

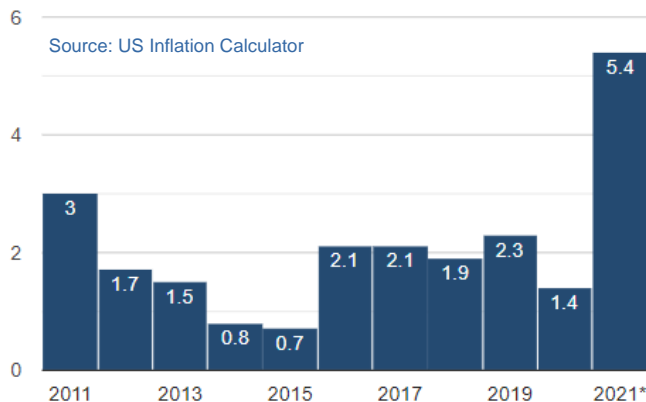
The Long Reach of COVID

While we would love to say that the COVID-19 pandemic is now fully in the rearview mirror, the unfortunate reality is that the pandemic continues to play a major role in shaping today's world. While uranium mines are no longer shut down due to COVID, the pandemic is currently having myriad other impacts on the nuclear fuel supply chain.

Inflation – Inflation has been accelerating since the beginning of this year, and much of this can be tied to very loose monetary policies by central banks and heavy stimulus spending by governments, both of which were in response to the negative economic effects of the pandemic. Supply chain and labor constraints have added to these inflationary pressures. As a result, suppliers around the world are having to adapt to a new environment where input costs are rising. The U.S. inflation rate for 2021 will not be known for a few more months, but it will clearly be higher than the ~2% average over the past decade. Similar higher-than-normal inflation rates are reported in Europe, Canada, and elsewhere.

So far, inflation has yet to directly translate into higher market prices for uranium or other nuclear fuel components, but we are starting to hear about rising prices in existing contracts that are linked to inflation escalators. For example, from July 2020 to July 2021, the U.S. Gross Domestic Product - Implicit Price Deflator (GDP-IPD) rose 4.5%. Since many base-escalated contracts in the nuclear industry are tied to the GDP-IPD, we expect to see utilities paying higher prices under some existing contracts due to faster escalation rates. While some long-term contracts include limits on annual escalation, we do not believe utilities are fully hedged against the potential higher cost impacts from faster inflation.

Chart: United States Annual Inflation Rates (2011 to 2021)



Ux Price Indicators [Click for Market Page](#)

Weekly Ux U₃O₈ Prices (11/8/21)

Ux U ₃ O ₈ Price [®]	\$44.00 (+\$1.25)	CMC [Cameco]	\$44.00
Ux U ₃ O ₈ 3-Yr Price	\$44.00 (+\$1.00)	CVD [ConverDyn]	\$44.00
Ux U ₃ O ₈ 5-Yr Price	\$45.00 (+\$1.00)	ORO [Orano]	\$44.00

Month-End Ux Prices (10/25/21)

U ₃ O ₈	Ux U ₃ O ₈ Price [®]	\$47.40	Conversion	NA Spot	\$15.75
	CMC	\$47.50		NA Term	\$18.00
	CVD	\$47.25		EU Spot	\$15.75
	ORO	\$47.25		EU Term	\$18.00
	Spot MAP*	\$43.23		NA Price	\$137.50
SWU	3-Yr Forward	\$47.00	U ₆ F ₆ Spot	NA Value*	\$139.60
	5-Yr Forward	\$48.00		EU Value*	\$139.60
	Long-Term	\$41.00		EUP	NA Spot*
Spot	\$56.00	NA Term*	\$1,653		
	Long-Term	\$60.00			* Calculated values

Top Stories

- Thanks to a slightly stronger bid tone in the spot market over the past week, price rose to \$44 (see page 13).
- Fuel loading has begun on CNNC's second HPR-1000 at Fuqing 6 (see page 3).
- The U.S. Congress passed a major infrastructure bill that includes support for nuclear energy (see page 7).
- Sprott is taking over the URNM uranium equity ETF that trades on the NYSE (see page 11).

At the same time, producers are also experiencing negative impacts from inflation. While COVID has already made operations more complicated for many miners and fuel cycle plant operators, further cost increases are likely to stem from rising input costs. There is unlikely to be any producer that is immune to these rising costs, but the extent to which it will alter profitability remains hard to gauge. Obviously, the longer and faster inflation rises, the more likely that producers will pass more of these higher costs onto their customers.

Supply Chain Disruptions – Another spillover from COVID is the ongoing mess in the global supply chain. When COVID hit in early 2020, many manufacturers apparently delayed making new shipments of goods, especially internationally, as ports and transport hubs were operating at lower capacities. When the global economy started to rebound in late 2020 and even more so in early 2021, shipments began to increase dramatically. This created a huge backlog in the global transportation network as key ports and hubs

were overburdened. These bottlenecks have recently intensified further, and thus supplies of all kinds of goods are not arriving to their final destinations on time. On top of that, the backlog in shipping and lower capacities due to fewer truck drivers and container/rail car shortages have made shipment costs rise further, which adds to the inflationary factors previously discussed.

For the nuclear fuel industry, supply chain disruptions have already translated into several notable production shortfalls. As announced over the past week, both Cameco and Kazatomprom have been affected. In Cameco's case, the company's supplier of hydrogen, which is a key input for the operations at the Port Hope conversion plant, was unable to make a delivery to Cameco due to its own supply chain disruption. As a result of the lack of hydrogen, Cameco has reduced its output of fuel services (both UO_2 and UF_6) by roughly 1.0 million kgU this year. For Kazatomprom, the supply chain issues have been a bit more widespread as the company reported "limited access to certain key operating materials and equipment (production reagents, certain types of pipes and pumps, specialized equipment, drilling rigs)." The impact on Kazatomprom's total annual U_3O_8 production is forecast to be roughly 800 tU (~2.1 million pounds). In both cases, the companies have assured customers that they have sufficient inventories and other sources of supply to make good on delivery commitments, but it is clear that supply chain problems are having a measurable effect on nuclear fuel production.

Transportation Issues – As we have already mentioned, there are many bottlenecks in the global transport system at this time, but nothing is more acute than in international ocean freight. Major ports, including LA, Savannah, Rotterdam, Shanghai, and Hong Kong, are currently seeing delays of upwards of a week in some cases. While these delays are having an impact on the ocean freight costs, there are other important implications as well.

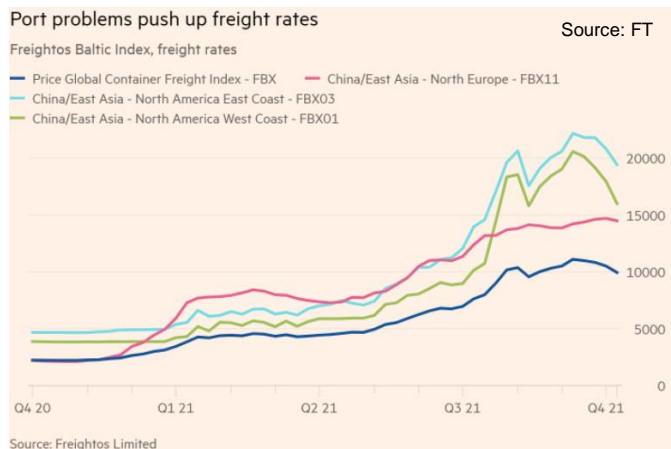
Since the nuclear fuel industry ships much of its semi-finished and finished products by sea, the problems in the ocean cargo industry are starting to show up here as well. Anecdotally, we are hearing that there are now discussions by nuclear transporters to see if any shipments can be diverted from ship



to air, as the silver lining of COVID has been that more unused airplanes are now becoming available for cargo. However, as is well known, shipments of Class 7 radioactive materials are highly complex, and air cargo is usually not an easy or cost-effective option. Ultimately, we have yet to see any deliveries of U_3O_8 , UF_6 , EUP, or finished fuel assemblies be delayed significantly due to the headaches confronting the global logistics industry, but this is a risk that must be factored in, at least for the near-term. Moreover, rising transport costs will likely be borne by suppliers and customers alike.

Human Resource Constraints – As an easily transmissible illness, COVID-19 obviously affected the way companies manage their workforces. For those blessed to hold desk jobs, the transition to remote work meant that most operations could continue relatively seamlessly. However, workers in plants, mines, and other production facilities, as well as those involved in the transportation industry have had to find ways to conduct their jobs while balancing new safety measures to prevent the spread of the illness. Vaccines and other measures have clearly helped tremendously, but there is no avoiding that hands-on work is now more complicated than before the pandemic. Due to these factors and others, there has also been a reduction in workers willing or able to do the jobs they used to perform. Finding new workers has also been difficult in many areas. Thus, while demand is rising, the supply of skilled workers is not keeping pace. This issue could also affect nuclear fuel suppliers, especially if they look to ramp up operations (e.g., Honeywell's Metropolis restart) and also raise overall operating costs as a labor shortage usually results in higher wages to attract and retain workers.

Conclusions – When we first wrote about COVID-19 last year, we noted the eerie parallel with Fukushima as the date March 11 was when both the earthquake happened in 2011 and the WHO officially announced a global pandemic in 2020. While the ramifications of Fukushima were around for many years after the accident, it remains difficult to predict how long COVID's reach will resonate in our industry. However, we are now nearly two years into the pandemic, and it is clearly still affecting many aspects of our industry. Ultimately, what we are seeing is that risks within the supply chain are increasing and costs are also rising. Given that the nuclear fuel fundamentals have already been tightening and are leading to higher market prices, these added impacts from COVID are undoubtedly going to push things up even more.



