

# NUCLEAR INTELLIGENCE WEEKLY<sup>®</sup>

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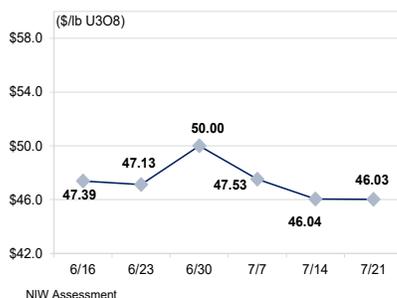
## Market Points

Paladin Energy is planning to return its flagship Langer Heinrich mine in Namibia to production by March 2024, following an off-take agreement concluded earlier this year.

BHP's Olympic Dam in Australia reported 2022 uranium production down by 27% from 2021, though output is expected to increase closer to prior year levels going forward due to completed smelter maintenance.

The midsummer market malaise continues as Energy Intelligence's Uranium Price Panel delivered an average price of \$46.03 per pound U3O8 this week, barely changed from the \$46.04/lb. delivered Jul. 14.

### UPP: \$46.03/LB U3O8



## WEEKLY ROUNDUP

### First Nuclear Concrete at El-Dabaa-1, Akkuyu-4

- The first nuclear concrete was poured this week at two Rosatom-supplied VVER-1200 newbuilds: El-Dabaa-1, the first of four reactors at Egypt's first nuclear power plant, and Akkuyu-4, the last unit to start construction at Turkey's first nuclear plant. The milestones occurred on two consecutive days. Workers at the Nuclear Power Plants Authority's (NPPA's) El-Dabaa began pouring the concrete during a Jul. 20 ceremony attended by Egyptian Electricity Minister Mohamed Shaker, NPPA Chairman Amged El-Wakeel and Rosatom Director General Alexey Likhachev, who commented that this "will be the largest project of the Russian-Egyptian cooperation since the Aswan High Dam." The next day Likhachev was present for a similar ceremony, this time with Turkish Energy Minister Fatih Dönmez, at the Akkuyu site on Turkey's Mediterranean coast. The two projects are the fourth and fifth large nuclear newbuilds to achieve this milestone this year, following three units in China. It's not clear why Akkuyu-4's construction launch came nine months after authorities granted a construction license in October 2021; the El-Dabaa milestone came only weeks after Egypt's nuclear regulator issued a construction license on Jun. 29.
- Kyiv and Moscow exchanged charges this week over the escalations at the Zaporozhye nuclear plant that Russian troops have occupied since Mar. 4. Petro Kotin, president of Ukrainian nuclear operator Energoatom, said in a Jul. 15 television interview that Russian troops have stored weapons "including missile systems" at Zaporozhye, and have used the weapons to shell nearby areas. Moscow countered in two letters to the International Atomic Energy Agency alleging that Ukrainian troops had on Jul. 12 and again on Jul. 18 used unmanned aerial vehicles to strike the territory of the plant. In the second instance one drone "hit in the immediate vicinity (several tens of meters)" from "the storage of plant's spent nuclear fuel and the reactor cooling tank." In its own Jul. 18 letter to the agency, Kyiv alleged that Russian troops and Rosatom representatives had stormed Zaporozhye's management office. On Jul. 21 Energoatom reported on Telegram that Russian troops had "dragged" an arsenal of "ammunition, weapons and explosives" into the engine room of the first of Zaporozhye's six reactors.
- The French state will spend roughly €9.7 billion (\$9.9 billion) to fully nationalize EDF, the finance ministry announced Jul. 19. "This operation implements the general policy speech of the Prime Minister delivered to Parliament," Finance Minister Bruno Le Maire said, referring to Prime Minister Elisabeth Borne's Jul. 6 announcement that this government will follow through on long-mooted plans to nationalize — and therefore recapitalize — the financially-flailing nuclear powerhouse. The move "strengthens France's energy independence," said Le Maire, and "gives EDF the necessary means to accelerate the implementation" of a newbuild program of 6-14 reactors, "and the deployment of renewable energies in France." This announcement was followed by news that the UK government has granted planning consent to EDF's planned twin-EPR newbuild at Sizewell C, though EDF has made clear it won't proceed until it can sell down its current 80% ownership of that project to below 20%.

## NUCLEAR FUEL MARKET

# Paladin to Return Langer Heinrich to Production

Paladin Energy announced this week plans to return its mothballed Langer Heinrich mine in Namibia to operation with first production by March 2024, citing “strong uranium market fundamentals and continued progress on uranium marketing activities including the execution of a binding contract.”

