



Global Technical Training Services, Inc. Newsletter



The State of the Industry

Sid Crouch, GTTSi Chief Technical Consultant

For years, the power sector has warned about transformer supply chain issues along with an aging transformer fleet. Since COVID, supply chain issues have accelerated, and our transformers aren't getting any younger. The industry is now faced with transformer lead times of 115 to 130 weeks, or more than 2 years. It's worse for larger transformers (substation power transformers and generator step-up transformers) - 120 to 210 weeks, or 2 to 4 years. NREL (National Renewable Energy Laboratory) says the nation's current stock of distribution transformers needs to increase by 160% to 260%, most prominently due to increased severity and frequency of extreme weather events. The largest U.S.-owned transformer manufacturer in North America attributes the market gap to demand caused by bitcoin mining and AI. EPRI (Electric Power Research Institute) warns that the changing duty cycles, caused by the integration of renewables, could shorten transformers life, or result in capacity de-ratings, further straining grid capacity. Future transformers will need to have larger capacities - the smaller 10 or 15kVA will be replaced with a minimum 25kVA. Pole-mount transformers will be replaced with pad-mount transformers due to undergrounding for storm and wildfire issues. In areas subject to flooding, the demand will increase for submersible and corrosion-resistant transformers. Today, as much as 25% of all global renewable projects are at risk of delay due to transformer lead times. Costs have also risen 60% to 80% on average since January 2020 due to the increased cost for raw material like copper.

I welcome your comments or questions - sid.crouch@gttsi.com

Highlights

**WORLD'S YOUTH
ADVOCATING FOR
NUCLEAR**

**FORT GREELY'S SM-1A
IN FINAL STAGES**

**NOVA EXPLOSION IN A
GALAXY FAR, FAR AWAY**

**CENTRUS AND THEIR
RUSSIA SUPPLIER**

DID YOU KNOW?

GTTSi Job Board Update



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THE WORLD'S YOUTH IS ADVOCATING FOR NUCLEAR

People oppose nuclear power for a variety of reasons often stemming from concerns about safety, environmental impact, and economic factors. High-profile nuclear accidents such as Chernobyl, Three Mile Island, and Fukushima have raised significant concerns about the potential for catastrophic accidents and their long-lasting effects on health and the environment. Even though radiation from nuclear plants and the waste they generate is well-controlled, the perception of risk remains. In addition, the costs of building nuclear power plants is high, and decommissioning old plants adds to the financial burden. Media highlight the risks and cost associated with nuclear power, influencing public opinion against it.

These concerns highlight the complexity of the nuclear power debate-how to balance the benefits of a nearly zero carbon energy source with the potential risks it poses. Now the world's youth are participating in the debate. Several organizations led by or involving young people are actively advocating for nuclear energy, educating the public, and influencing policy.

North American Young Generation in Nuclear (NAYGN) is an organization that supports young professionals in the nuclear industry. They provide networking, professional development, and public outreach to promote nuclear science and technology.

Stand Up for Nuclear is a global initiative that

organizes events to raise awareness about the benefits of nuclear energy. It involves young advocates who are passionate about climate change and promoting clean energy.

WePlanet (photo credit for below) is a grassroots organization whose mission is described as saving the planet with data-backed science and defending nuclear energy. Their membership, call WePlanetees, includes many young advocates.

Generation Atomic is an organization that empowers young people to advocate for nuclear energy. They use innovative approaches, including music and technology, to engage the public and policymakers.

The International Youth Nuclear Congress (IYNC) is an international organization that connects young nuclear professionals and students. They organize conferences and workshops to foster knowledge exchange and collaboration in the nuclear field.

Nuclear Pride Coalition consists of several pro-nuclear organizations, including those led by young advocates. They work together to create a positive narrative around nuclear energy and how it combats climate change.

Young Generation Network (YGN) within the European Nuclear Society (ENS) is a network for young professionals in the European nuclear industry. *Continued*



They organize events, provide training, and facilitate knowledge sharing to promote nuclear energy across Europe.

