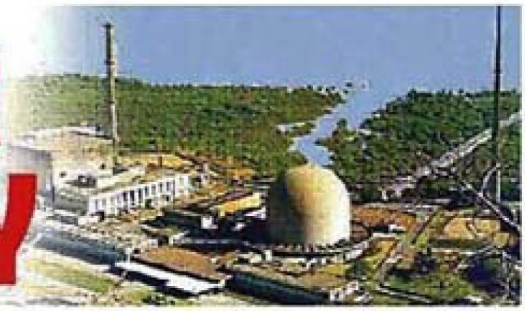
NUCLEAR SECURITY



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

Vol 19, No. 06, 15 JAN. 2025

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OPINION – Christina Pazzanese

Nuclear has Changed. Will the U.S. Change With It?

Fueled by artificial intelligence, cloud service providers, and ambitious new climate regulations, U.S. demand for carbon-free electricity is on the rise. In response, analysts and lawmakers are taking a fresh look at a controversial energy source: nuclear power.

Two new reactors in Georgia are the first in consecutive years in the U.S. since 1990. In June, Congress overwhelmingly passed the ADVANCE Act, a bipartisan bill that boosts the number of reactors coming on line. Late last year, tech giants Google, Amazon, and Microsoft all pledged to invest in small reactors to help meet their future energy needs.

In this edited conversation with the Gazette, Daniel Poneman, a senior fellow at the Belfer Center, discusses the growing momentum behind nuclear power plants. Poneman served as deputy secretary of energy and chief operating officer at the U.S. Department of Energy from 2009 to 2014. From 2015 through 2023 he was CEO of Centrus Energy, a supplier of nuclear fuel to power plants around the world.

Fueled by artificial intelligence, cloud service providers, and ambitious new climate regulations, U.S. demand for carbon-free electricity is on the rise. In response, analysts and lawmakers are taking a fresh look at a controversial energy source: nuclear power. Two new reactors in Georgia are the first in consecutive years in the U.S. since 1990. In June, Congress overwhelmingly passed the ADVANCE Act, a bipartisan bill that boosts the number of reactors coming on line.

Is Nuclear Power Making a Comeback?

I believe the answer is yes, because we have new factors present and they're all converging to add momentum to nuclear. For a long time, a lot of people have been worried about climate change and reducing carbon emissions. The only source of clean power that's been proven to work — day or night, season in, season out, in any geographic location, and successfully operating at large scale — that's nuclear. It's just shy of 20 percent of our total electricity

production and nearly half of our carbon-free electricity.

On top of that is this vertiginous increase in electricity demand that's driven by 1) the AI revolution and 2) the effort to decarbonize not only power generation, which is about one-quarter of total emissions, but also transportation and industrial processes. If you have electric vehicles and you get the power for the vehicles from coal plants, you haven't solved the emissions problem.

The last factor is the hyper scalers, which have the wherewithal and frankly the balance sheets to support these very substantial investments in nuclear. So, you have all of those market-driven factors and strong recognition by the government of the importance of nuclear. I don't think there's any issue that has broader or deeper bipartisan support than this one. All of these things are converging to add new momentum to American nuclear energy.

Historically, opposition to nuclear power has been linked to safety and environmental concerns — including waste — and on the business side, to high costs and low profits. What's different — is today's nuclear power safer, cleaner, more cost-effective?

In terms of security, when people were concerned after 9/11, changes were undertaken. And obviously, a lot of lessons were drawn after Fukushima. There has been a continuous set of improvements over the years.

When you ask what's different: There is a whole new generation called advanced reactors. One of the problems over the years is that large reactors got larger and larger, and each one became a bespoke project. There were too many change orders within a single reactor project, and that just kills you on budget. One thing is to go to factory-built, small reactors that can be standardized, punched out like a cookie cutter, the same design over and over. The more of these things you punch out, the cheaper it gets, and the more practice you have installing them, the cheaper it gets. If you do things like that, you can improve on safety and budget.

The waste issue depends on the specific reactor technology. Some advanced reactors are based on existing Gen III designs, so their waste would be the same but with smaller quantities because the reactors are smaller. Gen IV reactors use fast neutrons, which allow a more efficient use of fuel and therefore a reduction of total volumes. Some Gen IV reactors can burn used fuel that has already been irradiated, which would have the effect of both burning out some of the minor actinides and turning what is now considered "waste" into a source of more energy. At the end of the day, all nuclear waste, whether from current generation or advanced reactors, will need to be disposed in deep geologic formations; this is a safe process with well-known technology.

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The Biden administration late last year announced several new U.S. nuclear benchmarks at the United Nations Climate Change Conference. Are those goals realistic?

They're ambitious, but I think they're necessary if we're going to reach our targets. At the Belfer Center, I'm working on a project on how to get 200 gigawatts of new nuclear built in the United States by 2050. A bunch of things have to happen right for that to be achievable. But I have great confidence that when there's something that's truly important, and people in the United States put their minds to it, we can do great things. But it's going to take smart government policies. We're going to have to have lean and effective regulations. We've

got to figure out a way to spread the cost and risk sufficiently, so you induce people to act sooner rather than later. Government loan guarantees that reduce the cost of capital can both defray first-mover risks and also give confidence to the private sector to co-invest. If we concentrate our efforts, we have a chance to restore U.S. global leadership.

If there's a cyber threat from an enemy or from some natural event, I would recommend the government buy a bunch of these small reactors to help them get over that first-of-a-kind challenge that is so hard to overcome for private entrepreneurs who can't wait decades for an adequate return on investment. Private capital can then take the confidence that comes from having strong co-investment and commitments from the federal side.

What factors will determine whether those goals are reached or derailed?

Government is going to have to be there in terms of smart tax policy, in terms of providing things like cost-overrun insurance. The government also can be an important source of demand, especially for small and micro reactors that have potential applications such as supporting micro grids for things that can't afford to go dark — military bases, things of that character. If there's a cyber threat from an enemy or from some natural event, I would recommend the government buy a bunch of these small reactors to help them get over that first-of-a-kind challenge that is so hard to overcome for private entrepreneurs who can't wait decades for an adequate return on investment. Private capital can then take the confidence that comes from having strong co-investment and commitments from the federal side.

You're going to have to have the engineering, procurement, and construction contractors who got rusty over the last few decades get back into the game and execute well. And we're going to have to have the talent pool grow and training programs at the university level, but also in the trades and organized labor. Many thousands and, ultimately, hundreds of thousands of jobs are needed.

You're going to need well-trained people in the supply chain manufacturing these very precise components and parts. It's going to take a group effort. And to maintain the social license to do this, we have to bring all of civil society along with us. So far, in recent years, you see a lot of very positive movement in that direction.

Source: https://news.harvard. edu/gazette/story/2025/01/nuclear-has-changed-will-the-u-s-change-with-it/, 07 January 2025.

OPINION – Aaron Larson

War and Nuclear Energy: Risks Are Enormous for Power Industry and World

Nuclear power can be a highly important component of a country's energy security strategy. This is true for several reasons. Nuclear plants provide consistent baseload power that is not dependent on weather conditions or a constant fuel delivery system. Unlike solar or wind energy, nuclear power can generate electricity 24/7 with very high capacity factors, often 90% or more, which ensures a steady and predictable energy supply. Nuclear power reduces dependence on foreign energy imports, particularly coal, oil, and natural gas. Countries with nuclear power plants can generate substantial electricity domestically, enhancing their energy independence and reducing geopolitical vulnerabilities associated with energy supply chains.

By incorporating nuclear power into their energy mix, countries can diversify their electricity sources, reducing risks associated with over-reliance on any single energy technology or fuel type. This diversification enhances overall energy system resilience.

Meanwhile, nuclear fuel (uranium) is relatively abundant and concentrated, meaning a small volume of fuel can generate massive amounts of electricity. This characteristic leads to more stable

and predictable energy pricing compared to fossil fuels, which are subject to significant market volatility. Uranium reserves are widely distributed globally, and modern reactor designs can use fuel very efficiently. Some advanced reactor concepts even propose recycling nuclear fuel, potentially extending fuel availability for decades or centuries. By incorporating nuclear power into their energy mix, countries can diversify their electricity sources, reducing risks associated with over-reliance on any single energy technology or fuel type. This diversification enhances overall energy system resilience.

Protecting nuclear facilities during conflict is extremely challenging. Reactors require continuous cooling systems, robust infrastructure maintenance, specialized personnel to prevent potential meltdown scenarios, and extreme security measures that become exponentially more difficult during active combat. Meanwhile, the mere threat of nuclear facility damage can create significant psychological pressure, potentially forcing strategic withdrawals or negotiations due to the potential for catastrophic consequences.

The Risks in War Zones: However, nuclear power plants present significant vulnerabilities during wartime, which can pose catastrophic risks to both military personnel and civilian populations. For example, a direct military strike or significant damage to a nuclear power plant could cause a massive radiological release, creating an environmental catastrophe far beyond the immediate conflict zone. The Chernobyl and Fukushima incidents have demonstrated how nuclear facility damage can create long-lasting contamination spanning hundreds of square miles.

The establishment of a "Nuclear Safety and Security Protection Zone" was urgently needed at the Zaporizhzhia site to ensure that the physical integrity of the plant was not compromised. While no agreement was ever reached to formally implement a protection zone at Zaporizhzhia, the IAEA has continued to closely monitor and assess the situation at the site on a daily basis. It has prioritized nuclear safety and security implications, alongside ongoing verification activities.

Nuclear power plants are high-value strategic targets. An attacking force might intentionally target these facilities to create widespread environmental disruption, cause massive civilian displacement, generate long-term economic and environmental damage, or potentially contaminate critical infrastructure and agricultural lands. Unlike conventional military targets, damage to nuclear facilities can create radioactive exclusion zones, render surrounding areas uninhabitable for decades, contaminate water sources, cause long-term health risks through radiation exposure, and disrupt agricultural and economic activities in vast regions.

Protecting nuclear facilities during conflict is extremely challenging. Reactors require continuous cooling systems, robust infrastructure maintenance, specialized personnel to prevent potential meltdown scenarios, and extreme security measures that become exponentially more difficult during active combat. Meanwhile, the mere threat of nuclear facility damage can create significant psychological pressure, potentially forcing strategic withdrawals or negotiations due to the potential for catastrophic consequences.

A Real-World Problem: The risks associated with war and nuclear power are not just a thought exercise today—there's been a real situation at hand for nearly three years. Russia invaded Ukraine on Feb. 24, 2022. Notably, the largest nuclear plant in Europe—the Zaporizhzhia facility, which has six VVER-1000 units each with a capacity of about 950 MW—was seized almost immediately by Russian forces on March 4, 2022. Fighting in the territory surrounding the Zaporizhzhia plant quickly raised concerns that its reactors could be critically damaged in the crossfire. Concerns were heightened in August 2022 when two of the four

high-voltage (750-kV) offsite power lines to the site were damaged by an attack.

Representatives of the IAEA, including Director General Rafael Mariano Grossi, visited the plant in late August 2022 to assess the threat of a nuclear accident. Grossi addressed the United Nations Security Council via video link on Sept. 6, 2022, saying the establishment of a "Nuclear Safety and Security Protection Zone" was urgently needed at the Zaporizhzhia site to ensure that the physical integrity of the plant was not compromised. While no agreement was ever reached to formally implement a protection zone at Zaporizhzhia, the IAEA has continued to closely monitor and assess the situation at the site on a daily basis. It has prioritized nuclear safety and security implications, alongside ongoing verification activities.

At the American Nuclear Society's Winter Conference and Expo in Orlando, Florida, on Nov. 18, 2024, Grossi spoke about the work the IAEA has done in Ukraine during the war. He specifically highlighted an attack that had taken place just days before the Orlando event. "A tremendous, ferocious attack on Ukraine's energy infrastructure reminded us once again that nuclear has sometimes unexpected challenges," he said. Grossi noted that monitoring activities at a nuclear plant on the front lines of a war is "an amazing challenge." Still, he said it was incredibly important for the IAEA to be there.

"This is why today I have teams of dedicated staff, not only in Zaporizhzhia, but also in Rivne, in Khmelnitski, in South Ukraine, in Chernobyl," he said, referring to all the nuclear facilities in Ukraine, which total 15 operable reactors and four permanently shut down reactors. "Every three weeks crossing the front lines. I've done it myself five times. They do it all the time. And sometimes we've done it under fire. The proud flag of the IAEA, which represents us all, is there to remind those who are in conflict that nuclear energy is for peace." The nuclear industry has a safety maxim that posits "an accident anywhere is an accident everywhere." In the case of war and nuclear power, the stakes are high for everyone and an accident must be avoided at all costs.