The Australian junior miner announced on Mar. 31 that it had won a tender to supply 2.1 million pounds of U3O8 to a subsidiary of Duke Energy over a six-year period beginning in 2024. That represented approximately 5% of total planned Langer Heinrich production over this period, with an option to extend the annual supply arrangements for another three years. The contract pricing is based on a mix of “expected all-in sustaining costs of Langer Heinrich (factoring in an appropriate margin) and a range of current uranium pricing metrics, inflation-adjusted from the date of execution of the binding offtake contract.”

Langer Heinrich, which had over its lifetime produced some 43 million lbs. U3O8, was mothballed in May 2018 in response to a weak uranium price. Paladin estimates total capital expenditure for restarting the mine at \$118 million, up from a prior estimate of \$87 million, but easily achievable given the \$177 million it had in cash as of Jun. 30. The revision is “primarily driven by recent inflationary pressures across the project supply chain, brought forward power and water infrastructure works and increased owners’ team costs.”

Paladin said it has committed to providing 100% project funding, “if required, via priority loans to be repaid in priority to all outstanding shareholder loans.” However, Langer Heinrich’s 25%-owner CNNC Overseas Uranium Holding has “yet to finalize their funding decision.” Paladin has an existing offtake agreement with that China National Nuclear Corp. (CNNC) subsidiary for up to 25% of future Langer Heinrich life-of-mine production based on a spot-market pricing mechanism, but it’s unclear which company gets to determine the offtake amount.

CNNC Overseas Uranium Holding’s Hong Kong-listed subsidiary CNNC International reported on Jun. 17 the receipt of a \$50 million

loan from China Nuclear Capital to support “the future development of the uranium trading business of the group” but made no mention of Langer Heinrich.

In Australia, meanwhile, BHP’s Olympic Dam copper mine — where uranium is a byproduct — reported a large drop in uranium production in its 2022 financial year ending Jun. 30, due to smelter maintenance completed in January and Covid-19-related labor impacts.

Olympic Dam produced 2,375 tons of U3O8 (5.2 million lbs. U3O8) in the 2022 financial year, down by 27% from 2021, according to its annual operational report. Following the smelter ramp-up to full capacity in April 2022, production is expected to increase closer to prior year levels going forward.

Growing uranium output could put a damper on the uranium spot price, which this summer slumped from recently achieved, decade-long highs in the \$60s/lb. Energy Intelligence’s Uranium Price Panel delivered an average price of \$46.03 per lb. U3O8 for Thursday, Jul. 21, barely changed from the previous week’s price of \$46.04/lb.

And in the UK, the Department for Business, Energy and Industrial Strategy on Jul. 19 launched a £75 million (\$90 million) Nuclear Fuel Fund for “projects that can increase the UK’s domestic nuclear fuel sector, reducing the need for foreign imports and creating the material used in nuclear power stations to generate electricity — with funding going towards designing and developing new facilities.”

The fund is meant to “ensure the UK builds on its legacy of nuclear fuel innovation and production,” and could go toward broad categories: “preservation of UK capability to manufacture fuels for” light-water reactors, including pressurized-water reactors (of which there is only one operating in the UK, with two more under construction), and “development of new fuels” for small modular reactors and advanced reactors.

As the Springfields nuclear fuel fabrication plant in northern England leased and operated by Westinghouse has shown growing signs that it will be shut down, it may be in a pole position for funding to support one or more new fuel production lines. Another likely funding candidate is Rolls-Royce, for the development of fuel for its small modular reactor design.

Jessica Sondgeroth, Washington

## URANIUM PRICE PANEL

For the week ended July 21, 2022

	Chg.	Weekly Spot Market Prices												
		Jul			June			May			Apr			
		21	14	7	30	23	16	9	3	26	19	12	5	28
Price (\$/lb U3O8)	-0.01	46.03	46.04	47.53	50.00	47.13	47.39	52.25	49.40	46.67	47.14	50.41	54.00	52.13
Total Assessments	1.00	10.00	9.00	10.00	10.00	10.00	11.00	10.00	10.00	12.00	10.00	9.00	11.00	9.00
% within 1 StDev	24.44	80.00	55.56	70.00	60.00	90.00	72.73	70.00	40.00	75.00	80.00	77.78	72.73	55.56
Low (\$/lb U3O8)	0.25	45.75	45.50	47.00	49.25	47.00	46.60	51.70	49.00	46.00	47.00	49.00	53.50	51.25
High (\$/lb U3O8)	-0.50	46.25	46.75	48.50	50.75	47.50	48.50	52.50	50.15	47.50	47.50	52.00	55.00	53.00
Variability*	-0.31	0.00	0.31	0.50	0.16	0.06	0.09	0.40	0.32	0.05	0.00	0.28	0.50	0.50

\*This represents the value of the potential range of conceivable final averages that might result when random elimination is used to balance market positions within the panel.