News Briefs

Nuclear Power

CNNC loads fuel at Fuqing 6 in China

On November 8, China National Nuclear Corp. (CNNC) reported it began loading the first of more than 170 fuel assemblies into the reactor vessel of Unit 6 of the Fuqing nuclear power plant located in Fujian Province, China. The fuel loading milestone officially moves the Fuqing 6 HPR-1000 (Hualong One) into the commissioning stage and marks an important step toward reaching initial criticality in the coming weeks. The latest milestone at Fuqing 6 occurs approximately 10 months after CNNC placed the world's first Hualong One into commercial operation at the co-located Fuqing 5 in late January (*UxW35-05*).

The Fuqing nuclear power plant is located on the coast of Xinghua Bay, China. The plant's last reactor, Fuqing 6, remains on track to receive its final operating license and begin commercial operations in the first part of 2022. The reactor started construction in 2015.



Fuqing 6 Fuel Loading
Source: CNNC

CNNC completes steam turbine island concrete works at Zhangzhou 1 in China

China National Nuclear Corp. (CNNC) reported November 3 that it successfully poured the operating layer concrete platform for the conventional steam island turbine at Unit 1 of the Zhangzhou nuclear power plant in Fujian Province, China. CNNC said it took crews nearly 29 hours to pour 2,522 cubic meters to form the HPR-1000 (Hualong One) turbine island operating level, which includes several beams set atop 74 sets of spring isolators to support the eventual installation of the plant's turbine generator systems. The company noted the latest milestone marks one of the "most important mass concrete pouring" events since the company poured the reactor's first safety-related concrete in 2019 (*UxW33-42*). Moreover, the milestone sets the stage for the installation of the turbine island's core equipment including the condenser and steam turbine generator.

The Zhangzhou nuclear power plant is expected to eventually host six HPR-1000 reactors. Construction work at

Industry Calendar

- November 7-9, 2021
International Uranium Fuel Seminar
NEI
<https://www.nei.org/Conferences/>
Savannah, GA, USA
- November 30-December 4, 2021
2021 ANS Winter Meeting and Technology Expo
American Nuclear Society
<https://www.ans.org/meetings/wm2021/>
Washington Hilton, Washington, D.C.
- November 30-December 2, 2021
WNE – World Nuclear Exhibition 2021
Reed Expositions
<http://www.world-nuclear-exhibition.com/>
Paris-Nord Villepinte Exhibition Centre, Paris, France
- June 27-30, 2022
UxC Nuclear Fuel Training Seminar – Atlanta
UxC
https://www.uxc.com/p/products/uxc_seminar.aspx
InterContinental Buckhead, Atlanta, GA, USA

Details are available at:
<https://www.uxc.com/c/data-industry/Calendar.aspx>

Zhangzhou 1 began in October 2019, and CNNC expects to commence operation in June 2024. Meanwhile, Zhangzhou 2, which began construction in September 2020, is expected to be completed in April 2025. Additional reactors at the site are expected to begin construction in the coming years.

ENEC's Barakah 3 construction completed

Emirates Nuclear Energy Corporation (ENEC) reported November 4 it successfully completed construction on Unit 3 of the Barakah nuclear power plant located in the Al Dhafra region of Abu Dhabi, UAE. Following construction completion, the APR-1400 PWR Barakah 3 has been handed over for operational readiness activities. ENEC stated that the unit is on track to start up and deliver clean electricity in 2023, joining the operating Barakah 1 and the co-located Barakah 2, which was connected to the UAE's national grid this year and is now undergoing power ascension testing.

Barakah 3 has already successfully completed a raft of individual and combined system tests, including Cold Hydrostatic Testing (CHT), the Structural Integrity Test (SIT), and Integrated Leak Rate Test (ILRT), and the Hot Functional Test as part of the first phase of its Initial Testing Program (ITP). The ITP aims to ensure that the PWR's systems operate in accordance with the highest industry standards. ENEC said that Barakah 3 will now shift to complete operational readiness preparations, testing, regulatory inspections, and international assessments required to obtain the Operating License from the UAE's independent nuclear regulator, the Federal Authority for Nuclear Regulation (FANR). The regulator is currently carrying out detailed inspections and reviews of all aspects of the plant prior to granting the plant's Operating License. ENEC noted that unit will also undergo a series of assessments led by independent international nuclear energy experts from the World Association of Nuclear Operators (WANO).

The Barakah nuclear power plant consists of four APR-1400 PWRs constructed with South Korea's KEPCO. The plan started construction in 2012 and has progressed steadily ever since and is now more than 96% complete. When fully operational, the plant will produce 5.6 GWe of carbon-free electricity for more than 60 years to come.

EDF presents progress report on Excell Plan

On November 8, France's EDF and French industrial organization GIFEN presented a second progress report on the Excell Plan, which is designed to align France's nuclear industry "with the highest standards of diligence, quality and excellence required for the successful completion of nuclear projects." The Plan was unveiled in December 2019 (*UxW33-50*) following an audit in October 2019 by Finance Minister Bruno Le Maire on EDF's construction of the Flamanville 3 EPR in France. The company's Excell Plan focuses on three major objectives: 1) enhancing manufacturing quality; 2) boosting skills; and 3) tighter governance of nuclear projects. In its latest update, EDF announced that 22 of the 25 commitments in the Plan have reached or even exceeded established targets. The company said that the governance of nuclear projects has been bolstered by the implementation of the Control of Major Projects initiative, which subjects each nuclear project initiated to quarterly reviews by EDF's Chairman. Concerning the directive to enhance skills, EDF said that the University of Nuclear Professions (UMN) was successfully established in April 2021 to enhance training offered to French nuclear sector employees. Concerning manufacturing quality enhancements, EDF said the Plan's associated welding guidelines led to the creation of the Hefaïs welding training school in partnership with Orano, Naval Group, and CMN, which aims to train the best welders in France for the nuclear and naval sectors.

Going forward, EDF said the Plan will continue to define the French nuclear industrial standard to ensure simpler contracts between EDF and its associated suppliers. As a result of the Plan, EDF said that 44 of its suppliers have already launched their own Excell-type plans to better align their business offerings and services with EDF's. In addition, EDF said that the Plan has positively affected quality and safety factors through standardization and replication while also reducing unnecessary redundancies.

EDF said it is now entering the third phase of the Plan: consolidating the results achieved and perpetuating the actions undertaken to meet or exceed industrial standards. The company said this objective translates into 30 commitments to be met by mid-2022, two-thirds of which are a direct extension of those made in 2021. EDF General Delegate for Industrial Quality and Nuclear Skills Alain Tranzer stated, "Eighteen months after the launch of the Excell Plan, the first results are here. The coming year should allow us to consolidate these actions carried out by the entire French nuclear industry and to regain the highest level of industrial requirements to be at the rendezvous of the fight against climate change."

EDF's NUWARD SMR targeted for groundbreaking in 2030

On November 4, EDF Senior Vice President Development New Nuclear Projects & Engineering Vakisasai Ramany told the audience of Nuclear Engineering International's Small and Advanced Reactors Webinar about the company's efforts to design and build its NUWARD SMR demonstration project in France with a longer-term view toward international deployment. Ramany said the company plans to complete the SMR's design in 2022 with a permit application and conceptual design to follow in the mid-2020s. He also stated that EDF is currently discussing the NUWARD design's safety features with the French Nuclear Safety Authority (ASN). Should the licensing process advance as planned, Ramany said the world's first NUWARD SMR could see pouring of nuclear safety-related first concrete sometime in 2030.

French President Emmanuel Macron announced in October (*UxW35-43*) the 'France 2030' investment plan totaling €30 billion, which includes €1 billion in support for development of the NUWARD SMR design. EDF's SMR offering features a pair of 170 MWe PWRs for a total capacity of 340 MWe per NUWARD plant. The company's initial focus is for the NUWARD SMR to replace coal-fired power plants and provide power supplies to remote cities, energy-intensive industries, and microgrids.

Exelon reports third quarter 2021 results; updates on generation spin-off process

Exelon announced its results for the third quarter of 2021 on November 3. Total nuclear generation for the quarter including Exelon's owned output from the Salem nuclear power plant was 44,850 GWh, marking a slight decline when compared to nuclear output of 44,884 GWh reported during the third quarter of 2020. When excluding Salem, the company reported a Q3 2021 total capacity factor for its nuclear fleet of 96%.

Exelon noted that approval in Illinois of a clean energy law in September allowed for the continued operation of the Byron and Dresden nuclear power plants. The company said that it no longer views its Braidwood and LaSalle nuclear power plants to be at risk for early retirement. "We achieved several critical milestones during the third quarter, starting with passage of landmark clean energy legislation in Illinois that preserves our nuclear fleet and puts the state on a path to zero emissions by 2045," said Exelon President and CEO Chris Crane.

Exelon is also moving forward to finalize its planned business separation in Q1 2022, which involves the spin-off of all its generation assets into a new company. "We also remain on track to complete the separation of our utility and competitive generation businesses in the first quarter of next year, having recently named executive leadership, secured approval from the Federal Energy Regulatory Commission and completed the acquisition of EDF's stake in three of our nuclear

plants.” Once completed, Exelon’s nuclear generation business will operate

OPG awards BWXT a supply contract for Darlington refurbishment

Ontario Power Generation (OPG) announced November 4 that it awarded BWX Technologies a Fueling Machine (FM) head engineering and component supply contract in support of the refurbishment of the Darlington nuclear power plant in Ontario, Canada. The contract is valued at C\$50 million and envisions BWXT carrying out the contracted work at its facility in Peterborough, Ontario to enable all eight FM heads at the plant to be refurbished. The company will supply components from 2022 until 2026.