Source: https://www.powermag.com/war-and-nuclear-energy-risks-are-enormous-for-power-industry-and-world/, 02 January 2025.

OPINION – Romeo Kokriatski

How I Learned to Stop Worrying and Love the Bomb

There have been few political positions I have believed in so vociferously as nuclear non-proliferation. As a consequence of a youth spent reading primarily history books (as a way to understand the present I had found myself in), I had developed what I considered to be a very healthy fear of nuclear war, or nuclear weapons use in general. My favorite history book at the time, a tome entitled The Illustrated History of the Twentieth Century, delved quite deeply into the events surrounding the development, use, and threatened use, of nuclear weapons.

The result was that my fear of nuclear weapons extended to even the childish jokes percolating through popular consciousness during the early years of the Iraq War. This drove quite a bit of my further political formation. Non-proliferation was an unalloyed good, while nuclear weapons programs were giveaways to military contractors and a salve for the insecure egos of elected politicians—or so I thought. That was a luxury, I now realize, borne of my residence within a nuclear power. Twenty years later, having spent a full third of my life in an ex-nuclear state invaded by a nuclear one—I cannot honestly claim that my opinions have remained static, no matter how much I mourn the loss of innocence.

Unfortunately, Russia's initial invasion in 2014 and its follow-up full-scale invasion in 2022 proved that the international community is, at best, hesitant to oppose nuclear powers fully. Instead of a broad peacekeeping coalition to ensure Ukrainian security, the country was forced into signing an agreement that not only handicapped our own defense against Russian incursions until 2022, but also gave Russia the time, capability, and funds to build up its future invasion force. Even after the full-scale war had commenced and Russian tanks were only dozens of kilometers from

Kyiv, the international community could only issue statements of concern and offer rides to our political leadership—it wasn't until months later that our partners organized the first Ramstein Contact Group.

Three years on, Ukraine still suffers from the lack of solidarity and coordination presaged in the opening days of the full-scale war. Much of the military aid promised by Ukraine's partner nations has never been delivered—and the aid that Ukraine has received, while obviously critical to Ukraine's defensive and offensive operations, has never reached the scale or scope necessary to make real changes to the war's nature. Instead, Ukraine has attempted to fill in some of the gaps in our military prowess with domestic manufacturing—notably drones of all types, but also cruise missiles, electronics warfare systems, and more. Long-range strike capability is something we have had to figure out for ourselves, after it became laughably clear that the United States, Ukraine's largest provider of military kit by far, would never provide us with the weapons necessary to strike deep into the Russian rear, at their airbases and fossil fuel processing facilities.

Ukraine can no longer rely on the United States, and as an extension, neither the EU nor NATO. Ukraine must forge its own security guarantees—security that is guaranteed from Kyiv, not from DC or Brussels. That is why Ukraine must launch its own nuclear weapons development program. Many of the reasons cited as to why the international community cannot take a harsher stance towards Russia is Russia's possession of nuclear weapons.

Despite these advances in domestic capability, the war continues, and in light of the changing political situations in Ukraine's partner nations, it has become increasingly clear that Ukraine is a long way away from securing real security guarantees—and not just a ceasefire that would allow Russia to re-arm for a few years before invading again. The administration of President Volodymyr Zelenskyy recognizes this need, and has expended serious diplomatic effort in convincing our partners that only by joining a military alliance like NATO could Ukraine be safe—yet his words fall on deaf ears, time and time again. Every statement Zelenskyy makes in support of Ukraine's NATO membership is rebuffed, like clockwork, by one Alliance official or another, who instead reiterate that Ukraine has NATO support, for 'as long as it takes'. This is always, inevitably, followed by a politician in a NATO member nation making a statement to the effect of 'We'll be together, but not right now'—teenage dating habits as applied to geopolitical crises. It is time to face facts. Ukraine will not join NATO. Ukraine will not receive a surge in military aid and materiel. Ukraine's partners will not push for more drastic action against Russia, despite the worsening economic and political situation in Ukraine. In short—Ukraine is on its own.

We should embrace that fact. A dangerous madman has seized control of Ukraine's biggest partner, a madman with direct, documented ties to the dictator currently invading us. Globally, the world's post-COVID economic recovery is at risk with the massive uncertainty introduced by the upcoming reign of Donald Trump, who, as of publishing time, has so far threatened to forcibly annex Greenland, Canada, and the Panama Canal, while conducting a special military operation in Mexico. Ukraine can no longer rely on the United States, and as an extension, neither the EU nor NATO. Ukraine must forge its own security guarantees—security that is guaranteed from Kyiv, not from DC or Brussels.

That is why Ukraine must launch its own nuclear weapons development program. Many of the reasons cited as to why the international community cannot take a harsher stance towards Russia is Russia's possession of nuclear weapons. The theocratic monarchy of North Korea can even involve itself, sending troops and heavy artillery to assist their Russian allies—again, because they have nukes. Iran, another of Russia's partner states, can freely purchase sanctioned Russian fossil fuels and sell them advanced military gear—and Iran is suspected of developing or already possessing a nuclear weapon.

That is to say, it is an undeniable fact that possession of nuclear weapons allows a nation-state enormous latitude in how it conducts its affairs, up to and including warding away the consequences of a territorial invasion. For Ukraine to ever feel even a hint of security again, we must secure our own. This is no longer the realm of saber-rattling nationalism, but of urgent need. Our country's survival has never been so much in doubt. But we can secure it. It is time for Ukraine's nuclear program to grow wings, and perhaps, make the world a slightly safer place than it has been.

Source: https://english.nv.ua/opinion/how-i-learned-to-stop-worrying-and-love-the-bomb-opinion-50480173.html, 09 January 2025.

OPINION – Louis Rene Beres

To Avoid Nuclear War: America's Most Important Obligation

For the incoming American president, one policy assumption is unchallengeable: If the United States doesn't manage to avoid a nuclear conflict, all other obligations will become moot. It follows that all necessary fiscal and intellectual resources should be vested in this primary and primal obligation. There will be derivative obligations. In thinking about such unique peril, metaphor could prove helpful. A nuclear war – any nuclear war – would resemble an incurable disease. Accordingly, all serious "therapeutic" hopes must lie in prevention. We require a core focus on science-based and law-based analyses, not a series of narrowly partisan or self-serving manipulations.

To progress with such a defined responsibility, one that is suitably theoretical and not ad hoc, a key distinction should be introduced. It concerns tangibly basic differences between a deliberate or intentional nuclear war and a nuclear war that is unintentional or inadvertent. Should this rudimentary distinction be overlooked or undervalued for any reason, the United States could impair its capacity to identify plausible national security options. Prima facie, any such impairment could be intolerable and irremediable, both for itself and for various allies.

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During analytic inquiry, multiple impediments and ironies will surface. Because there has never been an authentic nuclear war (Hiroshima and Nagasaki don't "count"), verifiable probabilities would be impossible to ascertain. Always, in logic and mathematics, true probabilities must stem from the discernible frequency of relevant past events. Where there are no such events – that is, when current situations are unprecedented or sui generis – nothing could be concluded with any predictive reliability. There is more. Not every oxymoron must be unreasonable. At times, good news can be bad news. Though humankind is fortunate to have avoided a nuclear conflict thus far, such good news also signifies something "bad:" In scientific terms, we can predict very little about the likelihood of a nuclear war.

Still, especially in Washington and Jerusalem, capable scholars will need to calculate optimal strategies for averting a nuclear war and minimizing the harms of a nuclear war that cannot be prevented. Among other things, this bewildering calculation will vary according to (1) presumedenemy intentions and (2) presumed plausibility of accidents, hacking intrusions or decisional miscalculations. Linguistically, when taken together as overlapping categories of cumulative nuclear threat, the component risks of an unintentional nuclear war are best described as "inadvertent."

Language will matter. Any instance of accidental nuclear war would be inadvertent, but not every case of inadvertent nuclear war would be the result of accident. Conceptually, all such examples represent complex elements of a single overall national and international security problem – that

is, preventing a "final epidemic." Nuclear war prevention should never be approached by American security thinkers and planners as a preeminently political or tactical issue. Informed by serious historical understandings ("understood backwards") and by consciously refined analytic capacities, US strategists should continuously prepare to deal with a large variety of potentially-intersecting factors. Under the best conditions of modern science, this broad variety will appear multi-dimensional and daunting, but it need not appear insoluble.

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There is more. Principal hazards in nuclear war avoidance can only be understood in light of the credible or at least conceivable intersections between them. All such critical intersections are more-or-less plausible, a conclusion based on various expectations of "informal logic" (not an actual history) and on the knowledge that mutually reinforcing intersections could become "synergistic." Close attention to anticipated nuclear synergies – intersections in which the "whole" outcome is greater than the sum of its "parts" – should remain primary among America's analytic defense objectives.

In dealing with growing nuclear war risks involving North Korea, Russia, China or Iran, no concept could prove more important to security policy than synergy. Unless synergistic interactions are correctly anticipated, the United States could underestimate the total impact of any considered nuclear engagement.

In dealing with growing nuclear war risks involving North Korea, Russia, China or Iran, no concept could prove more important to security policy than synergy. Unless synergistic interactions are correctly anticipated, the United States could underestimate the total impact of any considered nuclear engagement. The flesh and blood consequences of such underestimations could defy dispassionate analytic imagination and also any post-war justifications. More than likely, many survivors of a nuclear war would envy the dead.

This raises a longstanding personal issue for the present writer. I have been publishing about complex nuclear war issues for over fifty years. After four years of doctoral study at Princeton in the late 1960s, long an intellectual center of American nuclear strategic thought (recall both Albert Einstein and J. Robert Oppenheimer), I began to consider adding a modest personal contribution to a newly-evolving nuclear literature. By the late 1970s, I was cautiously preparing a new manuscript on US nuclear strategy. At that early stage of a still-emerging strategic discipline, I was especially interested in US presidential authority to order the use of American nuclear weapons.

From day one, I was assured in official (DoD) circles that reliable safeguards had been incorporated into all operational nuclear command/control decisions, but that these safeguards could simply not be applied at the presidential level. To a young scholar searching optimistically for nuclear war avoidance opportunities, this ironic disjunction didn't make any obvious sense. What next? I was inquiring, after all, on the hallowed Princeton grounds of Albert Einstein and J. Robert Oppenheimer. Indeed, I was residing just a few blocks from where they had lived.

It was high time for gathering suitable clarifications. I reached out to retired General Maxwell D. Taylor, a former Chairman of the US Joint Chiefs of Staff. In rapid response to my query, General Taylor sent a

comprehensive handwritten reply. Dated 14 March 1976, the distinguished General's letter concluded ominously: "As to those dangers arising from an irrational American president, the only protection is not to elect one."

Until 2016 and "Trump I," I had never given extended thought to this authoritative response. Today, at the start of "Trump II," General Taylor's 1976 warning takes on more conspicuously urgent meanings. Based on pertinent facts and logical derivations (called "entailments" in philosophy of science), Americans should reasonably assume that if the incoming president were to exhibit accessible signs of emotional instability, irrationality or delusional behavior, he could still order the use of American nuclear weapons. He could do this officially, legally and without expectations of nuclear chain-of-command "disobedience."

Under US law, Article 1 (Congressional) war-declaring expectations of the Constitution aside, any presidential order to use nuclear weapons, whether issued by an apparently irrational president or by an otherwise incapacitated one, would have to be obeyed. To act otherwise in such incomparably dire circumstances, would be illegal. In essence, any chain-of-command disobedience would be impermissible on its face.

Even more worrisome, a US president could become emotionally unstable, irrational or delusional, but not conspicuously exhibit such liabilities. What would happen then? A corollary question should be brought to mind: What precise stance should be assumed by the National Command Authority (Secretary of Defense, Chairman of the Joint Chiefs of Staff, and several others) if it should ever decide to oppose an "inappropriate" or "irrational" presidential order to launch nuclear weapons?

Could the National Command Authority (NCA) "save the day," informally, by acting in an impromptu or creatively ad hoc fashion? Or should indispensable preparatory steps already have been taken preemptively? Should there already be in place certain credible and effective statutory measures to (1) assess the ordering president's reason and judgment; and (2) countermand the presumptively inappropriate or wrongful order?

