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**OPINION – Raymond Graap, Schuyler Hilts**

**Nuclear Weapons: The End of Them, or the End of Us**

Recently two op-eds appeared in the *Star* about the issue of nuclear weapons. One urged that we upgrade and replace all current missiles, submarines, aircraft and land-based silos. The other argued that we maintain our current arsenal and use the trillions of dollars for urgent needs in our country.

A real solution has been proposed by 122 nations of the UN in the summer of 2017 targeting all nine of the nuclear weapons-holding nations. The UN Treaty on the Prohibition of Nuclear Weapons is now circulating to all nations for ratification. When ratified by 50 it will become international law. It is incumbent upon all citizens, political parties, municipal governments, states, and elected representatives to support this treaty. Our global survival is at stake.

If one nuclear weapon were launched by mistake, either from Russia to the US or vice versa, it would set in motion a counter-launch sequence with computer programs choosing which cities and targets were to be destroyed. Tucson, with Raytheon and the Air Force facilities, would be prime targets. There have been many near launches, often an error caused by one person and catastrophe averted by the corrective actions of a second person. President

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Jimmy Carter has said that “it hasn’t happened yet, but it only has to happen once.”

A bill pending now in Congress is “Restricting First Use of Nuclear Weapons” S.200 and HR 921.

It does allow for retaliation. Our Arizona Senate and House representatives should support these measures. A missile once launched cannot be recalled. The destruction would be devastating to both sides, with no meaningful recovery possible. Our current U.S. course bends toward

planetary destruction. Unimaginably powerful weapons are ingeniously developed, and then control is placed in the hands of leaders of dubious stability and competence. The U.S. and

Russia each have 1,500 nuclear weapons ready to launch.

Ira Helfand, an expert on nuclear weapons, has described in detail the effect of a nuclear attack on a city of 2.8 million: "Within 1/1000 of a second, a fireball would form enveloping downtown and reaching out for two miles in every direction from ground zero. Temperatures would rise to 20 million degrees Fahrenheit, and everything, buildings, trees, cars and people would be vaporized. Out to a distance of two to four miles, the blast would produce pressures of 25 pounds per square inch and winds in excess of 650 miles per hour. These titanic forces would rip buildings apart and level everything, reinforced concrete and steel structures ...."

Ronald Reagan and Mikhail Gorbachev at their meeting in 1986 in Reykjavik, Iceland, came close to concluding an agreement to abolish all nuclear weapons. Reagan's insistence of maintaining a strategic missile defense system sunk that opportunity. But to quote Reagan: "A nuclear war can never be won and must never be fought." And Gorbachev: "It is my firm belief that the infinite uncontrollable fury of nuclear weapons should never be held in the hands of any mere mortal ever again, for any reason."

And consider this, from President Trump after being briefed on the issue: "If we can't use them then why do we have them?" Unfortunately that sensible question has been lost by every administration in recent history. Albert Einstein said: "The splitting of the atom has changed everything save the mode of man's thinking, and thus we drift towards unparalleled catastrophe." Abolishing and

verifying the end of nuclear weapons is the right policy.

Source: <https://tucson.com>, 13 February 2019.

**OPINION – Jacob Weindling**

**Trump Wants Saudi Arabia to have Nuclear Power. Here are 5 Ways that can Go Very Wrong**

Any report that has the words "Trump" and "nuclear power" in the headline should stop you in your tracks, given that our manchild president

should not be trusted with a pair of scissors, let alone the most powerful kind of energy mankind has ever devised at scale. *Per Axios:* President Trump is set to meet...US energy industry leaders to discuss issues including the possibility of providing Saudi Arabia with a path to nuclear power.

**Why it Matters:** Saudi Arabia says it wants nuclear power in order to be able to divert more oil for export, and Crown Prince Mohammed bin Salman (MBS) led negotiations with the U.S. Energy and State departments last year over a power plants deal "worth upward of \$80 billion," per the *NY Times*. But the kingdom has reportedly resisted safeguards to ensure it doesn't develop nuclear weapons, and MBS said last March that Saudi Arabia will "follow suit as soon as possible" if its rival Iran makes a break for the bomb.

Nuclear power is very different from nuclear bombs, but nuclear power is also the perfect cover to build nuclear bombs. No one has any reason to take the

Saudis at their word that this is not about obtaining a weapon that has proven to elevate a country's standing in the global pecking order, so let me put

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**If we can't use them then why do we have them?" Unfortunately that sensible question has been lost by every administration in recent history. Albert Einstein said: "The splitting of the atom has changed everything save the mode of man's thinking, and thus we drift towards unparalleled catastrophe." Abolishing and verifying the end of nuclear weapons is the right policy.**

my political science hat on, and walk you through five extremely plausible scenarios that could arise from this madness.

### **1. This has Echoes of a Previous Trump Corruption Scandal**

We have all understandably forgotten about this given the hyperspeed at which the news cycle operates, but in the distant past—2017—a whistleblower revealed a truly alarming plan involving the shortest tenured National Security Adviser in American history.

This whistleblower's testimony came to light thanks to Rep. Elijah Cummings (D-MD), and was summarized as such in Vox:

**Turkey is ruled by a despot who spends his days persecuting political dissidents and trying to get the starting center for the New York Knicks extradited and would not hesitate to incorporate nuclear weapons into his widening power grab. If Saudi Arabia, Israel and Iran have nukes, that means Turkey gets nukes. Period.**

The project in question – promoted by a group of former senior US military officers, and often described as a “Marshall Plan” of sorts – would involve US companies working with Russian companies to build and operate nuclear plants in the Middle East, and export spent fuel from those plants.

In June 2015, Flynn flew to Egypt and Israel to “gauge attitudes” on the proposal, Newsweek's Jeff Stein has reported. And one of the companies involved in the project covered his travel expenses and wrote him a check for \$25,000 for the trip, though it's not clear if Flynn cashed the check. But reports over the last few months have suggested that Flynn continued to promote the project after the election, and even after he had been sworn in as national security adviser.

Let's assume that Saudi Arabia's pursuit is only about nuclear power and not nuclear weapons: do you really trust that this scheme dubbed the “Trump/Putin [Middle East] Marshall Plan” by Alex Copson of ACU Strategic Partners in an e-mail obtained by Reuters has nothing to do with this Axios report that Trump is trying to convince US energy companies to back a plan to bring nuclear power to a Middle Eastern country?

If this new report is a way to get that initial whistleblown plan in motion, then that means the President of the United States likely has a financial interest in delivering nuclear power to the Middle East. This is fine.

### **2. It Sparks a Nuclear Arms Race**

Even if Saudi Arabia doesn't get nuclear weapons, just the pursuit or even the perception of a pursuit of nuclear weapons can spark a nuclear arms race.

Iran has been trying for years to obtain a nuclear weapon, and they would surely ramp up those efforts if their other geographical foe tried to get one. I said “other” geographical foe because Israel's claim to not have nukes is the most well-known lie in the world. Saudi Arabia trying to get nukes means Iran trying to get nukes. Period. And I haven't even mentioned Turkey yet.

### **3. Oh Yeah, Turkey**

Oh yeah, the country with, according to the World Bank, the 17th largest economy in the world—larger than the economies of Saudi Arabia, Iran and Israel. Turkey is ruled by a despot who spends his days persecuting political dissidents and trying to get the starting center for the New York Knicks extradited and would not hesitate to incorporate nuclear weapons into his widening power grab. If Saudi Arabia, Israel and Iran have nukes, that means Turkey gets nukes. Period. We could be barreling towards a scenario where 28% of the highlighted countries and the vast majority of landmass in this picture are controlled by nuclear powers.

### **4. This Nuclear Arms Race Could Spill Out of the Middle East**

Given that “Middle East” is an inherently colonialist term (what is it “middle” and “east” of?), it's not exactly concretely descriptive, but given the recent history of U.S. foreign policy adventurism, that image is more or less a good representation of what landmass constitutes the

Middle East as we have come to know it. To its east, India and Pakistan have been rattling the world's nerves with their nuclear weapon-empowered posturing for decades. North of that is the western portion of nuclear-armed China, and north of that is nuclear-armed Russia.

Giving the Saudis nuclear weapons would kick-start a chain-reaction that would lead to a nuclear firewall stretching from the Mediterranean to the Pacific—and that's only including countries that already have nuclear weapons. If the entire Middle East power center is laden with nukes, why not the North African power center? Nigeria has a larger economy and much more oil than Israel, why shouldn't they have nukes too? South Africa ended its nuclear weapons program in 1989, but you can bet that those files still exist somewhere and they could restart the program next year if they wanted to. And if a country like Nigeria gets nukes, why not the eighth largest economy the world (Brazil)? Like South Africa, they have a dormant Cold War-era nuclear program that they could resuscitate if they wanted to.

See how all it takes is one shift in the power balance of one region to spark a litany of others throughout the region and beyond? This is not a topic to be trifled with.

### 5. Integrating U.S. Companies with Foreign Nuclear Ambitions is not Great!

I mean, this should be self-evident, but it is the Trump era. What happens if Exelon, Westinghouse, TerraPower, GE, BWXT, X-energy, Fluor, NuScale, Lightbridge and AECOM invest in a Saudi nuclear power program that turns into a Saudi nuclear weapons program? Do American companies then have a vested interest in the Saudi nuclear weapons program? If not, did they finance its creation? Even if it doesn't become a nuclear weapons program, does this mean that U.S. energy companies now have a fiduciary interest in spreading nuclear power throughout the world?

What does the State Department think of this policy being in the hands of private business? Etc...etc...etc...

If this does happen, I'm not sure that there's a better example of capitalism run amok than U.S. companies having a vested financial interest in a nuclear arms race taking place in the most volatile region on the planet.

Source: <https://www.pastemagazine.com>, 12 February 2019.

#### OPINION – Sung-Yoon Lee

### Korea and America's Second Summit: Here's What Sung-Yoon Lee Thinks will Happen

**Giving the Saudis nuclear weapons would kick-start a chain-reaction that would lead to a nuclear firewall stretching from the Mediterranean to the Pacific—and that's only including countries that already have nuclear weapons. If the entire Middle East power center is laden with nukes, why not the North African power center.**

Moved by an illusory chance to make history, President Trump jumped at the first opportunity for summit pageantry. Thus, Trump fell right into the North Korean dictator's trap of ensnaring the United States in a labyrinthian process of protracted negotiations during which

Pyongyang buys time and money with which to perfect its nuclear posture review. The second summit is the predictable Act II of a tragedy in-the-making, written and directed by Kim:

1. Raise the adversary's hopes and expectations by making more false promises and granting illusory concessions like opening up or decommissioning an old site or two.
2. Wrest away from Washington real concessions like the non-enforcement of sanctions and sanctions relief.
3. Build further "trust" by compelling the U.S. to sign a peace agreement, thus setting the stage for the slowdown of U.S. support for South Korea, ultimately leading to the withdrawal of U.S. Forces in Korea.

North Korea will ride the momentum of rapprochement and seek a Third Act that will further solidify its extortionist posture toward the South and its international standing as a nuclear power. At a point of its choosing Pyongyang will

punctuate Act IV with a thermonuclear test in outer space, as it threatened in September 2017. In blaming U.S. “non-compliance” and “hostile policy” for its act, North Korea will be accepted as an irreproachable, veritable nuclear state.

Kim Jong-un will seek to close out Act V by absorbing in whole the nuclear-free, risk-averse Korean state south of the border, thus fulfilling the highest stated mission of the Workers’ Party of Korea of the DPRK: complete the Juche Revolution by achieving the independent reunification of the fatherland. That is, unless South Korea shapes up and stands up to the North, embarking on a nuclear path itself.

While such a bold switchover in policy will not take place under the current Moon administration, South Korea’s nuclearization will increasingly become a taboo-free point of debate and the prevailing policy desire of the South Korean people. The choice between “Vietnamization,” i.e., communization by the North, and state survival through effecting nuclear parity with Pyongyang, will become starkly clear. In the face of international opprobrium, South Korea will argue that it, too, like the UK and France, can be a responsible, proliferation-resistant nuclear state....

*Source: Sung-Yoo Lee is a Kim Koo-Korea Foundation Professor of Korean Studies and Assistant Professor at the Fletcher School at Tufts University. <https://nationalinterest.org/>, 06 February 2019.*

**OPINION – Business Recorder**

**Demise of INF Treaty Profoundly Dangerous**

Today, the nuclear world is in tumult, much against expectations that as follow-up of various treaties and protocols the nuclear jinni would be back in the bottle. But that doesn’t seem to be happening.

The nuclear jinni is out in the air, showcasing its unique power to destroy the world.