“Ontario’s nuclear supply chain is strong, allowing us to source much of what we need, both as we refurbish Darlington and also as we work toward small modular reactor deployment, right here at home,” said OPG’s Senior Vice President for Refurbishment, Subo Sinnathamby. “We know BWXT has the skilled workers and the same rigorous commitment to quality and safety we do at OPG, which is imperative as they provide key parts and knowledge to refurbish Darlington’s fuel machine heads.”

NuScale and Nuclearelectrica partner to deploy SMRs in Romania

On November 2, U.S. SMR developer NuScale Power and Romania’s government announced the signing of a teaming agreement to accelerate the deployment of SMRs in Europe. Under the agreement, Romania’s nuclear utility Nuclearelectrica and NuScale are to explore how NuScale’s Power Module SMRs can support international climate goals, help mitigate the worst impacts of climate change, and strengthen global prosperity. NuScale said it plans to help Nuclearelectrica take steps toward deploying a first NuScale 6-Module, 462 MWe, power plant in Romania as early as 2027/2028.

The parties’ latest agreement follows a Memorandum of Understanding (MOU) signed between Nuclearelectrica and NuScale in 2019 (*UxW33-12*) to evaluate the development, licensing, and construction of a NuScale SMR in Romania. The new teaming agreement advances the commitment to facilitate the deployment of a NuScale SMR in Romania. Specifically, the teaming agreement outlines the next significant milestones for Nuclearelectrica and NuScale to develop safe, affordable, zero-carbon baseload power technology with a focus on retired coal plant sites in Romania.

The teaming arrangement seeks to support the Romanian government’s National Recovery and Resilience Plan, which aims to phase out 4.59 GWe of coal fired energy production by 2032. By repurposing coal plants, Nuclearelectrica and NuScale can help communities and plant workers participate in the transition to decarbonized energy, while also continuing to provide local economic benefits. This teaming agreement serves as a catalyst for deployments in other Three Seas Initiative countries seeking to decarbonize.

“As Romania aims to diversify its energy portfolio and meet climate goals, NuScale’s advanced technology presents the perfect safe, economic and scalable solution,” said John Hopkins, NuScale Power Chairman and CEO. “While world leaders emphasize how critical this moment is in addressing climate change, NuScale’s SMR technology not only represents a pathway to meet Romania’s climate commitments, but also is a means to bolster local economic growth. NuScale is excited to work with Nuclearelectrica and to showcase the many benefits our technology will bring.”

Framatome completes Rolls-Royce Civil Nuclear I&C purchase

On November 8, Framatome reported it completed acquisition of Rolls-Royce Civil Nuclear Instrumentation and Control (I&C). Framatome said the deal to acquire the UK firm’s I&C division enhances the company’s existing engineering expertise, grows its industrial footprint, and expands its global I&C systems development and deployment capabilities. “I&C systems serve as the ‘central nervous system’ of a nuclear power plant enabling operators to control the reactor. This purchase and the expert workforce joining Framatome, will further enhance our I&C offering for reliable, low carbon nuclear energy production,” said Bernard Fontana, CEO of Framatome.

The deal will see more than 550 employees, mainly located in Grenoble, France, join Framatome. The acquisition will incorporate Rolls-Royce Civil Nuclear’s products and technologies such as Spinline, Rodline, and Hardline into Framatome’s I&C portfolio. Framatome I&C’s current products include the TELEPERM XS and Tricon digital platforms, in addition to non-computerized analog platforms and instrumentations for nuclear power plants.

The Rolls-Royce Civil Nuclear I&C business includes offices in France, the Czech Republic, and China. Rolls-Royce’s products and technologies are installed in 150 operating reactors worldwide.

SNERDI completes preliminary study on planned Jiamusi nuclear heating project

Shanghai Nuclear Energy Research and Design Institute Co., Ltd. (SNERDI) said November 7 it recently completed a special study and created an associated report for State Power Investment Corp.’s (SPIC) planned Jiamusi nuclear energy heating demonstration project in Heilongjiang Province, China. This project is to consist of two pilot-scale 200 MWt reactors that are intended to replace coal or gas plants typically used to supply district heating to towns and cities in China’s northern regions. SNERDI’s Jiamusi nuclear energy heating demonstration project review covered the construction project overview, including technical surveys, regulatory input, and related ecological studies. Moreover, the report issued several positive findings on the plant’s construction impacts and environmental safety and protection measures.

Following publication of the Jiamusi report, SNERDI held

a meeting with experts from the Nuclear and Radiation Safety Center of the Ministry of Ecology and Environment (MEE), the Chinese Academy of Radiation Protection, the Forestry and Grass Survey and Planning Institute of the State Forestry and Grassland Administration, and Beijing Normal University. The experts present at the report's unveiling reportedly affirmed SNERDI's investigations, noting the project's initial review contains "comprehensive content, accurate data, scientific and specific methods, credible survey results, appropriate environmental protection measures recommendations, and meeting the requirements of the technical mission statement." Following the meeting, all parties voted unanimously to approve the report and allow the project to advance further.

Details on the Jiamusi project are scant. However, SPIC Senior Engineer Wang Xujia told the press in 2019 that the Jiamusi heating reactors are intended to prove to the public that nuclear energy can be effectively used to provide district heat supplies and process steam for industrial purposes. He added that SPIC hoped to have the Jiamusi units in operation by 2024. SPIC is known to be working on several heating reactor designs, including the Heating Reactor of Advanced Low-Pressurized and Passive Safety System ("Happy200"). The Happy200 operates under low temperature and low pressure in a closed primary circuit. All safety systems are designed to operate passively and take advantage of external air as the unit's ultimate heat sink.

Russian regulator approves power flexibility testing at Leningrad-II 1

On November 8, Rosatom reported the successful completions of a scheduled testing campaign focused on the flexibility of plant systems at various power levels at Unit 1 of the Leningrad-II nuclear power plant in Russia. The test, ordered by Russian nuclear regulator Rostekhnadzor, saw the Leningrad-II 1 VVER-1200 PWR quickly shed and then increase power levels to simulate the need to vary power output to match system needs. During the testing period, Rosatom noted that the power of the reactor was reduced five times from 100% to 75%, followed by its restoration to nominal values. Rosatom operators also decreased power output from 100% to 50% another five times, with subsequent power res-

toration to 100%. Following the testing program, the company's technicians and nuclear scientists concluded that the reactor successfully demonstrated the overall operational flexibility of Leningrad-II 1 at various power levels as well as the effectiveness of plant personnel to respond to changes in operating conditions.

Rosatom's currently operates two VVER-1200 PWRs at Units 1 & 2 of the Leningrad-II nuclear power plant in Sosnovy Bor, Leningrad Oblast, Russia. Unit 1 commenced commercial operation in October 2018 (*UxW32-39*) and Unit 2 achieved commercial operation in March 2021 (*UxW35-12*). Moreover, it was widely reported in April (*UxW35-16*) that Russia's government approved plans to construct another two new reactors at Leningrad-II (Units 3 & 4), with construction set to begin in the late-2020s.

Argentina's NA-SA taps Henisa Sudamericana to restart works on CAREM-25 SMR project

Argentina's government reported November 8 that it signed a contract for the main concrete works with Henisa Sudamericana to restart construction on the country's first-of-a-kind CAREM-25 SMR project being built alongside the existing Atucha nuclear power plant north of Buenos Aires. The contract calls for Henisa Sudamericana to begin hiring between 230 to 250 workers on a 20-month contract focused on completing construction on "all concrete structures of the CAREM-25 reactor building." Nucleoelectrica Argentina SA (NA-SA) Manager of CAREM Works Management Juan Cattaneo told *World Nuclear News*, "What was signed is extremely important to us. It guarantees that in the course of the coming weeks a significant number of personnel will be incorporated that will allow us to resume the pace that the work needs."

NA-SA announced in April 2020 (*UxW34-17*) it was working to revive the idled locally designed prototype CAREM-25 reactor. Construction on CAREM-25, a small PWR with a 25 MWe capacity, first began in early 2014. The project's initial primary contractor, Techint Engineering & Construction, reportedly stopped work in November 2019 based on various issues ranging from missed payments to ineffective documentation. Now the project appears to be advancing with Henisa Sudamericana as the project's main contractor.

Policy & Regulation

Georgia PUC approves Southern Co's plans to bill customers for Vogtle expansion

Georgia's Public Utilities Commission (PUC) on November 2 voted unanimously to allow Southern Co. subsidiary, Georgia Power, to pass onto customers \$2.1 billion of the costs needed to complete construction on Units 3 & 4 of the Vogtle nuclear power plant near Augusta, Georgia. The PSC initially voted in August (*UxW35-34*) under a preliminary Stipulation Order with Georgia Power to halt approving incre-



mental cost increases incurred at the project. The Commission instead postponed deciding how much of the expansion's cost overruns would be shouldered by Georgia Power's ratepayers until after Vogtle 3 entered commercial operation. Georgia Power reported last month (*UxW35-43*) that it has delayed the commercial operation dates for Vogtle 3 & 4 to the third quarter of 2022 and the second quarter of 2023, respectively. Costs to complete the Vogtle 3 & 4 expansion project have doubled to about \$27 billion overall from an initial projection of \$14 billion.

The company stated that it could load fuel into Vogtle 3 as early as the first quarter of 2022. However, it believes it could still meet its new target date for commercial operation even if fuel loading for Unit 3 does not take place until May 2022. Hot functional testing for the reactor was completed this summer, and Unit 3 is now 99% complete. The total completion rate for both units now stands at 95%.