## BELGIUM

## 'In Principle' Agreement for Nuclear Life-Extensions

The Belgian government and Engie today agreed on the broad outline of a deal to extend the lifetime of the two youngest of Engie's seven reactors in Belgium, all of which are currently slated to be shuttered by the end of 2025. The government reconsidered its commitment to a nuclear phaseout earlier this year, prompted by the European energy crisis. Separately, in preparation for an anticipated energy crunch this coming winter, the two sides are also discussing the more temporary operational extension of an older reactor slated to be permanently shuttered in February.

The government hopes to finalize by year's end this "agreement in principle", which would aim to restart Doel-4 and Tihange-3 in November 2026 — apparently after shutting them both at the end of 2025, as currently required — adding 2 gigawatts of low-carbon capacity before another high-demand winter season.

All of this underlines how attractive Belgium's nuclear capacity, which in the first half of 2022 provided 53.5% of Belgian electricity, has become as Europe suffers through a gas-supply crisis triggered by the Russian invasion of Ukraine. That attractiveness has only increased across the EU as policymakers contemplate a cutoff of Russian gas supplies before this coming winter. "We should take precautions," Christian Durr, the Parliamentary leader of the Free Democratic Party and a member of the governing coalition in Germany, tweeted Jul. 12: "stop generating electricity from gas, extend the lifespan of nuclear power plants and examine gas production in the North Sea." While Berlin is unlikely to reexamine yet again its nuclear phaseout, in which its last three reactors are slated to shut by year's end, Durr's comments reveal how dramatically European thinking on energy has shifted.

### Vagaries of Belgium's Life-Extension Deal

Belgium's restart of Doel-4 and Tihange-3 would be contingent on "approval by the safety authorities" and would take place in the context of a "stable and sustainable structure in which the Belgian state and Engie share both risks and profits through a new company to be established," according to a Jul. 22 statement from Prime Minister Alexander De Croo and Energy Minister Tinne Van der Straeten.

The plant operator would still bear the costs of decommissioning the reactors and "managing" of their spent nuclear fuel and waste. However, agreed spent fuel management costs will be finalized "after a study" in which "discussions will start" about defining "a cap and risk premium."

The announced long-term extension agreement in Belgium is short on details, and Bram Claeys, a Brussels-based policy adviser with the Regulatory Assistance Project, argued to Energy

Intelligence that it was heavy with "what seem to be" contradictions. The state "is not going to pay for the waste, yet we're introducing a cap on how much Engie will have to pay," said Claeys, and the state "is not becoming a co-owner, yet we're going to share costs and benefits in some sort of new structure."

Claeys also noted that an ongoing national dialogue on nuclear waste disposal was launched in April 2022, and was estimated to take 18 months. "Not sure how that matches with this principles agreement," said Claeys.

### Engie's Strong Bargaining Position

What's clear is that Engie remains in a strong negotiating position. Although it had previously lobbied to extend its Belgian nuclear capacity, last year it gave into the government's previous phaseout policy, and it even recorded a €2.9 billion (then \$3.5 billion) impairment from its seven Belgian reactors in February 2021. In its May. 17 quarterly results presentation Engie said it would engage in a life-extension of Doel-4 and Tihange-3 "only in a balanced risk sharing approach."

Engie CEO Catherine MacGregor told analysts that "what is really important to understand with this potential extension is that it would come with a number of risks and uncertainties", including "technical aspects", Belgium's "regulatory framework" and "the risks related to the dismantling of the plants, which would happen at the same time as well as the waste management."

The one Engie demand not highlighted by MacGregor, but reported in the Belgian press, was that any life extension be for 20 years rather than 10. In the government's announcement this week it said that it started talks with Engie in March "with a view to extending the operation of the Doel-4 and Tihange-3 nuclear reactors for a period of 10 years," but it makes no mention of that time period in its explanation of the actual framework agreement. The statement did however, underline the motivations for its policy U-turn: "a radically changed geopolitical situation in Europe, in particular the war in Ukraine, the impact of the war on gas supplies in neighboring countries, the unplanned unavailability of several French nuclear power plants and the impact of all this on the Belgian electricity supply."

This agreement is "too late and too light," Marie-Christine Marghem, who served as federal energy minister from 2014-20, said in a Jul. 22 tweet. "This is the first time that the Minister" — presumably a reference to Van der Straeten, Marghem's successor and a Green Party politician who until February had been a strong phaseout advocate — "has acknowledged that energy is a matter of national security. We must work to extend ALL the nuclear fleet!"