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This has happened because the two principal nuclear weapon states, the US and Russia, who seem to be returning to the nuclear arms race, and with more destructive weapons. And as they take that route of competition and confrontation, the rest of the world tends to lose its

cool. What is in the offing is colossal breakdown of arms control set in place by US President Reagan and his then Soviet Union counterpart Mikhail Gorbachev in 1987 under the rubric of INF Treaty.

Of late, there were reports that both the US and Russia were contemplating modernizing their nuclear arsenals. While the US was focused on improving size, delivery and target-ability of its weapons, Russia was working on the reach of its nuclear-tipped intermediate and long-range missiles. What is particularly frightening is its recently tested nuclear-capable hypersonic missile.

**Seemingly, in the wake of demise of the INF Treaty, the world has arrived at the threshold of a new spell of Cold War. And this could put the world “much closer” to a nuclear war. In other words, the collapse of the INF Treaty has brought mankind closer to the brink.**

But it was the INF Treaty that stood in the way.

They have now walked out of this inhibiting dictate amid reports of potential deployment of new American missiles in Europe. Not only has this unsavoury development encouraged Russia to speak about ‘military retaliatory steps’, this has also helped the US challenge China’s intermediate-range conventional force arsenal in an effective manner. Seemingly, in the wake of demise of the INF Treaty, the world has arrived at the threshold of a new spell of Cold War. And this could put the world “much closer” to a nuclear war. In other words, the collapse of the INF Treaty has brought mankind closer to the brink.

If both Washington and Moscow found the INF Treaty obsolete and an impediment to realising

their latest nuclear-based strategic planning, the rest of the world does not. Thanks to the INF Treaty, the NATO countries are comfortable with its compliance over the last three decades. They would not like to host more lethal missiles the US would like to put on ground as response to Russia's Novator 9M729 ground-launched cruise missile, which is said to have broken INF Treaty's back.

As to how the nuclear-hinged Cold War would play out there are a variety of opinions and reactions. To the non-nuclear-weapon countries the end of the INF Treaty is a blow to the stability it generated in Europe. But some draw support from it for their nuclear ambitions. Iran's launching of a new cruise missile with a range of 1300km is a case in point. Iran says its missile tests are not in violation of the 2015 nuclear deal with world powers, an explanation rejected by the US. There is an element of defiance to the Iranian position; it activated the missile programme in the wake of US withdrawal from that deal and imposition of stiff economic anti-Iran sanctions. The demise of the INF Treaty could jeopardize another critical nuclear arms control tool or agreement - the New START.

However, if the US and Russia have upped the ante of nuclear apocalypse, the other nuclear-weapon states have not, and China is one of them. China has once again called upon the countries that have not joined the NPT to become members "as soon as possible". Unless that happens, admission to the Nuclear Suppliers Group is not possible, and this applies to India also. Equally untenable is the belief that nuclear deterrence acts as an antidote to nuclear holocaust. The proponents of this argument should also know that there is also something called human error. If the humanity is to survive the only option is to cork the nuclear jinni bottle up.

Source: <https://fp.brecorder.com>, 10 February 2019.

OPINION – Victor Gilinsky, Henry Sokolski

**Are Washington's 'Advanced' Reactors a Nuclear Waste?**

Late last year, the Energy Department (DOE), began work on a new flagship nuclear project, the Versatile Test Reactor (VTR), a sodium-cooled fast reactor. If completed, the project will dominate nuclear power research at DOE. The department's objective is to provide the groundwork for building lots of fast-power reactors. This was a dream of the old Atomic Energy Commission, DOE's predecessor agency. The dream is back. But before this goes any further, Congress needs to ask, what is the question to which the VTR is the answer? It won't be cheap and there are some serious drawbacks in cost, safety, but mainly in its effect on nonproliferation.

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Congress has to ask hard questions: Is there an economic advantage to such reactors? Or one in safety? Or is it just what nuclear engineers, national laboratories, and subsidy-hungry firms would like to do? The answer of DOE's Idaho National Laboratory,

which would operate the reactor, is cast in terms of engineering and patriotic goals, not economic ones: "US technological leadership in the area of fast reactor systems...is critical for our national security. These systems are likely to be deployed around the globe and US leadership in associated safety and security policies is in our best national interest." In other words, we need to build fast reactors because DOE thinks other people will be building them, and we need to stay ahead.

In the 1960s, when the Atomic Energy Commission concentrated on fast reactors ("fast" because they don't use a moderator to slow down neutrons in the reactor core), it argued with a certain plausibility that uranium ore was too scarce to provide fuel for large numbers of conventional light-water reactors that "burned" only a couple percent of their uranium fuel. Fast reactors offered the possibility, at least in principle, of using

essentially all of the mined uranium as fuel, and thus vastly expanding the fuel supply. To do this you operate them as breeder reactors—making more fuel (that is, using excess neutrons available in fast reactors to convert inert uranium to plutonium) than they consume to produce energy. The possibility of doing so is the principal advantage of fast reactors.

But we then learned there are vast deposits of uranium worldwide, and at the same time many fewer nuclear reactors were installed than were originally projected, so there is no foreseeable fuel shortage. Not only that, the reprocessing of fuel, which is intrinsic to fast reactor operation, has turned out to be vastly more expensive than projected. Finally, by all accounts fast reactors would be more expensive to build than conventional ones, the cost of which is already out of sight. In short, there is no economic argument for building fast reactors.

When it comes to safety, sodium-cooled fast reactors operate under low pressure, which is an advantage. But fast reactors are worrisome because, whereas a change in the configuration of a conventional nuclear core—say, squeezing it tighter—makes it less reactive, the corresponding result in a fast reactor is to make it more reactive, potentially leading to an uncontrolled chain reaction.

With regard to nonproliferation, the issue that mainly concerns us is that the fast reactor fuel cycle depends on reprocessing and recycling of its plutonium fuel (or uranium 233 if using thorium instead of uranium). Both plutonium and uranium 233 are nuclear explosives. Widespread use of fast reactors for electricity generation implies large quantities of nuclear explosives moving through commercial channels. It will not be possible to restrict such use to a small number of countries. The consequent proliferation dangers are obvious. And while it is doubtful the U.S. fast reactor project will lead to commercial exploitation—few, if any, projects from DOE ever

do—U.S. pursuit of this technology would encourage other countries interested in this technology, like Japan and South Korea, to do so.

One should add that one of the claims of enthusiasts for recycling spent fuel in fast reactors is that it permits simpler waste management. This is a complicated issue, but the short answer is that rather than simplifying, reprocessing and recycling complicate the waste disposal process.

With all these concerns, and the lack of a valid economic benefit, why does the Energy Department want to start an “aggressive” and expensive program of fast reactor development? It’s true that so far only exploratory contracts have been let, on the order of millions of dollars (to GE-Hitachi). But the Department is already leaning awfully far forward in pursuing the VTR. It estimates the total cost to

be about \$2 billion, but that’s in DOE-speak. We’ve learned that translates into several times that amount.

But beyond that, the nuclear engineering community, and the wider community of nuclear enthusiasts, have never given up the 1960s AEC dream of a fast breeder-driven, plutonium-fueled world. Such reactors were to have been deployed by 1980 and were to take over electricity generation by 2000. It didn’t even get off the ground, in part because of AEC managerial incompetence, but mainly because it didn’t make sense.

After the 1974 Indian nuclear explosion and the realization that any country with a small reactor and a way to separate a few kilograms of plutonium could make a bomb, proliferation became a serious issue. In 1976 President Gerald Ford announced that we should not rely on plutonium until the world could reliably control its dangers as a bomb material. The plutonium devotees never accepted this change. Jimmy Carter froze construction of an ongoing fast-breeder

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prototype, the Clinch River Reactor, about three times the size of the proposed VTR. Ronald Reagan tried to revive it but, as its rationale thinned and its cost mounted, Congress shut it down in 1983. The plutonium enthusiasts thought they got their chance under George W. Bush with a fast reactor and a reprocessing and recycling program under the rubric of Global Nuclear Energy Partnership. But it was so poorly thought out it didn't go anywhere. More or less the same laboratory participants are now pushing the VTR.

The DOE advanced reactor program has many irons in the fire, mostly in the small reactor category. But do not be misled. They are mostly small potatoes without much future. Only the fast reactor project is the real thing, bureaucratically, that is. Although at this point DOE has only contracted for conceptual design, the follow-up will cost many millions and take many years. Nothing attracts national laboratories, industrial firms, and Washington bureaucracies as much as the possibility of locking into a large multiyear source of funding.

Congress needs to look hard at the rationale for a fast reactor program. This means getting into the details. At a Senate Appropriations hearing last month on advanced reactors, Sen. Dianne Feinstein said rather plaintively, "We cast the votes, and cross our fingers hoping nothing bad will happen." That's not good enough.

*Source: Victor Gilinsky is program advisor for the Nonproliferation Policy Education Center in Arlington, Virginia. Henry Sokolski is executive director of NPEC. <https://nationalinterest.org/>, 06 February 2019.*

OPINION – Greg Kats

**Bill Gates' Quixotic Quest to Revive Nuclear Power**

Bill Gates has been lobbying Congress to secure federal financial support for nuclear power and for a nuclear company in which he is a large investor.

This plea for federal largesse from a decabillionaire illustrates why further nuclear subsidies make no sense.

Nuclear power is already a heavily subsidized 60-year-old industry with over half a trillion dollars invested in

several hundred large operating nuclear plants, including 99 in the United States. The cost of nuclear power has soared while the cost for other low-carbon power options — including wind, solar, batteries and energy efficiency — have plunged. This is why no U.S. utilities want to build nuclear plants unless they can get large additional subsidies.

Gates' rationale for nuclear power can be summarized as follows: Given the reality and gravity of climate change, nuclear provides the only large-scale, very-low-carbon electricity source that cost-effectively can provide power at scale when needed. Other very-low-carbon options, such as wind and solar power, batteries and energy efficiency,

cannot reliably provide power when needed — especially on hot summer afternoons when air conditioning loads are large.

This same argument was made by nuclear advocates 30 years ago and is even less true today. At the time, I co-authored a widely referenced study comparing nuclear power and energy efficiency as alternative ways to slow global warming. Our work showed that because nuclear is far more expensive

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than energy efficiency, given limited energy investment capital, if investments in costly nuclear power displace cheaper energy-efficiency investments, it would have the net effect of increasing global warming. Nuclear remains a large and important source of very-low-carbon electricity but energy efficiency has delivered far more CO2 reduction at far lower cost. Gates' argument for nuclear power was made 30 years ago and is even less true today.

Energy efficiency has cut electricity demand by half over the last 30 years and can cut growth in electricity use by half again by 2050. Gates has said his dream is clean energy at half the price of coal. Energy efficiency is now about half the price of coal. And large-scale solar contracts are being signed at close to half the price of coal, so Gates' dream already is coming true. Forbes, in a 2018 article titled "Plunging Prices Mean Building New Renewable Energy Is Cheaper Than Running Existing Coal," noted, "Across the U.S., renewable energy is beating coal on cost," and that new solar is commonly less expensive than existing, already-built coal plants.

...And a proliferation of innovative firms such as NEST, Tendril, AtSite and Ohm are making energy efficiency an increasingly flexible resource. California-based Ohm, for example, enables and connects more than 50,000 smart devices to balance the grid, including Teslas, smart home thermostats and smart plugs. It is close to a zero-capital-cost equivalent of batteries, and is enabling greater grid reliability and expanded reliance on renewable energy while reducing consumer cost of power.

**Resilient and Secure?:** In effect, power demand, once static, is increasingly flexible and responsive to utility price signals, making the grid more resilient and secure and reducing the need for continuously operating nuclear or coal plants.

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power generation. Meanwhile, America's most valuable corporations — including Apple, Google, Facebook and even Gates's Microsoft — are shifting to 100 percent renewable energy to power their companies and data centers, both to save money and to enhance their brand by cutting greenhouse gas emissions. Clearly wind and solar can — and do — provide power at scale.

**When a huge nuclear power plant has an unplanned shutdown, it is far more disruptive than small plants going offline. This and nuclear plants' highly radioactive materials is why security analysts and the military worry about the vulnerability of nuclear plants to accidents or to terrorism. The projected cost of cleanup for military and civilian nuclear waste is over \$490 billion.**

Wind and solar made up more than half of all new generating capacity in the United States and Europe over the last four years, adding more generation capacity than all other power sources combined. And with costs declining, wind and solar are generally projected to continue to be the dominant source of new

This leaves us with Gates's most complicated argument: that baseload power such as nuclear is almost always on and so can be relied on to provide power that other low-carbon energy solutions cannot.

