

Industry Note

Equity Research

March 26, 2020

Metals & Minerals

Uranium Weekly: COVID-19 Mine Closures a Potential Tipping Point

- **We highlight the uranium market as a one for investors to monitor closely because it is a small market susceptible to supply (and demand) shocks (Exhibit 1).** Cameco announced on Tuesday evening a four-week closure of the Cigar Lake mine due to concerns about the potential spread of COVID-19 in remote Northern Saskatchewan. Cigar Lake represents ~13% of current global primary supply. In our view, a one-month shutdown does not classify as a supply shock — but if more mines follow suit (particularly in Kazakhstan) and/or the closure is extended, it could become one.
- **Ux Consulting's (UxC) spot price indicator has increased by US\$2.45/lb over the last three days to US\$26.50 (March 25);** this compares with the previous week's average of US\$24.25/lb. UxC noted that some of the recent pickup in spot activity last week could be attributed to utilities/other buyers reacting to COVID-19-related market uncertainties. We expect that this type of spot market buying behaviour could accelerate as concerns over potential COVID-19 mine closures work their way into procurement strategies.
- **We believe that primary demand for uranium is relatively inelastic.** The inelasticity of primary demand is due to nuclear power's core role in base load power generation, which, at least in the short term, should be unaffected by decreased economic activity levels, in our view. According to the WNA, although uranium reactors are expensive to construct and maintain, they are very competitive on an operating cost per kWh basis. We expect that nuclear reactors will stay on-line to provide grid stability. Although the spot market is not the primary uranium procurement avenue for utilities, fuel buyers may look to bolster their inventory levels during this period of uncertainty.
- **We believe that in-situ recovery (ISR) uranium production in Kazakhstan will be a key driver behind uranium price volatility as the COVID-19 crisis continues to unfold.** Kazakhstan produces more than 40% of global primary supply, and its in-situ leach operations could continue to provide production via residual leaching (albeit declining), even if minimally staffed and well-field activity is curtailed. That being said, we believe that further mine closures or production slowdowns (particularly in Kazakhstan) could drive utilities, producers, and financial players to reassess procurement strategies on the fly. The Cigar Lake floods in the early-2000s drove record levels of contract demand as utilities sought security of supply.
- **We have not updated our price deck at this time — but further or extended mine curtailments present upside risk to our forecasts.** We are currently projecting an average spot price of US\$25.13/lb in 2020 and US\$27.00/lb in 2021. Our long-term price (starting in 2025) is US\$45/lb.

Greg Barnes

416 983 9588
greg.barnes@tdsecurities.com

Craig Hutchison, P. Eng

416 982 3474
craig.hutchison@tdsecurities.com

Derick Ma, CFA, CPA, CA

416 308 3404
Derick.Ma@tdsecurities.com

Joel Brown, P.Eng. (Associate)

416 307 8932
joel.brown@tdsecurities.com

Laura Baker, (Associate)

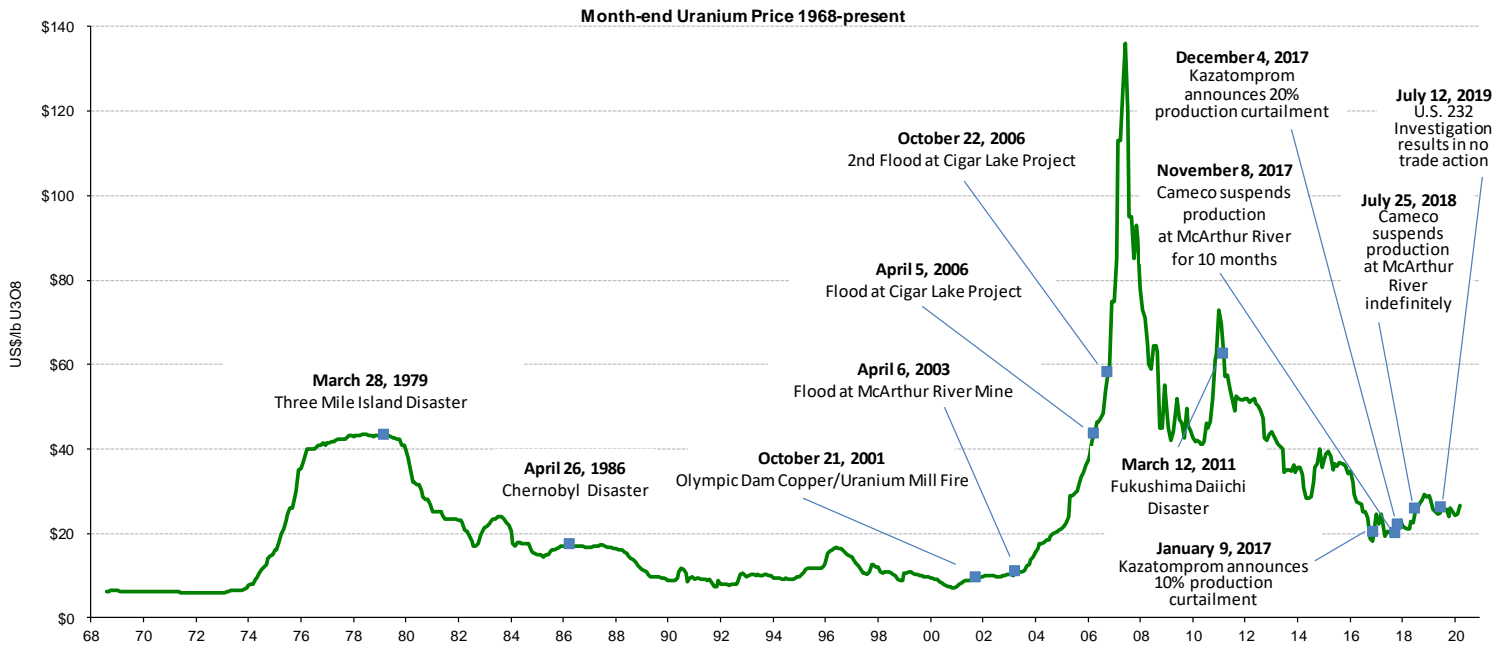
416-308-2360
Laura.A.Baker@tdsecurities.com