South Korea's Moon signs two agreements for nuclear cooperation with Hungary and Poland

South Korea's President Moon Jae-in attended a meeting in Budapest, Hungary on November 3 to meet with representatives of the Visegrad Group (V4) to discuss a number of initiatives ranging from electric vehicles to nuclear power plant construction. During the meeting, President Moon reportedly signed two nuclear cooperation agreements with government representatives from Hungary and Poland. Hungary's President Janos Ader discussed the cooperation agreement following the summit meeting, noting that, "The two countries agreed that carbon neutrality would not be possible without the use of nuclear energy."

President Moon's team, however, did not comment on the nuclear partnership with Poland. While details were light on Moon's agreement with Poland, it was later reported by *Business Korea* that Korea Hydro & Nuclear Power (KHNP) and South Korea's Ministry of Trade, Industry and Energy (MOTIE), and a consortium of South Korean heavy engineering companies, held a meeting after the Presidential summit on November 5 with representatives from Poland's energy sector to discuss a proposal to build Poland's first nuclear power plant. The consortium of South Korea, including the Export-Import Bank of Korea, the Korea Trade Insurance Corp., Doosan Heavy Industries, and Daewoo is planning to submit a proposal for APR-1400 PWRs to the Polish government by the first quarter of 2022. The proposal is expected to include technology transfer and engineer training, among others. Poland's government is asking foreign reactor vendors to provide up to 49% of the financial resources to build the country's first nuclear power plant, and South Korea's KHNP is reportedly working with the country's Export-Import Bank to fulfill the funding requirements. Moreover, it was reported that KHNP signed a Memorandum of Understanding (MOU) with the Electric Power Industry Association of Poland aimed at increasing technological localization. In addition, Doosan Heavy Industries and Daewoo Engineering signed a raft of

MOUs focused on equipment supply, construction cooperation, localization, etc. The consortium of South Korean companies said it is planning to work with at least 70 Polish engineering, machinery, construction, and energy companies in the project.

Poland plans to start construction on its first nuclear power plant later this decade with a view toward the plant entering operation in 2033. The country wants to have at least six large-scale LWRs operating by 2043 as it aims to phase out its coal-fired generation.

Congress passes Infrastructure bill including support for nuclear energy

The U.S. House of Representatives passed on November 5 the over \$1 trillion bipartisan Infrastructure, Investment and Jobs Act in a 228-206 vote. A total of 13 Republicans supported the legislation, while six Democrats voted against it. The bill is now before President Joe Biden, who is expected to sign the act into law within the next few days. Biden said the infrastructure bill aims to, "Create millions of jobs, turn the climate crisis into an opportunity, and put us on a path to win the economic competition for the 21st Century." The bill includes, among several other items, provisions for the U.S. government to invest in advanced nuclear demonstration projects; fund a clean hydrogen production initiative that looks to demonstrate the economic feasibility of deploying hydrogen electrolyzers at U.S. nuclear power plants; support innovation and research funding for next generation fuels and reactors.

Nuclear Energy Institute (NEI) President and CEO Maria Korsnick said in a press release following the bill's passage, "As the urgency to decarbonize grows, the next generation of nuclear reactors is essential to reaching our ambitious climate goals. Through continued support for nuclear energy innovation and funding of the Advanced Reactor Demonstration Program, Congress has signaled its commitment to accelerating the deployment of innovative reactor technologies over the next decade while bolstering U.S. technological leadership globally. Nuclear energy will play a crucial role in our energy transition beyond our electricity grid. Establishing a demonstration program for Regional Clean Hydrogen Hubs will advance efforts by the industry to decarbonize the industrial, transportation and even agricultural sectors. Through the utilization of our existing nuclear facilities and the next generation of reactors, nuclear energy can serve as a cost-effective, reliable source for large-scale, carbon-free hydrogen production."

It should be noted that Democrats entered the House chambers on November 5 expecting pass both the infrastructure bill and the party's Build Back Better Act, which is a wider-ranging package including social safety net and climate change initiatives totaling \$1.75 trillion. The Democrats' Build Back Better bill cleared a key procedural on November 6, which puts it on path for likely passage later this month. President

Biden said the successful procedural vote will “allow for passage of my Build Back Better Act in the House of Representatives the week of November 15th.” Among the nuclear-related items being discussed as part of the Build Back Better Act is a nuclear production tax credit (PTC) plan that could provide much-needed support to economically challenged U.S. nuclear plants.

U.S. Energy Secretary Granholm says U.S. ‘very bullish’ on nuclear

On November 6, U.S. Energy Secretary Jennifer Granholm told *Yahoo News* that President Joe Biden’s administration is “very bullish” on building new advanced reactors (ARs) in the U.S. “We are very bullish on these advanced nuclear reactors,” she said. “We have, in fact, invested a lot of money in the research and development of those. We are very supportive of that.” Granholm said the administration is working to deploy the first ARs domestically to provide baseload capacity to support a national energy mix that continues to shift toward intermittent renewable energy resources. “These advanced nuclear reactors, and the existing fleet, are safe... And they’re baseload power,” she continued. “The holy grail is to identify clean, baseload power. ... Nuclear is dispatchable, clean baseload power, so we want to be able to bring more on.”

Turning toward costs, Granholm said that while nuclear power plants are “more expensive” to operate compared with renewable energy, she said the Biden administration is working to make the next wave of SMRs and ARs less expensive to enhance system flexibility and bring down total costs. “For example, TerraPower in Wyoming [plans to build] a small advanced reactor adjacent to a retired coal plant. And because the infrastructure is there to carry the power away, it made perfect sense. And those coal miners who were working at the plant now have a job at the new facility. So we’re excited about nuclear power.”

NRC ASLB to hold oral argument on Oconee nuclear power plant SLR

On November 8, the U.S. Nuclear Regulatory Commission’s (NRC) Atomic Safety and Licensing Board (ASLB) announced it will conduct an oral argument on November 16 regarding a petition to hold an adjudicatory hearing on Duke Energy’s application for a 20-year Subsequent License Renewal (SLR) for the company’s Units 1, 2, & 3 of the Oconee nuclear power plant in Seneca, South Carolina. The NRC docketed (accepted for review) Duke’s SLR application for Oconee in July (*UxW35-31*). In its latest release, the NRC said the oral argument will begin at 1 p.m. Eastern on November 16 to address proposed contentions from petitioners Beyond Nuclear and the Sierra Club challenging aspects of the dam failure impacts analysis of applicant Duke Energy’s environmental report. The three administrative judges on the Board will hear argument from representatives for the petitioners, Duke Energy, and the NRC staff.



The Board is composed of three administrative judges from the NRC’s ASLB Panel. Boards conduct adjudicatory hearings on major licensing actions by the NRC and are independent of the NRC staff. A Board’s rulings may be appealed to the Commission, the five-member body that sets NRC policy. The public will have listen-only access to the oral argument by dialing 800-857-9887, passcode 5721898.

The plant’s reactor operating licenses are valid through the early-2030s, but approval of Duke’s SLR application would see Oconee’s operating licenses extended by an additional 20 years to 2053 and 2054. The Oconee SLR application is Duke’s first, but the utility has announced it plans to submit similar SLR applications for its other five nuclear stations.

IEA Executive Director says nuclear power has a role in all net-zero scenarios

During the COP26 meeting in Glasgow, Scotland on November 4, International Energy Agency (IEA) Executive Director Fatih Birol told attendees of the event titled “The Role of Nuclear Energy in a Net Zero Future” that nuclear energy is critical to reach net zero emissions under all climate strategies. He said that nuclear’s primary role will be a low-carbon, baseload bridge to allow a wider shift to renewable energy sources. “But this is not enough, there are technologies which are not yet part of the market, but under development. So we have to push the button today in order to see that those technologies are becoming part of the market. What are those, different hydrogen applications, different carbon capture technologies and new nuclear technologies,” said Birol. Going forward, Birol said that nuclear is modeled in every scenario to meet net zero emissions, but he called the road to carbon neutrality a “Herculean task.”

Birol also told *World Nuclear News* at France’s booth at COP26 that there are three main tasks facing nuclear energy in the coming years. First, Birol said the long-term operation of existing reactors must be ensured to provide the world “one of the cheapest sources of clean electricity generation.” Next he said the nuclear industry must work to bring SMRs and advanced reactors to market to help lead the industry’s ongoing evolution. Finally, Birol stated that nuclear energy in all forms is set to grow under IEA’s *Net Zero Roadmap* (*UxW35-21*), which outlines the pathways to maximize technical feasi-

bility, cost-effectiveness, and social acceptance while ensuring continued economic growth and secure energy supplies. Birol told the press, “I think again if people believe our *Net Zero Roadmap* we have to increase the pace of new build of nuclear power plants by a factor of five.”

Uranium & Fuel Cycle

Framatome delivers first complete accident tolerant fuel LFA to Exelon’s Calvert Cliffs

On November 2, Framatome announced it delivered the nuclear industry’s first 100% accident tolerant fuel (ATF) assembly to Exelon Generation’s Calvert Cliffs nuclear power plant in Maryland. Developed with funding from the U.S. Department of Energy (DOE) under Framatome’s PROtect program, the company’s lead fuel assembly (LFA) contains 176 chromium-coated rods and chromia-enhanced pellets, which was inserted as part of the plant’s recent spring refueling outage. The first complete fuel assembly builds on previous work that included completing an 18-month fuel cycle test on LFA in the U.S. and Switzerland. Framatome said its PROtect ATF chromium-coated cladding and chromia-enhanced pellets are more resistant to changes in reactor core temperatures, which increases coping time. Moreover, the new design aims to reduce corrosion and the production of hydrogen under high-temperature conditions. The LFA was fabricated at Framatome’s fuel manufacturing facility in Richland, Washington, as part of a 2019 contract with Exelon.