But unlike energy efficiency, which is always working, nuclear plants experience accidents that cause abrupt plant shutdowns that have been very expensive for states ranging from California to Louisiana. When a huge nuclear power plant has an unplanned shutdown, it is far more disruptive than small plants going offline. This and nuclear plants' highly radioactive materials is why security analysts and the military worry about the vulnerability of nuclear plants to accidents or to terrorism. The projected cost of cleanup for military and civilian nuclear waste is over \$490

billion, according to a 2018 study by KPMG for the U.S. Department of Energy.

And we still have not figured out a long-term strategy for storing highly radioactive spent fuel from nuclear power plants. The issue of nuclear waste disposal remains unsolved, with huge costs pushed down the road, and until these problems are solved a nuclear expansion does not make much sense.

Gates is right that nuclear plants usually operate more reliably and predictably than wind or solar plants. A single solar or wind installation has unpredictable power availability, but as solar and wind resources are added across the country's grid, their combined predictability and reliability rises because if it is not windy or sunny in one place, it is windy or sunny elsewhere. As wind and solar generation continues to expand, their combined reliability and availability keeps rising and may exceed that of nuclear power plants.

As wind and solar generation continues to expand, their combined reliability and availability keeps rising and may exceed that of nuclear power plants. Further, the growth of inexpensive natural gas power generation has expanded the amount of power generation than can be started up and shut down relatively quickly and efficiently (which nuclear and coal plants cannot do), making natural gas a natural complement to wind and solar — which, unlike natural gas plants, have zero fuel costs.

In much of the United States, batteries are already a cost-effective way to shift up to two hours of electric load — for example, from the middle of the day when there is a lot of sun to later in the afternoon when solar power generation drops but air conditioning use peaks. Batteries, particularly lithium-ion batteries, are scaling very rapidly, driven mainly by electric cars, and that is reducing battery costs by about 10 percent per year. And

electric car batteries are increasingly being plugged into the grid to allow car owners to profit from buying power when it is cheap and not needed — and selling back to the grid when it is needed and expensive — reshaping load around demand and availability of wind and solar power.

Consumers, businesses and utilities all win with this new distributed clean utility because renewables plus efficiency and batteries is available as a very resilient, near-zero carbon solution to providing power when and where it's needed at the lowest cost. As these technologies continue to scale, they continue to experience steep cost declines, making the idea of a nuclear alternative vanishingly unrealistic. Even with enormous government subsidies and guarantees, corporations and utilities do not want to invest in nuclear power.

**Gates is a large investor in a nuclear firm, Terrapower, which hopes to build a prototype by 2030. If this target is achieved and a prototype is demonstrated by 2030, it could move toward commercial deployment in the 2030s. But we cannot afford to wait 15 or 20 years to scale very-low-carbon energy.**

Tens of billions of dollars have been spent developing different nuclear power plant designs, and even with enormous government subsidies and guarantees, corporations and utilities do not want to invest in nuclear power. Gates is a large investor in a nuclear firm, Terrapower, which hopes to build a prototype by 2030. If this target is achieved and a prototype is demonstrated by 2030, it could move toward commercial deployment in the 2030s. But we cannot afford to wait 15 or 20 years to scale very-low-carbon energy — and, fortunately, we don't need to.

...Nuclear's competition with efficiency, renewable energy and batteries is over, and we should be glad of it. After all, renewables and efficiency provide about five times as many jobs per dollar invested as nuclear power and don't impose nuclear power's risks of long-term radiation, accidents, unresolved and vastly expensive nuclear waste disposal challenges or the potential to provide materials for nuclear bombs — issues that most citizens are or should be concerned about.

Nuclear energy has played an important if expensive role in providing low-carbon power, and these plants should operate as long as they are safe. But America, including corporate America, has moved on to safer, cleaner, faster and more secure options that are proving to be a resilient and low-cost path to a very-low-carbon grid. Gates should do the same and shift his formidable skills and capital to accelerating this current and essential clean-energy transition.

Source: <https://www.greenbiz.com/>, 07 February 2019.

**OPINION – Elizabeth Rosenberg, Neil Bhatiya**

**7 Things America can Do to Counter International Nuclear Threats**

Clandestine state-sponsored nuclear programs have time and again surprised the international community with their skill and speed and there is no reason to believe it won't happen again.

Fifteen years ago, the global effort to prevent the spread of nuclear weapons was dealt an enormous shock. In the aftermath of the dismantling of Libya's nuclear weapons program, the world learned that Pakistani nuclear scientist AQ Khan, the father of his country's atomic bomb, had operated an alarming global proliferation network. He sold know-how and goods to build the world's most dangerous weapons to the world's most unsavory regimes. The international community, led by the United States, tried to patch the gaping regulatory holes that Khan exploited. Today, that effort is woefully lagging.

World leaders agree about the dire, and growing, threat to peace and security of the spread of WMD. There are sophisticated international legal control regimes on the production and trade of WMD materials and carefully crafted diplomatic agreements governing proliferation. But where is the concerted global effort to stop the money trail? A new Center for a New American Security report explains the yawning lack of political will and

capacity to fight the financing of WMD proliferation around the world. Some jurisdictions have the resources, but their political leadership finds it more convenient to look the other way. Other states understand the danger of letting their banking and commercial sectors be exploited, but do not have the legal framework or technical capacity to act effectively. Proliferating states know exactly how to manipulate these gaps. The United Nations and major investigative journalists have pointed out how adept North Korea is in particular.

The United States is not a laggard in blocking the money trail for proliferators. But successive Congresses and presidents committed to countering WMD proliferation threats have largely failed to lead the global community to block those funding streams. Now, with uncertainty around the future of the Iran nuclear deal and US-North Korean

diplomatic efforts, this failure is unacceptable. The United States cannot allow this threat to persist while it has the ability to lead at home and abroad on law and policy to counter the financing of proliferation.

An international response cannot be effective without

Washington's support. America possesses unrivaled intelligence and law enforcement capacities, especially when it comes to fighting financial crime. The size and sophistication of its financial sector, thanks to ubiquity of the dollar in trade and investment, means that US rules guide the international financial system. When American banks adopt new strategies, responsible banks around the world follow.

There are several things that the U.S. administration should do to address this threat. They will also advance Trump's policy goals of supporting denuclearization on the Korean peninsula and impeding Iran's ability to consider a dash to a bomb. First, the Trump administration should prioritize diplomatic efforts to harmonize information-sharing efforts between the United States and international counterparts, specifically

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Europe, to help financial institutions hunt the few suspicious transactions hiding in a sea of legitimate global commerce. It is difficult to find these red flags, and near to impossible if banks cannot easily share lead information with counterparts all over the world.

The US administration should also take the lead in expanding regulatory scrutiny for proliferation transactions beyond a requirement for financial institutions that have historically been the focus of stop-the-money-for-nukes efforts. Financial institutions only see a fraction of the underlying commercial activity associated with building a nuclear weapons program. Manufacturers, shippers, and insurers also have valuable insight into these flows, but are not required to impose the same kind of vigilance measures that global banks are. Also, it's hard for them all to share information with each other. To take another example: North Korea uses ship-to-ship transfers to evade United Nations sanctions with ease. Cracking down harder on those activities would be a good place to start.

Congress also has a role to play. Legislators have proposed measures to increase financial transparency, but have failed to find traction because of the perception that these regulations are anti-business. That attitude has allowed the use of anonymous companies to flourish in this country. Law enforcement and state and federal prosecutors have warned repeatedly that such practices allow criminals, including those abetting sanctions evasion by Russia, Iran, and North Korea, expansive means to move money around and acquire property in the United States. Passing legislation to require the collection of beneficial ownership information—data about who actually controls or benefits from the proceeds of a corporate entity—would be a powerful tool to close this loophole. Congress should also support U.S. efforts to help jurisdictions around the world

improve their legal and regulatory structures to combat proliferation financing by increasing funding for technical training programs offered overseas—particularly in countries under greatest threat for proliferation.

**Congress should also support U.S. efforts to help jurisdictions around the world improve their legal and regulatory structures to combat proliferation financing by increasing funding for technical training programs offered overseas—particularly in countries under greatest threat for proliferation.**

These efforts cannot wait until some future catastrophe finally wakes the world up. Clandestine state-sponsored nuclear programs have time and again surprised the international community with their skill and speed and there is no reason to believe it won't happen again. At this very moment, there may be a state actor—one the international community is not focused on as a WMD threat—that is abusing the open global financial system to acquire the goods and materials to build a nuclear device. Stopping that rogue actor—as well as North Korea, Iran, Syria, and other documented programs—must be a serious national-security issue and goal for financial policy leaders. And the United States must take the global leadership role.

*Source: Elizabeth Rosenberg is the senior fellow and program director for the Energy, Economics, and Security Program at the Center for a New American Security. Neil Bhatiya is a research associate for the Energy, Economics, and Security Program at the Center for a New American Security. <https://nationalinterest.org/>, 05 February 2019.*

## NUCLEAR STRATEGY

### CHINA

#### Is China about to Abandon its 'No First Use' Nuclear Weapons Policy?

Nuclear competition is brewing between the two countries as China makes gains in weapons development and Washington tries to limit Beijing's military build-up in the South China Sea. The US is still decades ahead in nuclear weapons development but a successful test late last year

of China's new submarine-launched ballistic missile, the JL-3, is cause for concern in Washington.

The test signals that China is moving ahead with a new class of strategic submarines called SSBNs, vessels that could be equipped with nuclear-armed JL-3s and that would be more difficult to detect than conventional land-based nuclear weapons.

In a sign of that growing concern, US President Donald Trump said in October 2018 that his decision to withdraw from a decades-old atomic accord with Russia was driven by a need to respond to China's nuclear build-up.... According to Zhao Tong, a fellow in Carnegie's Nuclear Policy Programme, based at the Carnegie-Tsinghua Centre for Global Policy, the US and its allies are stepping up their anti-submarine warfare in the South China Sea and the Indian Ocean. Chinese scientists make progress on nuclear submarine communication

In a report late last year (2018), Zhao said this was increasing mistrust between the two countries and raising the possibility that Beijing might rethink the "no first use" nuclear weapons policy, which has been in place since the first Chinese nuclear test in 1964.

...The United States and China are both capable of delivering nuclear weapons through three systems: land-launched nuclear missiles, nuclear missile-armed submarines and strategic aircraft with nuclear bombs and missiles. The JL, or Julang, series of missiles for nuclear-powered submarines is part of a People's Liberation Army strategy to extend the country's nuclear retaliation capabilities further from land to sea. But China trails the US

in these areas by decades, a technological gap that means Beijing could only for now work on its capacity to retaliate, or "second strike" options. One military source said that unlike the US, China was incapable of launching a pre-emptive strike and so had little choice but to retain its "no first use" policy.

..."China needs to strengthen and improve its at-sea nuclear deterrent capability by increasing both the quality and quantity of its SSBNs and

attack subs because the US is making every effort to restrain Chinese strategic subs from sailing further," Song said. He said America's moves "are aimed at undermining Beijing's second-strike capability", adding that Beijing's decision to develop more nuclear subs "was also pushed by the massive replacement of old generation [submarine-launched ballistic missiles]".

...The PLA Navy so far has four Type 094 nuclear-powered ballistic missile submarines, each outfitted with 16 JL-2 missiles for routine underwater patrols—equivalent to the missile component of their Western counterparts. But military experts said China's four Type 094 subs would not adequately safeguard the country's national security.

Meanwhile, the US Navy has 18 Ohio-class nuclear-powered submarines, with 14 capable of carrying up to

24 powerful Trident I missiles. But America also is developing its next-generation Columbia-class submarines, which will carry 16 of its most advanced Trident II missiles. Antony Wong Dong, a Macau-based military observer, said the shortcomings and limited number of China's sea-based nuclear weapons had constrained China's military capability during peacetime patrols.

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“The JL-2 is a single-warhead missile, while the Type 094 is well-known for its noise and is easy to detect,” Wong said. “That’s why China needs to develop the JL-3, which is expected to carry multiple warheads with a longer range.” Song said China’s aircraft carrier projects would accelerate its nuclear submarine build-up since subs were needed to provide underwater protection for the flotillas.

China plans to build at least four carrier battle groups by 2035 to achieve its goal of having a maritime force capable of operating across the deep waters of open oceans and defending the country’s expanding overseas interests. In the past year, it has launched two aircraft carriers and started construction on its new-generation aircraft carrier, the Type 002.

...But Beijing’s effort to develop precise land-based launchers, solid-fuelled ICBMs and hypersonic gliders would escalate the arms race among Beijing, Washington and other countries in the region, he warned. US and China team up to keep nuclear material from terrorists. ...

