUSSIA-CHINA

Russia and China Expand Nuclear Cooperation

Russia and China have agreed to expand cooperation on nuclear energy, with Russia to build another two reactors in China in addition to expanding cooperation on fast-reactor technology and floating nuclear plants, Russia's state-owned nuclear firm Rosatom said in a 8 November 2016 statement. The two nations, which share a 4,200-

km-long border, have worked together on nuclear energy for decades, but the cooperation has ramped up as Russia has moved to expand export markets for its advanced nuclear technology and China has dramatically expanded its nuclear generation capacity to stay ahead of surging demand.

The core of the most recent deal is the Tianwan Nuclear Power Plant that Rosatom built in Jiangsu Province. Unit 1 entered service in 2006 and Unit 2 in 2007.

Units 3 and 4 are currently under construction, with operations slated for 2018. All four are VVER-1000 designs. Units 5 and 6, based on Chinese technology, are planned but on hold. On 8 November 2016, PM Dmitry Medvedev and Premier Li Keqiang formally agreed to proceed with an additional two Russian-supplied reactors, to be designated Units 7 and 8, Rosatom said in the 8 November 2016 statement.

In addition, Rosatom said, discussions for other plants are in the works, as are plans for "cooperation in floating nuclear power plants as well as in the promising area of fast neutron reactors." Russia has been a driving force in developing fast-reactor technology, most recently commissioning Unit 4 at the Beloyarsk Nuclear Power Plant, the first of its BN-800 design. Russia's floating reactor project has been somewhat less successful, with the 70-MW Akademik Lomonosov plant experiencing delays and cost overruns. China is reportedly working on its own floating nuclear plant designs, though the project is still in the early stages. The two nations signed a cooperation agreement on floating nuclear technology in 2014.

Source: <http://www.powermag.com/>, 08 November 2016.

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The program is the next phase in the Company's mission to advance the Project into a low-cost uranium mining operation in order to be the first domestic supplier of uranium to the growing Argentine nuclear industry.

URANIUM PRODUCTION

ARGENTINA

Blue Sky Expands Exploration Program at Amarillo Grande Uranium Project, Argentina

Blue Sky Uranium Corp has report that it has expanded the aggressive planned exploration program at its 100% owned Amarillo Grande Uranium Project in Rio Negro Province, Argentina. The program is the next phase

in the Company's mission to advance the Project into a low-cost uranium mining operation in order to be the first domestic supplier of uranium to the growing Argentine nuclear industry. The Amarillo Grande Project currently includes over 187,000 hectares of mineral rights along a 140-km long trend of mineralization in a new uranium district. The Ivana, Anit and Santa Barbara properties, each a part of the Amarillo Grande Project, all host secondary near-surface uranium mineralization, open to expansion, and the potential for discovery of primary sandstone-hosted uranium mineralization at depth. This

phase of work will include up to 10,000 mts of reverse circulation drilling, designed to identify and delineate mineral resources.

"We believe that a domestic source of uranium with a low-cost production

model has the opportunity to supply Argentina's growing nuclear industry at highly competitive pricing compared to imported material. Our Amarillo Grande project with its near-surface mineralization, access to infrastructure, and supportive federal and provincial policies, is an excellent candidate to fulfill that model, and we have expanded our exploration program in order to take advantage of the current opportunity window," stated Blue Sky President and CEO Nikolaos Cacos.

The Opportunity Window: In 2016, Argentina committed to "The Paris Accord" a Global Commitment to Clean Energy and set a goal of a 15% reduction in CO2 emissions by 2030. This goal may be increased to 30%, depending on the availability of foreign investment. A shift from carbon-based fuels to nuclear power for energy requirements is a keystone of the plan moving forward. Argentina has a significant nuclear industry, with three power plants in operation, six research reactors, and a variety of supporting facilities and centres. However, in 2015, nuclear energy accounted for only about 4% of Argentina's energy matrix. Under the 15% CO2 reduction goal, the planned proportion of nuclear would more than double to 10% of the energy matrix in 2025. Currently there is one new power plant under construction, two additional ones in the planning stage and two more under proposal. However, there is no domestic source of uranium to supply the current or future nuclear power plants.