Under US law, Article 1 (Congressional) war-declaring expectations of the Constitution aside, any presidential order to use nuclear weapons, whether issued by an apparently irrational president or by an otherwise incapacitated one, would have to be obeyed. To act otherwise in such incomparably dire circumstances, would be illegal. In essence, any chain-of-command disobedience would be impermissible on its face. In principle, at least, a US President could order the first use of American nuclear weapons even if this country were not under actual nuclear attack. Some further strategic and legal distinctions would need to be made between a nuclear "first use" and a nuclear "first strike." These would not be trivial or minor distinctions.

While there exists an elementary yet substantive difference between the two options, it is a distinction that candidate Donald Trump failed to understand during the 2016 presidential campaign debates and also during the 2024 campaign. Should we now simply take for granted that he has somehow become more familiar with the multiple and nuanced expectations of national nuclear doctrine and strategy? Regarding a president who has said "the moon is part of Mars" and "nuclear weapons could be used against hurricanes," such enhanced familiarity is hardly self-evident.

What happens next? Where should the Trump-directed American polity go from here? To reply, a fully coherent, authoritative and comprehensive answer will be needed for the following question: If faced with any presidential order to use nuclear weapons, and not offered sufficiently appropriate corroborative evidence of any actually impending existential threat, would the National Command Authority be: (1) be willing to disobey, and (2) be capable of enforcing such expressions of disobedience?

In any such unprecedented crisis-decisional

circumstances, all binding decisions could have to be made in a compressively time-urgent matter of minutes, not hours or days. As far as any useful policy guidance from the past might be concerned, there could be no scientifically valid way to assess the true probabilities of all possible outcomes. This is because all scientific judgments of probability – whatever the salient issue or subject – must be based on the determinable frequency ofpertinent past events.

In matters of nuclear war, there would be no such events. To be sure, this is a palpably fortunate absence, but one that could still stand in the way of reliable security decision-making predictions. The irony is simultaneously obvious and problematic. Whatever the scientific obstacles, the optimal time to prepare for such vital US national security contingencies is now.

To avoid being placed in such a limited choice strategic environment, incoming American president Donald J. Trump should understand that displaying a larger national nuclear force might not necessarily bestow meaningful bargaining advantages. On the contrary, especially if ostentatious, such display could generate unwarranted US presidential overconfidence and assorted forms of decisional miscalculation. In such utterly unfamiliar, many-sided and unprecedented matters, size matters. Counter-intuitively, however, it could also vary inversely with national influence and power.

Regarding the immediately specific matter of Iran, though that country is "pre-nuclear" and weakened by the loss of Syrian proxy Bashar al Assad, increasing US military encounters with Iranian surrogates could sometime draw in North Korea as an adversarial nuclear belligerent. Faced with manifold uncertainties about Kim Jung Un's willingness to push the escalatory envelope, a now-returned American president could find himself confronted with grievously stark choices between outright capitulation and chaotic nuclear warfighting. Even for a more intellectually capable US president, any such choice could prove overwhelming.

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In searching for "escalation dominance" during crises, the United States, its allies and its adversaries could find themselves caught up in unique circumstances. To navigate such fragile matters of world politics, even an inadvertent decisional outcome could include a nuclear war. Whatever the cause, there could be no "winner."

There is more. In the paroxysmal aftermath of an unintended nuclear conflict, an American president who had earlier downplayed "preparation" in strategic negotiations ("attitude is more important than preparation") could question an adversary's presumed strategic calculations. By then, however, it would be too late. As survivors of a once-preventable nuclear conflagration, this stunned American leader might vainly ask himself: Were we ever properly schooled in such mind-taxing and esoteric problem solving? As a nuclear war would resemble any other incurable disease, the only auspicious "therapies" will lie in war avoidance. Ultimately, for the United States and certain allies, nuclear war avoidance is not just a matter of American "optimism" or Freudian "wish fulfilment," but a problem demanding reason, intellect and courage. For America, Israel and various other states, life in a dissembling global order will need to be "understood backwards," but "lived forwards."

Source: https://moderndiplomacy.eu/2025/01/07/to-avoid-nuclear-war-americas-most-important-obligation/, 07 January 2025.

OPINION – Michael Rubin

Could Turkey Pose as Great a Nuclear Threat as Iran?

An Iranian nuclear weapon would be a game-changer in the Middle East. Should the Islamic Republic of Iran acquire nuclear weapons, at a minimum, Iranian leaders would feel so secure behind their own nuclear deterrent that they could export terrorism without fear of retaliation. Iranian assassins could murder Americans worldwide, and even the most hawkish administration in Washington would hesitate to respond militarily for fear of escalation.

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Many realists argue that the world, even Israel, could live with a nuclear Iran because the Islamic Republic is not suicidal. That is a strawman argument, however. The problem has never been whether the regime is suicidal but rather if it is terminally ill. The custodianship of any Iranian bump would be with the most radical and ideologically pure unit of the Islamic Revolutionary Guard Corps. Both the growing frequency of nationwide protests and looming succession raise questions about Iran's stability. No regime is eternal. If the Islamic Republic's demise became inevitable — think Romania in 1989 as Nicolae Ceau'escu's regime collapsed around him — the true believers with their hands on Iran's nuclear arsenal could launch to fulfill what they believe is ideological destiny. There is no way to deter such an attack, for neither Jerusalem nor Washington would gratuitously kill millions of Iranians after the regime they also hate had collapsed. In such a scenario, deterrence collapses.

While the world focuses on a possible Iranian nuclear breakout, however, a stealth nuclear threat looms. Turkey's Russia-built nuclear plant will become operational this year. The notion that it is proliferation-proof rests on the assurance of Ankara and Moscow. Even if proliferation does not occur at the plant, Turkish President Recep Tayyip Erdogan may replicate Supreme Leader Ali Khamenei's strategy. Iran used its Russian-built Bushehr reactor to legitimize orders and imports it could then divert to supply its covert program.

Israel may have no choice but to attack Iran's nuclear program in the coming months. While pundits might argue that U.S. and Israeli success at shooting down drones and missiles in April and October 2024 buy Israel time, they interpret the situation completely wrong: If seven out of 300 missiles and drones get through, as happened in the first Iranian salvo, but carried chemical, biological, or radiological warheads, then all bets would be off.

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Speaking on the centennial of the beginning of Turkey's independence movement just over five years ago, Erdogan hinted at nuclear weapons ambitions. "Several countries have missiles with nuclear warheads, not one or two. But [they tell us that] we can't have them. This I cannot accept," he declared. It was not a one-off event. On Sept. 7, 2024, Hayrettin Karaman, Erdogan's personal theologian, published an essay arguing, "Either the Islamic world must unite and collaborate with China and Russia, or Turkey must move forward

by acquiring nuclear warheads and weapons." Erdogan has chosen both, apparently.

And, like Iran, Turkey seeks to work on the triad of weaponization: enrichment, warhead design, and delivery. Beginning in 2021, for example, senior Turkish and Pakistani generals and military industry heads have met, apparently to discuss delivery systems. It's deja vu all over again, with one important difference: While Israel can strike at Iran, Turkey's NATO membership protects it from similar preemptive action. Erdogan may despise the West and hate its primary defense alliance, but he does not withdraw Turkey for two reasons: First, he can use NATO's consensus provisions to paralyze it from within, and second, he wants NATO mutual defense commitments at least until Turkey gets the bomb, in effect using NATO as a shield against Israel. Talk about a Trojan horse. Stopping Iran's nuclear breakout may consume Washington and Jerusalem, but Erdogan, motivated by the same irrational antisemitism as Khamenei, could, thanks in part to NATO, reach the nuclear finish line first.

Source: https://www.aei.org/op-eds/could-turkey-pose-as-great-a-nuclear-threat-as-iran/, 06 January 2025.

NUCLEAR STRATEGY

UK

Charles Questioned Thatcher's Nuclear Defense Strategy, Declassified Files Show

Declassified documents reveal King Charles III, then Prince of Wales, expressed skepticism over Margaret Thatcher's nuclear defense strategy during the Cold War. His concerns, raised in 1983, highlight his proactive engagement in military and foreign policy matters during a period of heightened tensions between the United States and the Soviet Union. The documents, now available at the National Archives, show that Charles sought personal military briefings to better understand the UK's policies on nuclear arms and disarmament. Dissatisfied with the explanations provided, the prince reportedly found the government's public and private stances contradictory. For instance, while ministers publicly supported a CTB, they privately argued against it, citing the need for ongoing nuclear testing to maintain a credible deterrent.

In response to Charles's demand for clarity, government officials tailored bespoke briefings for him. Sir Bryan Cartledge, then Britain's ambassador to the Soviet Union, emphasized the importance of frankness in addressing the prince's concerns, acknowledging his disdain for "official flannel or obfuscation." These briefings also exposed the UK's reliance on the United States, including tacit support for controversial policies such as Ronald Reagan's Strategic Defense Initiative, known as "Star Wars," to maintain privileged access to American intelligence. This episode highlights Charles's willingness to challenge government positions on critical issues. Notably, his engagement extended beyond defense policy. In 1979, during James Callaghan's Labour government, he reportedly sought ministerial briefings on Britain's economic decline, advocating for "radical and rapid" changes to compete with economic powerhouses like Japan and Germany.

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While Charles has since vowed to remain above politics as monarch, the declassified documents offer a rare glimpse into the intellectual rigor and curiosity he applied to matters of state during his time as heir to the throne. As tensions between East and West eventually eased following Mikhail Gorbachev's rise to power in 1985, the prince's involvement in these debates remains a fascinating chapter in the intersection of royalty and politics.

Source: https://slguardian.org/charles-questioned-thatchers-nuclear-defense-strategy-declassified-files-show/, 06 January 2025.

USA–SOUTH KOREA

Ex-Pentagon Official Says Trump May Not Support South Korea's Nuclearization

Incoming President Donald Trump may not support South Korea's independent nuclearization, a former senior Pentagon official anticipated Tuesday, stressing Seoul is "better off" under America's nuclear umbrella. Vipin Narang, former acting assistant secretary of defense for space policy, made the remarks, voicing optimism that the Nuclear Consultative Group (NCG), the allies' nuclear deterrence body launched during the Biden administration, will continue at least "for the foreseeable future" under Trump.

Under the NCG mechanism, the two allies are pursuing a model of "conventional and nuclear integration" in which the Asian ally uses its high-tech conventional military assets to support America's nuclear operations in an integrated way — a shift that requires South Korea to take greater responsibilities in the alliance. Rather, Narang raised concerns over whether South Korea's efforts for the NCG would continue in the midst of political uncertainties caused by President Yoon Suk Yeol's botched martial law bid and his subsequent impeachment last month.

"I personally don't think President Trump would support South Korean independent nuclearization," he said during a virtual forum hosted by the Institute for Corean-American Studies, a nonprofit research organization. "I think President Biden and President Trump may not agree on many things, but I think they agree on one thing, which is they both view nuclear weapons as an existential threat, and neither wants nuclear weapons to spread to other countries," he added. Though he described the North's nuclear program as advancing at "one of the highest rates in the world, matched only by China," Narang said it is better for South Korea to rely on America's "extended deterrence" pledge to use the full range of its military capabilities, including nuclear, to defend its ally.

"I still believe that it's in South Korea's interest to ensconce itself in the extended deterrence umbrella because it's not as if South Korea can get nuclear weapons overnight. There will be a window of vulnerability against a nuclear North Korea that will have an incentive to try and stop South Korea potentially through the use of force," he said. "In a world in which South Korea is pursuing its own nuclear weapons, then the U.S. probably doesn't have an obligation to defend it ... South Korea may be very vulnerable in that period."

Narang, currently the Frank Stanton Professor of Nuclear Security and Political Science at the Massachusetts Institute of Technology, expected that the NCG would remain under Trump, highlighting it is "in America's interest." "The work streams that we've established mean that the NCG will at least persist, in my view, for the foreseeable future. I do think that the Trump administration will see that this is in America's interest," he said. "It's a way to allow South Korea to contribute to the extended deterrence relationship in ways that I think the president will appreciate in the sense that it is a good 'bargain' for the U.S., and so I am hopeful that at least on the U.S. side, there will be some continuity," he added.

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"My bigger question is actually on the South Korea side ... what happens with the domestic political

changes that are imminent and forthcoming in South Korea and the commitment to the NCG, given that President Yoon himself was so intimately ... and personally involved with the NCG," he said. Apparently mindful of growing concerns over Trump's foreign policy approach, Narang underscored the importance of alliances. "This notion that allies are liabilities or free riders is simply not true," he said, calling the allies "force multipliers." "When we provide a united front to our adversaries, we are stronger, and the allies provide capability and geography, and we share values."