*Source: Additional reporting by Guo Rui, Excerpted from <https://www.scmp.com/>, 07 February 2019.*

## RUSSIA

### Russia Bids Farewell to INF Treaty with Fresh Nuclear Development Plans

It didn’t take long following the United States’ announcement that the country would suspend its participation in a major Cold War arms treaty for Russia to move in kind. Now, freed of its obligations under the 1987 INF, Moscow is wasting no time in developing new, once-prohibited weapons systems.

In a meeting of Russian military leaders in Moscow, Defence Minister Sergei Shoigu passed down the word from the Kremlin: Develop, by 2020, “a ground-based version of the sea-based Kalibr system with a long-range cruise missile,” Shoigu said, “and in the same period, we will create a ground-based missile system with a long-

range hypersonic rocket.”

During a meeting with Putin., the Russian-language transcript quotes Shoigu as describing the system as ballistic. The term ballistic disappeared from the English-language transcript, and again did not appear in Shoigu’s description of the system...

“While the second description doesn’t contradict the first, we’ve only heard the word ‘ballistic’ once,” said Andrey Baklitskiy, an expert on nuclear issues with the Moscow-based PIR Center. “Was Shoigu’s statement a slip of the tongue? If he was right and it will be a ballistic missile, it could be Rubezh resurrected from the dead with or without a hypersonic glide vehicle.”

Rubezh was a Russian development project for an intercontinental ballistic missile. Russian news agency Tass reported in March 2018 that the development effort was bumped to 2027 in favor of the Avangard boost-glide hypersonic project unveiled by President Vladimir Putin on 01March 2018. However, the Kommerstant newspaper has suggested the weapon may be a modified Tsirkon anti-ship cruise missile.

...In addition to new ground-launched cruise missiles and some form of hypersonic system, Shoigu said the military has been directed to increase the strike range of existing ground-launched systems currently under development thanks to funds allocated for procurement through 2021.

Using existing sea- and ground-based systems as the basis for new missiles to fill strike ranges once banned by the INF Treaty (500-5,500 kilometers), according to Shoigu, will allow for a significantly expedited development timeline. And some in Washington may say Russia, which stands accused of already developing weapons at INF ranges, already has a head start.

...Few in the West doubt that Russia stands in violation, but the Trump administration prompted alarm across Europe when national security adviser John Bolton was dispatched to Moscow in

**Using existing sea- and ground-based systems as the basis for new missiles to fill strike ranges once banned by the INF Treaty (500-5,500 kilometers).**

October 2018 to signal America's imminent withdrawal from the treaty. Russian officials scoffed at an ultimatum to return to compliance or face unilateral US withdrawal.

Moscow has been on overdrive in attempting to make the case that the US is, in fact, the main offender — pointing to a variety of US actions as evidence that Washington's suspension of the treaty was premeditated and precedes a major American buildup of INF-banned weapons.

In a meeting with Putin..., Foreign Minister Sergey Lavrov laid out Moscow's case. "The United States has been violating the treaty since 1999, when it started testing combat unmanned aerial vehicles that have the same characteristics as land-based cruise missiles banned by the treaty," Lavrov said. He then lashed out at US missile defense deployments in eastern Europe, specifically the Mark 41 launch system. "These launchers are fully suitable, as they are for Tomahawk intermediate-range attack missiles," he said. The US has denied the allegation.

Lavrov noted that the United States' most recent Nuclear Posture Review called for the development of low-yield nuclear weapons, and that intermediate-range missiles would likely be used to deliver them. "It was also announced only recently that this provision of the US nuclear doctrine is beginning to materialize with missiles of this kind entering production," he said. ...The day Russia suspended its participation in the INF Treaty, the Russian Defence Ministry took to social media to allege that the US began preparations to manufacture missiles banned by the agreement two years before it formally suspended its participation.

*Source: Excerpted from report by Matthew Bodner, Aaron Mehta. <https://www.defensenews.com/>, 07 February 2019.*

### **Russia Conducts Test of Nuclear-Powered Cruise Missile**

Russia conducted a partially successful test of its developmental nuclear-powered cruise missile, the

Burevestnik, on 29 January 2019, according to US government sources with knowledge of Russia's weapons programs who spoke to the *The Diplomat*. The test took place at Russia's Kapustin Yar missile test range and is the thirteenth to date involving the missile. The test marks the first involving the Burevestnik in nearly one year. The missile had not been tested since February 2018. According to one source, US intelligence assesses that Russia's development efforts on the missile continues. The United States intelligence community internally calls the missile the KY30 or the SSC-X-9 SKYFALL.

**No country has to date deployed a cruise missile using an on-board nuclear reactor, largely given the engineering challenges and safety concerns involved.**

The Burevestnik was first tested at Kapustin Yar in June 2016. According to US military intelligence, only one test of the missile has been moderately successful to date. That test took place in November 2017 from Russia's Pank'ovo test site in Novaya Zemlya and resulted in recovery mission involving specialized Russian ship crews to retrieve the missile's debris and nuclear materials from the Barents Sea after a crash.

In a speech unveiling a suite of new missile systems before the Russian Federal Assembly in March 2018, Russian President Vladimir Putin noted that "In late 2017, Russia successfully launched its latest nuclear-powered missile at the Central training ground." He continued that "during its flight, the nuclear-powered engine reached its design capacity and provided the necessary propulsion." He additionally claimed that the missile's range was "unlimited" and that it could "maneuver for as long as necessary."

No country has to date deployed a cruise missile using an on-board nuclear reactor, largely given the engineering challenges and safety concerns involved. In the late-1950s, the United States began development on prototype nuclear-powered ramjet engines as part of Project Pluto, but none of those missiles were ever deployed.

The Burevestnik was announced by Putin alongside a range of new nuclear weapons in his March 2018 address. Some of the other

weapons include the Avangard, a hypersonic boost-glide reentry vehicle, the Poseidon, an autonomous thermonuclear torpedo, the Sarmat, a new intercontinental-range ballistic missile, and the Kinzhal, an air-launched ballistic missile.

The January test of the Burevestnik comes shortly after the release of the United States' 2019 Missile Defense Review, which called for the development of a range of new technologies to augment existing US defensive capabilities against cruise and ballistic missile threats. In March 2018, Putin justified Russia's development of the Burevestnik and other new systems in terms of growing Russian concerns about US missile defense capabilities.

*Source: Ankit Panda, The Diplomat, 06 February 2019.*

## USA

### **The World's Most Dangerous Nuclear Weapon Just Rolled Off the Assembly Line**

Last month, the NNSA announced that the first of a new generation of strategic nuclear weapons had rolled off the assembly line at its Pantex nuclear-weapons plant in the panhandle of Texas. That warhead, the W76-2, is designed to be fitted to a submarine-launched Trident missile, a weapon with a range of more than 7,500 miles. By September, an undisclosed number of warheads will be delivered to the Navy for deployment.

What makes this particular nuke new is the fact that it carries a far smaller destructive payload than the thermonuclear monsters the Trident has been hosting for decades—not the equivalent of about 100 kilotons of TNT as previously, but of five kilotons. According to Stephen Young of the Union of Concerned Scientists, the W76-2 will yield “only” about one-third of the devastating power of the weapon that the Enola Gay, an American B-29 bomber, dropped on Hiroshima on August 6, 1945. Yet that very shrinkage of the power to devastate is precisely what makes this nuclear weapon potentially the most dangerous ever manufactured. Fulfilling the Trump administration's quest for nuclear-war-fighting “flexibility,” it isn't designed as a deterrent

against another country launching its nukes; it's designed to be used. This is the weapon that could make the previously “unthinkable” thinkable.

There have long been “low-yield” nuclear weapons in the arsenals of the nuclear powers, including ones on cruise missiles, “air-drop bombs” (carried by planes), and even nuclear artillery shells—weapons designated as “tactical” and intended to be used in the confines of a specific battlefield or in a regional theater of war. The vast majority of them were, however, eliminated in the nuclear-arms reductions that followed the end of the Cold War, a scaling-down by both the United States and Russia that would be quietly greeted with relief by battlefield commanders, those actually responsible for the potential use of such ordnance who understood its self-destructive absurdity.

Ranking some weapons as “low-yield” based on their destructive energy always depended on a distinction that reality made meaningless (once damage from radioactivity and atmospheric fallout was taken into account, along with the unlikelihood that only one such weapon would be used). In fact, the elimination of tactical nukes represented a hard-boiled confrontation with the iron law of escalation, another commander's insight—that any use of such a weapon against a similarly armed adversary would likely ignite an inevitable chain of nuclear escalation whose end point was barely imaginable. One side was never going to take a hit without responding in kind, launching a process that could rapidly spiral toward an apocalyptic exchange. “Limited nuclear war,” in other words, was a fool's fantasy and gradually came to be universally acknowledged as such. No longer, unfortunately.

Unlike tactical weapons, intercontinental strategic nukes were designed to directly target the far-off homeland of an enemy. Until now, their extreme destructive power (so many times greater than that inflicted on Hiroshima) made it impossible to imagine genuine scenarios for their use that would be practically, not to mention morally, acceptable. It was exactly to remove that practical inhibition—the moral one seemed not to count—



that the Trump administration recently began the process of withdrawing from the Cold War–era Intermediate-Range Nuclear Forces Treaty, while rolling a new “limited” weapon off the assembly line and so altering the Trident system. With these acts, there can be little question that humanity is entering a perilous second nuclear age.

That peril lies in the way a 70-year-old inhibition that undoubtedly saved the planet is potentially being shelved in a new world of supposedly “usable” nukes. Of course, a weapon with one-third the destructive power of the bomb dropped on Hiroshima, where as many as 150,000 died, might kill 50,000 people in a similar attack before escalation even began. Of such nukes, former secretary of state George Shultz...said, “A nuclear weapon is a nuclear weapon. You use a small one, then you go to a bigger one. I think nuclear weapons are nuclear weapons and we need to draw the line there.” ...

Source: James Carroll, <http://www.thenation.com>, 12 February 2019.

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## BALLISTIC MISSILE DEFENCE

### IRAN

#### Iran Reveals New Ballistic Missile, Underground Factory

Iran’s Revolutionary Guards inaugurated a surface-to-surface ballistic missile with a range of 1,000 kilometers (621 miles), the semi-official Fars news agency reported, ignoring Western demands that Tehran halt its missile program. Fars published pictures of an underground missile factory called “underground city”, saying the “Dezful” missile was a version of the Zolfaghar missile that has a 700 km range and a 450 kg (992 lb) warhead.

Iran says it has missiles with the range of up to 2,000 km, which puts Israel and US military bases in the region within reach. The EU has stepped up criticism of Iran’s ballistic missiles program, while the block remains committed to a 2015

nuclear deal between Iran and major powers.

A 2015 UN resolution that enshrines the nuclear deal “called upon” Iran to refrain for up to eight years from work on ballistic missiles designed to deliver nuclear weapons. Some states argue that the language does not make it obligatory. President Donald Trump pulled out of the nuclear deal last year and reimposed sanctions on Iran. The EU has been trying to save the nuclear accord....

Source: <http://www.ejinsight.com/>, 08 February 2019.

## NUCLEAR ENERGY

### EGYPT

#### IAEA Director General Visits Egypt, Highlights Support for Peaceful Nuclear Energy

IAEA Director General Yukiya Amano met the President of Egypt Abdel Fattah el-Sisi during an official visit to Cairo on 03 and 04 February, highlighted his country’s

valuable cooperation with the IAEA and said he wished to further strengthen cooperation between Egypt and the IAEA in the peaceful applications of nuclear energy to help the country meet its development objectives. President el-Sisi talked of the importance of establishing a Nuclear Weapons Free Zone in the Middle East and Mr Amano reiterated the IAEA’s support and willingness to make available its experience in nuclear safeguards.

The two men also discussed Egypt’s interest in using nuclear power to meet increased electricity demand. Mr Amano told President el-Sisi that the IAEA would continue to support Egypt’s efforts to establish the country’s first nuclear power plant at El Dabaa. He emphasised the importance of an IAEA Integrated Nuclear Infrastructure Review mission, scheduled for October 2019, noting that recommendations from the expert mission would help Egypt in its preparatory work on the plant.

President el-Sisi said Egypt would observe the highest standards of safety and security in building and operating the nuclear power plant, to be located just west of Alexandria on the country's Mediterranean coast. He emphasized Egypt's willingness to share its nuclear related facilities and expertise in the various peaceful applications of nuclear energy with experts from across Africa and the Middle East.

...In a meeting with Egyptian Atomic Energy Authority Chairman Atef Abdel-Fattah, Mr Amano was briefed on the operation and use of the ETRR-2 multi-purpose research reactor, the fuel manufacturing plant for the research reactor and the radioisotope production laboratories. Mr Abdel-Fattah explained the facilities' contribution to health care, industry and education not only in Egypt, but also in the wider region by hosting experts from across the Middle East....