### Near Term Extensions As Well?

The Belgian government actually ticked closer to this argument a week ago, when the government released a "Winter Energy Plan" for this upcoming 2022-23 winter. That plan involves asking Engie

to extend the operation of Tihange-2, the 1,008 megawatt reactor currently slated to be shuttered Feb. 1, 2023, “until the winter has passed.” Meanwhile Zuhair Demir, energy minister of the wealthy Flanders region of Belgium, similarly called for 1,006 MW Doel-3, currently slated for closure on Oct. 1, to be similarly extended. “In the coming winter we will have to pull out all the stops if we don’t want to let people suffer,” she said in a Jul. 14 tweet.

The problem with both proposals is that these two reactors are the ones that were taken offline from 2012–15 after the detection of “hydrogen flakes” produced during the forging process of their reactor pressure vessels. Both reactors were allowed to restart in November 2015, but the Federal Agency for Nuclear Control (FANC) only authorized their continued operation through the already delineated lifespan ending over the next seven months.

An Engie spokesperson quickly shot down the Winter Energy Plan proposal, telling the Belgian press that an extension of either reactor is impossible for technical and safety reasons. The government claims that the FANC “will check” whether a Tihange-2 extension “can be done under safe conditions,” it said. If the answer is yes, the next question will be whether Engie asks for anything further to actually implement the change.

*Phil Chaffee, London*

## WASTE

# New Mexico Prepares to Block Holtec Interim Storage Plan

The New Mexico governor is pushing state lawmakers to take a page from neighboring Texas’ playbook and prohibit interim nuclear waste storage within the southwestern US state. Although US Nuclear Regulatory Commission (NRC) staff recently approved an environmental report for the centralized interim storage facility planned by Holtec International, a final decision from the federal nuclear regulator to approve Holtec’s license application could potentially now coincide with the adoption of a state ban in the session of the New Mexico state legislature that starts in January.

The opposition from Democrat-led New Mexico and Republican-led Texas governments — both in the courts and through state legislation — suggests the US Department of Energy (DOE) may struggle to fulfill its Congressional mandate to identify temporary waste storage solutions using a consent-based siting approach. In an April visit to the shuttered San Onofre nuclear power station in California, Energy Secretary Jennifer Granholm said “some communities have raised their hands to have these conversations” about temporarily hosting the nation’s civilian spent nuclear fuel, but she gave no specifics. For any real clarity on the nation’s nuclear spent fuel dilemma, the onus remains with Congress to clear a way forward for permanent disposal. But so far, with DOE

just beginning its consent-based process for interim storage siting and the NRC licensing two private interim storage facilities heavily opposed by the host states, US lawmakers have yet to prioritize or take seriously the nation’s spent fuel strategy.

New Mexico and Texas have taken up separate court proceedings challenging the NRC’s authority under both the 1954 Atomic Energy Act and the 1982 Nuclear Waste Policy Act to license a waste storage site without the state’s consent. Meanwhile the DOE operates under the Nuclear Waste Policy Act that bars it from transferring the nation’s civilian spent nuclear fuel from reactor sites to an interim storage facility until the NRC has authorized construction of a permanent repository. But in late 2020 Congress mandated the DOE launch a consent-based siting approach to interim storage, while once again punting on a permanent waste storage solution. Various parties have suggested that private companies like Holtec could use their subsidiary ownership of decommissioning plant sites to maintain title of the spent fuel stored on-site and transport it to an interim site, but that’s only likely to be financially acceptable to those private companies if DOE covers the liability.

Both Texas and New Mexico have expressed concerns that the waste would eventually become a *de facto* repository if no permanent storage solution is in place. Both have also pointed to radiological and safety concerns given nearby gas drilling, and to the economic impact a nuclear waste facility could have on their respective oil and gas industries. Anti-nuclear activists and state lawmakers opposed to the interim storage sites also warn that the federal government is on course to pick up the tab.

These “so-called ‘private’” centralized interim storage facilities in New Mexico and Texas “could effectively become federalized,” 137 Native American, environmental justice, environmental non-governmental organizations and individuals said in a Mar. 14 response to the DOE’s request for information on its process to identify federal interim storage facilities.

New Mexico state Senator Jeff Steinborn, a democrat from nearby Dona Ana County who authored legislation to block Holtec’s siting of an interim storage site in the state, called the timing of the DOE’s effort troubling. It is sending a “bifurcated and contradictory federal message” on consent-based siting, Steinborn told Energy Intelligence. “Clearly, obviously we think there should be a consent-based process for any nuclear waste storage decision,” but Steinborn questioned why the NRC would begin a licensing process at a site before the DOE has consent to store the fuel there. “Why would the federal government push something on a state that is so heartily opposed to it?”