“Loading the first complete accident tolerant fuel assembly is a huge milestone for Framatome and the nuclear energy industry,” said Lionel Gaiffe, senior executive vice president, Fuel Business Unit at Framatome. “This is the next step in our PROtect program and further demonstrates our commitment to advancing nuclear fuel technology by offering more efficient and reliable solutions to support the production of low-carbon energy.”

Technical audit confirms Rosatom’s ability to meet EDF requirements for managing RepU

On November 6, Rosatom reported that experts from France’s EDF conducted a detailed technical audit at Rosatom’s Siberian Chemical Combine in Seversk, Tomsk region, Russia to confirm the company’s ability to fulfill all technical and environmental contractual requirements, including the vitrification of non-recyclable process residues at a facility that meets the best international standards. The work is to be carried out within the framework of long-term contracts signed by Rosatom’s TENEX and France’s EDF for the conversion and enrichment of reprocessed uranium, as well as maintenance of packaging containers. The agreements were signed in 2018 as part of the XXII St. Petersburg International Economic Forum (*UxW32-22*). The supply of reprocessed uranium to the Russian Federation with subsequent export of the uranium product obtained as a result of its processing will be carried out until 2032. Reprocessed uranium reprocessed

in Russia will be used to fabricate fuel for French nuclear power plants. The loading of the first fuel assemblies using recycled material is scheduled for 2023 at EDF’s Cruas nuclear power plant in Ardèche, France. Rosatom noted that the transportation of nuclear materials will be carried out by Rosatom in compliance with all Russian and international safety regulations for the transportation of the relevant cargo.

The RepU deal, signed by Rosatom’s TENEX and EDF in 2018, calls for deliveries ranging between 2022-2032 at a total contract price of more than \$1 billion. Under the France-Russia RepU deal, Framatome inked a related contract with EDF to design, fabricate, and supply enriched reprocessed uranium (ERU) fuel assemblies over the period 2023-2032. Framatome will manufacture the assemblies at its plant in Romans-sur-Isère, France, and will deliver the finished fuel to EDF’s fleet.

Yellow Cake reports Q3 2021 results

On November 8, Yellow Cake Plc reported a quarterly performance update for the third quarter (Q3) ended September 30, 2021. The company reported that following the completion of an oversubscribed share placing and retail offer in June 2021, raising gross proceeds of approximately £62.5 million (US\$86.9 million), Yellow Cake purchased and took delivery of 550,000 pounds U₃O₈ at an average price of US\$32.35 for a total consideration of US\$17.8 million. This acquisition raised the company’s total holdings to 13.86 million pounds U₃O₈ as of September 30, 2021. Moreover, the company signed an agreement in August with NAC Kazatomprom to purchase a further 2.0 million pounds of U₃O₈ at US\$32.23 per pound for a total consideration of US\$64.5 million for agreed delivery between October and December 2021. The completion of this transaction will increase Yellow Cake’s current holdings to 15.86 million pounds of U₃O₈. Yellow Cake reported its estimated Net Asset Value (NAV) as of the end of Q3 2021 was £3.26 per share or US\$675.2 million, comprising 13.86 million pounds U₃O₈ valued at a spot price of US\$43.00 per pound, a uranium derivative liability of US\$6.5 million, and cash and other current assets and liabilities of US\$85.9 million.

After the end of the quarter, Yellow Cake announced it completed an oversubscribed share placing for US\$150 million, which it intends to dedicate toward physical uranium purchases of approximately 3.0 million pounds U₃O₈ to increase total holdings to 18.8 million, comprised of: 2.0 million pounds U₃O₈ from Curzon Uranium Ltd. at US\$46.32 per pound U₃O₈ with agreed delivery to take place before the end of November 2021; and 950,000 pounds U₃O₈ from Kazatomprom at a price of US\$47.58 per pound with delivery to occur by June 2022. As of November 5, the company’s proforma NAV was £3.39 per share or US\$840.8 million, assuming 18.80 million pounds of U₃O₈ valued at a spot price of US\$43.50 per pound, a uranium derivative liability of US\$6.5 million and cash and other current assets and liabilities of US\$85.9 million as of September 30, 2021, plus net proceeds

from the October Placing of US\$145.7 million less an estimated US\$202.3 million applied to uranium purchases.

Yellow Cake CEO Andre Liebenberg commented, “2021 continues to be a year of considerable growth for Yellow Cake, with momentum continuing throughout the third quarter. We successfully raised £62.5 million in June to increase our uranium holdings by 20%. After the period end, we have extended that strategy, raising a further £109 million, and agreeing to purchase an additional 3 million pounds of uranium from Curzon and Kazatomprom, bringing our total holdings to nearly 19 million pounds once these transactions and deliveries are complete, more than double our holdings since the start of the year. Our net asset value is now over \$800 million, compared to \$200 million when we first floated three years ago.”

Orano and Denison complete successful test of SABRE mining method at McClean Lake

Orano Canada Inc. and Denison Mines Corp., as joint venture partners in the McClean Lake Joint Venture (MLJV), reported November 3 the successful completion of a five-year test mining program deploying the patented Surface Access Borehole Resource Extraction (SABRE) mining method on the McClean Lake property in Saskatchewan, Canada. SABRE is a non-entry, surface-based mining method that uses a high-pressure water jet placed at the bottom of a drill hole to excavate a mining cavity. The cuttings from the excavation process are then air lifted to surface, separated, and stockpiled. Thus, SABRE is viewed as an innovative mining method that could potentially allow for the economic access to relatively small high-grade orebodies in the Athabasca Basin that are either too small or too deep to be mined economically by open pit and/or underground mining methods. SABRE is also unique in that it can be selective and scalable, with the potential to provide superior flexibility compared to conventional mining methods and is thus ideally suited to changing uranium market conditions, offering the potential for a short production ramp up of months instead of years.

The final stage of a five-year SABRE field test was completed from May to September 2021 with four mining cavities successfully excavated to produce approximately 1,500 tonnes of high-value ore ranging in grade from 4% U_3O_8 to 11% U_3O_8 . The program was concluded with no safety, environmental or radiological incidents and confirmed the ability to achieve key operating objectives associated with the test program – including targets for cavity diameter, rates of recovery, and mine production rates. The majority of the ore recovered from the test mining program has been transferred to the McClean Lake mill, and is expected to be processed for the MLJV by the end of the year.

Based on the success of the 2021 program, the MLJV partners plan to evaluate the potential use of this innovative method for future mining operations at their jointly owned McClean Lake and Midwest properties. The MLJV is owned

by Orano Canada (77.5% and operator) and Denison Mines (22.5%). The Midwest joint venture is owned by Orano Canada (74.83% and operator) and Denison Mines (25.17%).

Paladin Energy provides Restart Plan update for Langer Heinrich project in Namibia

Paladin Energy Ltd. reported November 4 an update to the Langer Heinrich Mine Restart Plan and an update to the Mineral Resources and Ore Reserve estimates for the mine. The Restart Plan Update confirms the restart cost estimate of US\$81 million and a 17-year mine life supported by ore reserves of 84.8 Mt with an average U_3O_8 grade of 0.0448% U_3O_8 . The life of mine production target has increased to 77.4 million pounds U_3O_8 from 76.1 million pounds U_3O_8 . The estimated life-of-mine C1 (cash) costs are updated to US\$27.40 per pound U_3O_8 from US\$26.90 per pound U_3O_8 , due to increased estimated contract mining rates. The company confirmed an estimated project execution timeframe of 18 months from project commencement to first production, with full production achieved after a further 15 months.

Paladin said it continues to engage with global utilities with the intent of securing uranium offtake contracts with sufficient duration and value to underpin the restart of Langer Heinrich. The company noted an increase in market queries from utilities and an increase in long-term market pricing.

Paladin said it will now focus attention on exploring value enhancement opportunities at Langer Heinrich and across the company's broader asset portfolio. Concept studies are underway for potential Langer Heinrich mine value enhancement opportunities, including vanadium recovery and sales; increased low grade stockpile phase production rate; application of ore sorting technology; mine life extension through lower cut-off grade resource processing; resource expansion; further cost optimization; and recovery improvements. The company is considering an optimized Langer Heinrich mine project execution plan exploring the possibility to self-fund early works in FY 2022 and fast track first production when a decision to restart is made. Furthermore, Paladin is looking to establish development and exploration pathways across its three exploration projects in Canada and Australia. The company will continue to assess M&A opportunities complementary to its existing global project and exploration portfolio.



As of September 30, 2021, Paladin reported unrestricted cash reserves of US\$40.5 million and said it has the financial flexibility to respond rapidly to improving uranium market conditions.

Sprott to acquire North Shore Global Uranium Mining ETF

On November 4, Sprott Asset Management LP, a wholly owned subsidiary of Sprott Inc., entered into a definitive agreement with North Shore Indices, Inc. to acquire an exclusive license to use the North Shore Global Uranium Mining Index, the performance of which the North Shore Global Uranium Mining ETF (URNM) seeks to track.

The agreement is subject to approval by both the Board of Trustees and the shareholders of URNM. Once approval is granted, URNM will be reorganized to create the Sprott Uranium Miners ETF, which will be advised by Sprott Asset Management and sub-advised by ALPS Advisors, Inc. Assuming the transaction is approved by the Board of Trustees of the Trust and the shareholders of URNM, the reorganization is expected to close in the first quarter of 2022.

“We believe we are in the early stages of a uranium bull market and URNM is a perfect complement to the Sprott Physical Uranium Trust (U.U), which is the world’s largest physical uranium fund,” said John Ciampaglia, CEO of Sprott Asset Management. “URNM is the only US-listed pure-play uranium equities ETF and we look forward to providing investors with two compelling options to invest in the sector.”