The Exploration Plan: The first major stage in the exploration plan is to delineate mineralization across the district in greater detail and to identify extensions and new targets, both near surface and at depth. Since announcing the program in July 2016, the Company has completed standardization of the project database, applied for updated work permits on all three properties, and had its expert technical consultants re-assess and refine the project's geologic model. Exploration permits have been received for the Anit property and a surface geophysical program is now underway which will help to refine targets for a 10,000 metre RC drilling program, scheduled to commence at the beginning of 2017. The drilling program will be designed to identify and delineate mineral resources and to provide material for a comprehensive metallurgical test work program. The Company's medium-term goal is to define sufficient mineral resources to support an

Carnotite is amenable to leaching, and early metallurgical work indicates that it will also be upgradeable using a very simple wet screening method. The near-surface mineralization, ability to locally upgrade, amenability to leaching and central processing possibility suggest a potentially low-cost development scenario for a future deposit.

economic assessment to evaluate exploitation of surficial uranium deposits in the Project area.

About the Amarillo Grandee Project: This new uranium district was first identified, staked and underwent preliminary exploration by Blue Sky from 2007 to 2012 as part of the Grosso Group's strategy of adding alternative energy focus to its successful portfolio of metals exploration companies. The Ivana, Anit, Santa Barbara properties, which comprise the Amarillo Grande Project, are within 50 kms of each other along the trend, therefore if resources are delineated at each property a central processing facility is envisioned. The area is flat-lying, semi-arid and accessible year round, with nearby rail, power and port access.

Mineralization identified to date represents a Surficial Uranium style of deposit, where carnotite mineralization coats loosely consolidated pebbles of sandstone and

conglomerates. Carnotite is amenable to leaching, and early metallurgical work indicates that it will also be upgradeable using a very simple wet screening method. The near-surface mineralization, ability to locally upgrade, amenability to leaching and central processing possibility suggest a potentially low-cost development scenario for a future deposit.

Rio Negro is host to several facilities related to the nuclear industry. Furthermore, the Provincial government is amenable to mining as a means of socio-economical development. In addition, the Federal government has expressed support for building domestic resources of uranium. In particular, the Argentina's CNEA published its Strategic Plan 2015-2025, which includes a strategic objective "To ensure the supply of domestic uranium for nuclear power plants in operation, under construction and planned.

Source: <http://www.marketwatch.com/>, 07 November 2016.

CHINA

China Uranium Demand to Double by 2020 but Prices Seen Depressed

Chinese demand for uranium is expected to nearly double to 9,800 tonnes per year by 2020 from the end of 2015, although a near-term supply glut will keep prices depressed, said the head of a unit of state-owned CNNC. China is in the middle of a nuclear reactor building programme and aims to have 58 GW of capacity in full commercial operation by the end of 2020, up from 30.7 GW at the end of July 2016.

But Wang Ying, chief executive of CNNC International, told the IMARC mining conference in Melbourne, that only around 53 GW of capacity would likely be online by the turn of the decade as not enough construction of nuclear plants had already begun. Uranium last traded at \$18.75 per pound, down from \$67 before Japan's Fukushima disaster in 2011.

"I think perhaps we have a bottom of around \$20 per pound at present. But unfortunately today because of excess supply and storage, I don't think it will be more than \$40 by the end of this decade," she said on 31 October 2016. Prices could recover as more nuclear capacity comes online by 2025, she added. Global stockpiles of uranium stand at around 1,427.5 million pounds or some 550,000 tonnes she said, around 6-7 years of supply. That includes stockpiles of nearly 300 million pounds at China's utilities. It also includes China's government stockpiles, which stand at more than 10,000 tonnes, she said, citing data by US based consultancy Trade Tech.

Meanwhile, she said uranium needed to supply

growing global nuclear generating capacity is seen at 80,383 tonnes in 2020, rising to 90,780 tonnes in 2025 and 106,301 tonnes in 2030. Estimated total production of uranium is seen at 75,000 tonnes by 2020 and around 85,000 in 2025.

Source: <http://www.reuters.com/>, 06 November 2016.