On Jul. 14 NRC staff recommended approval of both Holtec’s final environmental impact statement (EIS) for the mooted storage facility in the southeast corner of the state, and of “the initial phase of the project, subject to the determinations in the staff’s safety review of the application.” Holtec still requires approval by NRC staff of the project’s safety evaluation report. Holtec’s responses to a third round of NRC requests for additional information were

found to be insufficient with regard to the “evaluation of external hazards, the evaluation of the proposed canister transfer building, and the evaluation of the off-site dose estimate,” the NRC said in a May 26 schedule update. Pending Holtec’s clarity on those matters, the NRC said it expects to issue Holtec’s safety evaluation report along with a final licensing decision in January 2023. Holtec submitted its license application to the NRC in March 2017.

New Mexico Gov. Lujan Grisham responded to the final EIS recommendation in a Jul. 13 statement: “The state of New Mexico will not become a dumping ground for the nation’s spent nuclear fuel due to Congress’s failure to identify a permanent disposal solution for commercial nuclear waste. My message to the state Legislature is clear: deliver a proposal to my desk that protects New Mexico from becoming the de facto home of the country’s spent nuclear fuel and it will have my full support.”

The bill proposed in the New Mexico legislature would prohibit the issuance or certification of state permits “for the construction or operation of a disposal facility for spent fuel or high-level waste, unless a permanent repository is in operation.” New Mexico considered the legislation in the last legislative session, but it ran out of time for a floor vote in the 30-day session and the measure was put to the side on Feb. 14. Proponents are hopeful it will pass in the next (60-day) legislative session beginning in January 2023, though Steinborn told Energy Intelligence he expects it will be a battle and he “wouldn’t predict the outcome.”

Holtec spokesperson Joe Delmar told Energy Intelligence the company “continues to evaluate the State permits required and will apply to obtain these permits in accordance with the overall project schedule.”

Texas, meanwhile, has already passed similar legislation. This has blocked Interim Storage Partners’ plans for an interim waste storage facility at Waste Control Specialists’ low-level waste site in Andrews, Texas after it was granted an NRC license in September last year. Interim Storage Partners is a joint venture of Orano USA and Waste Control Specialists.

*Jessica Sondgeroth, Washington*

## JAPAN

# Parsing the Fukushima Liability Rulings

There is an overwhelming consensus among Japanese courts that Tokyo Electric Power Co. (Tepco) bears considerable responsibility and liability for the disaster that began unfolding on Mar. 11, 2011 at the utility’s Fukushima Daiichi nuclear power plant. But to what extent individual Tepco executives are similarly liable — either civilly or criminally — remains unsettled. The Tokyo High

Court is expected to rule on this criminal liability question in a ruling in January, and whether it adopts any of the logic or conclusions of the recent lower court decision on civil liability may begin to settle the matter. If a precedent for civil and/or criminal liability of these former executives is established and survives review in Japan’s highest courts, it could have major knock-on effects on Japan’s nuclear operators’ ability to restart reactors or even hire senior executives.

“This kind of judgment could undermine corporate management and the willingness of executives to lead nuclear power companies and even other businesses,” a senior industry professional told Energy Intelligence. One London-based law firm argued that the ruling is “an example of what could come for directors and officers who are the front line of managing risk,” and is certainly “a warning to all people involved in the management of an electric utility owning and operating nuclear power plants.”

The question now is to what extent the thinking in last week’s eye-popping verdict — that four ex-directors of Tepco must pay 13.3 trillion yen (\$9.7 billion) in damages to Tepco as a result of their own civil negligence — will be adopted by higher courts. A panel of three civil division judges in the Tokyo District Court found the former executives negligent in their failure to heed the December 2002 long-term earthquake and tsunami forecast of the Headquarters for Earthquake Research Promotion. That Cabinet-level organization warned of the risk of an 8.2 magnitude earthquake offshore northeastern Japan setting off a massive tsunami within the following years, but this prompted the Tepco executives to enact few countermeasures at Fukushima Daiichi.

## Setting a Precedent?

The next big data point will come early next year, when the Tokyo High Court is expected to rule on an appeal of the September 2019 decision by a criminal division of the Tokyo District Court that three of those same executives do not bear criminal liability for their management choices.

Yuichi Kaido, a leading lawyer for the plaintiffs in both the civil and criminal negligence cases, stated in the hours after the Jul. 13 ruling that it’s “possible” that “this judgment will have major influence on the result of the Tokyo criminal judgement which is now being considered in the Tokyo High Court.” Kaido, who is co-founder of the Tokyo-based National Network of Counsels in Cases against Nuclear Power Plants, argued that the civil judgment was “a breakthrough” that acknowledged the existing risk of severe accidents at nuclear power plants and the obligation of operators to take necessary precautions in order to prevent loss of lives or injuries and property damage. Kaido also stated that the judgment “was based on the most comprehensive examination of the evidence regarding the cause of the Fukushima nuclear accident.”