Deep Yellow upgrades Omahola MRE in Namibia to JORC (2012) from JORC (2004)

Deep Yellow Ltd. announced November 4 an upgrade to the Mineral Resource Estimate (MRE) from JORC (2004) to JORC (2012) for the Omahola project, which includes the Ongolo, MS7 and Inca deposits located in EPL3496 in Namibia. The updated MRE is now reported to the JORC (2012) Code at a 100 ppm U₃O₈ cut-off including a measured, indicated, and inferred mineral resource base of 125.3 million pounds U₃O₈ at 0.19% U₃O₈. At a 150 ppm U₃O₈ cut-off, the deposits contain a combined 82.9 million pounds U₃O₈ at 0.0269% U₃O₈.

NexGen releases inaugural Sustainability Report

NexGen Energy Ltd. announced in late October the release of its inaugural Sustainability Report available at <https://www.nexgenenergy.ca/resources/pdf/NexGen-ONLINE-compressed.pdf>. The “Sustainability Report 2020” documents NexGen’s commitment and approach to maximizing value for all stakeholders, with sustainability topics identified as: Environmental Stewardship, Health & Safety, Reclamation & Continuing Land Use, Regulatory Compliance, and Strong Community & Indigenous Relations. NexGen will release the report annually and prepare reports in accordance with the

Global Reporting Initiative Standards reflecting the appropriate stage of the company’s development.

Peruvian Judicial ruling confirms American Lithium’s title to all 32 disputed concessions

American Lithium Corp. (formerly Plateau Energy Metals Inc.) reported November 2 that a judicial ruling in relation to title to the 32 disputed concessions on the Falchani and Macusani projects in Peru has been issued in favor of the company’s Peruvian subsidiary Macusani Yellowcake S.A.C. The ruling restores full title to these concessions.

GTI Resources completes acquisition of Branka Minerals

GTI Resources Ltd. stated November 3 that it completed the acquisition of Branka Minerals Pty Ltd. (UxW35-34) and the vendor placement of A\$600,000. Branka was the holder of around 22,000 acres of land across several underexplored mineral lode claims in Wyoming (WY) and Colorado (CO). Executive Director Bruce Lane commented, “preparation for our maiden drilling campaign in Wyoming has proceeded according to plan and settlement of the acquisition has put us in great position to commence drill testing before the end of the year. The company is now well funded after raising in excess of A\$5 million during the last 2 months and the market context for investing in ISR uranium exploration appear to be increasingly positive.”

On November 2, GTI received approval to drill at the Thor ISR uranium project in Wyoming’s Great Divide Basin. A 15,000-meter drill program will take place in December at the Thor project with the bonding process underway and contractor bids received for the mud rotary drilling campaign. The campaign is due to begin on December 21 this year.

The company also reported that it has made the final acquisition payment of US\$100,000 and 2 million shares in consideration for the purchase of Section 2 (ML52627) and Section 36 (ML53599) in the Henry Mountains of Utah. The payment was made to Anfield Energy Inc. and secures ownership across a now contiguous interpreted uranium & vanadium mineralized trend of over 5.5 kilometers between GTI’s Rat Nest and Jeffrey claim groups.

CUR to acquire 66% interest in Mustang Lake project in Labrador

Consolidated Uranium Inc. (CUR) and Labrador Uranium (LUR) have entered into a purchase agreement with Mega Uranium Ltd. and its wholly owned subsidiary, pursuant to which LUR has agreed to acquire Mega Uranium’s 66% participating interest in the joint venture that holds a 100% interest in the Mustang Lake project, a prospective uranium project located in the Central Mineral Belt of Labrador.

Three main prospects occur within the area: Mustang Lake, Irving Zone and Mustang Lake North. The project has potential for IOCG-style mineralization. The Mustang Lake project

is host to the highest lake-sediment value for uranium within the entire Michelin-Jacque Lake region. Past diamond drilling has intersected uranium values of 0.12% U_3O_8 over 9.11 meters.

Stephen Keith, President and CEO of Labrador Uranium, commented, “We are pleased to be able to add Mustang Lake to our portfolio of targets within the Central Mineral Belt. Not only does this transaction provide us with an additional uranium target along strike to Paladin Energy’s existing Michelin deposit, but it also aligns us with yet another exceptional team of asset developers in the uranium sector, Mega Uranium. This joint venture interest was one of our original targets when creating LUR and, with this agreement signed, we can now continue to seek additional growth opportunities. Combining this acquisition with the previously announced acquisitions from Altius Minerals and CUR and our \$7 million financing, we believe LUR is well positioned to drive growth for its investors. We look forward to the addition of Mega’s CEO, Richard Patricio, to the Board of Directors of LUR on closing.”

Eagle Plains completes sale agreements for four Saskatchewan uranium area claims

Eagle Plains Resources Ltd. announced November 4 that it completed four separate agreements with unrelated third parties for the sale of a 100% interest (subject to retained NSR interests where applicable) in four separate groups of claims located in the Athabasca Basin region of Saskatchewan.

Transaction highlights include:

- Cable Bay area: Uranium Energy Corp. (UEC) – 9 dispositions for 4,067 hectares. Consideration includes 64,149 UEC common shares.
- Lazy Edward Bay area: ALX Resources Corp. – 9 dispositions for 2,410 hectares. Consideration includes 600,000 ALX common shares, with 2% NSR to Eagle Plains.
- Pine Channel South area: Pegasus Resources Inc. – 1 disposition for 211 hectares. Consideration includes 500,000 PEGA common shares and a 2% NSR to Eagle Plains.
- Bell Lake/Kernaghan: IsoEnergy Inc. – two dispositions for 904 hectares. Consideration includes C\$25,000 in cash and a 2% NSR to Eagle Plains.

Medaro enters into option agreement to acquire up to a 100% interest in Yurchison property

Medaro Mining Corp. announced November 2 that it entered into an option agreement with Skyharbour Resources Ltd. to acquire up to a 100% interest in the Yurchison uranium property located in the Wollaston Domain of northern Saskatchewan, Canada. The property contains 12 mineral claims comprising approximately 55,934 hectares.

Pursuant to the agreement, Medaro may acquire an initial 70% interest in the property by 1) issuing common shares of

Industry Request For Proposals (RFP)

Buyer: **Dioxitek S.A.**

Request: **Price Bidding for Purchase of Raw Material**

Details: **Purchase of 220 tons of natural uranium in the form of uranium ore concentrate (U_3O_8).**

The documents of reference may be requested free of charge until **November 9, 2021**, through the following communication channels:

Compras Dioxitek S.A.:

Purchasing office hours: 10 am to 4 pm.

+54 (11) 3068 2294

General email: compras@dioxitek.com.ar

Nuria Cevela: ncevela@dioxitek.com.ar

Camila La Vitola: clavitola@dioxitek.com.ar

Bettina Giovanetti: bgiovanetti@dioxitek.com.ar

<http://dioxitek.com.ar/transparencia-activa/contrataciones/>

the company having an aggregate value of C\$3 million; 2) making aggregate cash payments of C\$800,000; and 3) incurring an aggregate of C\$5 million in exploration expenditures on the property over a three-year period. Once the company has earned an initial 70% interest in the property, the company may acquire the remaining 30% interest in the property, within 30 business days of earning the initial 70% interest, by 1) issuing shares having a value of C\$7.5 million; and 2) making a cash payment of C\$7.5 million.

Skyharbour will retain a 2% Net Smelter Royalty (NSR) on 11 of the 12 claims, with Medaro holding a buyback option whereby it can purchase 1% of the NSR for C\$1 million. A separate NSR of 2% on the 12th claim will be payable to a third party.

CanAlaska increases private placement to C\$11.5 million

CanAlaska Uranium Ltd. announced that further to its press releases of October 15 and 18, 2021, due to increased demand, it is increasing the total gross amount to be raised under its non-brokered private placement to C\$11.5 million. The Offering will be comprised of a combination of: 1) non-flow-through (NFT) units to be sold at a price of C\$0.75 per NFT unit; 2) flow-through (FT) units to be sold at a price of C\$0.88 per FT unit; and 3) flow-through charity units to be sold at a price of C\$1.00 per charity unit. Each NFT unit will be comprised of one non-flow-through common share and one-half (0.5) of one warrant. Each FT unit and Charity unit will be comprised of one flow-through common share and one-half (0.5) of one warrant. The warrants for all units will be the same with each whole warrant entitling the holder thereof to purchase one non-flow-through common share for a period of 2 years at a price of C\$1.00. The exact number of NFT units, FT units and Charity units sold will be determined at closing. Gross proceeds received from the sale of the FT units and the Charity units will be used for work programs on the company’s exploration properties. The net proceeds received from the sale of the NFT units will be used for general working capital.

The Market

Uranium Spot & Forward Market

Spot U₃O₈ activity was on the lighter side last week, with only nine transactions involving 1.7 million pounds U₃O₈ reported as being awarded from Tuesday through today (Monday). Over half of that volume occurred on late Tuesday and early Wednesday. Activity paused briefly on Thursday as buyers and sellers shifted their focus to a quick turnaround spot RFP for up to 500,000 pounds issued by a fund early that day with offers due at 5 p.m. While some spot volumes were booked because of this activity on Friday morning, the rest of the day was again quiet with respect to volume. However, after the spot price continued to slip during the first part of the week, and with some activity reported below the \$42 level, the spot price firmed on Thursday as the bid solidified and sellers prepared their offers for the RFP. This upward price shift continued into today (Monday) as many in the industry are attending the NEI-IUFS in Savannah, the first large in-person nuclear fuel industry meeting since early 2020. Although some participants were unable to attend due to U.S. travel restrictions, the response of those that were able to attend has been extremely positive.