NUCLEAR PROLIFERATION

NORTH KOREA

Leaders of S. Korea, Kazakhstan Urge N.K. to Stop Nuke Program, Provocations

The leaders of South Korea and Kazakhstan on 10 November 2016 urged North Korea to stop its nuclear program and all other provocative acts, as they agreed to closely work together toward the communist state's denuclearization. In a joint declaration issued after their summit in Seoul, President Park Geun-hye and her Kazakh counterpart Nursultan Nazarbayev also expressed "serious concerns" over the woeful human rights situation in the reclusive state. "The two sides strongly urged North Korea to abandon all activities of its nuclear program in a complete, verifiable and irreversible manner in line with UNSC resolutions, and to immediately halt provocations," the joint statement read.

The statement also noted that the two sides shared the understanding that Pyongyang's "extremely irresponsible" acts have negatively affected the international non-proliferation regime, posed a serious threat to peace and security in the region and the world, and undermined the world's efforts to secure a future without nuclear arms. Nazarbayev, who has led his country since 1991,

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Uranium needed to supply growing global nuclear generating capacity is seen at 80,383 tonnes in 2020, rising to 90,780 tonnes in 2025 and 106,301 tonnes in 2030. Estimated total production of uranium is seen at 75,000 tonnes by 2020 and around 85,000 in 2025.

began his three-day state visit to South Korea on 9 November 2016. Over the last 25 years, the Kazakh leader has championed the cause of denuclearization in the Central Asia and throughout the world.

Aside from security issues, the two sides also agreed to expand bilateral cooperation in the economic realm. The partners shared the view that a free trade agreement between South Korea and the Eurasian Economic Union will contribute to expanding investment, trade and economic cooperation between their countries. In particular, Kazakhstan, this 2016's EAEU chair, pledged to make active efforts to open FTA negotiations between South Korea and the customs union that consists of Russia, Belarus, Kazakhstan, Armenia and Kyrgyzstan....

The Eurasia Initiative seeks to bring countries in the Eurasian continent closer together through increased railway and other infrastructure links. The Nuryly Zhol plan is an economic stimulus package to develop roads, railways and ports in Kazakhstan. On the occasion of the summit, the two sides signed a total of 10 memorandums of understanding over strengthening economic cooperation. The leaders oversaw the signing of two MOUs on cooperation in traffic, logistics, trade and investment....

Source: <http://www.koreaherald.com/>, 10 November 2016.

PAKISTAN-CHINA

UK Nuclear Report Nails Pakistan's Lies, China's Complicity

Pakistan's continued use of front companies and other deceptive methods to obtain dual-use goods for its nuclear programme means it cannot "expect to be welcomed" into the NSG, a new report by

experts at King's College of London has said. The report contends that the scale of Islamabad's procurement of sensitive material from Beijing is "so substantial that it must be concluded that the

Chinese state is either complicit in supplying Pakistan's programmes, or negligent in its control over state-owned enterprises".

"Pakistan's strategic nuclear and missile industries", prepared by Project Alpha of the Centre for Science and Security

Studies at King's College, concluded Pakistan has a "deliberate strategy of using deceptive methods to obtain dual-use goods" that has been demonstrated by its "systematic use of front companies to supply its strategic industries".

Islamabad also maintains a network of at least 20 trading companies in mainland China, Hong Kong, Dubai and Singapore that it uses to "covertly funnel dual-use goods to its strategic programmes". "While the full extent of their overseas operations are not clear, these trading

companies probably purchase goods from manufacturers in China, Europe, the US and elsewhere and then arrange their export to Pakistan," the report said. The deceptive methods of acquiring dual-use goods

undermines "Pakistan's claim that it is a responsible actor in the non-proliferation domain: Pakistan cannot expect to be welcomed into the NSG when it continues to secretly and systematically undermine NSG members' national export control systems by targeting companies through the use of front companies and other deceptive techniques," the report said.

The conclusion is significant as Pakistan recently applied for entry to the NSG, an elite club that controls trade in nuclear technology and materials, soon after India's bid for membership.

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However, Pakistan's close ally China effectively blocked India's application. Project Alpha was established in 2011 with funding from the British government to counter illicit nuclear proliferation-related trade. It is headed by Ian Stewart, who was seconded to King's College from Britain's defence ministry.