Source: <https://www.iaea.org/>, 05 February 2019.

## **INDIA**

### **India Must Sign NPT to Gain Entry into Nuclear Suppliers**

India must sign the NPT to gain entry into the NSG, China said, asserting that "patient negotiations" were required for New Delhi's admission into the group as there is no precedent for the inclusion of non-NPT countries. China has been opposing India's entry into the 48-member NSG on the ground that India is not a signatory to NPT, though the other P5 members, including the US and Russia backed its case based on New Delhi's non-proliferation record.

The permanent members of the UNSC also known as P5 countries - have concluded their two meetings here to discuss issues related to nuclear disarmament, nuclear non-proliferation and peaceful uses of nuclear energy. Briefing the media

**President el-Sisi said Egypt would observe the highest standards of safety and security in building and operating the nuclear power plant, to be located just west of Alexandria on the country's Mediterranean coast. He emphasized Egypt's willingness to share its nuclear related facilities and expertise in the various peaceful applications of nuclear energy with experts from across Africa and the Middle East.**

**We promise to enforce the NPT fully and comprehensively and gradually realise our goal of a nuclear weapon free world and do our best to solve the nuclear non-proliferation issues through political and diplomatic means for the peaceful use of nuclear energy and international cooperation.**

on the outcome of the conference, Chinese Foreign Ministry spokesman Geng Shuang said at the end of the successful conference the member countries reached an important consensus to jointly uphold the responsibilities for international peace and security.

"We will uphold the NPT mechanism. We underscore its importance as the cornerstone of international non-proliferation system and also an important component of international security. "We promise to

enforce the NPT fully and comprehensively and gradually realise our goal of a nuclear weapon free world and do our best to solve the nuclear non-proliferation issues through political and diplomatic means for the peaceful use of nuclear energy and international cooperation," he said.

Asked whether the issues related to India's application to enter into the NSG figured in the meeting, Geng said "the P5 countries are committed to uphold the NPT mechanism, recognise that it is the cornerstone of the international non-proliferation system". "For the full and comprehensive implementation of the NPT

we will do our best to resolve the non-proliferation issues through the diplomatic means for the peaceful use of the nuclear energy," he said. ...

Source: <https://www.timesnownews.com/>, 31 January 2019.

## **SOUTH KOREA**

### **Fuel Loading Underway at New South Korean Reactor**

A ceremony has been held to mark the loading of the first fuel into unit 4 at South Korea's Shin Kori nuclear power plant. The country's nuclear

regulator gave Korea Hydro & Nuclear Power (KHNP) permission to start up the APR1400 unit on 01 February 2019.

The event, on 07 February, marked the loading of the first of 241 fuel assemblies into the core of Shin Kori 4. The ceremony was attended by Chung Jae-hoon, President and CEO of KHNP, and Kepco Engineering & Construction Company (Kepco E&C) CEO Lee Bae-Soo.

The loading of all the fuel assemblies is expected to be completed by the end of this month. Shin Kori 4 is scheduled to start commercial operation in September following seven months of commissioning tests. Construction of the first pair of the domestically-designed APR1400 reactors - Shin Kori 3 and 4 - was authorised in 2006, although the actual construction licence was not issued until April 2008.

First concrete for Shin Kori 3 was poured in October 2008, with that for unit 4 following in August 2009. Unit 3 was originally scheduled to enter commercial operation at the end of 2013, with unit 4 due to start in September 2014. However, their operation was delayed by the need to test safety-related control cabling and its subsequent replacement. Unit 3 eventually reached first criticality in December 2015, was connected to the grid in January 2016 and entered commercial operation in December that year.

KHNP completed cold hydrostatic testing and hot functional testing of Shin Kori 4 in November 2015 and April 2016, respectively. The company announced in August 2017 that it expected to load fuel into the unit last January, with commercial operation beginning in September. However, it said fuel loading was delayed due to slight improvements in the unit's design resulting from commissioning work carried out so far. Additional seismic assessment work has also been carried out in response to the Gyeongju earthquake in September 2016 and the Pohang earthquake in November 2017.

At a meeting on 01 February 2019, the Nuclear Safety and Security Commission approved the start up of Shin Kori 4 after considering the results of an inspection carried out by the Korea Institute of Nuclear Safety. Construction of two further 1350 MWe APR1400 pressurised water reactors at Shin Kori - units 5 and 6 - began in April 2017 and September 2018, respectively. Unit 5 is scheduled to begin commercial operation in March 2022, with unit 6 following one year later. Two further APR1400 units are under construction in South Korea as units 1 and 2 of the Shin Hanul site. Four APR1400s are under construction at Barakah in the United Arab Emirates. All four are scheduled to be in operation by 2020.

**Unit 5 is scheduled to begin commercial operation in March 2022, with unit 6 following one year later. Two further APR1400 units are under construction in South Korea as units 1 and 2 of the Shin Hanul site. Four APR1400s are under construction at Barakah in the United Arab Emirates.**

*Source: World Nuclear News, 11 February 2019.*

## **NUCLEAR COOPERATION**

### **AFRICA–CHINA–RUSSIA**

#### **Russia and China Back Nuclear As a Clean-Power Fix for Africa**

Impatient to boost electricity supplies for homes and businesses alike, Ethiopia and other African nations are doing deals paving the way to nuclear power plants. In a damp office at Ethiopia's Addis Ababa University, doctoral student Hailu Geremew fantasises about working on the nuclear reactor his country is now pondering building.

... For now, South Africa is the only country on the continent operating a nuclear power plant. But in recent years, at least seven other sub-Saharan African states have signed agreements to deploy nuclear power with backing from Russia, according to public announcements and the WNA, an industry body.

...Ethiopia's memorandum of understanding on nuclear cooperation with Russia paves the way for the construction of a nuclear power plant and a research reactor in the long term, said Frehiwot Woldehanna, Ethiopia's state minister for the energy sector. The East African country has been

electrifying rapidly to meet rising energy demand and its own goal to become the biggest power exporter on the continent, while sticking to pledges to remain a low emitter of planet-warming greenhouse gases.

Under a 2015-2020 development plan, Addis Ababa wants to raise power generation to more than 17,000 MW from current capacity of just over 4,200 MW, mainly by harnessing hydro, wind and geothermal sources. Its most ambitious project under construction is the Grand Renaissance Dam on the Nile river that will churn out 6,000 MW at full capacity when completed within the next four years, according to Ethiopian Electric Power, the state-owned utility. ...Plans for a nuclear power plant in Ethiopia remain at the "pre-feasibility stage", but the country is serious about building one, he emphasised.

**'Atoms for Africa':** With sub-Saharan Africa's 48 countries generating the same amount of power as Spain, despite a population 18 times larger, the option to bring electricity access to their people on a bigger scale using nuclear energy is gaining momentum. Like Ethiopia, emerging nuclear states Sudan, Kenya, Uganda, Nigeria, Rwanda, Zambia and Ghana have signed agreements with Russia's state nuclear corporation, ROSATOM - most since 2016.

Their content ranges from language on the construction of nuclear reactors to assistance with feasibility studies and personnel training, press statements show. Rosatom's solutions for managing spent fuel and radioactive waste vary from country to country, but are normally worked out at the later stages of a nuclear new-build programme "in the strictest compliance with international law", a spokeswoman told the

Thomson Reuters Foundation. Chinese state-owned nuclear firms have also taken the lead in the region, sealing deals with Kenya, Sudan and Uganda, WNA data shows.

**Like Ethiopia, emerging nuclear states Sudan, Kenya, Uganda, Nigeria, Rwanda, Zambia and Ghana have signed agreements with Russia's state nuclear corporation, ROSATOM - most since 2016. Their content ranges from language on the construction of nuclear reactors to assistance with feasibility studies and personnel training, press statements show.**

Sub-Saharan African nations have shown an interest in nuclear because coal is scarce, while large volumes of natural gas in Nigeria and Tanzania tend to be exported for profit, said Jessica Lovering, co-author of a 2018 report, "Atoms for Africa", from the U.S.-based Center for

Global Development.

...Ethiopia, for instance, has pledged under the Paris Agreement on climate change to curb its already meagre emissions by two-thirds from business-as-usual projections by 2030. The Paris accord, agreed in 2015 by

about 195 nations, seeks to wean the global economy off fossil fuels in the second half of this century, limiting the rise in average temperatures to "well below" 2 degrees Celsius (3.6 Fahrenheit) above pre-industrial times.

...Some political observers, however, are concerned about the prospect of

nuclear reactors backed by Russia in some countries with rebel groups and weak government institutions. An Africa-based Western diplomat, who asked to remain anonymous, doubted Russia's assurances it would collect nuclear waste from projects it helped establish.

Source: <https://allafrica.com/>, 07 February 2019.

**NUCLEAR NON-PROLIFERATION**

**IRAN**

**EU Adopts Resolutions in Support of Iran Nuclear Deal**

The European Union has reiterated its continued support for the 2015 Iran nuclear deal, while citing

concerns about the country's ballistic missile programme and regional activities. In a series of resolutions adopted..., the European Commission, the EU's governing body, said it was disappointed at the United States' decision to pull out of the multilateral JCPOA.

"The JCPOA is a key element of the global nuclear non-proliferation architecture and an achievement of multilateral diplomacy, endorsed unanimously by the UNSC," the European Commission said in a statement....CIA Director Gina Haspel told the congressional hearing that Iran is still abiding by the terms of the 2015 nuclear deal. "At the moment technically they are in compliance" with the JCPOA, Haspel told lawmakers.

In its 12-point statement, the EU said it was committed to the landmark 2015 accord and welcomed Iran's implementation of its nuclear-related commitments. Concern over missile tests, regional influence. However, the EU expressed concern about Iran's expansion of its missile programme, particularly its ballistic missile tests, which have been carried out in defiance of opposition from the US and other European countries.

..."The Council is ... gravely concerned by Iran's ballistic missile activity and calls upon Iran to refrain from these activities," the EU said in its statement. "Iran continues to undertake efforts to increase the range and precision of its missiles, together with increasing the number of tests and operational launches.... These activities deepen mistrust and contribute to regional instability."

Tehran should refrain in particular from any work on missiles designed to be capable of delivering a nuclear weapon, the EU said. A UNSC resolution that enshrined Iran's 2015 nuclear deal with world powers called on Tehran to refrain for up to eight years from work on ballistic missiles designed to deliver nuclear weapons.

...So, the EU is sticking with the JCPOA for its own benefit, not for Iran's, and may ditch it later if they decide to go to war along with the US. Russia and China are sticking with the deal because with the US out and EU unhelpful, they have more leverage over Iran. And Iran is sticking with the deal because it is stuck – if the mullahs pull out, it will be a green light for war.

Source: <https://iranian.com/>, 05 February 2019.

### Defying US, European Parties to JCPOA Launch Payment Channel with Iran

Defying US, European parties to JCPOA launch payment channel with Iran the European signatories to the 2015 Iran deal formally announce the launch of a long-awaited direct payment mechanism meant to safeguard their trade ties with Tehran in the face of the "toughest ever" American sanctions.

..."France, Germany and the United Kingdom, in accordance with their resolute commitment and continued efforts to preserve the JCPOA

endorsed by UNSC Resolution 2231, announce the creation of INSTEX SAS, a Special Purpose Vehicle (SPV) aimed at facilitating legitimate trade between European economic operators and Iran," the three foreign ministers said in a joint statement," they said in a joint statement.

They also underlined their commitment "to pursue the further development of INSTEX with interested European countries to make this instrument in support of trade exchanges with Iran operational by following the steps set out above." Iran will also need "to create an effective and transparent corresponding entity that is required to be able to operationalise" the mechanism," it added. France, Germany and the UK are the initial shareholders of the INSTEX mechanism for trade with Iran, which has been registered in the French capital, Paris, with a capital of 3,000 euros, and

**France, Germany and the United Kingdom, in accordance with their resolute commitment and continued efforts to preserve the JCPOA endorsed by UNSC Resolution 2231, announce the creation of INSTEX SAS, a Special Purpose Vehicle (SPV) aimed at facilitating legitimate trade between European economic operators and Iran," the three foreign ministers said in a joint statement.**

will be governed by a German banking expert, according to AFP and German media.

INSTEX is designed to pave the way for European firms to do business with Iran while evading the strict sanctions the US re-imposed against Iran last year after leaving the 2015 multinational nuclear deal, formally called the JCPOA. The mechanism will initially facilitate trade of humanitarian goods such as medicine, food and medical devices....Iranian Foreign Minister Mohammad Javad Zarif was quick to welcome the trio's announcement, saying Tehran's European partners in the deal finally took a "long overdue first step."...Iranian Deputy Foreign Minister Seyyed Abbas Araqchi described the launch as "the first of a set of commitments to Iran that the Europeans must fulfill," expressing hope that mechanism will not be left incomplete.