Indeed, the citizen support group driving the prosecution in the criminal case has already launched a new petition calling on the

Tokyo High Court to reopen its hearings, which concluded last month, to permit “the adoption and interrogation of evidence” from the Jul. 13 civil case judgment.

Even though the four defendants in that civil case “will be able to appeal and delay any impact on their lives for some time,” the lower court judgment will immediately set “a good precedent because it will inhibit corporate leaders from acting irresponsibly or with impunity,” a Taiwan-based professor in Japanese criminal law told Energy Intelligence Jul. 21. He added that “the judges found a cause-and-effect relationship between the error in judgment by the top Tepco executives in not promptly acting to bolster tsunami countermeasures and the resulting deaths and injuries that could have been prevented by the adoption of intermediate safety measures.”

A Tepco spokesperson told Energy Intelligence that the utility “sincerely apologizes for causing great inconvenience and concern to the people of Fukushima Prefecture and the general public due to the accident at our nuclear power plant,” but added that “we will refrain from responding to individual proceedings.”

## A Precautionary Safety Principle

The conservative *Sankei Shimbun* reported Jul. 11 that the defense for the ex-Tepco senior executives had continued the argument they’d made in the separate criminal proceedings. Defendants argued that the 2002 forecast did not specify specific tsunami water levels or inundation ranges and that its reliability “was questioned by national organizations and experts.” Therefore the Tepco executives had asked the Japan Society of Civil Engineers to review the Cabinet-level agency’s forecast, and had put off major investments in countermeasures such as breakwaters and a stronger seawall.

The Tokyo District Court judges in the civil case found that it was sufficient that the 2002 forecast “possessed a sufficient degree of scientific credibility and authority” for the Tepco board of directors to have taken it seriously, and they were “obligated” to adopt tsunami-adequate countermeasures. The court’s ruling marked a shift away from an “all or nothing” notion in the September 2019 criminal acquittal to a more nuanced view centered around multiple preventive measures obligated by a “precautionary safety principle.” That principle has been referenced in recent high court judgments on class action-forced evacuee suits, as well as in a dissent from Justice Mamoru Miura in last month’s Supreme Court ruling on government liability for Fukushima.

The civil court judges observed that the decisive event in the tragedy was the flooding of the basements of the power plant’s turbine buildings and the disabling of emergency diesel generators. This resulted in a station blackout. The court found that the implementation of measures such as waterproofing and the relocation of emergency generators and water supply units to higher elevations could have allowed the plant to avoid this station blackout. This in turn would markedly reduce the damage caused by the tsunami,

irrespective of whether stronger or higher seawalls were constructed to keep the facility entirely “dry.”

No less damaging to the defense was the discovery that other nuclear power plants, including Tepco’s own Kashiwazaki-Kariwa in Niigata Prefecture and the Tokai-2 facility in Ibaraki Prefecture operated by the Japan Atomic Power Co. had or planned to adopt design changes to introduce such measures.

*Dennis Engbarth, Taipei*

## LEGAL

# Key Fukushima Liability Cases

Responsibility for the disaster at the Fukushima Daiichi nuclear power plant, which was triggered by the 9.0 magnitude Great Tohoku earthquake and tsunami of Mar. 11, 2011, has been debated for over a decade now in front of Japanese judges.

Plaintiffs ranging from displaced Fukushima residents to shareholders of plant operator Tokyo Electric Power Co. (Tepco) have pursued multiple defendants, from the government to Tepco to senior Tepco management.

While any number of these cases continue to wind their way through the Japanese judicial system, below are the key cases in which the Supreme Court may ultimately apportion both responsibility and liability for the disaster:

- **The Tokyo District Court’s Jul. 13 decision on top Tepco executives’ civil liability**

After a decade of investigation, deliberation and debate, the recent 636-page verdict in this “Tepco shareholder derivative suit” found in favor of the 48 Tepco shareholders who had filed a suit in 2012 demanding that five former Tepco senior executives pay 22 trillion yen in damages to the utility.

Presiding Judge Yoshihide Asakura led two other justices in the 8th Civil Division of the Tokyo District Court in a ruling ordering four of those five former executives to pay a cumulative 13.32 trillion yen (US\$96.4 billion) in reparations to Tepco: former chairman Tsunehisa Katsumata, former president Masataka Shimizu and two former vice presidents, Ichiro Takekuro and Sakae Muto. Former managing executive officer Akio Komori, who was director of the Fukushima Daiichi facility when the disaster occurred, was not ordered to pay compensation because he had been at the post for only a year.