Young people advocating for nuclear is even happening a few towns over from GTTSi HQ in South Carolina. Rorey Laps, a recent graduate of Greenville Classical Academy in Greenville, SC, just completed his Senior Capstone Project, which makes the argument for nuclear power and is entitled ***Fearing the Solution***. As described by Dr. Russell Freeman, Dean of Curriculum and Instruction, “Senior Capstone at Greenville Classical Academy is designed to prepare students to articulate a clear, thoughtful, and relevant thesis and to defend that thesis in front of the greater school community. Students take what they have learned about truth, research, evidence, and persuasion to make their own case based on their own ideas and concerns.” Other topics have included ***Is Human Gene Editing Ethical?*** and ***Purge the Poison: Combating Judicial Corruption***.


While Rorey’s project was in total fourteen pages, presented here is an excerpt of the final conclusions in his verbal argument.

We have explored nuclear energy and how it is the best viable replacement for other power plants. Nuclear power plants can produce the needed electricity, competing with the highest energy plants. While they can be expensive, taking ten years to become profitable, more advancements are being made every year that can cut costs and lower construction times. Advancements like modular nuclear power plants can standardize power plants to become even more profitable. Nuclear energy’s supporting factor is that it is one of the cleanest forms of generating electricity. Due to a closed fuel cycle, no pollutants are released during its operation, and new plants are reducing nuclear waste exponentially. Even then, nuclear waste is stored in safe underground facilities. Nuclear power has gained a bad reputation from past



Dr. Russell Freeman, Dean of Curriculum and Instruction, Greenville Classical and Rorey Laps, Recent Graduate, Presenting “Fearing the Solution”

events like Chernobyl and Fukushima. But due to these events, nuclear power plants have become some of the safest machines on the planet, with countless safety systems preventing an event like Chernobyl from ever happening again. This causes the number of people hurt by nuclear power plants to be vastly lower than any other high-energy sources such as coal and natural gas, but people still listen to their irrational fears...

...The challenge now is taking the next step towards a better future. Our culture has viewed nuclear energy as dangerous, mostly due to TV and movies. Whenever someone hears about a nuclear power plant being built, they already have a bad view of it. This causes people to protest the construction of nuclear power plants and to advocate for the decommissioning of current ones. But this only adds to the problem, limiting the amount of energy we have. People need to learn more about nuclear power plants and advocate for their construction. It is important that nuclear power can be used to its full potential so it can help people. We need to encourage more advancement in nuclear technologies, so even small countries can get clean energy. To end pollution, we must break away from our fears of nuclear power to make a better world for future generations. 

FIFTY YEARS AFTER SHUTDOWN, FORT GREELY, ALASKA SM-1A NUCLEAR PLANT BEING DISMANTLED

In October 2023, the Baltimore District U.S. Army Corps of Engineers announced their decision to begin the decommissioning and dismantlement of the SM-1A former nuclear power plant, located at Fort Greely, Alaska.

This year, just over 50 years after its final shutdown in 1972 and following the removal of the radioactive reactor components last year, the building that housed the reactor and vapor containment structure will be dismantled.

Program Manager Brenda Barber said the original plan was to erect a large weatherproof enclosure over the structure to facilitate working year-round, but that raised concerns about potential earthquake, snow, and wind damage, “and whether or not that weather enclosure would stay stable on top of those conexes during some of the severe weather that occur...”

That led the Corps’ team to reconsider how to cover the plant with the enclosure and the vapor containment structure that towers over the facility. Now the plan is to eliminate some of the height concerns this summer, especially with the vapor containment structure, and remove an old Quonset Hut that sits next to the plant. This will allow the tent to completely encompass the site and allow the demolition work to continue through the winter.

Ms. Barber said the Corps needs approval from the Army Reactor Office before work under the new schedule can begin. If they get the go-ahead, demolition will start this summer with trucks hauling away debris starting in the fall. These trucks will be carrying what is called an intermodal container, similar in size and look to a Sea Land container typically seen on a barge. Re-sequencing of the work, however,




Photo Credit U.S. Army Corps of Engineers

requires changes that were not originally scheduled for this summer and fall, such as the asbestos removal this year. Therefore, both demolition waste and asbestos removal will occur this August and be monitored by the Army Corps of Engineers. The debris being removed will be metal and wood-basically construction debris, but the other materials removed will be classified as low-level radioactive waste.