Based on transactional volume breakdowns by location for recent activity, as well as currently available bids and offers at all locations, the Ux U₃O₈ Price increases to \$44.00 per pound, up \$0.50 for the day and up \$1.25 for the week. Based on the most competitive market information, prices for delivery within three months at Cameco, ConverDyn, and Orano all increase this week to \$44.00 per pound. The Ux 3-Year & 5-Year U₃O₈ Forward Prices also increase to \$44.00 and \$45.00 per pound, respectively.

While there has been a recent uptick in mid- and longer-term utility demand based on recently booked activity, utility spot demand has been limited with little to no spot U₃O₈ transactions purchased by a utility since late September. With the face-to-face meetings in Savannah this week, utilities are getting an opportunity to discuss uranium market developments and how they should react to the latest trends. These discussions include spot U₃O₈ interest, but some utilities may continue to focus on delivery further out the curve as they

Market Highlights

- While volume picked up late Tuesday and early Wednesday, spot U₃O₈ activity was again moderate over the past week, pausing on Thursday until results of a fund RFP was determined early Friday.
- As activity remained low, spot prices continued to trickle down through the middle of the week before firming on Thursday, ticking up on Friday, and rising again today.
- Term activity was limited over the past week as there were no new utility formal requests and no contract awards reported for the week involving any component.

compare available spot prices with competitive fixed pricing for mid- and longer-term delivery. At this time, a non-U.S. utility is awaiting offers based on its spot request for 220 tU (~572,000 pounds U₃O₈) with delivery four months after award at the Port of Buenos Aires. Offers are due next week (November 18).

Uranium Term Market

After a pickup in activity in the previous week, the term uranium market was relatively quiet with no reported new demand or contract awards. A U.S. utility is now awaiting term offers based on its request for delivery of up to two million pounds in 2023-2027, plus options through 2030. Offers are due November 30. A non-U.S. utility is finalizing its selection(s) based on its request for annual quantities ranging from 440,000 pounds U₃O₈ to 1.1 million pounds U₃O₈ with delivery split over two five-year time periods (2024-2028 and 2029-2034) for a total volume of just over 6.6 million pounds U₃O₈. Another non-U.S. utility is reviewing pre-bid responses to its preliminary request for U₃O₈, UF₆, and/or EUP with delivery that could include the 2024 to 2033 time period. Several other utilities remain in quiet discussions with potential suppliers or are evaluating unsolicited offers for a combination of mid- and longer-term deliveries.

Conversion & UF₆

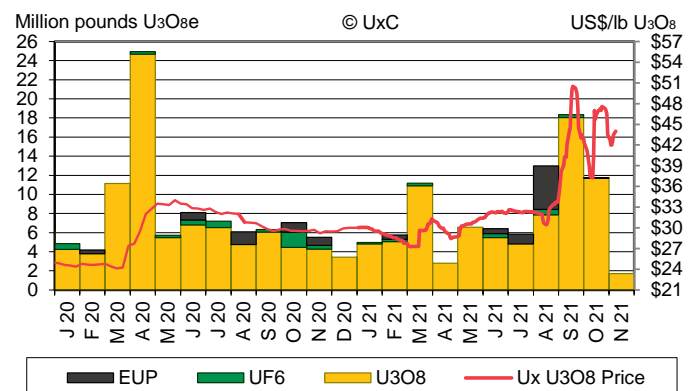
Spot conversion activity remains limited with no new demand or transactions reported over the past week. A few sellers have been interested in freeing up the U₃O₈ component of UF₆ inventory. However, sellers note that it is difficult to generate any demand interest for conversion services (or even

UxC Market Statistics

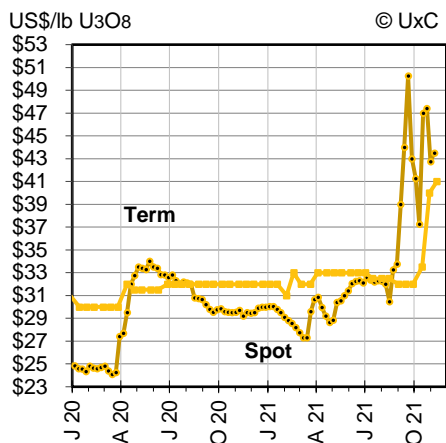
Monthly (Nov)	Spot		Term (Utility only)	
	Volume	# Deals	Volume	# Deals
U ₃ O ₈ e (million lbs)	1.7	10	0	0
Conv. (thousand kgU)	0	0	0	0
SWU (thousand SWU)	0	0	0	0
2021 Y-T-D	Spot		Term (Utility only)	
	Volume	# Deals	Volume	# Deals
U ₃ O ₈ e (million lbs)	88.4	456	60.8	49
Conv. (thousand kgU)	>5,500	26	15,268	16
SWU (thousand SWU)	>3,100	13	16,568	19

Key: N/A – Not available. W – Withheld due to client confidentiality.

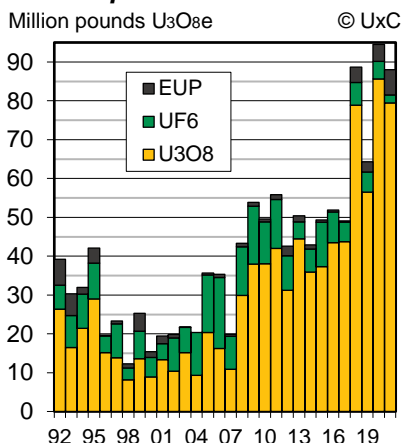
Ux U₃O₈ Price vs. Spot Volume by Form



Ux U₃O₈ Prices



Annual Spot Uranium Volumes



Ux Price Indicators (€ Equiv[†])

Weekly (11/8/21)		1 US\$ = .86299€	
Ux U₃O₈ Price	\$44.00	€37.97	
Ux U ₃ O ₈ CMC Price	\$44.00	€37.97	
Ux U ₃ O ₈ CVD Price	\$44.00	€37.97	
Ux U ₃ O ₈ ORO Price	\$44.00	€37.97	
Ux 3-Yr Forward	\$44.00	€37.97	
Ux 5-Yr Forward	\$45.00	€38.83	
Mth-End (10/25/21)		1 US\$ = .86117€	
U₃O₈	Ux U₃O₈ Price	\$47.40	€40.82
	CMC	\$47.50	€40.91
	CVD	\$47.25	€40.69
	ORO	\$47.25	€40.69
	Spot MAP [†]	\$43.23	€37.23
	3-Yr Forward	\$47.00	€40.47
	5-Yr Forward	\$48.00	€41.34
	Long-Term	\$41.00	€35.31
Conversion	NA Spot	\$15.75	€13.56
	NA Term	\$18.00	€15.50
	EU Spot	\$15.75	€13.56
	EU Term	\$18.00	€15.50
UF₆ Spot	NA Price	\$137.50	€118.41
	NA Value*	\$139.60	€120.21
	EU Value*	\$139.60	€120.21
SWU	Spot	\$56.00	€48.23
	Long-Term	\$60.00	€51.67
EUP	NA Spot**	\$1,775	€1,529
	NA Term**	\$1,653	€1,424

UF₆), even if offering more competitive pricing to place spot and near-term conversion.

In the term conversion market, although no new formal demand requests or contract awards were reported over the past week, several utilities remain in discussion or are working to finalize agreements with potential suppliers through quiet off-market discussions. For formal requests, a non-U.S. utility is awaiting offers for term conversion services based on its request totaling 4.2 million kgU as UF₆ with delivery broken down over two time periods (2023-2025 and 2026-2028). Offers are due November 30. Another non-U.S. utility is reviewing pre-bid responses to its preliminary request for conversion, UF₆, and/or EUP with potential delivery that could include the 2024 to 2033 time period.

few utilities have been reported as quietly looking at options for delivery further out in the spot window.

New term activity was lacking over last with no new demand or contract

awards reported, but the term enrichment market remains moderately active with several utilities awaiting or evaluating offers. A U.S. utility is now evaluating offers received last week for term enrichment with deliveries starting in 2026. A non-U.S. utility is reviewing pre-bid responses to its preliminary request for enrichment services and/or EUP with potential delivery that could include the 2024 to 2033 time period. Several other utilities remain in quiet discussions seeking a combination of mid- and longer-term SWU or EUP coverage.

Enrichment & EUP

While off-market near-term demand interest continues to be tracked, the spot enrichment market was quiet over the past week with no reported new formal demand or transactions. A

Ux Price Indicator Definitions

Ux Spot Prices indicate, subject to the terms listed, the most competitive offers available for the respective product or service of which UxC, LLC is aware, taking into consideration information on bid and transaction prices as well as the timing of bids, offers, and transactions (with a cut-off time of 2:30pm Eastern Time). The **Ux U₃O₈ Price[®]** (Spot) includes conditions for delivery timeframe (≤ 3 months), quantity (≥ 100,000 pounds U₃O₈), and origin considerations. †The **Ux U₃O₈ Monthly Average Price** (Spot MAP) represents the average of all Monday Ux U₃O₈ Prices for the month. The **Ux U₃O₈ 3-Year and 5-Year Forward Prices** reflect UxC's estimate of prices for U₃O₈ delivery 36 and 60 months forward taking into account market activity and other indicators, using the same quantity and origin specifications as the Spot indicator. The **Ux LT U₃O₈ Price** (Long-Term) includes conditions for escalation (from current quarter), delivery timeframe (≥ 36 months), and quantity flexibility (up to ±10%) considerations. The **Ux Conversion Prices** consider offers for delivery up to 12 months forward (Spot) and base-escalated long-term offers (Term) for multi-annual deliveries of conversion services with delivery in North America (NA) or Europe (EU). The **Ux NA UF₆ Price** includes conditions for delivery timeframe (6 months), quantity (≥ 50,000 kgU as UF₆), and delivery considerations. *The **Ux NA and EU UF₆ Values** represent the sum of the component U₃O₈ (multiplied by 2.61285) and conversion spot prices as discussed above, and therefore do not necessarily represent the most competitive UF₆ spot offers available. The **Ux SWU Price** (Spot) considers spot offers for deliveries of SWU up to 12 months forward. The **Ux LT SWU Price** (Long-Term) reflects base-escalated long-term offers for multi-annual deliveries of SWU. **The **Ux Spot and Term EUP Values** are provided for comparison purposes only and represent calculated prices per kgU of enriched uranium product based on a product assay of 4.50% and a tails assay of 0.30%, using spot and term Ux NA and appropriate spot and term price indicators. The Ux U₃O₈ Price is published daily (excluding certain U.S. holidays), the Ux Forward Prices are published every Monday, and all other Ux Price indicators are only published the last Monday of each month. All Ux Month-End Prices are as of the last Monday of each month. Ux Prices represent neither an offer to sell nor a bid to buy the products or services listed. †The Euro price equivalents are based on exchange rates sourced from XE.com at the time of publication and are for comparison purposes only. (Units – U₃O₈: US\$ per pound, Conversion/UF₆: US\$ per kgU as UF₆, SWU: US\$ per SWU, EUP: US\$ per kgU)