The researchers analysed information that was till now "fragmented and uncollated", including trade data, academic papers, contractor websites and corporate newsletters, and developed a representation of the organisational structure of Pakistan's strategic industries and their procurement entities. Some of the material is so sensitive that Project Alpha only made public a redacted version of its report. China is the most important supplier of all forms of goods to Pakistan's nuclear and missile programmes, and most procurements from China are "probably from unwitting private suppliers".

"But, on a smaller scale, Chinese state and private entities continue to knowingly supply Pakistan's strategic programmes with sensitive equipment," the report said. Islamabad's reliance on Beijing for sensitive technologies is "not surprising" as Pakistan is a strategic ally of China. "However, it does nonetheless raise questions about China's commitment to the principles of the export control regimes which it claims to subscribe," the report added. Pakistan wants to expand its civil nuclear programme with outside assistance and "perhaps even to become a nuclear exporter" and "yet does not want to accept the international rules associated with responsible non-proliferation behaviour", the report said.

Islamabad has rejected the NPT and FMCT and not signed the CTBT. "It continues to keep most of its nuclear fuel cycle off-limits to IAEA inspection. These refusals in themselves make Pakistan's push to join the NSG hard to accept," it added. Pakistan's extensive procurements of dual-

use goods from abroad suggests its "strategic industries are not as self-sufficient as Islamabad has long claimed", the report said. Pakistan has named less than a dozen of the main organisations involved in its nuclear and missile programmes and it "has certainly not made reference to the web of clandestine front companies that these organisations use to conduct procurement activity", it said.

Islamabad "continues its forty-year history of covert procurement for its nuclear weapon programme largely unabated" and Project Alpha's study showed that Pakistan "continues to engage in deceptive procurement tactics aimed at defeating national export controls in countries across the world in order to build strategic capabilities

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at home". "Pakistan has questions to answer about how it will reconcile these activities with its goals of joining the NSG – and most NSG members are likely to be sceptical of any response. Islamabad has only a few allies in its quest to build strategic capabilities, albeit ones whose commitment is not wholly known," the report said.

"Our analysis shows that China continues to aid Pakistan's missile programmes through repeated sales of sensitive dual-use technology. If Beijing has intended for these exports to be clandestine, it has failed in its tradecraft. If Beijing is unaware of the extent that its state-owned enterprises are supplying Pakistan's missile industries, then it has failed in its oversight. "Either way, Beijing will need to adjust its sales relationship with Pakistan in order to avoid international criticism."

Pakistan, which is said to have the world's fastest growing nuclear arsenal, also continues to improve its fissile material production facilities, develop tactical nuclear weapons and work on enhanced nuclear delivery systems, "probably including submarine-based second strike capability". It added, "In secret...Pakistan continues to procure dual-use technology from

abroad for its nuclear weapon and missile programmes on a vast scale." Pakistan targets companies worldwide for nuclear and missile-related dual-use equipment, often through "layers of middlemen and front companies". Virtually all state-controlled entities in Pakistan's strategic programmes "maintain front companies, most likely for the purpose of defeating export control efforts in other countries".

Analysis by Project Alpha of Pakistani procurements revealed hundreds of imports over the past five years, with most imports made by front companies not obviously affiliated with strategic industries. "It has been possible to identify these as procurements for nuclear- and missile-related end-users mostly because of poor tradecraft on the part of Pakistani procurers: they use common addresses; common telephone numbers, and repeatedly use the same, limited network of suppliers abroad for dual-use technologies that can be clearly identified as for missile-related or nuclear-related purposes," the report said. IAEA safeguards too have limited reach in Pakistan, which has an agreement with the UN watchdog whereby only six facilities and specific materials are subject to safeguards.

Source: <http://www.hindustantimes.com/>, 08 November 2016.

NUCLEAR DISARMAMENT

RUSSIA

Russian Reactor Running on Weapons-Grade Plutonium from Warheads Named 'Top Plant' by US Magazine

The influential US magazine on energy industry, Power, has chosen the BN-800, Russia's new fast-

neutron breeder reactor, for its annual 'Top Plant' award. The reactor was signed for commercial operation on 31 October 2016. The BN-800 reactor located at the Beloyarsk power plant was selected

for Power Award's Top Plants category, which honors recently-commissioned facilities "that exhibit some unique design or technology that will be of general interest to the power industry." The Russian facility was honored alongside the Peach Bottom Atomic Power Station in Pennsylvania.