The professor voiced worries over North Korea's fast-advancing nuclear capabilities as well as its deepening military alignment with Russia. "I think on a percentage basis, North Korea's strategic programs are advancing at one of the highest rates in the world, matched perhaps only by China ... and it continues to expand and diversify its capabilities," he said without elaborating further. Asked to describe Pyongyang's nuclear doctrine, Narang said Pyongyang has an "asymmetric escalation" posture under which a state deploys a nuclear arsenal to present a credible threat of a first nuclear strike or preemptive nuclear strike. "No question. Asymmetric escalation, 100 percent," he said.

Commenting on the potential for South Korea's nuclear latency, Narang said the Asian country has the scientific and technical capability if it needed to pursue nuclear weapons, but the question is "how far could they go without getting detected?" "I do think that if there is an effort to produce ... enough quantities of fissile materials to have ... an arsenal that is credible of independently deterring and defeating North Korea ... I think South Korea probably gets detected," he said.

Source: https://www.koreatimes.co.kr/www/nation/2025/01/113_389958.html, 08 January 2025.

BALLISTIC MISSILE DEFENCE

IRAN

Iran Deploys New Air Defense Systems to Protect Nuclear Facility Amid Threat of Israeli Airstrikes

On January 7, 2025, Brigadier General Ghader Rahimzadeh, the Iranian commander of the Khatam al-Anbia Air Defense Base, announced that Iran's air defense units, under the command of the Islamic Revolution Guards Corps (IRGC) Aerospace Force, are actively securing the Shahid Ahmadi Roshan nuclear site—commonly known as the Natanz facility—against potential aerial threats.

This move comes as Iran continues to bolster its defense posture amid escalating tensions with Israel and ongoing concerns about its nuclear program. Rahimzadeh emphasized that both army and IRGC (Islamic Revolution Guards Corps) air defense units have been deployed near critical sites such as Natanz, enhancing their ability to detect and neutralize aerial threats. The air defense systems in place reportedly include new and advanced technologies, reflecting the country's determination to safeguard its sensitive nuclear infrastructure.

The Natanz facility, a cornerstone of Iran's uranium enrichment program, has long been a focal point of international contention due to concerns over its potential role in the development of nuclear weapons. Iran's air defense upgrades signal its increasing focus on protecting such facilities and its broader preparedness for aerial challenges amid the complex security landscape.

The Natanz facility, a cornerstone of Iran's uranium enrichment program, has long been a focal point of international contention due to concerns over its potential role in the development of nuclear weapons. Iran's air defense upgrades signal its increasing focus on protecting such facilities and its broader preparedness for aerial challenges amid the complex security landscape. Rahimzadeh also stated that the air defense measures are part of a wider national strategy, with upcoming exercises planned to strengthen the country's air defense capabilities. These drills will be conducted under the command of the integrated air defense network, an initiative designed to consolidate and enhance the effectiveness of Iran's military and defensive resources.

On January 8, 2025, the Defense Mirror website

reported that Iran had ramped up its defense posture by conducting large-scale military exercises to protect its nuclear sites. These exercises come amid growing concerns over Israel's military stance and its potential for action against Iran's nuclear facilities. Israel, which has consistently voiced its opposition to Iran's nuclear ambitions, is said to be preparing for a military strike, fearing that Iran's nuclear program could eventually lead to the development of nuclear weapons.

The perceived threat from Iran's nuclear program has been compounded by its ongoing support for Houthi rebels in Yemen, whose missile and drone attacks on Israel have heightened security concerns in Tel Aviv. These attacks have been attributed to Iranian assistance to the Houthi group, further fueling Israel's fears of an expanding nuclear threat. In this context, Israeli defense officials are reportedly considering military action against Iran's nuclear infrastructure, with a sense of urgency mounting ahead of the upcoming change in the U.S. presidency.

The strategic considerations of regional powers like Israel and global players like the United States further complicate the situation surrounding Iran's nuclear program. The potential for military confrontation remains high, with Israel reportedly preparing for the possibility of an attack on Iran's nuclear sites. The trajectory of this crisis will largely depend on the actions of key stakeholders, including the new U.S. administration under President Trump, Israel's military strategy, and Iran's willingness to engage in further diplomacy or continue its nuclear activities.

In October 2024, Israel conducted airstrikes against Iranian missile-production sites around Tehran. These strikes targeted key facilities, including the Parchin military complex, the Khojir military base, the Shahrud missile site, and a factory in the Shamsabad Industrial Zone. These attacks were seen as part of Israel's broader strategy to disrupt Iran's missile development and its nuclear capabilities. The airstrikes are believed to have been a direct response to what Israel perceives as a growing threat from Iran's expanding missile and nuclear programs.

The threat of an Israeli military response has been compounded by uncertainties surrounding the new U.S. administration, as President-elect Donald Trump is set to take office in January 2025. Israeli officials fear that Trump may prioritize diplomatic engagement with Iran over military action, which has created a sense of urgency in Tel Aviv to neutralize what it views as an existential threat before the transition of power.

Iran's nuclear program has been a point of contention for over two decades, with the country maintaining that its nuclear activities are intended solely for peaceful purposes, such as energy production. However, the international community, particularly Israel and Western powers, has expressed concerns that Iran's nuclear ambitions could ultimately result in the development of nuclear weapons. The IAEA has monitored Iran's nuclear activities, issuing reports that have raised questions about Tehran's compliance with international agreements. Despite the 2015 Joint Comprehensive Plan of Action (JCPOA), designed to limit Iran's nuclear activities in exchange for the lifting of sanctions, tensions have remained high, especially following the U.S. withdrawal from the agreement in 2018.

Since then, Iran has resumed some of its nuclear enrichment activities, increasing uranium enrichment levels beyond the limits set by the JCPOA. These developments have sparked renewed concern from the international community, with the United Nations and the European Union calling for greater transparency and accountability in Iran's nuclear program. In the face of these growing concerns, Iran has invested heavily in its defense systems, particularly air defense, to protect its nuclear facilities from external threats. This includes the deployment of advanced missile defense systems around sensitive sites like Natanz. By enhancing its military capabilities, Iran seeks to send a clear message about its resolve to maintain its nuclear sovereignty, despite the international pressure to curtail its nuclear program.

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As Iran continues to strengthen its defenses and conduct military exercises to safeguard its nuclear infrastructure, the risk of an escalation in the region remains significant. The potential for a military confrontation, especially between Israel and Iran, could have far-reaching implications not only for the Middle East but for global security as a whole. With the situation continuing to evolve, the international community must closely monitor developments in Iran's nuclear program and its military posture, while also considering diplomatic efforts to prevent further escalation.

Source: https://www.armyrecognition.com/news/army-news/2025/breaking-news-iran-deploys-new-air-defense-systems-to-protect-nuclear-facility-amid-threat-of-israeli-airstrikes, 10 January 2025.

SERBIA

Serbia Completes Fielding of Chinese Air-Defense System

Serbian defense authorities announced that the Chinese-made FK-3 air defense systems are now in service with the Serbian Air Force, marking a success for Beijing, which has sought out to expand its presence further within the Balkan country in recent years. The 250th Air Defense Missile Brigade division has been equipped with the anti-aircraft missile system, which consists of vehicles with a command center as well as missile launchers and radars, the Serbian defense ministry said in a Dec. 30 statement.

Serbia represents an ambiguous case in Europe stemming primarily from its decision to adopt a policy of military neutrality. This has allowed the country to preserve ties to two of the West's most prominent foes, Russia and China, while also striking deals with countries such as France for Rafale fighter jets. During a panel organized at the Globsec security conference in Prague last August, Serbian President Aleksandar Vucic said it was unlikely that his country would join the EU in 2028, a target other western Balkan states have set out.

According to the release, the FK-3, the export variant of China's HQ-22 surface-to-air missile system, can target aircraft, helicopters, cruise missiles, drones and air-to-ground missiles flying at maximum speeds of 1,000m/s across distances ranging up to 100 kilometers. The initial deal signed between the Serbian government and the manufacturer China Aerospace Science & Industry Corporation, or CASIC, was significant when it was made public in 2020, as it represented the first purchase of a Chinese medium- to long-range air defense shield by a country on the European continent.

At the time, the United States warned that striking deals with Beijing may put Serbia's proclaimed objective of becoming a member of the European Union at risk. "Procuring military equipment is a sovereign decision – however, governments should understand the short- and long-term risks and costs involved in doing business with Chinese companies and procurement choices should reflect Serbia's stated policy goal of greater European integration," the U.S. Embassy in Belgrade said in a statement in 2020.

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While Serbia is bordered by five NATO members, and the military alliance has a liaison office in Belgrade, Vucic has made it clear that he has no plans to apply for membership. At the Serbian government-sponsored Partner defense exhibition held in Belgrade in 2023, where a handful of Chinese defense firms exhibited for the first time, several manufacturers told Defense News that they had an "obvious interest" to further expand their activities in the country. Serbia previously became the first operator of Chinese drones in Europe when it acquired the Chinese CH-92 and CH-95 unmanned aerial vehicles, publicly displayed for the first time five years ago.

Source: https://www.defensenews.com/global/europe/2025/01/09/serbia-completes-fielding-of-chinese-air-defense-system/, 09 January 2025.

EMERGING TECHNOLOGIES AND DETERRENCE

NORTH KOREA

North Korea's Kim Says New Hypersonic Missile will Deter 'Rivals'

North Korea's leader Kim Jong Un said it tested a new hypersonic missile this week aimed at deterring the country's Pacific rivals, state media reported Tuesday, as Washington's top diplomat visited the region. The test came two weeks before the inauguration of US president-elect Donald Trump, who previously tried to woo North Korea, and coincided with US Secretary of State Antony Blinken's visit to the South. "The hypersonic missile system will reliably contain any rivals in the Pacific region that can affect the security of our state," Kim, who oversaw the launch, said in comments carried by the Korean Central News Agency (KCNA) on Tuesday.

KCNA cited the use of a "new compound of carbon fibre" in the missile's engine, which experts warned could allow Pyongyang to hit further targets with technology to which only the United States, Russia and China currently have access. The launch also used a "new comprehensive and effective method" for its flight and guidance control system, KCNA said. Blinken visited on Monday strategic ally South Korea, a fierce rival of the North with whom it technically remains at war. The top US envoy, now in Tokyo, was expected to address issues surrounding Pyongyang in talks with Japan.

It was North Korea's first launch since November, when it test-fired what it said was its most advanced and powerful solid-fuel intercontinental ballistic missile (ICBM). Kim said in a statement the missile launched on Monday flew for 1,500 kilometres (930 miles) — beyond the 1,100-kilometre figure given by South Korea's military — and travelled at 12 times the speed of sound before landing in the ocean. "This is clearly a plan and effort for self-defence, not an offensive plan and action," Kim said.

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However, he added the missile's performance could "not be ignored worldwide", saying it was able to "deal a serious military strike to a rival while effectively breaking any dense defensive barrier". "The development of the defence capabilities of the DPRK aiming to be a military power will be further accelerated," Kim said, using the acronym for the North's official name. The launch was a message to the United States to engage in dialogue based on Pyongyang's new game-changing technology as Trump prepares to enter the White House, analysts said. "It sends a clear message to the Trump administration, suggesting that in order to engage in dialogue, North Korea's strategic position must be acknowledged," Hong Min, a senior analyst at the Korea Institute for National Unification, told AFP.

Kim's Daughter Watches: Images released by

KCNA showed Kim observing the launch with his teenage daughter Ju Ae at an undisclosed location. The location of the test site was also undisclosed, but images showed the missile launching from a remote piece of land surrounded by water on either side and trees stripped because of the winter cold. Analysts said the new missile launch was concerning because it included technology to which few nations have access.

"Achieving such speeds requires materials that can withstand extreme conditions," said Yang Moo-jin, president of the University of North Korean Studies in Seoul. If successful, the launch means North Korea could test for extended ranges and, if it can reach between 3,000 and 5,000 kilometres, "it could threaten not only US forces in Japan but even further targets", Yang said.

Blinken condemned the launch and said Pyongyang was "already receiving Russian military equipment and training". Hong said Pyongyang may have had "technical cooperation" with Moscow on the new missile technology. US and South Korean intelligence believe that North Korea sent thousands of troops late last year to fight against Ukraine and has already suffered hundreds of casualties.

Known as "gravity bombs," the warheads have been in service for over 50 years, making them the oldest in the US nuclear arsenal. The upgrade extends the service life of the weapons by at least 20 years while enhancing safety, security, and reliability.