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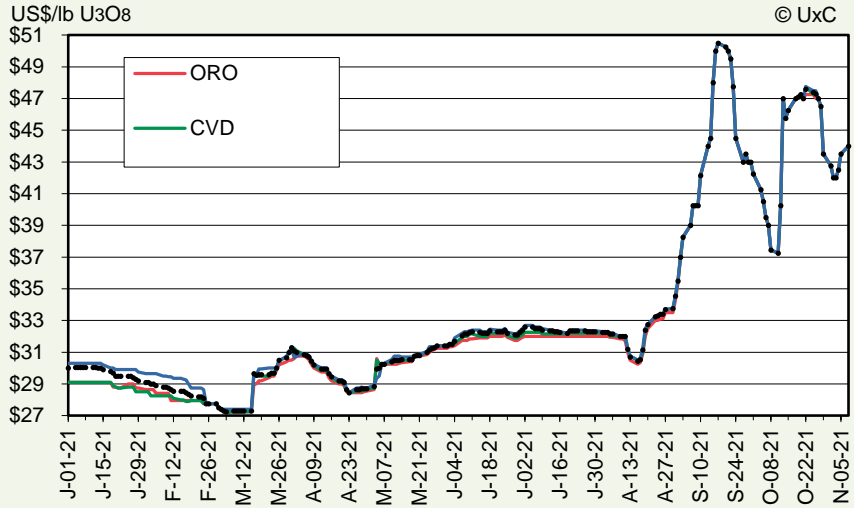
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UxC U₃O₈ Location Pricing

The spot UxC U₃O₈ CMC, CVD, and ORO Prices reflect UxC's determination of prices for U₃O₈ delivery at the specified delivery location taking into consideration bids, offers, and market activity, using the same delivery time period, quantity, and origin considerations as the UxC U₃O₈ Price® indicator, and are published daily (excluding certain U.S. holidays). The CMC [Cameco], CVD [ConverDyn], and ORO [Orano] naming convention represent individual book transfer delivery locations. Please note that the use of company names as part of the delivery location naming convention represents neither an endorsement by the respective companies nor by UxC.

Under cooperation with our participating brokers, Evolution Markets and Numerco Limited (the "Brokers"), UxC collects on a daily basis the best spot bids and offers reported for prompt delivery. *From this Broker data, UxC calculates the UxC Broker Average (BA) Bid and the UxC Broker Average (BA) Offer prices and presents them in the table below for comparison purposes only.



Daily UxC U₃O₈ Spot Prices (Change from previous day)

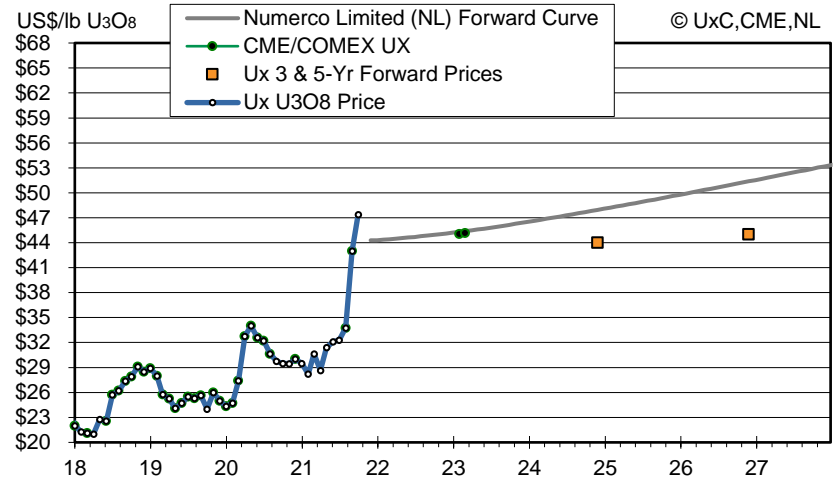
Date	UxC U ₃ O ₈ Price	CMC [Cameco]	CVD [ConverDyn]	ORO [Orano]	UxC BA Bid*	UxC BA Offer*
08-Nov-21	\$44.00 (+0.50)	\$44.00 (+0.50)	\$44.00 (+0.50)	\$44.00 (+0.50)	\$43.75 (+0.50)	\$45.00 (Unch.)
05-Nov-21	\$43.50 (+1.00)	\$43.50 (+1.00)	\$43.50 (+1.00)	\$43.50 (+1.00)	\$43.25 (+0.75)	\$45.00 (+1.50)
04-Nov-21	\$42.50 (+0.50)	\$42.50 (+0.50)	\$42.50 (+0.50)	\$42.50 (+0.50)	\$42.50 (+0.75)	\$43.50 (+1.00)
03-Nov-21	\$42.00 (Unch.)	\$42.00 (Unch.)	\$42.00 (Unch.)	\$42.00 (Unch.)	\$41.75 (+0.50)	\$42.50 (+0.25)
02-Nov-21	\$42.00 (-0.75)	\$42.00 (-0.75)	\$42.00 (-0.75)	\$42.00 (-0.75)	\$41.25 (-1.13)	\$42.25 (-0.87)
01-Nov-21	\$42.75 (-0.75)	\$42.75 (-0.75)	\$42.75 (-0.75)	\$42.75 (-0.75)	\$42.38 (Unch.)	\$43.12 (-0.50)
29-Oct-21	\$43.50 (-3.00)	\$43.50 (-3.00)	\$43.50 (-3.00)	\$43.50 (-3.00)	\$42.38 (-3.87)	\$43.62 (-3.38)
28-Oct-21	\$46.50 (-0.50)	\$46.50 (-0.50)	\$46.50 (-0.50)	\$46.50 (-0.50)	\$46.25 (-0.50)	\$47.00 (-0.50)
27-Oct-21	\$47.00 (-0.30)	\$47.00 (-0.50)	\$47.00 (-0.25)	\$47.00 (Unch.)	\$46.75 (-0.50)	\$47.50 (-0.25)
26-Oct-21	\$47.30 (-0.10)	\$47.50 (Unch.)	\$47.25 (Unch.)	\$47.00 (-0.25)	\$47.25 (Unch.)	\$47.75 (-0.13)
25-Oct-21	\$47.40 (-0.20)	\$47.50 (-0.25)	\$47.25 (-0.50)	\$47.25 (Unch.)	\$47.25 (-0.13)	\$47.88 (-0.12)

CME Uranium U₃O₈ (UX) Futures

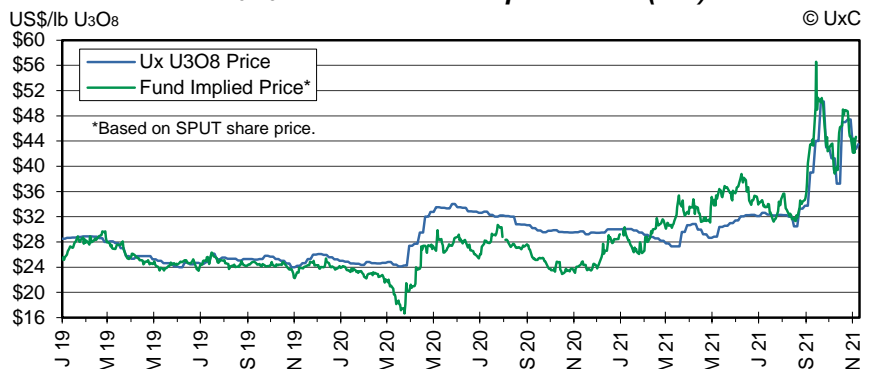
Activity as of November 5, 2021

Settlement	Price	Volume	Open
Dec 2019	\$25.00	1,745	-
Jan 2020	\$24.35	3	-
Feb 2020	\$24.70	1,603	-
Mar 2020	\$27.40	663	-
Apr 2020	\$32.75	5	-
May 2020	\$34.00	56	-
Jun 2020	\$32.60	1,209	-
Jul 2020	\$32.20	12	-
Aug 2020	\$30.65	8	-
Dec 2020	\$30.00	3	-
Aug 2021	\$33.75	200	-
Sep 2021	\$43.00	165	-
Feb 2022	-	40	-
Mar 2022	-	40	-
Apr 2022	-	40	-
Feb 2023	\$45.05	678	600
Mar 2023	\$45.15	200	200
From May 2007	Totals:	126,253	800

Ux U₃O₈ Prices vs. CME Forward UX Prices vs. NL Forward Curve



Ux U₃O₈ Price vs. Fund Implied Price (FIP)



*Based on SPUT share price.



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