The payment system, he said, could "fully meet our interests only when it is accessible to non-European firms and countries...so it could cover our entire international purchases," adding that this feature "is apparently slated to be realized in the next phase." Details about how the mechanism functions will be put to talks in the future expert-level meetings between Iran and Europe, Araqchi added.

**INSTEX Has 'Full EU Support':** Shortly after the announcement, the EU's foreign policy chief, Federica Mogherini, who has been leading the bloc's efforts to keep the Iran deal alive, issued a statement in support of INSTEX, saying, "The instrument will provide economic operators with the necessary framework to pursue legitimate trade with Iran." "We will continue to accompany the work of the Member States involved to make this vehicle operational as soon as possible in close coordination with the Iranian counterparts. We support their commitment to further develop

INSTEX with interested European countries and open it, at a later stage, to economic operators from third countries," the statement added.

Source: <http://parstoday.com/en/>, 31 January 2019.

## NORTH KOREA

### Trump to Meet North Korea's Kim Jong Un in Vietnam in Two Weeks for the Pair's Second Summit

President Donald Trump will meet with North Korean leader Kim Jong Un in Vietnam on 27–28 February 2019, the latest sign of thawing tensions between two leaders who had publicly traded insults and threats of military confrontation. Trump

announced the meeting...during the State of the Union address, saying it was part of "a bold new diplomacy" that has already yielded tangible results.

"Our hostages have come home, nuclear testing has stopped, and there has not been a missile launch in 15 months," Trump said. "If I had not been elected President of the United States, we would right now, in my opinion, be in a major war with North Korea."

**Trump's special representative for North Korea, Stephen Biegun, said that the United States and North Korea would hold working-level negotiations before the summit aimed at agreeing on concrete "deliverables" for that meeting. North Korea has not provided the United States with an inventory of its nuclear arsenal, a step toward a denuclearization agreement. Biegun conceded that the United States and North Korea have "no detailed definition or shared agreement on what denuclearization entails."**

...Pointing to an end of nuclear missile tests, Trump placed North Korea at the top of his foreign policy achievements. Trump and Kim have traded letters, and the president has repeatedly said he has a "very good relationship" with the reclusive leader. Analysts questioned the decision to hold a second summit, arguing Trump should demand concrete steps toward denuclearization from North Korea – the original U.S. goal – before agreeing to another meeting. Trump unexpectedly announced at the first summit that the United States would suspend joint US military exercises with South Korea.

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Source: <https://www.usatoday.com/>, 05 February 2019.

## USA

### **\$25 Million Award will Support Nuclear Nonproliferation R&D, Education**

A consortium of 12 universities and 10 national laboratories led by the Georgia Institute of Technology has been awarded \$25 million from the US Department of Energy’s NNSA to develop new technologies and educational programs to support the agency’s nuclear science, security and nonproliferation goals.

The award will provide \$5 million per year across a five-year period to link basic research at universities with the capabilities of national laboratories through the Consortium for Enabling Technologies and Innovation (ETI). The effort will focus on three core disciplines: computer and engineering science research through machine learning and high performance computing, advanced manufacturing and nuclear detection technologies.

Among the potential research topics are understanding how advanced manufacturing might produce nuclear reactor components and fuel assemblies, machine learning to predict and uncover new phenomena affecting proliferation, and novel instrumentation to leverage cutting-edge capabilities in microelectronics, solid state technologies and other areas to detect radioactive materials.

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The NNSA and the national laboratories are responsible for the nation’s nuclear stockpile, and also for preventing the spread of nuclear weapons and materials worldwide. That challenge is growing as new technologies – including additive manufacturing, also known as 3D printing – makes possible manufacturing that in the past could only be done in a limited number of facilities....

The technologies of the future will require people to use them. The ETI Consortium will be developing new coursework and pathways to national laboratory internships designed to attract the best students and give them a broad education that goes beyond traditional nuclear engineering.

The courses will be taught by the participating universities, and potentially also through online platforms.

...The consortium’s education goal is to transfer more than 40 graduate students and 20 undergraduate students to the national laboratories over the next five years. As part of that strategy, it will

provide approximately 70 internships, and establish eight faculty-student laboratory visit fellowships. Consistent with the vision of broadening the technology base, only a quarter of the faculty involved in the ETI Consortium will be traditional nuclear engineers. “People will come from all kinds of disciplines, from materials science to chemistry, advanced manufacturing and computer science. We are taking people with very diverse backgrounds and asking them to work together to create a new vision.” ...

The national laboratory partners will include Brookhaven National Laboratory, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Idaho National Laboratory, Oak Ridge National Laboratory, Princeton Plasma Physics Laboratory, Sandia National Laboratory, Argonne National Laboratory and Pacific Northwest National Laboratory.

“These grants will foster development of concepts and technologies that keep the United States at the forefront of nuclear monitoring and verification capabilities and allow us to nurture tomorrow’s nonproliferation experts,” said Brent K. Park, NNSA’s Deputy Administrator for Defense Nuclear Nonproliferation. ...”We want people to think about nuclear engineering in a different light,” said Erickson. “Nuclear engineering has been very specific to a narrow discipline, but we are trying to show the community that we are much more. We want to create the next-generation thinker, and there is nothing traditional about this effort.”

The NNSA also announced the Consortium for Monitoring, Technology & Verification, a partnership of 14 universities led by the University of Michigan that is also funded for \$25 million over five years. That organization seeks to improve U.S. capabilities to monitor the nuclear fuel cycle. “Its nonproliferation focus will be nuclear and particle physics, signals and source terms, and the physics of monitoring nuclear materials,” the NNSA announcement said.

Source: John Toon, <https://news.gatech.edu/>, 06 February 2019.

**USA–RUSSIA**

**US Open to Russia Nuclear Treaty and Warns Turkey on Arms**

The top US envoy to the NATO said Washington was open to a broad treaty with Russia to curb the proliferation of nuclear weapons while also warning Turkey not to purchase a new arms system from Moscow. “Our government is firmly in the camp of looking for an opportunity to have an arms control agreement that would include all

the countries that have these intermediate ballistic missiles,” US Ambassador to NATO Kay Bailey

Hutchison said during a call with reporters. “Now America is going forward with the treaty protocol to give notice that we need to begin to develop a defense to the violating missiles that Russia has been developing.”

The warning came after President Donald Trump said on Feb. 1 he would pull out of the landmark 1987 nuclear disarmament

treaty, called the INF Treaty, citing years of Russian violations. President Vladimir Putin a day later said Moscow would also abandon the accord, which restricts the deployment of missiles with a range of 500 kilometers (311 miles) to 5,500 kilometers.

The U.S. doesn’t have immediate plans to deploy new missiles to Europe when the withdrawal takes effect in August, according to two administration officials involved in the deliberations who briefed reporters on condition of anonymity. Russia won’t station any short and medium-sized missiles in Europe and other regions unless the U.S. does, the Foreign Ministry in Moscow said.

**More Missiles:** Still, Russian Defense Minister Sergei Shoigu on Feb. 2

proposed developing weapons of this range, arguing that the US is already producing such missiles. The NATO is taking a measured approach, waiting to see if the accord can be salvaged. “Our main focus now is to preserve the treaty and there is a window of opportunity for Russia to come back into compliance,” Secretary General Jens Stoltenberg said before a meeting of NATO defense ministers in Brussels. “At the same time we are planning for the future without the INF treaty and with more Russian missiles.”

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**Secretary General Jens Stoltenberg said before a meeting of NATO defense ministers in Brussels. “At the same time we are planning for the future without the INF treaty and with more Russian missiles.” Stoltenberg ruled out deploying new nuclear land-based weapon systems in Europe, but added there were other choices, including “conventional and other options.”**



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**NATO Tensions:** Hutchison also warned Turkey, a NATO member, against entering a proposed arms deal with Russia that has been straining relations within the alliance. Turkey finalized plans to buy the Russian systems, called the S-400, last year, with first delivery scheduled for October 2019. “We are very concerned about any kind of Russian missile defense in one of our alliance countries,” Hutchison said. “The whole alliance is concerned about this and we hope that Turkey will make the right decision and look for another system.”

If Turkey does purchase Russian arms, it could put at risk the types of defenses other NATO allies could have in the country, affect the inter-operability of defense systems and violate security and intelligence among alliance members, Hutchison said. President Recep Tayyip Erdogan has been adamant that Turkey would take the Russian missile system, saying traditional allies in the West failed to meet his country’s defensive needs.

Source: Richard Bravo, Lyubov Pronina, <https://www.bloomberg.com>, 12 February 2019.

**NUCLEAR PROLIFERATION**

**NORTH KOREA**

**North Korea Nukes Intact, Dispersing Missiles**

North Korea’s nuclear and ballistic missile programs “remain intact” and its leaders are dispersing missile assembly and testing facilities to prevent “decapitation” strikes, UN experts said in a new report. The experts’ report to the Security

Council says the country continues to defy UN economic sanctions, including through “a massive increase in illegal ship-to-ship transfers of petroleum products and coal.”

The DPRK also continues to violate an arms embargo, a ban on luxury goods and financial sanctions, the experts said....The report was sent to council members as President Trump is preparing for a second summit with North Korean leader Kim Jong Un. At their June (2018) summit in Singapore, Trump promised “security guarantees” to Pyongyang and Kim recommitted to the “complete denuclearization of the Korean Peninsula.”

But there were no signs in the experts’ report that Kim has taken any steps toward eliminating his nuclear arsenal or intercontinental ballistic missiles, which he boasted could reach the US mainland....

“The panel found that the DPRK is using civilian facilities, including airports, for ballistic missile assembly and testing with the goal of effectively preventing ‘decapitation’ strikes,” the report said. It also “found evidence of a consistent trend on the part of the DPRK to disperse the assembly, storage and testing locations.” The experts said they are continuing to investigate companies, entities and individuals in Asia that are on the UN sanctions blacklist and “clandestinely procured centrifuges for the DPRK’s nuclear program” and that attempted to sell “a wide range of military equipment to armed groups and governments in the Middle East and Africa.”

...They also said that “global banks and insurance companies continue to unwittingly facilitate payments and provide coverage for vessels involved in ever-larger, multimillion-dollar, illegal

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ship-to-ship transfers of petroleum products, as well as an increasing number of ship-to-ship coal transfers and attempted trans-shipments.”

The panel said ship-to-ship transfers involve “increasingly advanced evasion techniques.” These include ship identity theft, false Automatic Identification System transmissions, physically disguised North Korea tankers, illegally changed vessel names, night transfers, and the use of additional vessels for trans-shipment of prohibited items, it said. The panel said it inspected seized vessels engaged in prohibited coal trading and documented “ship identity laundering.” In addition, it said, “the world’s largest container shipping line continued to unwittingly transport prohibited items” seized by unnamed countries....

The experts said they also investigated North Korean involvement in gold mining in Congo, construction of a military camp in Sierra Leone, the sale of fishing rights in waters surrounding the country, and other activities around the world banned under UN sanctions. “Financial sanctions remain some of the most poorly implemented and actively evaded measures of the sanctions regime,” the panel said.

Individuals acting on behalf of North Korean financial institutions are operating in at least five countries “with seeming impunity,” it said. The Reconnaissance General Bureau, the North Korean intelligence agency that conducts clandestine operations, continues to transfer funds from closed accounts in the European Union to those in Asian financial institutions, the panel said. ...They said that “DPRK diplomats continue to play a key role in financial sanctions evasion” along with representatives of companies and other entities on the sanctions blacklist, including by controlling accounts in multiple countries and using the names of family members and front companies....

Source: <https://www.miamiherald.com/>, 05 February 2019.

### ‘N. Korea may have Continued to Produce Nuclear Bomb Fuel’

North Korea has continued to produce bomb fuel while in denuclearization talks with the United States and may have produced enough in the past year to add as many as seven nuclear weapons to its arsenal, according to a study released just weeks before a planned second summit between the North Korean leader and US President Donald Trump.

However, the country’s freeze in nuclear and missile testing since 2017 means that North Korea’s weapons program probably poses less of a threat than it did at the end of that year, the report by Stanford University’s Center for International Security and Cooperation found. Siegfried Hecker, a former director of the US Los Alamos weapons laboratory in New Mexico who is now at Stanford and was one of

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the report’s authors, told Reuters analysis of satellite imagery showed North Korea’s production of bomb fuel continued in 2018.