An average of two trucks per week will transport containers to Fairbanks, where they’ll be transferred to Alaska Railroad cars for delivery to Anchorage or Whittier, Alaska. From there, they’ll be barged to Seattle, then railroaded to a hazardous waste facility in Texas.

Barber says the re-sequencing of work should enable the Corps to complete the dismantling and decommissioning of the power plant by the end of 2029.

She says the agency will hold public meetings on the new schedule in July or August to let the public know about the new plan for dismantling the old SM-1A. 

ONCE-IN-A-LIFETIME NOVA EXPLOSION TO OCCUR IN SEPTEMBER

In September, a once in a lifetime nova explosion will occur in a galaxy far, far away... 3000 light-years away to be specific. It is expected to light up our night sky and be visible with the naked eye.

A nova explosion is a powerful stellar event that occurs in a binary star system when a white dwarf and a red giant star interact. The white dwarf is an incredibly dense remnant of a larger star that has exhausted its nuclear fuel. It is about the size of Earth but has more mass than our Sun. The red giant star is in the final years of its existence and is slowly being stripped of its hydrogen due to the gravitational pull of the white dwarf star.

This process is called “star cannibalism” and it results in a tremendous buildup of pressure and heat, which eventually causes a thermonuclear explosion. This explosion does not destroy the stars and so this “nova explosion event” can occur many times with the interval between events capable of lasting hundreds or thousands of years. This nova explosion event

seems to occur about every 80 years – thus a once in a lifetime event. Astronomers believe this same event was observed in December 1787 and October 1217.

Although this nova explosion will blast away star matter in a blinding light, it will not look like the star explosion that you may have seen in the movies. Instead, to the naked eye, it will look like a new star has appeared in the sky. People with high-powered telescopes will be able to see the nova's brightly colored luminosity in some detail.

It will be visible for several days in the area called the Northern Crown, which is a horse-shoe shaped curve of stars west of the Hercules constellation. To find the Northern Crown, locate the two brightest stars (Arcturus and Vega) in the Northern Hemisphere. Tracing a line between these two stars will lead you to the Northern Crown.

Exactly when this nova explosion will occur is unknown, but all signs point to sometime in September. 🌍



CENTRUS GRANTED WAIVER FOR RUSSIAN URANIUM THROUGH 2025

Centrus Energy Corp, formerly known as USEC Inc. (United States Enrichment Corporation), supplies nuclear fuel and services for the nuclear power industry. The company was originally created in 1992 as part of the U.S. government's efforts to privatize its uranium enrichment operations. It was rebranded as Centrus Energy Corp. in 2014 after emerging from bankruptcy.

An article in the September 2023 GTTSi Newsletter described how Centrus Energy had received approval to produce high-assay low-enriched uranium (HALEU) fuel for the next generation reactors. On October 11, 2023, Centrus Energy announced that they had begun enrichment operations, and on November 7, 2023, they announced their first delivery of 20 kilograms of HALEU fuel.

Centrus Energy also provides low-enriched uranium (LEU) fuel to utilities in the United States and around the world using supplies they purchase from other primary and secondary suppliers. In fact, they recently revealed in their 1st Quarter 2024 Report that they had signed ~\$900 million in contingent sale commitments for LEU fuel. But now, Centrus Energy has a new challenge, and it's not a technical one.

Centrus Energy has a supply problem in that one of their suppliers is Russia, and on April 30, 2024, the Senate passed the Prohibiting Russian Uranium Imports Act (**HR 1042**), which bans uranium imports from Russia. The bill was passed by unanimous consent in response to Russia's February 2022 invasion of Ukraine. **HR 1042** becomes effective July 30, 2024.



Centrus Energy has a long-term supply agreement with TENEX, the commercial subsidiary of Russia's State Atomic Energy Corporation (ROSATOM). This agreement allows Centrus to purchase LEU from Russia, then sell it to utilities in the United States and other countries for use as nuclear fuel. The relationship with TENEX has been an essential part of Centrus Energy's supply chain. For several years, Centrus has bought an annual quantity of Russian LEU under the quota limit established in the *Suspension Agreement on Uranium* from the Russian Federation. This agreement was amended in 2020 and will not expire until 2040 at the earliest.