Acting South Korean president Choi Sang-mok criticised Pyongyang's launch at a cabinet meeting Tuesday, calling it a "grave threat" to regional security. Lee Sung-joon, spokesperson of South Korea's Joint Chiefs of Staff, said some of North Korea's launch details, such as the missile's flight range, were inaccurate and that it "has frequently made exaggerated claims". The launch took place while South Korea grapples with political turmoil after impeached President Yoon Suk Yeol declared martial law last month, claiming he had to protect against "North Korean communist forces". North Korea's Kim last year said Yoon was "a man lacking something," asserting that the way for Yoon to guarantee South Korea's security was to "not provoke" the North.

Source: https://www.griffonnews.com/news/nation/north-koreas-kim-says-new-hypersonic-missile-will-deter-rivals/article_84d77482-0d30-52ca-bdcb-59c44c3265ed.html?=/&subcategory=446%7CBlues, 07 January 2025.

USA

US Completes $9B Upgrade of B61-12 Nuclear Bombs

The National Nuclear Security Administration (NNSA) has announced the completion of the $9-billion life extension program for the US military's B61-12 nuclear warheads. Known as "gravity bombs," the warheads have been in service for over 50 years, making them the oldest in the US nuclear arsenal. The upgrade extends the service life of the weapons by at least 20 years while enhancing safety, security, and reliability.

"Completing the B61-12 on schedule is the latest example of what we've been saying for several years now: NNSA is delivering capabilities at the pace and scale needed by our Department of Defense partners and our deterrence requirements," NNSA Administrator Jill Hruby explained. The B61 gravity bombs are deployed at US Air Force and NATO bases.

About the B61-12: The B61-12 is designed to provide the US military with a modern, air-delivered nuclear deterrent capability. Weighing approximately 825 pounds (374 kilograms), the weapon uses an inertial navigation system for high kill probability. Its tail features four maneuverable fins, offering enhanced accuracy and stand-off capability. The warhead received formal production clearance in 2021 — more than 17 years after design and development began. In March 2024, the US cleared the F-35A Joint Strike Fighter aircraft to carry two B61-12 bombs, making it the first fifth-generation jet authorized for this mission. With the B61-12 upgrade now complete, the NNSA will focus on producing a more advanced variant, the B61-13.

Source: https://thedefensepost.com/2025/01/08/us-upgrade-nuclear-bombs/, 08 January 2025.

NUCLEAR ENERGY

CZECH REPUBLIC

Czech Energy Plan Focuses on Renewables and Nuclear

The Czech Republic has submitted its updated National Energy and Climate Plan to the European Commission, featuring large renewable and nuclear energy capacity increases. The Ministry of Industry and Trade and the Ministry of the Environment worked together on the update, which models the development of the country's energy sector to fulfil European Union decarbonisation targets. Minister of Industry and Trade Lukáš Vlèek said: "We have been looking for solutions to ensure that these targets are met as cost-effectively as possible, taking into account our current conditions and the need to ensure a secure supply of affordable energy. Electricity generation will be based on renewables and nuclear, and the role of gas-fired sources can also be expected to increase."

According to the ministries "the national plan does not contain any new obligations or prohibitions for private entities. Nor does it serve in any way as a central plan for the development of our energy sector, telling investors what they can and cannot do and giving them mandatory targets". It says natural gas will serve as an intermediate source alongside "less predictable renewable generation, but then it will gradually disappear almost completely from the energy mix to be replaced by renewable and low-emission gases, including hydrogen".

The plan says the share of renewable energy sources (RES) in electricity generation will rise from 16.5% in 2023 to 28% by 2030 and 46% by 2050. The ministries said: "The share of nuclear will be around 44% by 2030. Together with the completion of new reactors, an increase to 68% in 2040 can be expected." It says that 28% of heat in the Czech Republic comes from renewable sources, with the plan expecting that to rise to 40% in 2030 and 74% in 2050. The country also uses heat from nuclear power plants.

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Environment Minister Petr Hladik said the plan "represents a strategic vision of the future of the Czech energy sector until 2050. The plan is especially crucial for the private sector, which needs to know the long-term outlook for its planning and investments ... the goal is to reduce greenhouse gas emissions by 55% by 2030 through the development of RES, storage and flexibility, energy savings and the phasing out of fossil energy, including the complete phase-out of coal mining and combustion by 2033. The scenario envisages a fivefold increase in energy from photovoltaics and wind, increasing building renovation rates, which we are now meeting mainly through our most successful New Green Savings Programme, and the development of nuclear ... [the plan] ... has the potential to increase GDP by two percentage points." The Czech Republic currently has six nuclear reactors generating about one third of its electricity. There are plans for a large expansion of capacity, with up to four new large power units, as well as a roll-out of as much as 3 GW of capacity from small modular reactors.

Source: https://www.world-nuclear-news.org/articles/czech-energy-plan-focuses-on-renewables-and-nuclear, 08 January 2025.

INDIA

NTPC And NPCIL Restructure Joint Venture With ₹ 15,000 Crore Agreement to Advance Nuclear Energy Initiatives

TPC Limited has officially disclosed a significant development in its corporate operations through

a communication addressed to the stock exchanges. On January 9, 2025, the company signed a Supplementary Joint Venture Agreement-2 (SJVA-2) with the NPCIL. This agreement, which builds upon the existing Joint Venture Agreement dated April 27, 2010, marks a strategic restructuring of their joint venture company, Anushakti Vidhyut Nigam Limited (ASHVINI).

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The amendments introduced under SJVA-2 include a redefined shareholding structure, with NPCIL now holding a 51% stake and NTPC retaining a 49% stake in ASHVINI. This revised structure emphasizes the collaborative approach and mutual commitment to advancing nuclear energy initiatives in India. Additionally, the agreement facilitates the transfer of the Mahi Banswara Rajasthan Atomic Power Project (MBRAPP), comprising four units of 700 MW each, from NPCIL to ASHVINI. This strategic transfer is expected to bolster the operational scope and resource base of the joint venture.

One of the noteworthy changes is the enhancement of the authorized share capital of ASHVINI. Previously set at ₹ 5 crore, the capital has now been significantly increased to ₹ 15,000 crore, indicating ambitious plans for growth and investment in nuclear energy infrastructure. The agreement also includes a revision in the board composition, with directors nominated by NTPC and NPCIL in proportion to their respective shareholdings, ensuring balanced representation and governance. This collaboration between NTPC and NPCIL aligns with their shared vision of promoting sustainable and efficient energy solutions. By restructuring the joint venture and enhancing its financial and operational capacities, the partnership is poised to contribute significantly to India's energy sector, particularly in nuclear energy development.

The disclosure, made in compliance with Regulation 30 of the SEBI Listing Obligations and Disclosure Requirements, underscores NTPC's commitment to transparency and stakeholder engagement. The details provided in the annexure highlight the strategic intent and operational nuances of the agreement, ensuring clarity for investors and regulatory bodies.

With this development, NTPC and NPCIL reaffirm their roles as pivotal players in India's energy sector, aiming to meet the growing energy demands of the nation while prioritizing sustainability and technological advancement. The restructured joint venture is expected to pave the way for innovative projects and reinforce India's position in the global nuclear energy landscape.

Source: https://solarquarter.com/2025/01/10/ntpc-and-npcil-restructure-joint-venture-with-₹15000-crore-agreement-to-advance-nuclear-energy-initiatives/, 10 January 2025.

POLAND

Poland Approves $14.7bn for First Nuclear Power Plant

Poland has taken a significant step towards establishing its first nuclear power plant by approving funding of up to 60.2bn zlotys ($14.7bn). The funding is crucial for the project, which is still awaiting approval from the European Union, according to a report by Bloomberg. The government's decision reflects a commitment to modernise the country's energy infrastructure. On Tuesday 7 January 2025, the cabinet led by Donald Tusk adopted a draft bill that permits the government to increase the capital of PEJ, the state-owned utility company. PEJ will be responsible for constructing the 3.75GW reactors along the Baltic coast. The government will have the flexibility to transfer either bonds or cash to

PEJ, depending on the project's investment timeline.

Poland aims to complete the nuclear power plant by 2036, intending to replace ageing coal-fired plants and ensure a stable electricity supply while transitioning to cleaner energy sources. The new equity will represent 30% of the total funding, with the remaining 70% expected to come from debt financing through the US Export-Import Bank and other financial institutions. Wojciech Wrochna, a government official overseeing critical infrastructure, noted that discussions with the EU could extend beyond one year.

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Following these negotiations, Poland plans to finalise agreements with Westinghouse Electric and Bechtel Group. The funding decision coincides with an investigation by the European Commission into Poland's proposal for state aid related to the project. The proposal includes not only equity injections but also a contract for difference for power generated by the plant and state guarantees for PEJ's debt.

In December 2024l the EU's executive arm expressed concerns, stating it has "doubts at this stage on whether the measure is fully in line with EU state aid rules." In August, Poland announced an investment of 4.6bn zlotys ($1.2bn) from its 2025 budget to kickstart the development of the nuclear power plant. The initiative is part of a broader strategy to diversify the nation's energy mix and lower electricity costs.

Source: https://finance.yahoo.com/news/poland-approves-14-7bn-first-163807568.html, 08 January 2025.

SMALL MODULAR REACTORS

INDIA

India's NPCIL Seeks Proposals for Privately Funded Small Reactor Projects

India's nuclear power operator has issued a Request for Proposals from 'visionary Indian industries' to finance and build a proposed fleet of 220 MW Bharat Small Reactors to help decarbonise Indian industry. Nuclear Power Corporation of India Ltd (NPCIL) describes Bharat Small Reactors - or BSRs - as compact 220 MW pressurised heavy water reactors that are tailored for "captive use". Minister of Finance Nirmala Sitharaman announced in the July 2024 budget that the government would partner with the private sector to set up BSRs as part of efforts to open up India's nuclear power sector for private investments as part of its efforts to achieve net-zero goals.

BSRs are planned to be set up with private capital, within the existing legal framework and approved business models. According to the Request for Proposals, the industrial party - referred to as the user - will have the right to the plants' electrical output, but the plant assets, "for purpose of operation, will get transferred to NPCIL". The user is expected to use the power for its own captive power requirements, but could sell the electricity to other customers at a tariff determined by the Department of Atomic Energy, subject to Indian law and regulations.

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The user would be responsible for all the capital and operating expenditure for the project from pre-project and throughout its "entire life-cycle including reinstating the assets in case of any damage and decommissioning". The project would be constructed by the user under the supervision and control of NPCIL, and transferred to NPCIL for operation on completion of construction. The announcement of the Request for Proposals comes after Minister of State Jitendra Singh set out the government's vision for BSRs as part of its nuclear power programme in a written answer to the Lok Sabha on 4 December.

"The standard 220 MW PHWR, which has a proven safety and performance record, is being upgraded to reduce the land requirement and make it deployable close to the industries for use as a captive power plant. These reactors, termed as Bharat Small Reactors (BSR) are planned to address the decarbonisation needs of industries like steel, aluminium, metals etc. Setting up of 220 MW Bharat Small Reactors is envisaged within the existing legal framework, broadly envisaging provision of land, cooling water and capital by the private entity, with the design, quality assurance and operation & maintenance by NPCIL, based on agreed business models," he said.

"BARC is developing SMR for repurposing of retiring coal-based power plants and catering to power requirements at remote locations in the country." BARC is the Bhabha Atomic Research Centre, India's multi-disciplinary national nuclear research centre. Users have until 31 March to submit proposals to the NPCIL.

Source: https://www.world-nuclear-news.org/articles/npcil-seeks-proposals-for-privately-funded-small-reactor-projects, 02 January 2025.

NORWAY

Three SMRs Selected for Evaluation in Ship Propulsion Study

The initial phase of Norway's NuProShip initiative – which is evaluating Generation IV small modular reactor technologies for their viability in commercial shipping applications - has concluded, with three SMR technologies being selected for further evaluation in the next phase. The NuProShip project is being funded by the Research Council of Norway. Alongside Norwegian shipbuilder VARD, the project is supported by prominent partners, including the Norwegian University of Science and Technology, class society DNV, the Norwegian Maritime Administration, ship owner Knutsen Tankers, and the Spanish nuclear consultancy IDOM.

The nuclear technology itself was studied, but also regulatory issues, safety issues, ship design implications, maintenance, handling of radioactive rest material and crew requirements. VARD has now announced that three promising SMR designs have been selected for more in-depth assessment in NuProShip II, which will run over the next two years. This phase aims to develop a workable prototype solution. In NuProShip III, it will be tested.