The figure of 13.32 trillion yen sets an astronomical domestic record in awarded damages for a corporate liability case. It

includes 1.62 trillion yen for decommissioning, 7.83 trillion yen for redress payments to disaster victims and 4.62 trillion yen for site clean-up and interim waste storage.

The ruling will almost certainly be appealed to the Tokyo High Court, the criminal division of which is already considering the issue of the criminal liability of three of these defendants, following an appeal of a 2019 acquittal described blow.

- **The Tokyo District Court's Sep. 19, 2019 ruling on top Tepco executives' criminal liability**

Katsumata, Takekuro and Muto were all acquitted of criminal liability in this decision by a three-judge panel from the criminal side of the Tokyo District Court. In a ruling led by Presiding Judge Kenichi Nagafuchi, the court found that a criminal charge of professional negligence resulting in death or injury must be based on "a determination beyond a reasonable doubt that there was predictability in the events that led to the deaths or injuries." That determination could not be made in this case, it found.

This case was prosecuted only after government prosecutors twice refused to do so, and were then compelled to prosecute by a panel of citizens in a "Committee for an Inquest of Prosecution." The designated prosecutor appealed the ruling to the Tokyo High Court in September 2020, and that court began a hearing on the issue in November 2021. The court is expected to deliver a judgment this coming January.

- **Two 2022 decisions from the Japan Supreme Court on the liability of Tepco and the Japanese government**

There have been over 30 class action suits, filed by thousands of forced evacuees, demanding reparations from both Tepco and the national government for loss of livelihood and related mental distress. On Mar. 5 the *Tokyo Shimbun* reported that of 23 district court judgments, Tepco was found fully liable in 21

cases and partially liable in two. Meanwhile the government was held liable under the State Redress Act in nine verdicts and not liable in eight actions. Of the seven decisions appealed to high courts, Tepco was found liable in all seven, while the government was ordered to provide redress in three suits and found not liable in one.

Earlier this year, Japan's highest court reviewed four high court decisions involving both Tepco and the national government. It separated the proceedings into two procedures. The first reviewed Tepco's liability under the Act on Compensation for Nuclear Damage, and the second reviewed the government's liability under the State Redress Act.

On Mar. 4, the court's Third Petty Bench upheld the four high court judgments of Tepco's civil liability under the Act on Compensation for Nuclear Damage, and hiked the operator's total damages to 1.45 billion yen (\$10.5 million). Then in a separate Jun. 17 ruling, the court's Second Petty Bench concluded that the Japanese national government did not bear any liability under the State Redress Act. The 3-1 majority opinion delivered by Presiding Justice Hiroyuki Kanno did not rule on whether the responsible government regulatory agencies had performed properly. Instead it found that the Mar. 11, 2011 earthquake and tsunami were so large that the accident could not have been avoided even if government overseers had acted on the basis of July 2002 predictions from the cabinet-level National Headquarters for Earthquake Research Promotion and had pressed Tepco to implement countermeasures.

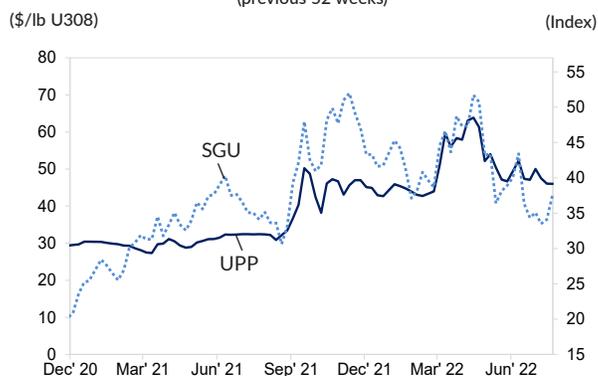
The Supreme Court has yet to rule on the liability — civil or criminal — of any of the Tepco management. But it may do so in the future if and when judgments from the Tokyo High Court, including a possible review of the Jul. 13 Tokyo District Court ruling, are themselves appealed.