The world's most powerful sodium-cooled fast-breeder reactor is part of Russia's ambitious plan to have a closed nuclear fuel cycle. It is capable of using waste from traditional nuclear reactors, dramatically reducing the amount of radioactive waste that needs to be stored in a permanent sealed repository. Another key feature of BN-800

is its ability to work on MOX fuel, which is produced from WGP from decommissioned nuclear warheads. Until recently, Russia and the US had a deal on weapons plutonium reprocessing, which would require both nations to build MOX-fuel manufacturing facilities and

reactors to consume it.

After the US failed to stick to its part of the bargain, Russia suspended the deal in protest, but said that in practical terms it intended to stick to it. The new breeder reactor can also be used for producing isotopes or – if needed – new plutonium. The fact that BN-800 can serve multiple purposes is one of the reasons Power recognized with the award it this 2016. The magazine also remarked the number of passive safety features the reactor boasts, such as hydraulically-suspended absorber rods, which would drop down and shut down the reactor core, if the sodium coolant flow were to

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drop to half of the rated level.

“Fast-neutron reactors are pivotal to Russia’s ambitious nuclear power plans. The successful construction, grid-connection, and testing of the country’s first BN-800 reactor at its Belyarsk nuclear plant is a major achievement in the right direction,” Power wrote. Construction of BN-800, the fourth reactor at the Belyarsk plant, began in 1984, but saw significant delays first after the Chernobyl disaster in 1986, which required an overhaul of the reactor’s design to boost safety, and later by the shortage of funding after the collapse of the USSR. The project was reinvigorated in 2006, amid Russia’s economic growth, which provided both the necessary investment and the demand for boosting national electricity generation.

The reactor achieved first criticality in June 2014 and was connected to the grid in December 2015. In August 2016, it underwent comprehensive testing at full power, successfully passing it. On 31 October 2016, Rosenergoatom, the state-owned operator of BN-800, endorsed it for commercial operation.

Source: <https://www.rt.com/>, 02 November 2016.

Fast-neutron reactors are pivotal to Russia’s ambitious nuclear power plans. The successful construction, grid-connection, and testing of the country’s first BN-800 reactor at its Belyarsk nuclear plant is a major achievement.

The draft, currently being examined at the bimonthly session of the NPCSC, specifies safety standards for nuclear facilities; emergency preparedness and response systems; and rules for information disclosure. It also details the responsibilities of staff and supervisory bodies, and sanctions for those who fail in their duties.

response systems; and rules for information disclosure. It also details the responsibilities of staff and supervisory bodies, and sanctions for those who fail in their duties. The legislation aims to enable China to utilize nuclear energy safely; ensure the security of facilities and materials; and prevent and cope with accidents while protecting employees, the general public and the environment.

Safety is the top priority of the nuclear cause, said Zhang Yunchuan, Vice Chairman of the NPC’s Environment Protection and Resources Conservation Committee, in a report to the session. The legislation will strengthen supervision and increase public confidence in nuclear safety, he said. It will also reassure the world about China’s safety management, and promote international cooperation in this regard, he said. By the end of June 2016, 31 nuclear power generating units are operating on the Chinese mainland, with a total installed capacity of 29.69 million kw. Another 23 units with capacity of 26.09 million kw are under construction. By 2020, the number of China’s nuclear power generating units is expected to be the second in the world, according to Zhang.

Source: <http://china.org.cn/>, 31 October 2016.

NUCLEAR SAFETY

CHINA

China Begins Deliberating Draft Nuclear Safety Law

China’s top legislature began deliberating a draft law on nuclear safety on 31 October 2016. The draft, currently being examined at the bimonthly session of the NPCSC, specifies safety standards for nuclear facilities; emergency preparedness and

NUCLEAR WASTE MANAGEMENT

GENERAL

New Method to Help Solve the Problem of Nuclear Waste

In the last decades, nano materials have gained broad scientific and technological interest due to their unusual properties compared to micrometre-sized materials. At this scale, matter shows properties governed by size. At the present time, nano-materials are studied to be employed in

many different fields, including the nuclear one. Thus, nuclear fuels production, structural materials, separation techniques and waste management, all may benefit from an excellent knowledge in the nano-nuclear technology. No wonder researchers are on the constant lookout for better ways to improve their production.