VARD said its primary contribution involves integrating these reactor systems into various vessel types, assessing the technical challenges to enable the future commercial use of nuclear-powered ships. The ultimate purpose of the research programme is to develop a commercially viable zero-emission technology for deep-sea ships that satisfies all stakeholders and requires no subsidies after the initial development process.

During Phase I of the project, which began in 2023 and ended on 31 December, a total of 99 companies developing advanced reactor technologies were assessed. The main purpose of NuProShip I is to adjust a Generation IV SMR to the needs of international shipping. The technical starting point was an already approved design at 25–55 MW. The nuclear technology itself was studied, but also regulatory issues, safety issues, ship design implications, maintenance, handling of radioactive rest material and crew requirements. VARD has now announced that three promising SMR designs have been selected for more in-depth assessment in NuProShip II, which will run over the next two years. This phase aims to develop a workable prototype solution. In NuProShip III, it will be tested.

The selected technologies are: Kairos Power of the USA's fluoride high-temperature molten salt reactor using TRISO (tri-structural isotropic) fuel

particles; Ultra Safe Nuclear Corporation of the USA's helium-cooled gas reactor, also employing TRISO fuel particles; and Blykalla of Sweden's lead-cooled reactor concept utilising uranium oxide as fuel. The second phase of NuProShip will expand the consortium to include insurance companies, "a critical step for evaluating the business viability of nuclear technology in the shipping industry", VARD said. The shipping industry consumes some 350 million tonnes of fossil fuel annually and accounts for about 3% of total worldwide carbon emissions. In July 2023, the shipping industry, via the International Maritime Organization, approved new targets for greenhouse gas emission reductions, aiming to reach net-zero emissions by, or around, 2050.

During the day, NSA Sullivan met NSA Doval for discussions to review progress in cooperation in defence, Cyber, and maritime security. One of the highlights of the meeting was NSA Sullivan announcing US efforts to finalize necessary steps to delist Indian nuclear entities, which will promote civil nuclear cooperation and resilient clean energy supply chains.

Source: https://www.world-nuclear-news.org/articles/three-smrs-selected-for-evaluation-in-ship-propulsion-study, 07 January 2025.

NUCLEAR COOPERATION

USA–INDIA

NSA Sullivan Announces US Efforts to Delist Indian Nuclear Entities

US National Security Advisor Jake Sullivan, who is in New Delhi on a two-day visit, has announced efforts to finalize necessary steps to delist Indian nuclear entities. This will promote civil nuclear cooperation and resilient clean energy supply chains. The announcement came during his meeting with Indian NSA Ajit Doval, according to a joint press release issued on Monday (January 6, 2025).

PM Modi Reaffirms Commitment to Deepen Close Cooperation between India & US

While in New Delhi, NSA Sullivan called on Prime Minister Narendra Modi. They positively assessed the significant advancement in the India-US Comprehensive Global Strategic Partnership over the last four years, especially in the key areas of technology, defence, space, civil nuclear, clean energy, semiconductors, and AI. Prime Minister Modi reaffirmed his commitment to continue to deepen close cooperation between the two democracies for the benefit of the people of the two countries and for the global good, the PMO said.

"It was a pleasure to meet the US National Security Advisor @JakeSullivan46. The India-US Comprehensive Global Strategic Partnership has scaled new heights, including in the areas of technology, defence, space, biotechnology and Artificial Intelligence. Look forward to building upon this momentum in ties between our two democracies for the benefit of our people and global good," Prime Minister Modi said on social media platform X.

US Efforts to Delist Indian Nuclear Entities

During the day, NSA Sullivan met NSA Doval for discussions to review progress in cooperation in defence, Cyber, and maritime security. One of the highlights of the meeting was NSA Sullivan announcing US efforts to finalize necessary steps to delist Indian nuclear entities, which will promote civil nuclear cooperation and resilient clean energy supply chains. This reflects the progress the United States and India have made—and will continue to make—as strategic partners and countries with a shared commitment to peaceful nuclear cooperation, the joint press statement issued after the meeting said. NSA Sullivan also briefed the Indian side on the updates brought out by the Biden administration to U.S. missile export control policies under the MTCR that will boost US commercial space cooperation with India.

Over the past few years, the two NSAs have engaged regularly in a high-level dialogue through extensive discussions on a broad bilateral, regional and global agenda. They have driven concrete initiatives between the two countries across a range of areas including Artificial Intelligence, Quantum Computing, Semiconductors, Telecommunications, Defence and Space since the launch of the India-US Initiative on Critical and Emerging Technologies

(iCET) by Prime Minister Modi and President Joseph Biden on the side lines of the Quad Summit in Tokyo in May 2022. "The current visit gave them the opportunity to review ongoing progress in their high-level dialogue, including in diverse fields such as Defence, Cyber and Maritime Security," the joint press release noted.

Forging a Closer and Stronger India-US Partnership

The US NSA also met External Affairs Minister S Jaishankar and discussed steps to deepen bilateral, regional and global cooperation. EAM Jaishankar expressed his appreciation for the US NSA's personal contribution to forging a closer and stronger India-US partnership

"Delighted to meet US NSA @JakeSullivan46 in New Delhi today morning. Continued our ongoing discussions on deepening bilateral, regional and global cooperation. Valued the openness of our conversations in the last four years. Appreciated his personal contribution to forging a closer and stronger India-US partnership," EAM Jaishankar said on X. During a recent visit to Washington, EAM Jaishankar met both Sullivan and his likely successor, Congressman Michael Waltz. This marked the first high-level contact between Indian officials and members of the incoming Trump administration. These engagements reflect India's proactive approach to ensuring continuity and strength in its strategic partnership with the US.

Addressing the media on January 3, 2025, MEA Spokesperson Randhir Jaiswal emphasized the depth and resilience of India-US relations. He stated, "The India-US partnership is expansive, encompassing strong economic and technological collaboration. Mobility of skilled professionals remains a crucial component, benefiting both nations." India looks forward to deepening ties with the new US administration under President-elect Trump, Jaiswal added.

Source: https://www.indianewsnetwork.com/en/20250106/nsa-sullivan-announces-us-efforts-to-delist-indian-nuclear-entities, 06 January 2025.

USA–SOUTH KOREA

US, South Korea Finalize Agreement on Civil Nuclear Cooperation

Seoul and Washington on Wednesday finalized an agreement on civil nuclear energy cooperation and principles concerning nuclear exports. The Memorandum of Understanding on Principles Concerning Nuclear Exports and Cooperation "reflects the two countries' mutual dedication to maximizing the peaceful uses of nuclear energy under the highest international standards of nuclear safety, security, safeguards, and nonproliferation", a joint statement said. The pact builds on over 70 years of cooperation in nuclear power between the allies and will bolster each country's export controls on civil nuclear technology, according to the statement published online by the United States Department of Energy (DOE). "It will also provide a pathway to help both countries keep up with the emergence of new technologies in this sector", the statement added.

The U.S. is also building civil nuclear cooperation with Japan, the United Kingdom and the European Union. In April 2024 the US DOE and Japan's Ministry of Education, Culture, Sports, Science and Technology agreed to cooperate on research and the development of the supply chain for the societal deployment of fusion energy. The seal emanates from a 2013 agreement between Japan and the U.S. for research and development in science and technology (STA). The partnership will "address the scientific and technical challenges of delivering commercially viable fusion energy for various fusion systems, through activities conducted pursuant to the STA", said a joint statement April 10, 2024.

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Technology agreed to cooperate on research and the development of the supply chain for the societal deployment of fusion energy. The seal emanates from a 2013 agreement between Japan and the U.S. for research and development in science and technology (STA). The partnership will "address the scientific and technical challenges of delivering commercially viable fusion energy for various fusion systems, through activities conducted pursuant to the STA", said a joint statement April 10, 2024.

In March 2024 at a meeting of the US-EU Energy Council, Washington and Brussels agreed to explore cooperation to curb the globe's reliance on Russia in the nuclear energy supply chain. "The United States and the EU intend to intensify cooperation to reduce dependency on Russia for nuclear materials and fuel cycle services, and support ongoing efforts by affected EU Member States to diversify nuclear supplies, as appropriate", said a joint statement March 15, 2024. "The Council expressed support for multilateral efforts to identify alternative nuclear energy-related suppliers across the global nuclear supply chain for relevant countries".

Under the latest memorandum, relevant agencies are called on to be more flexible in reviewing MTCR Category I military missiles, unmanned aerial systems and space launch vehicle systems for partners that have demonstrated strong export control. The memorandum also calls for support for such technologies while excluding the transfer of complete facilities that would enable the independent production of Category I systems.

On November 8, 2023, the energy departments of the UK and the U.S. announced a cooperation agreement to accelerate the commercial deployment of fusion energy through research and development projects, supply chain development, regulatory framework harmonization and skills development. Like the U.S., the UK aims to have commercial-scale fusion power plants in the 2030s, as outlined in the UK's "Fusion Strategy". The U.S., the UK and Japan, as well as Canada and France, are parties to the Declaration to Triple Nuclear Energy, agreed by over 20 governments at COP28. Aiming for the societal deployment of advanced reactors, the declaration plans to "invite shareholders of the World Bank, international financial institutions, and regional development banks to encourage the inclusion of nuclear energy in their organizations' energy lending policies", as stated in the official text published by the US DOE December 2, 2023.

Source:https://www.rigzone.com/news/us_south_korea_finalize_agreement_on_civil_nuclear_cooperation-09-jan-2025-179259-article/, 09 January 2025.

NUCLEAR NON-PROLIFERATION

USA

White House Updates Missile Technology Non-Proliferation Policies: What is the MTCR?

The MTCR is an informal understanding among participating countries that aims to limit the export of missile delivery systems as well as all types of weapons of mass destruction, with the ultimate goal of reducing nuclear weapons proliferation, the White House said Tuesday. The MTCR was established in 1987 by the G-7 (Canada, France, Germany, Italy, Japan, the U.K. and the U.S.) but has now grown to 35 member countries.

What Updates Does the Memorandum Bring?

Under the latest memorandum, relevant agencies are called on to be more flexible in reviewing MTCR Category I military missiles, unmanned aerial systems and space launch vehicle systems for partners that have demonstrated strong export control. The memorandum also calls for support for such technologies while excluding the transfer of complete facilities that would enable the independent production of Category I systems. The memorandum goes on to underscore the fact that the MTCR is not meant to impede space programs or cooperation in such efforts, provided those programs would not contribute to the proliferation of WMD delivery systems. The memorandum also emphasizes the continuing

policy of the U.S. to oppose missile programs of concern and the distribution of dual-use technologies to parties that may divert such capabilities to programs and activities of concern. The president's memo also says that the U.S. will use the MTCR and other instruments to ensure nonproliferation, and that the country will evolve the regime so that it keeps up with advances in technology.

The Trump administration's Maximum Pressure continued during the Biden administration," he continued in an apparent reference to the huge illegal sanctions on Iran imposed by the previous Donald Trump administration in May 2018 after illegally leaving the nuclear deal known as the JCPOA. "In all these years, our position has been consistent and transparent," Takht-Ravanchi said. "We are ready to talk within the framework of the JCPOA," he said.

Source: https://executivegov.com/2025/01/mtcr-policy-update-memo-white-house/, 10 January 2025.

NUCLEAR PROLIFERATION

IRAN

Nuclear Weapons Have No Place in Iran's Doctrine: Diplomat

Majid Takht-Ravanchi has made the remarks in an interview with Italy's Radio Radicale, recently. "We are a member of the NPT" the senior Iranian diplomat said, adding that "nuclear weapons have no place in the country's defense doctrine." "Numerous reports from the IAEA show that Iran has fulfilled its commitments 100%," he also underscored.

"The Trump administration's Maximum Pressure continued during the Biden administration," he continued in an apparent reference to the huge illegal sanctions on Iran imposed by the previous Donald Trump administration in May 2018 after illegally leaving the nuclear deal known as the JCPOA. "In all these years, our position has been consistent and transparent," Takht-Ravanchi said. "We are ready to talk within the framework of the JCPOA," he said.

The deputy foreign minister also highlighted that the US is no longer a JCPOA participant. He went on to talk about the situation in Syria, saying "It is up to the Syrian people who must decide on the type of government and how to run their country." He also said about the Israeli regime's threats against Iran, "The Israeli regime knows what the consequences of any aggression against Iran will be."

Source: https://en.mehrnews.com/news/226620/Nuclear-weapons-have-no-place-in-Iran-s-doctrine-diplomat, 07 January 2025.