He said spent fuel generated from operation of the 5 megawatt reactor at its main nuclear plant at Yongbyon from 2016-18 appeared to have been reprocessed starting in May and would have produced an estimated 5-8 kg of weapons-grade plutonium. This combined with production of perhaps 150 kg of HEU may have allowed North Korea to increase the number of weapons in its arsenal by between five and seven, the Stanford report said.

Hecker’s team had estimated the size of North Korea’s arsenal in 2017 at 30, bringing a possible current total of 37 weapons. US intelligence is not certain how many nuclear warheads North Korea has. Last year, the Defense Intelligence Agency was at the high end with an estimate of about 50 nuclear warheads, while analysts have given a range of 20-60. The Stanford report said that while North Korea was likely to have continued work on warhead miniaturization and to ensure they can

stand up to delivery via intercontinental ballistic missiles, the halt in testing greatly limited its ability to make such improvements.

The Stanford experts said it was their assessment that “North Korea cannot deliver a nuclear warhead with any measure of confidence to the US mainland,” although Hecker said its nuclear weapons were a real threat to Japan and South Korea. Hecker said it was understandable that North Korea should have continued its weapons work, given that it had reached no specific agreement in the latest talks with the United States to stop that work.

**North Korea cannot deliver a nuclear warhead with any measure of confidence to the US mainland,” although Hecker said its nuclear weapons were a real threat to Japan and South Korea. it was understandable that North Korea should have continued its weapons work, given that it had reached no specific agreement in the latest talks with the United States to stop that work.**

US Secretary State Mike Pompeo told Congress in July that North Korea was continuing to produce fuel for nuclear bombs in spite of its pledge to denuclearize, even as he argued – as he has continued to do – that the Trump administration was making progress in talks with Pyongyang.

US Special Representative for North Korea Stephen Biegun held three days of talks in Pyongyang to prepare for a second Trump-Kim summit due to be held in Hanoi on February 27 and 28. He said

**The US has shown “no readiness or desire” to engage in substantive talks on extending the pact, which limits each country to no more than 1,550 deployed nuclear warheads and 700 deployed missiles and bombers.**

before the talks they would include discussion of corresponding steps North Korea has demanded. Also, the choice of Vietnam as host of this month’s summit between Trump and Un shows the Southeast Asian nation is headed in the right direction, Prime Minister Nguyen Xuan Phuc said.

*Source: <https://www.jpost.com>, 13 February 2019.*

## **USA–RUSSIA**

### **Russian Official: Another Nuclear Pact with US in Trouble**

Another US-Russian nuclear pact is in danger following the US move to withdraw from a Cold

War-era arms control treaty, a senior Russian diplomat said....Deputy Foreign Minister Sergei Ryabkov charged that the US refusal to negotiate an extension to the New Start treaty signals Washington’s intention to let it expire in 2021. He warned that time is running out to save the pact, which was signed in 2010 by US President Barack Obama and Russian President Dmitry Medvedev.

Ryabkov said that the US has shown “no readiness or desire” to engage in substantive talks on extending the pact, which limits each country to no more than 1,550 deployed nuclear warheads and 700 deployed missiles and bombers. US Undersecretary of State Andrea Thompson argued in phone call with reporters that there is enough time to discuss the treaty’s extension.

But Ryabkov warned that the procedure isn’t going to be simple. He noted that the US said it has converted 56 Trident submarine-launched intercontinental ballistic missiles and 41 B-52H strategic bombers that carried nuclear weapons for use with conventional weapons, but stonewalled Russia’s repeated requests

for a verifiable way to exclude their conversion back to nuclear status. “In the worst-case scenario, they may carry 1,286 nuclear warheads,” he said, meaning that the US could nearly double the number of deployed warheads allowed by the New Start treaty.

...”It gives reason to suspect our American counterparts of setting ground to avoid those discussions ... and just let the treaty quietly expire,” Ryabkov said. Ryabkov also said Russia stands ready for talks on a possible successor to the 1987 Intermediate-Range Nuclear Forces treaty. “We are ready for dialogue,” Ryabkov said.

"If the US is interested, it should spell out its proposal."

Citing Russian violations, the US formally suspended its obligations under the INF that bans all land-based cruise and ballistic missiles with a range of 500 to 5,500 kilometers (310 to 3,410 miles), setting the stage for the treaty to terminate in six months. Russia, which has denied any breaches, has followed suit.

Russian President instructed the military over the weekend to work on developing new land-based weapons that were previously forbidden by the INF treaty, but emphasized that such new weapons won't be deployed to the European part of Russia or any other region unless the US does so in those areas. ...Ryabkov expressed particular worry about US plans to produce new, low-yield nuclear weapons, warning that it could dramatically lower the threshold for their use.

"It throws us many decades back to the ideology of nuclear battlefield weapons," he said. "There are just a couple of steps left ... before the revival of nuclear artillery, nuclear mortars, nuclear mines, nuclear grenades and other things like that. It appears to reflect the eagerness of those who have grown up in the age of computer games to easily push the button."

Source: <https://www.apnews.com/>, 07 February 2019.

## NUCLEAR SAFETY

### GENERAL

#### The Science of Dismantling a Nuclear Bomb

There are enough nuclear weapons in the world to cause atomic Armageddon many times over,

according to scientists, who estimate that no country could fire more than 100 nuclear warheads without wreaking such devastation that their own citizens back home would be killed.

Most nuclear nations recognized by the NPT have set about reducing their arsenals. China is a notable exception. The exact number of the country's warheads is unknown, but many analysts say its cache is slowly growing in size. North Korea, on the other hand, while notoriously difficult to predict, could eventually scale back its nuclear program if its diplomatic rapprochement with the West continues.

Negotiations on nuclear disarmament are politically tricky. But when agreements are reached, scientists and engineers can provide a variety of tools to take apart some of humanity's most deadly weapons and store or repurpose the dangerous nuclear material. It's a long and complex procedure, but experts say it's one worth doing.

#### *How to Disassemble an Armed "Swiss Watch":*

Nuclear disassembly is a coordinated process, which involves politicians, scientists and engineers working together. It all

begins with the blueprints that designers used to build the weapon in the first place, according to experts. "It's like any other kind of machine," said Robert Rosner, chair of the Bulletin of the Atomic Scientists Science and Security Board. "It's a case of taking it apart piece by piece."

To unpick a nuclear device, engineers need to know the exact sequence where the pieces were originally put together. "The design of atomic bombs is what I'd call an open secret. There aren't that many ways of designing them and so if the Americans had to deal with the North Korean

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bombs, for example, it wouldn't be much of a mystery to them," said Rosner.

But the more sophisticated and destructive hydrogen bombs that the Americans, British, Chinese, French and Russians possess is a different story. "There are many different designs and so the disassembly is very difficult. You have to be

awfully careful," said Rosner. "From a mechanical engineer's perspective, they're like a highly tuned Swiss watch. They're mechanical artwork with amazingly clever designs."

Other experts agree that unpacking the design is the most challenging part of the process. "It's less about the nuclear material and more about the engineering," said Tom Plant, director of Proliferation and Nuclear Policy at the Royal United Services Institute for Defence and Security Studies, an independent think tank in the United Kingdom.

It would be significantly harder and therefore less likely that a team of engineers could disassemble a hydrogen bomb without knowing the exact design sequence, but still not technically impossible. "It's very unlikely that it would blow up if a mistake was made

in the process of disassembly, unless it was designed to blow up in that eventuality, which is possible though not likely," said Rosner. Plant agrees the worst-case scenario is accidental detonation, but there are other possible perils if disassembly goes wrong. The people doing it could be electrocuted or exposed to the nuclear material or other toxic chemicals.

But a country, knowing its own design, should be able to disassemble its own modern nuclear weapons, and many have. As of 2014, the U.S. had dismantled 85 percent of its declared

stockpile of nuclear weapons since 1967 when it had more than 31,000 war-ready nuclear warheads, according to the U.S. Department of State.

Before any nuclear dismantling can even take place, the right political atmosphere needs to exist, said Plant. He still isn't optimistic that the current dialogue between

Pyongyang and Washington has enough political will to see the Korean peninsula through to denuclearization. "The overwhelming likelihood is that everything falls apart as before," said Plant.

***What do you do with the Leftover Uranium or Plutonium?*** Once the weapon has been taken apart, the process of dealing with what's left is identical for both the older and the more sophisticated bombs. "When the great powers decided to reduce their stockpiles, we were left with fairly substantial quantities of plutonium," said Rosner. "So, what do you do?"

One obvious answer is to repurpose the radioactive material—either plutonium or uranium—to produce electricity. To make it suitable for a power plant, the material needs to be diluted with less enriched versions. "There are no power reactors anywhere in

the world that are designed to deal with weapons-grade material," said Plant. "You have to down-blend it before you can turn it into fuel."

But that isn't what actually happens to most of the radioactive material. "It's not always economically viable. It can be cheaper to enrich new material than it is to downgrade it and repurpose it," said Rosner. "Shipping plutonium or uranium all over the place from storage to reactor isn't popular either. Mostly it's just stuck in storage facilities."

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Decommissioning the radioactive waste and keeping it safe is a science in its own right. The extracted uranium or plutonium will contain different isotopes—variants of themselves that have different atomic masses, which means their radioactivity decays at different rates. The highly radioactive isotopes have short half-lives, which means they decay much faster than the less radioactive ones, and that creates a lot of heat. “The material has to be put in water pools for about half a decade to cool the rods while they decay,” said Rosner. “Then you’re left with relatively low-level waste that’s less radioactive.”

The less radioactive isotopes are slower to decay, which presents its own problem. “They have nuclei that are heavier, so they have very long half-lives of millions of years and you still have to do something with them. You can’t just leave them hanging around,” said Rosner. The answer is to store the radioactive rods in specially designed containers, often called “dry casks.” These vessels are usually made from steel and welded shut to prevent leaking. Each of the casks is then encased in another steel shell and then in a thick layer of concrete to prevent radiation escaping. “If you were standing outside of the container then you wouldn’t be able to detect radiation,” said Rosner.

But even this containment option has its drawbacks—the cost of building, maintaining and monitoring these facilities will never go away so long as the rods inside are producing radiation. “That’s basically eternity for humans,” said Rosner. Additionally, there’s national security to consider, said Plant. “Governments will be keeping it somewhere safe in case they want to reuse it or in case a terrorist tried to get hold of it,” Plant

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**Unless the bomb is detonated, the nuclear material inside is in a steady and contained state—partial disassembly keeps it there while removing the opportunity for the bomb to be used. “If you remove the trigger, then what’s left can’t be used as a bomb”.**

added. That’s why a third option has become more popular in recent years: partial disassembly.

After all, unless the bomb is detonated, the nuclear material inside is in a steady and contained state—partial disassembly keeps it there while removing the opportunity for the bomb to be used. “If you remove the trigger, then what’s left can’t be used as a bomb,” said Rosner. But partial disassembly is reversible; the trigger can be put back in and the warhead can therefore be reactivated. “You couldn’t put it back in a matter of hours so they can’t be on standby. You’re talking about weeks to do it,” said Rosner.

If North Korea should ever agree to denuclearize, it has a few options to consider—none of them are perfect and all of them come with long-term strings attached, but when nuclear powers work together to control their arsenals, the world is a safer place, said Plant.

*Source: Benjamin Plackett, <http://www.laboratoryequipment.com>, 12 February 2019.*

## SPAIN

### IAEA Team Completes Safety Review at Two Spanish Nuclear Plants

An IAEA team of experts completed a review of long-term operational safety on Jan 24. at the Ascó and Vandellós nuclear power plants in Spain. The Pre-SALTO (Safety Aspects of Long Term Operation) review mission was requested by ANAV (Asociación Nuclear Ascó Vandellós II A.I.E.), which operates both power plants.

The 12-member team began its review began Jan. 15, focusing on aspects essential to the safe long-term operation of Units 1 and 2 at Ascó and Unit 2 at Vandellós, which respectively went into commercial operation in 1984, 1986, and 1988. The operator is preparing a license renewal

application to the competent Spanish ministry and the Nuclear Safety Council, Spain's nuclear regulator, and plans to apply for a lifetime extension of all three units beyond the current 40-year license.

The SALTO team reviewed preparedness, organization, and programs related to long-term operation. SALTO reviews are based on IAEA safety standards. The team found that the operator has a good basis to effectively manage long-term operation of the plants. The operator demonstrated that it is implementing preparations for safe operations in a timely manner, and the team reported aging management and long-term operation activities already meet many recommendations of IAEA safety standards. The team found staff to be professional, open, and receptive to suggestions for improvement.