Scientists from Joint Research Center have come up with a way to do just that. Olaf Walter, Karin Popa and Oliver Dieste Blanco, have devised a simple access to produce highly crystalline, reactive actinide oxide nano-crystals. The shape of the crystals, together with their increased reactivity, enables the consolidation of homogeneous nano structured mixed oxides as intermediates towards very dense nuclear fuels for advanced reactors. Moreover, such materials can be used as precursors for the production of compounds with special properties, which mimic structures those are found in spent nuclear fuel, and will also be of great use in the study of how such radioactive material migrates in nearby geological environments.

This new process could enable scientists further research on the properties of these types of materials. Surprisingly, this new route proved uncomplicated, fast, and reproducible. It contains fewer procedural steps than typical oxalate precipitation-decomposition processes, allowing for production using a single vessel and under continuous flow. The article, published recently in *Open Chemistry* may lead to the development of a process to remove uranium from wastewater at the front-end of the nuclear fuel cycle, or even extracting natural uranium from sea water.

This process could help scientists and governments comply with the European Council Directive 2011/70/EURATOM on the "responsible and safe management of spent fuel and radioactive waste" which requires EU Member States to establish a dedicated policy, including the implementation of national programmes for the management of spent fuel and radioactive waste. This also may help make the future brighter for nuclear, as a carbon-free energy source.

Source: <https://www.sciencedaily.com/>, 27 October 2016.

USA

Decades of Toxic Waste Stranded as Nuclear Plants Close Out

Midway between San Diego and Los Angeles, the San Onofre Nuclear Plant waits to be dismantled. After more than 40 years of protests, lawsuits and safety scares, its two concrete-encased reactors, jutting from the pristine California coastline, are powered down and its massive steam turbines, once deafening, are quiet. For the activists who fought to close the plant, the victory is bittersweet. The reactors will disappear, but 1,600 metric tons of radioactive wastes remain. While some is stacked in steel-lined casks, and the rest is submerged in cooling pools, all of it is trapped in a political and regulatory limbo that keeps it from going anywhere anytime soon. And San Onofre isn't alone: More than 76,000 metric tons of waste is stranded at dozens of commercial sites, just as

the US approaches a critical mass of nuclear-plant retirements.

"Many were surprised to learn that when the plant is decommissioned, the fuel has nowhere to go," said David Victor, chairman of the San Onofre Community Engagement Panel tasked with overseeing the closure. "The problem is, nobody is in charge." Under a 1982 law, the US government, not the utilities, is responsible for disposing of radioactive waste that can take thousands, even hundreds of thousands, of years to degrade. But more than a half-century after nuclear energy powered the first American home, the US Department of Energy still doesn't have a permanent solution for the waste left behind.

It's a problem that will only get worse. On October 24, the Fort Calhoun Nuclear Generating Station near Blair, Nebraska, became the fifth nuclear plant to close in five years. Of 119 reactors in the US, 20 are now being decommissioned and a half-dozen more are expected to close prematurely, nudged out by cheap natural gas and growing use

Olaf Walter, Karin Popa and Oliver Dieste Blanco, have devised a simple access to produce highly crystalline, reactive actinide oxide nano-crystals. The shape of the crystals, together with their increased reactivity, enables the consolidation of homogeneous nano structured mixed oxides as intermediates towards very dense nuclear fuels for advanced reactors.

of renewables. Beyond that, “the big wave of retirements really starts coming in around 2030,” Energy Secretary Ernest Moniz warned in October 2016 at an event in Washington. Among experts, the nuclear waste debate invariably turns on the fleeting nature of human institutions in dealing with an element that the Environmental Protection Agency has said must be isolated for 10,000 years to protect humans and the environment from toxic radiation.

“The problem with federal agencies is that the management structure changes every few years,” said Allison Macfarlane, a former chairman of the NRC, which licenses and regulates civilian use of radioactive material. “In hundreds of years, will these institutions be there, will they care, will they pay?” That’s one issue. A second is where exactly to put the waste.