Iranian Regime's Expresses Readiness for Nuclear Talks

The Iranian regime's foreign minister has stated that Tehran is ready to resume nuclear talks with the West based on the "previous JCPOA formula," which, according to him, involves "building confidence in Iran's nuclear program in exchange for sanctions relief." Abbas Araqchi, speaking during a trip to China in an interview with the CCTV network, which was broadcast by Iranian media on Friday, January 3, described the JCPOA as the result of "good-faith negotiations" and called the U.S. withdrawal from the deal a "major strategic mistake."

He further emphasized that diplomatic solutions remain viable and stated that the new U.S. administration must formulate its policy, upon which Iran will make its decisions accordingly. The Iranian regime's foreign minister also highlighted the "constructive role" of China and Russia in past negotiations and called for continued cooperation. He also referenced developments over the past 10 years, reaffirming that Iran is prepared for constructive negotiations to reach a new agreement and expressed hope that diplomatic efforts would lead to a favorable outcome.

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Donald Trump, the newly elected President of the United States, repeatedly stressed during his recent election campaign that he would reinstate the "maximum pressure" policy against the Iranian regime and criticized the 2015 nuclear deal between world powers and Iran as insufficient, citing its failure to address Iran's missile program and destabilizing activities in the Middle East. During his first presidential term, Trump withdrew from the nuclear agreement, known as the JCPOA, which had been brokered under Democratic President Barack Obama. Some senior U.S. officials have expressed concerns that Iran, weakened by recent developments in the Middle East, may move toward nuclear weapons production.

Iranian Officials Threaten Nuclear Weapon Development; U.S. Considers Strike Options: Meanwhile, senior officials close to Iran's Supreme Leader and several Iranian parliament members have repeatedly threatened the West with nuclear weapon development. On Thursday, Axios reported, citing three informed sources, that Joe Biden had recently discussed military options with his national security team, including a possible strike on Iran's nuclear facilities if Tehran moves toward developing nuclear weapons.

Araqchi, speaking at a press briefing in Portugal on November 28, 2024, warned that if Western countries persist in their threats to reinstate all UN sanctions on Iran, Tehran may shift its strategy toward nuclear weapons development. However, about 10 days ago, Jake Sullivan, Biden's National Security Advisor, stated that considering regional shifts and Iran's weak standing, the Trump administration has a chance to engage diplomatically with Tehran and strike a nuclear deal to restrain Iran's long-term nuclear ambitions.

Source: https://iranfocus.com/nuclear/52977-iranian-regimes-expresses-readiness-for-nuclear-talks/, 04 January 2025.

Iran Awaits Trump's Policy on its Nuclear Program

One of the many complex foreign policy problems that Donald Trump will inherit when he takes office in just over two weeks is Iran, according to the US Council on Foreign Relations. Iran is on the threshold of becoming a nuclear power, its robust ballistic missile program continues to progress, and it sees the United States as the main obstacle to its domination of the Middle East, the Council wrote in an analysis. "How will Trump respond," it then asked, "That question is easy to answer because Trump has been consistent about his plans. He will return to his first administration's policy of "maximum pressure."

That effort sought to turn the economic screws on Iran by expanding US sanctions against it and ratcheting up the enforcement of sanctions already in place. "The goal was not regime change but rather forcing Tehran to limit its nuclear and ballistic missile programs and curb support for the regional militias that made up the so-called axis of resistance," the Council said. It added that although maximum pressure squeezed the Iranian economy, it failed to force Tehran to the bargaining table. The Council said even as its economy faltered and its foreign reserves dwindled, Iran continued its nuclear and ballistic missile programs, expanded its support for its regional proxies, and even launched a missile attack against a US base in Iraq in 2020. "Would the maximum pressure campaign have paid off had the Biden administration kept it in place? Trump thinks so," it wrote.

The Council said evidence on that score is mixed. "Israel's wars against Hamas and Hezbollah, and the fall of the Assad regime in Syria, have weakened Iran's position in the region. Its proxies are fewer and weaker than just six months ago." Beyond that, Israel's October retaliatory air strikes destroyed much of Iran's air defenses, leaving it open to further military attacks.

Nuclear Program: According to the Council, that vulnerability, coupled with Iran's economic woes and domestic unrest, may be why Iran's foreign minister said that Iran is looking to resume nuclear talks. By the same token, however, a maximum pressure strategy takes time to work. "That could be in short supply, at least when it comes to Iran's nuclear program," according to the Council. It said Iran intensified its uranium-enrichment efforts after Trump terminated the 2015 nuclear deal that the Obama administration negotiated. By most estimates, it added, Iran can now build a small number of nuclear weapons within weeks of deciding to cross the nuclear threshold.

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The Council on Foreign Relations also noted that other great powers will also undermine the maximum pressure policy. "China and Russia have both skirted or ignored existing US and multilateral sanctions on Iran. They are unlikely to comply with them now unless they get something significant from the United States in return," it said. The Council also showed that Trump may be unwilling or unable to provide that enticement. "If Tehran believes that Beijing and Moscow have its back, resistance becomes a more feasible strategy. Tehran could even use negotiations as a way to buy time to address its vulnerabilities," it added.

According to the Council, Tehran will be assessing Trump's willingness to use military force, as well as Israel's military capabilities, as it thinks about negotiations. It said Iranian leaders know he ordered the assassination of Iranian General Qasem Soleimani in 2020, spoke on the campaign trail about blowing Iran "to smithereens" and has said that Israel should hit Iran's nuclear sites. But they also know that he campaigned against America's "forever wars" in the Middle East while boasting, wrongly, that he is "the only president in seventy-two years" that "had no wars."

Negotiations in Good Faith: Even if Iran enters into negotiations in good faith, Trump's efforts could stumble over deciding what deal is good enough, the Council wrote. It said the ideological diversity of his team, composed as it is of hardliners and American Firsters, makes it likely they will argue over what Tehran needs to concede to make a deal worthwhile. That internal division could torpedo the effort to get a deal. "All of this raises the question of what happens if talks either do not begin or, perhaps more likely, go nowhere once they do," the Council noted. It said calls for the US to attack Iran's nuclear sites are likely to mount if the maximum pressure campaign does not produce quick results. "Trump will also likely hear calls that he should encourage Israel to attack Iran, though Israel lacks the capability to destroy Iran's underground nuclear facilities."

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"had no wars."

According to the Council, resorting to military force, whether with direct US action or by encouraging Israel to attack, would be a major roll of the dice. "It might succeed beyond its planners' wildest dreams and usher in a new, more peaceful era in the Middle East," it said. Or, like the invasion of Iraq, it may open a Pandora's Box of problems that will haunt the region and the United States for years to come, the Council showed. But letting Iran continue its nuclear and ballistic missile programs while it rebuilds its axis of resistance has costs of its own, it noted. Therefore, the Council said some hope that a return to the maximum pressure strategy works.

Source: https://english.aawsat.com/world/5098106-iran-awaits-trumps-policy-its-nuclear-program, 05 January 2025.

NUCLEAR SAFETY

GENERAL

IAEA Launches New Project to Strengthen Radiation Safety and Nuclear Security in Asia and the Pacific

The IAEA has launched a new Regulatory Infrastructure Development Project for Asia and the Pacific as part of its efforts to strengthen radiation safety and nuclear security in the region. Building on the success of ongoing Regulatory Infrastructure Development Projects (RIDPs) in Africa, the Caribbean and Latin America, the new RIDP for Asia and the Pacific kicked off in December 2024 with a week-long meeting in Vienna attended by 32 participants from 17 countries, including the Solomon Islands and Timor-Leste, which are not IAEA Member States. Their discussions resulted in a draft workplan which will inform the project's implementation and ensure effective and tailored support to participating countries.

"This project marks a significant milestone in our joint efforts to support the development of robust and sustainable radiation safety and nuclear security infrastructure in the region," said Lydie Evrard, IAEA Deputy Director General and Head of the Department of Nuclear Safety and Security. "The valuable experience from RIDP projects implemented in this field will help strengthen the project's objectives among stakeholders, including senior national policymakers." The main stakeholders and beneficiaries in the countries participating in this multidisciplinary project are national officials with regulatory responsibilities for radiation safety and the security of radioactive material. The attendees had the opportunity to actively engage with IAEA experts, donors and partners supporting this new RIDP.

The IAEA presented detailed examples of tools and resources available to countries interested in establishing or strengthening national regulatory infrastructure based on IAEA safety standards and nuclear security guidance. These included the IAEA Advisory Mission on Regulatory Infrastructure for Radiation Safety and Nuclear Security, which is designed to be modular and easily tailored to the country's needs; the new regulatory authority information system RAIS+ and the Integrated Nuclear Security Sustainability Plan mechanism.

During bilateral sessions, national needs related to national regulatory infrastructures for radiation safety and nuclear security of radioactive material were identified. Numerous discussions throughout the week provided opportunities to explore ways to build a culture of nuclear safety and security and to identify regional challenges and opportunities for regulators. The governments of Australia, Canada and the United States of America provide financial support to the RIDP focusing on the Asia and the Pacific region, while other countries have expressed interest in supporting the implementation of project activities such as training and workshops.

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based on IAEA safety standards and nuclear security guidance. These included the IAEA Advisory Mission on Regulatory Infrastructure for Radiation Safety and Nuclear Security, which is designed to be modular and easily tailored to the country's needs; the new regulatory authority information system RAIS+ and the Integrated Nuclear Security Sustainability Plan mechanism.

"Fiji is now more aware of available tools, networks and the different platforms to refer to for assistance," said Vakaoca Kedrayate, National Liaison Assistant and project counterpart for Fiji. "Through these, a fit-for-purpose regulatory infrastructure for Fiji will serve our objectives as it manages current and emerging challenges." She said the new RIDP was a "peer mentoring opportunity, which gives us the chance to learn from our partners' experiences, lessons and insights as we work on our regulatory infrastructures."

According to an IAEA survey in the region that achieved a 73 per cent response rate with participation by 11 countries. Almost 78 per cent of the respondents reported having fully or significantly enhanced their national regulatory infrastructure. About 67 per cent rated the support provided by the IAEA and the RIDP as 'very effective,' and 33 per cent as 'effective'. A total of 70 per cent of participating countries reported having developed or reviewed procedures for authorization, safety and security assessment, inspection and regulatory enforcement.

RIDP: A Success Story: Regulatory Infrastructure Development Projects are consistently recognized as successful, cross-cutting projects supporting countries in establishing or enhancing national regulatory infrastructure for radiation safety and the security of radioactive material. They also contribute to the United Nations sustainable development goals (SDGs), especially SDG 3 on good health and well-being, SDG 4 on quality education and SDG 9 on industry, innovation and infrastructure. In 2024, 72 countries in Africa, Latin America and the Caribbean participated in RIDPs, and an IAEA survey of participating countries confirms the positive outcomes. Specifically, in Africa, under RIDP auspices, two countries established a regulatory body; three countries adopted new regulations; 16 countries received comprehensive training for staff in their regulatory bodies; and three countries established authorization and inspection processes.

Similar impact has been recorded in Latin America, where the second phase of the project is nearing completion. According to an IAEA survey in the region that achieved a 73 per cent response rate with participation by 11 countries. Almost 78 per cent of the respondents reported having fully or significantly enhanced their national regulatory infrastructure. About 67 per cent rated the support provided by the IAEA and the RIDP as 'very effective,' and 33 per cent as 'effective'. A total of 70 per cent of participating countries reported having developed or reviewed procedures for authorization, safety and security assessment, inspection and regulatory enforcement.

Source: https://www.iaea.org/news center/ news/ iaea-launches-new-project-to-strengthen-radiation-safety-and-nuclear-security-in-asia-and-the-pacific, 06 January 2025.

UZBEKISTAN

Uzbekistan to Join International Nuclear Safety Agreements

President Shavkat Mirziyoyev has signed a decree "On Additional Measures to Improve State Control in the Field of Industrial, Radiation, and Nuclear Safety," outlining plans to join international agreements on nuclear safety, and establish new inspections within the Committee for Industrial, Radiation, and Nuclear Safety. The decree states that new industrial safety inspections have been formed within the structure of the Committee for Industrial, Radiation, and Nuclear Safety under the Cabinet of Ministers. These include the Navoi, Almalyk, Bekabad, and Railway inspections.

In particular, from July 1, 2025, penalties will be applied to legal entities for violations of industrial safety requirements at hazardous production

sites, as well as for breaches of radiation and nuclear safety regulations and requirements related to technical regulation during the operation of amusement park rides. Additionally, Uzbekistan plans to join the following international agreements: the Vienna Convention on Civil Liability for Nuclear Damage, the Convention on Assistance in the Event of a Nuclear or Radiological Emergency, the Convention on Early Notification of a Nuclear Accident, and the Convention on Nuclear Safety. In 2025, it is also expected that draft laws will be developed on "Chemical Safety," "Industrial Safety of Hazardous Production Facilities," and "Radioactive Waste Management."