Thankfully for Centrus, **HR 1042** included a provision that allow waivers through 2027, especially if the waiver serves national interest. Centrus Energy requested the waiver and the DOE recently announced that it was granted for Centrus Energy to import Russian-enriched uranium this year and next year for existing contracts.

Vice President for Corporate Communications Dan Leistokow stated, "Centrus and others in the industry are working to build new capacity, but that will take a few years and there is broad agreement that the U.S. faces a shortage of enrichment in the meantime. That is precisely why the waiver process was created." 

DID YOU KNOW?



Today there are 440 nuclear power reactors operating in 33 countries, with a combined capacity of ~390 GWe (gigawatts electric) or 10% of the world's electricity. The US has the most operating reactors – 93 spread across 30 states with a total capacity of 91.5 GWe. Over the past two decades, 104 nuclear reactors have been placed into service and 102 have been shut down worldwide. While no SMRs (small modular reactors) are operational, several are under construction including TerraPower's Sodium reactor design, which has broken ground at its site in Kemmerer, Wyoming, USA. Since 2019, there have been 35 nuclear plants under construction. China accounts for 22, the US with 2 (Vogtle 3&4), and the remaining in Russia. Nuclear power advocates claim that these plants can operate for 80 to 100 years. To date, only 16 have operated for 40 or more years and none have achieved 60 years of operation.

A neutron source, typically used during initial reactor startups for LWR (light water reactors), is going into space with Europe's first Mars rover named Rosalind Franklin. Ms. Franklin was a British chemist and X-ray crystallographer, whose research in the 1950s was an essential contribution to the understanding of the double-helix structure of DNA. This will be the first time Americium-241 has been used on a space mission. Am-241 will be used in the lightweight radioisotope heater units to keep the rover's components warm but will not be used to provide electric power.

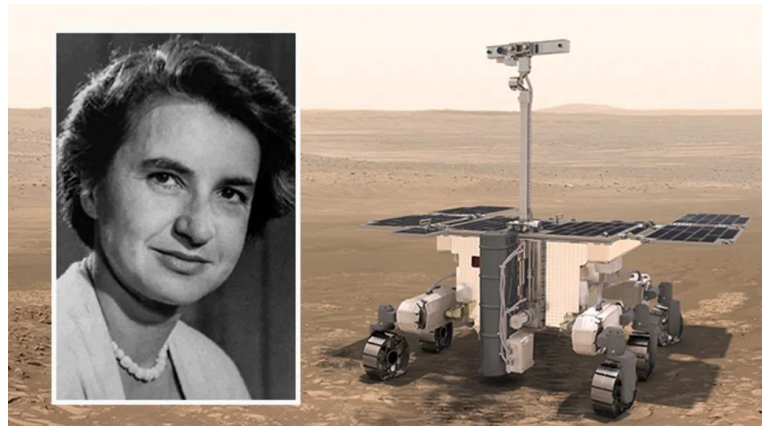


Photo Credit: Getty Images



Photo Credit: The Silent Forgotten

Plant Vogtle is named for Alvin W. Vogtle Jr., past Chairman of the Board for Southern Company. He was a leader not only for Southern Company from the 1960s to 1980s, but a leader with the electrical utilities during that same timeframe. He was WWII veteran, a POW (captured by the Germans) and during his 26 months of confinement, he tried to escape on six occasions, scaling a 15-foot-high barbed-wire fence and crossing the Rhine River to Switzerland, finally achieving freedom on his final attempt. Plant Vogtle Units 3&4 were named POWER's "Plant of the Year." This project faced many challenges in licensing and constructing the first new nuclear plants in the U.S. in more than three decades. The biggest challenge was the construction infrastructure which had deteriorated during the 80s and 90s to the point it had to be rebuilt. Supply chains had to be re-established and workers trained in nuclear-quality control and assurance for new plant construction - far more precise and exacting than typical industrial work.

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GTTSi Job Board

GTTSi has been providing professional services to the energy and nuclear industry since 1980. We are an MWBE (*minority woman-owned business enterprise*) and have served over 80% of the US commercial nuclear facilities, 8 Federal agencies and prime contractors, and one foreign government. If you are qualified and interested in any of the job opportunities listed below, please contact us at ginfo@gttsi.com or call **864.882.3111**.



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