*Dennis Engbarth, Taipei*

# URANIUM MARKET UPDATE

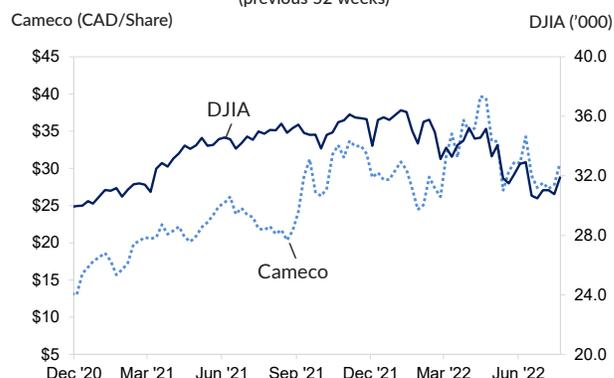
All prices as of Thursday, July 21, 2022

**UPP VS. SOLACTIVE GLOBAL URANIUM INDEX**  
(previous 52 weeks)



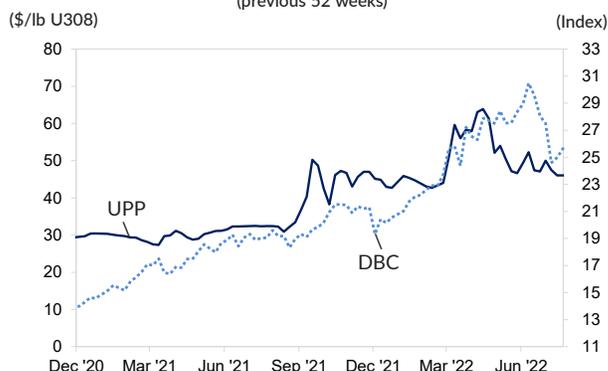
The Solactive Global Uranium Total Return Index, created by Structured Solutions AG, tracks the price movements in shares of companies active in the uranium mining industry. Calculated as a total return index and published in US\$, its composition is ordinarily adjusted twice a year.

**CAMECO VS. DOW JONES INDUSTRIAL AVERAGE**  
(previous 52 weeks)



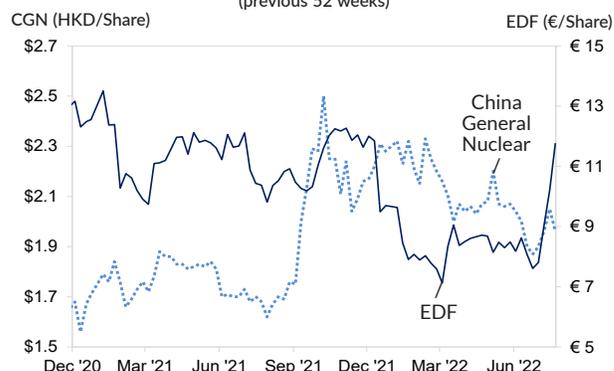
Canadian uranium miner Cameco's stock is valued in Canadian dollars compared with the US dollar on the Dow Jones Industrial Average (DJIA). Roughly two-thirds of DJIA's 30 component companies are manufacturers of industrial and consumer goods. The others represent industries ranging from financial services to entertainment.

**UPP VS. POWERSHARES DB COMMODITY INDEX**  
(previous 52 weeks)



The PowerShares DB Commodity Index Tracking Fund is designed to provide investors with a broadly diversified exposure to the returns on the commodities markets. It is based on the Deutsche Bank Liquid Commodity Index, which is composed of futures contracts on 14 of the most heavily traded and important physical commodities.

**EDF VS. CHINA GENERAL NUCLEAR**  
(previous 52 weeks)



The stock valuation of France's Electricite de France (EDF), largely owned by the French state, is in euros compared to state-owned China General Nuclear (CGN) Power Co., valued in Chinese yuan renminbi. Both companies build nuclear power facilities, design and service reactors, operate nuclear reactors and supply nuclear components and technology.

## MONTHLY SPOT MARKET PRICES

	Chg.	2022						2021						
		Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	
<b>Uranium (\$/lb U308)</b>														
Low	+1.00	45.50	46.00	52.50	51.00	42.50	43.00	42.00	43.00	36.00	36.00	32.20	32.20	
High	-1.50	52.50	54.00	64.00	60.00	44.50	46.50	47.00	47.50	48.00	51.00	36.00	32.50	
<b>Conversion (\$/kgU)</b>														
Low	-	30.00	30.00	28.00	26.00	16.00	16.00	16.00	15.00	16.00	19.00	19.00	19.50	
High	-	33.00	33.00	30.00	28.00	17.00	17.00	17.00	18.00	19.00	21.00	21.00	21.50	
<b>Enrichment (\$/SWU)</b>														
Low	-	84.00	84.00	82.00	100.00	59.00	57.00	56.00	56.00	55.50	55.50	54.00	54.00	
High	-	150.00	150.00	150.00	150.00	61.00	59.00	57.00	57.00	57.50	57.50	56.00	56.00	

NIW monthly UF6, SWU and U308 prices rely on the general consensus of direct market participants and is informed by actual market transactions. This section was previously known as the Nukem Weekly Report and the Nukem Price Bulletin. The methodology for NIW's weekly UPP price is different - more information about the methodology behind that price is available on page two.

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