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Source: https://kun.uz/en/news/2025/01/04/uzbekistan-to-join-international-nuclear-safety-agreements, 04 January 2025.

NUCLEAR SECURITY

BRAZIL

Brazil to Get Nuclear Physical Security Training Centre

A proposed centre providing training for specialists in physical protection systems for nuclear and radioactive installations and in transport operations has been selected for funding by Brazil's Funding Agency for Studies and Projects. The Nuclear Physical Security Training Centre will be housed at the Institute of Nuclear Engineering (Portuguese: Instituto de Engenharia Nuclear (IEN/CNEN)) and will be a facility, with partnerships across the country, region and with global agencies. The target is to have the centre fully operational within three years. Cristóvão Araripe Marinho, director of the institute, said: "The project foresees the installation of the most modern equipment and physical security systems, enabling practical classes to be taught, which constitutes an important differentiator."

João Régis dos Santos, head of the Radiological Safety and Protection Division, said the courses would be taught by specialists trained at international physical protection training centres, such as those in the USA, Austria and Russia, and would seek to establish partnerships across Brazil's nuclear sector, government and academia and global specialists such as the International Atomic Energy Agency, the World Institute for Nuclear Security, the US Department of Energy and Russia's Rosatom Technical Academy. He said training would be targeted at professionals working in nuclear physical security in Brazil and Latin America, including those supported by international agencies and programmes, specialists linked to the Physical Security Office, personnel working in nuclear and radiological safety and specialist response forces.

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According to the announcement from the National Nuclear Energy Commission (Comissão Nacional de Energia Nuclear, CNEN) the financing agency selected the project for support after a call for proposals for "national centres for thematic scientific and technological research infrastructure in the areas of energy transition, ecological transition, digital transformation, health and defence".

Source: https://www.world-nuclear-news.org/articles/brazil-set-for-new-nuclear-physical-security-training-centre, 09 January 2025.

JAPAN

Alleged Yakuza Leader Pleads Guilty to Trafficking Nuclear Materials

An alleged high-ranking leader of Japan's Yakuza crime syndicate has pleaded guilty in a U.S. federal court to trafficking weapons-grade nuclear material, believing it was destined for Iran's nuclear program. The case sheds light on a sprawling international smuggling operation involving drugs, weapons and radioactive materials.

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Takeshi Ebisawa, 60, entered his plea Wednesday, Jan. 8, in a Manhattan federal court, admitting to charges of nuclear and narcotics trafficking. Prosecutors said Ebisawa attempted to sell weapons-grade plutonium and uranium sourced from Myanmar to an individual he believed was an Iranian general. The "general" was, in fact, an undercover Drug Enforcement Administration (DEA) agent.

Prosecutors said Ebisawa planned to use the proceeds from the nuclear material sale to purchase military-grade weapons, including surface-to-air missiles, for insurgent groups in Myanmar. But his scheme extended beyond nuclear materials. He also conspired to traffic approximately 1,100 pounds each of heroin and methamphetamine into the United States. Additionally, he sought to launder $100,000 in drug proceeds between New York and Tokyo.

Between 2020 and 2022, Ebisawa reportedly provided photographs, Geiger counter readings and supposed laboratory analyses to verify the material's radioactivity. U.S. officials later confirmed the material was weapons-grade and suitable for constructing nuclear weapons. One of Ebisawa's co-conspirators claimed access to over 4,400 pounds of thorium-232 and more than 220 pounds of uranium in the form of U3O8, a compound commonly found in the uranium concentrate powder known as "yellowcake."

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Ebisawa's arrest in 2022 followed a DEA-led sting operation, which intercepted materials and dismantled parts of his narcotics and weapons trafficking networks. Thai authorities collaborated with U.S. agents during the operation. Additional charges were filed in 2024 after investigators uncovered the full scope of Ebisawa's criminal enterprise. His charges now include nuclear material trafficking, narcotics importation and money laundering. Ebisawa faces a mandatory minimum sentence of 10 years and up to life in prison if convicted. Sentencing is scheduled for April.

DEA Administrator Anne Milgram praised the investigation, calling it a testament to the agency's ability to dismantle some of the world's most dangerous criminal networks. "This case exposed the shocking extent of international organized crime, dealing in drugs, weapons and even nuclear materials," Milgram said. Acting U.S. Attorney Edward Y. Kim of the Southern District of New York described the plan as "brazen,"

emphasizing the catastrophic risks posed by Ebisawa's actions had the nuclear materials been sold or weaponized.

Once a dominant force in international crime, the Yakuza has seen its membership shrink to about one-third of its size two decades ago, according to Japan's National Police Agency. Strict anti-organized crime laws in Japan have limited the group's ability to operate openly and financially, forcing members to adapt.

Source: https://san.com/cc/alleged-yakuza-leader-pleads-guilty-to-trafficking-nuclear-materials/, 10 January 2025.

URANIUM PRODUCTION

CANADA

Canada Set to Lead Global Uranium Production Amid Rising Demand

As global demand for nuclear power continues to rise in response to climate change goals and geopolitical tensions disrupt supply chains, Canada is positioning itself to become the world's largest uranium producer. The surge in uranium prices—triggered by a boom in emissions-free nuclear energy—has prompted Canadian companies to ramp up production, setting the stage for a significant shift in the global uranium market. Cameco, Canada's largest uranium producer, has introduced plans to increase production by nearly a third in 2024, reaching 37 million pounds at its mines in northern Saskatchewan. Along with new expansions from companies such as Denison Mines, Orano Canada, Paladin Energy, and NexGen Energy, the nation's production could potentially double by 2035, according to media reports.

Jonathan Wilkinson, Canada's Energy and Natural Resources Minister, highlighted that the country's uranium sector is seeing its highest levels of investment in over two decades. Spending on exploration and deposit appraisal surged by 90 per cent to USD160 million in 2022 and increased another 26 per cent in 2023. "Canada is the only G7 country able to supply uranium to fuel reactors across the globe, and we export over 80 per cent of our production," Wilkinson stated, reaffirming the nation's leadership in the global uranium market. The industry's expansion follows a dramatic shift in uranium prices, which spiked above USD 100 per pound in January 2024—levels not seen since 2008. Despite recent declines to USD 73 per pound, prices remain significantly higher than the decade-long average of below USD 50 per pound.

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Once the world's top producer of uranium, Canada's output fell after the Fukushima disaster in 2010, leading to a global reduction in nuclear power and a subsequent decline in uranium prices. During this period, Kazakhstan overtook Canada to become the largest global producer, holding 43 per cent of the market by 2022, while Canada produced 15 per cent of the world's supply.

Source: https://www.businessworld.in/article/canada-set-to-lead-global-uranium-production-amid-rising-demand-544122, 07 January 2025.

NUCLEAR WASTE-MANAGEMENT

EGYPT

Egypt Advances Nuclear Program with Permit for Spent Fuel Storage

Egypt's Nuclear Power Plants Authority has secured a permit to construct a spent atomic fuel storage facility at the El-Dabaa power plant, located approximately 320 km northwest of Cairo. The NPPA plans to begin the construction of the facility in 2025. This storage solution will provide safe, dry, and scientifically advanced containment for spent nuclear fuel, with the capacity to store waste for up to 100 years, all while adhering to

the highest standards of safety and environmental protection.

El-Dabaa, Egypt's first nuclear power plant and the country's largest energy project in decades, is being developed in collaboration with Russia's Rosatom. The plant will house four VVER-1200 reactors, the same type as those in operation at Russia's Leningrad and Novovoronezh plants, as well as Belarus's Ostrovets. In a statement issued by the NPPA, Amjad El-Wakeel, chairman of the authority, highlighted the achievement as a significant milestone in Egypt's nuclear program. "The authority has successfully secured the permit for the construction of the spent nuclear fuel storage facility at El-Dabaa, aligning with the project's implementation timeline," the statement read.

Egypt's Nuclear Power Plants Authority has secured a permit to construct a spent atomic fuel storage facility at the El-Dabaa power plant, located approximately 320 km northwest of Cairo. The NPPA plans to begin the construction of the facility in 2025. This storage solution will provide safe, dry, and scientifically advanced containment for spent nuclear fuel, with the capacity to store waste for up to 100 years, all while adhering to the highest standards of safety and environmental protection.

The NPPA formally submitted the permit request to Egypt's Nuclear and Radiological Regulatory Authority on June 12, 2024, accompanied by comprehensive design and technical documentation reviewed by nuclear specialists. Following a series of productive technical meetings between NPPA and NRRA experts, the permit was granted during NRRA's seventh session on Dec. 31, 2024. The decision came after a successful site inspection by NRRA representatives, who visited the El-Dabaa plant from Dec.1 to 5, 2024, to assess the site's readiness for construction.

The El-Dabaa nuclear project, which has been in the planning stages since 1954, received formal approval in 1983 and was publicly announced in 2007. Following approval from the International Atomic Energy Agency in 2010, Egypt finalized agreements with Russia in 2015. Contracts came into effect in December 2017, and construction officially commenced in July 2022.

This development highlights Egypt's commitment to advancing its nuclear energy program in line with both national priorities and international safety standards, the statement further noted. Located in the Matrouh governorate along the Mediterranean coast, 250 km west of Alexandria, the El-Dabaa site offers numerous strategic advantages, including access to rail and road networks, low seismic activity, and an abundant supply of cooling water. The El-Dabaa nuclear project, which has been in the planning stages since 1954, received formal approval in 1983 and was publicly announced in 2007. Following approval from the International Atomic Energy Agency in 2010, Egypt finalized agreements with Russia in 2015. Contracts came into effect in December 2017, and construction officially commenced in July 2022.

Source: https://www.arabnews.com/node/2585294/business-economy, 05 January 2025.

USA

Department of Energy Expert Reveals Game-Changing Mission to Safely Neutralize Dangerous Substance Found in Nuclear Reactors

A nuclear safety expert from the Department of Energy revealed a groundbreaking innovation that could make nuclear waste management safer, transforming how countries such as Kazakhstan handle radioactive substances, Tech Xplore reported. Developed by nuclear nonproliferation specialist Kris Gaines and his team at the DOE's Oak Ridge National Laboratory, the technology provides a safe, cost-effective way to neutralize highly enriched uranium that powers certain nuclear reactors. By turning this hazardous material into a safer form for long-term storage, the breakthrough marks a step toward making nuclear

energy a viable, low-risk source of clean energy.

HEU poses significant risks once it's no longer usable. After the fuel is "spent," the remaining waste stays highly radioactive and can be dangerous if not properly managed. Mismanagement of nuclear waste can lead to harmful radiation leaks that can contaminate soil, water, and air, hurting wildlife and increasing the likelihood of developing cancer. The material could also pose a serious national security risk if it falls into the wrong hands. Additionally, not all nuclear reactors are built to safely handle nuclear waste. Traditional methods of disposal often require melting the material. But for reactors such as Kazakhstan's Impulse Graphite Reactor, this isn't an option. That's because the IGR uses a type of fuel that resists melting, complicating efforts to safely handle the nuclear waste, per Tech Xplore.

The process involves grinding the spent fuel into fine particles, mixing it with less potent uranium to drastically reduce its danger level, and encasing it in concrete-filled drums. As a result, the material is neutralized and cannot be recovered for future misuse. This breakthrough is significant because it provides a solution to a waste challenge that has puzzled experts for years. By neutralizing radioactive waste, nuclear energy can be produced in a safer way, preventing radiation from leaking into the environment and protecting drinking water, ecosystems, and human health.

To address this issue, Gaines and his collaborators from the National Nuclear Security Administration, the International Atomic Energy Agency, Idaho National Laboratory, and Kazakhstan's National Nuclear Center developed a unique technique. The process involves grinding the spent fuel into fine particles, mixing it with less potent uranium to drastically reduce its danger level, and encasing it in concrete-filled drums. As a result, the material is neutralized and cannot be recovered for future misuse. This breakthrough is significant because it provides a solution to a waste challenge that has puzzled experts for years. By neutralizing radioactive waste, nuclear energy can be produced in a safer way, preventing radiation from leaking into the environment and protecting drinking water, ecosystems, and human health.

Source: https://www.thecooldown.com/green-tech/doe-nuclear-waste-management-technology/, 08 January 2025.

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 Vice Marshal Anil Golani (Retd).

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