The team's members were experts from Argentina, Finland, France, Ireland, the Netherlands, Romania, Slovakia, South Africa, and the United States, as well as two IAEA staff members. Their recommendations for further enhancing preparations for long-term operating safety included:

The operator should completely analyze and properly document the review of relevant IAEA safety standards as a basis for Periodic Safety Reviews. The operator should demonstrate that management of aging of all active structures, systems, and components is in place for long-term operation. The operator should implement a complete management of aging of electrical, instrumentation, and control components for long-term operations. The plants' management said it was committed to implementing the recommendations and requested that IAEA schedule a SALTO mission to Ascó's Units 1 and 2 in January 2021 and a SALTO mission to Unit 2 at Vandellós in 2023. A final report will be submitted to the plant management, the regulatory authority and the Spanish Government within three months.

Source: <https://ohsonline.com/>, 28 January 2019.

## USA

### No Leaking Radiation from Alaska Island Nuclear Site

The latest round of testing on Alaska's remote Amchitka Island found no radioactive material has leaked from locations where the federal government conducted underground nuclear tests there decades ago, a federal official said. Environmental samples tested in 2016 show no subsurface migration of radioactive material, said Jason Nguyen with the US Department of Energy. Samples tested in 2011 also showed no "excessive risk" was found, he said. The department funds sample testing conducted on the island every five years.

"Our preliminary results for 2016 are showing that that conclusion still holds," Nguyen said as he moderated a panel discussion at an environmental forum in Anchorage. A final report on that study is expected later this year. Nguyen, the department's site manager for Amchitka work, also said a 2014 earthquake with a magnitude 7.9 damaged the caps of three drilling mud

pits on the now-uninhabited island. But he said none of the diesel-fuel filled mud was exposed. The damage has not yet been repaired.

Three nuclear tests were conducted between 1965 and 1971 on Amchitka, located in the Aleutian Islands chain 1,340 miles southwest of Anchorage. The island was occupied by Aleuts for thousands of years. But they were long gone by the time the US military built a base there during World War II as a strategic defense post, said Bruce Wright, the science adviser for the Aleutian Pribilof Islands Association, a tribal organization for Alaska's Aleuts including those on the closest occupied location, Adak Island, 200 miles east of Amchitka. ...Wright's group is a partner with the Department of Energy in the periodic sampling tests, including the latest studies. ...

Source: <https://kfdm.com/>, 13 February 2019.

**The latest round of testing on Alaska's remote Amchitka Island found no radioactive material has leaked from locations where the federal government conducted underground nuclear tests there decades ago, a federal official said. Environmental samples tested in 2016 show no subsurface migration of radioactive material.**

NUCLEAR WASTE MANAGEMENT

RUSSIA

Russia to Decommission World's Most Remote Nuclear Power Plant

Russia's government has approved plans to begin decommissioning what are perhaps the most secluded commercial nuclear reactors in the world, located at the Bilibino nuclear power plant in Chukotka – 5,600 kilometers and 11 time zones to Moscow's east. The approval represents a major step toward plugging in Russia's controversial floating nuclear power plant, the Akademik Lomonosov, which was built to replace the electricity supplied by the Bilibino facility.

In technical terms, Russia's nuclear utility Rosenergoatom asked for and received a license to operate the Bilibino plant's No. 1 reactor without generating electricity for 15 years. According to Russian regulatory procedure, such a license is required before actual decommissioning work can begin.

Bilibino's No. 1 reactor was disconnected from the power grid last March, after which its fuel was removed and placed in storage. The plant's remaining three reactors are scheduled for decommissioning by 2022. That's where the Akademik Lomonosov comes in. By the end 2019, tugboats will guide the floating plant from Murmansk, where it is being fueled and tested, through the Arctic to the remote Chukotka port of Pevek, where it will plug into the local grid.

Many environmental organization's, including Bellona, are not thrilled by this notion. The Akademik Lomosov, as a barge supporting two nuclear power units, could be vulnerable to tsunamis and other violent sea states that could

waterlog its reactors. Rosatom, Russia's state nuclear corporation, has claimed the floating plant is steeled against such calamities, citing that the Akademik Lomonosov's has 24-hours of backup coolant should its reactor's have to endure a Fukushima-like inundation.

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Rosatom has further argued that the Akademik Lomonosov, and other floating plants it might develop, provide an essential service by bringing carbon-free electricity to faraway settlements and towns that are unreachable by more conventional power sources. But Bellona says that this remoteness is part of the problem. The Akademik Lomosov's

location in a far-flung port makes removing and storing its spent nuclear fuel complicated and assures that any response to onboard accidents would be crippled by distance and the harsh Arctic elements of Chukchi Sea.

**When it was finished in 1976, it became the world's northernmost nuclear power plant – and certainly the only one operating in an entirely permafrost environment. The port of Pevek, where the Akademik Lomonosov will be moored, is accessible to Bilibino only by a highway built on icepack.**

Still, when Rosatom said the floating plant was meant to serve a remote location, it could hardly have chosen a better area to illustrate its point. Bilibino, which Moscow

classified as a town only in 1993, originally began as a gold mining outpost in the icy reaches of the East Siberian Sea. Volunteers from the Communist youth league, the Komsomol, began building the plant in 1974 – a mere four years after the Soviet post office began making regular deliveries to the area.

When it was finished in 1976, it became the world's northernmost nuclear power plant – and certainly the only one operating in an entirely permafrost environment. The port of Pevek, where the Akademik Lomonosov will be moored, is accessible to Bilibino only by a highway built on icepack. Once the ice melts in the summer, so



does the road.

The plant's four EGP-6 style graphite moderated reactors were used to power gold and tin mining operations, which fueled a minor population boom in the 1960s. The gold prospectors and geologists moved out of their tents and into town, topping out the population at about 15,000 by the 1980s.

But the fall of the Soviet Union, and the drying up of gold reserves, brought a major decline in the town's population, and now Bilibino is home to only about 5,000 people, the majority of whom are connected in one way or another to the operation of the nuclear power plant. Which brings us back to the Akademik Lomonosov. With a crew of only 69, its unlikely that the floating plant will require much from local townspeople in the way of nuclear know-how and experience, certainly not enough to sustain Bilibino's dwindling population.

Much less will the town be able to use all of the power it puts out – which Rosatom boasts is enough carbon free energy for a city of 100,000. Instead the Akademik Lomonosov will likely be used to the power numerous offshore oil drilling operations springing up in the Chukchi Sea. This, in turn, will bring more carbon-intensive fuels to market – and will thus dismantle the last of the arguments Rosatom has made in favor of its controversial experiment in bringing nuclear powers to regions as remote as Bilibino.

*Source: Charles Digges, <https://www.maritime-executive.com>, 12 February 2019.*

**UK**

**British Nuclear Waste Facility could be Located Near Newry**

The Border town of Newry is being considered as a location to dispose of the United Kingdom's

nuclear waste, with research identifying the area as potentially suitable for an underground disposal facility. It is one of five sites in Northern Ireland under consideration as possible stores for

**The Border town of Newry is being considered as a location to dispose of the United Kingdom's nuclear waste, with research identifying the area as potentially suitable for an underground disposal facility. It is one of five sites in Northern Ireland under consideration as possible stores for the waste and among 45 being examined across the UK as whole.**

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An area of granite bedrock near Newry may be suitable for a geological disposal facility (GDF), according to a recent preliminary report by Radioactive Waste Management (RWM), a UK State-owned company. The

area of rock stretches from Slieve Gullion to the Mourne mountains. Geological disposal sites hold radioactive waste hundreds of metres underground, and there are no current facilities in Northern Ireland.

Future policy decisions on nuclear disposal in Northern Ireland rest with the Stormont executive, where power-sharing has been collapsed for more than two years. The British government's current preference is that one facility would service the entire UK, a spokesman for RWM has said. Any future facility would need the support of the local community before it could be approved.

**Nuclear waste is stored at about 30 sites across Britain, but predominantly at ground level at the Sellafield reprocessing plant in Cumbria. Government 'dozing at wheel' over UK nuclear power plans UK 'yet to properly assess' nuclear plan's impact on Ireland.**

Nuclear waste is stored at about 30 sites across Britain, but predominantly at ground level at the Sellafield reprocessing plant in Cumbria. Government 'dozing at wheel' over UK nuclear power plans UK 'yet to properly assess' nuclear plan's impact on Ireland. ...Preliminary reports into other regions of Northern Ireland found a section of strong rock between Omagh and Cookstown, Co Tyrone, which might support a similar facility. A number of areas in the north of the country could also possibly be suitable, researchers found. These included one location between Belfast and Larne, areas around Coleraine, o Derry, and

Ballymoney and Ballycastle, in Co Antrim.

An emergency motion was passed at the Newry, Mourne and Down District Council, unanimously opposing locating any nuclear waste facility in the local area. Some 45 preliminary regional reports had been completed across the UK, assessing what locations might have suitable rock types to build a facility.

The waste facility will contain multiple barriers to secure the radioactive material underground for hundreds of thousands of years. The British government has also promised communities hosting future facilities significant investment. Responding to the Newry report, Sinn Féin MP for South Down Chris Hazzard said Britain could not be allowed to use the North “as a dumping ground” for its hazardous and toxic waste....

Source: <https://www.irishtimes.com/>, 07 February 2019.

**USA**

**Update Old Definitions about Nuclear Waste to Speed Safe Cleanup**

The US Department of Energy recently released new estimates for the cost of cleaning up the Hanford nuclear site in central Washington state. That number could now reach a staggering \$677 billion, with active cleanup ending in the year 2079. Under this scenario the federal government would spend, on average, more than \$11 billion dollars every year for 60 years.

As leaders in the Tri-Cities — the community closest to and most impacted by the Hanford site — we believe that the United States simply must find a way to effectively address this problem at a price that taxpayers can afford. One clear step in the right direction is to begin managing the waste based on its actual contents and risks rather than an arbitrary definition developed decades

ago.

To summarize, DOE is responsible for the cleanup of waste left over from decades of nuclear-weapons production, including approximately 53 million gallons in underground tanks at Hanford. Federal laws passed in 1954 and 1982 guide the agency’s management of this waste but do not clearly specify how the waste should be categorized. Rather than making a determination, the agency simply decided in the early 1980s to manage much of our nation’s defense nuclear waste as high-level, requiring the highest standards, regardless of the actual amount of radioactivity it contains or risk it poses.

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**Instead of arbitrarily making decisions based solely on the origin of the waste, agency officials are proposing to manage this waste based on its actual physical characteristics. This is the same method that countries like France and Germany use to guide their waste-management decisions, and would bring the US closer to international standards established by the IAEA.**

DOE is now considering moving away from this well-intentioned, but overly costly and inaccurate approach. Instead of arbitrarily making decisions based solely on the origin of the waste, agency officials are proposing to manage this waste based on its actual physical characteristics. This is the same method that countries

like France and Germany use to guide their waste-management decisions, and would bring the US closer to international standards established by the IAEA.

Why does this matter? A risk-based approach would allow DOE to manage, treat and dispose of defense waste in a manner that accurately reflects its contents and the potential risks it poses to human health and the environment. Doing so could reduce cleanup costs by tens of billions of dollars, and has the potential to significantly speed up remediation efforts at Hanford and elsewhere.

DOE has been accused of proposing this change in order to save money and shirk its

responsibilities, but this new approach would not mean that the federal government can simply walk away from its cleanup obligations. The federal government has committed to many billions of dollars' worth of remediation work at Hanford and elsewhere, and budget shortfalls mean that important cleanup projects often don't get started soon enough, or take too long to complete.

Treating waste based on its actual contents would allow DOE to direct the resources they save toward other important cleanup efforts that would otherwise languish, potentially for years to come. It could also open up pathways to get some waste out of Washington state more quickly. These waste streams would otherwise remain at Hanford for many more years, or even permanently.

... Ultimately, there is high-level defense nuclear waste at Hanford and elsewhere that does need to be treated and disposed of in a deep geological repository. It is some of the most challenging and expensive material that our country has to address. We should not, however, delay cleanup progress and waste taxpayer funds by

unnecessarily managing lower-level waste, which scientists agree can be safely disposed at permitted sites, in the same manner. After all, how can we expect to effectively address this problem if we aren't even willing to accurately define it?

The Tri-City community wants the Hanford site remediated as quickly and effectively as possible, but we see no need to make an already difficult job even harder. Our hope is for DOE to meaningfully engage with the appropriate regulatory bodies, including the Washington State Department of Ecology, to determine, in a technically justified manner, that more waste can be managed as low-level.

Importantly, this will require the state government and our elected officials to keep an open mind and make a genuine effort to reach a reasonable consensus. If they are successful, it will open the door for faster, less costly remediation outside of Washington state while still allowing the work to be accomplished safely and responsibly....

*Source: Robert Thompson, <https://www.seattletimes.com/>, 10 February 2019.*



Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal K.K Nohwar, PVSM VM (Retd).

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