The safest thing to do is to bury it deep underground, below the water table and within a stable rock formation. Congress picked such a site in 1987: a desert ridge in Southern Nevada known as Yucca Mountain. The site abuts a nuclear weapons testing ground where 928 atomic tests were conducted between 1951 and 1992. While a few Nevada counties agreed with the selection, the state government didn’t, and the Yucca solution soon devolved into a decades-long political fight that crossed party lines and spanned presidential administrations. In 2010, President Barack Obama finally scrapped the plan altogether, declaring the site unworkable.

Moniz, whose agency has primary authority for disposing of the waste, is hoping to overcome the problem, at least for the short term, by using interim storage sites built by the private sector, he testified before Congress in September 2016. In October 2016, the DOE for the first time began soliciting public comments on that proposal. But plans for two private facilities are already facing

flak. In October 2016, a collection of anti-nuclear, environmental and consumer advocates demanded in a letter that the commission dismiss a license application by Dallas-based Waste

Control Specialists LLC that offered up such a plan. The Texas facility, which the company said could be in place by the end of 2021, would store as much as 40,000 metric tons of waste, for as long as 40-years.

Of 119 reactors in the US, 20 are now being decommissioned and a half-dozen more are expected to close prematurely, nudged out by cheap natural gas and growing use of renewables.

In their letter, the plan’s opponents argue that the Nuclear Waste Policy Act of 1982 bars the federal government from taking responsibility for interim waste in the absence of a federal repository. “I think it’s a rather hollow argument to say the least,” said Chuck McDonald, spokesman for Waste Control Specialists, adding that the company couldn’t comment on the groups’ criticism of the NRC and the Energy Department. McDonald said the concept of interim storage

came out of the Obama Administration’s Blue Ribbon Commission on nuclear waste. “This idea didn’t come from Waste Control, it came from the federal government,” he said.

Allowing an interim site “lets the utilities off the hook,” making them less

inclined to push for a permanent solution, said Mindy Goldstein, an Emory University law professor who co-authored the letter. Another concern: “Private owners will be cutting costs at every turn to maximize profits,” said Tom Smith, director of the Texas office for Public Citizen, a consumer advocacy group. “That’s an inaccurate and unfair assumption that minimizes the oversight role of the NRC and the US DoE, who both have a pretty good track record as does Waste Control Specialists,” company spokesman McDonald said.

The other company proposing to host the waste, Holtec International Corp., declined to comment

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on the letter. "We have remarkable support," said Ed Mayer, program director for Holtec, which plans to store 120,000 tons of waste at its facility in New Mexico. The support comes from the counties where the facility would be located as well as nearby cities and state officials, Mayer said. Holtec will submit its application for a license in March 2017, with the site expected to be in service by 2022, he said.

Meanwhile, the Energy Department remains decades away from developing a permanent repository, according to John Kotek, an assistant secretary at the agency. An interim solution could be working in "a 5 to 10-year range," Kotek said by telephone. "It's a multi-decade effort to get to permanent disposal." Part of the delay stems from a years-long Energy Department initiative aimed at getting volunteers to host a permanent repository. "Consent-based siting is absolutely essential," Energy Secretary Moniz said. "We never said it would be easy, we just said you're not gonna get there without it."

In the meantime, the waste will stay at San Onofre and other commercial sites, where residents worry about the integrity of the containers that hold it. At nearly every meeting of the San Onofre Community Engagement Panel, residents line up

to ask whether sea air might cause corrosion in the casks, what the chance of leakage is, and who's responsible if the casks degrade. Their next meeting is 10 November 2016. Maureen Brown, a spokesperson for Southern California Edison, which operates San Onofre, said the company supports moving the spent fuel offsite as soon as possible, but for now it's secure. "Until the federal government does its legally mandated job and provides a storage facility for used nuclear fuel, SCE will continue to safely store the fuel on site," she said.

As the amount of waste grows, so does the government's liability. For decades, utilities have sued the DOE for defaulting on a statutory obligation to dispose of spent nuclear fuel. The US has paid more than \$5 billion to settle these suits, which companies use to fund temporary management of the waste. The government's estimated total liability is \$29 billion. "That's probably low, because it's getting more expensive to store this stuff," said Rod McCullum, senior director of decommissioning programs at the Nuclear Energy Institute. "It's a direct hit on the taxpayer whenever the government loses one of these lawsuits."

Source: <http://www.mitchellrepublic.com/>, 05 November 2016.



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