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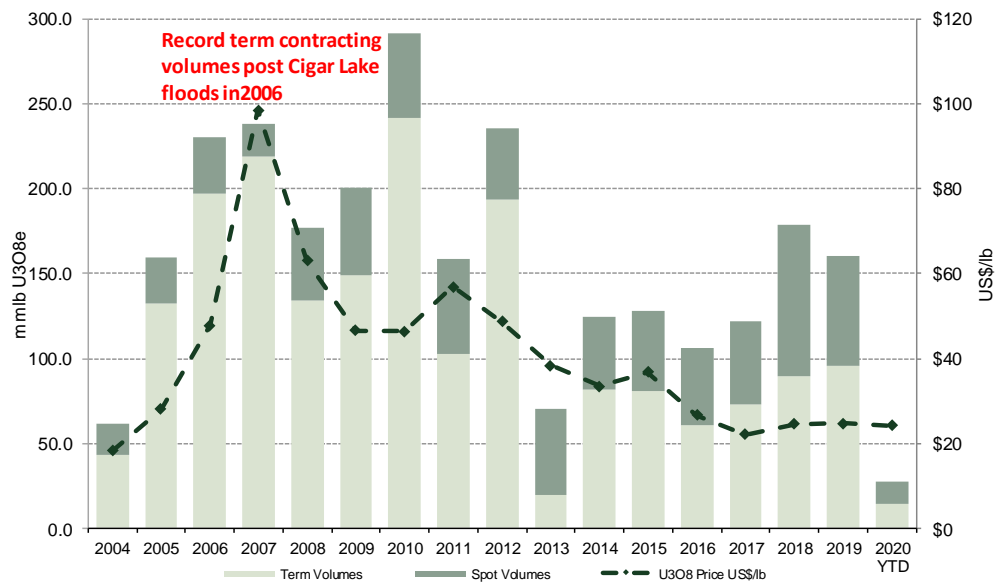
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Exhibit 1. Spot and Term Uranium Prices (US\$/lb)



Source: UxC, Companies, TD Securities Inc.

Exhibit 2. Term Contracting Hit Record Levels Following 2006 Cigar Lake Floods



Source: UxC; TD Securities Inc.

Industry News:**Utilities around the globe respond to COVID-19 epidemic (Source: UxC)**

- **In the U.S.**, NextEra Energy spokesperson Lindsay Robertson told the press that the company's nuclear plants, specifically Seabrook station in New Hampshire, are operating under an existing "pandemic plan," which outlines procedures for ensuring continuity of service at all its nuclear plants. Exelon, the U.S.' largest nuclear power utility, reported March 17 that it and its operating subsidiaries are managing all nuclear plants under similar pandemic preparedness plans through the end of this summer. It should also be noted that Reuters said it received word from over a dozen other U.S. power utilities, some of which operate nuclear plants, who said they were implementing measures and plans to mitigate infection among their employees.
- **In Europe**, French utility EDF said it is implementing new, stricter hygiene procedures at its nuclear power plant fleet. A handful of workers came down with COVID-19 infections last week, which prompted several nuclear power plant unions to strike as workers feared they would become infected if oversight was not improved. An EDF spokesman told the press on March 20 that the company's 40 nuclear reactors currently operating were not impacted by the coronavirus crisis.
- **In the UK**, EDF Energy said on March 17 that it intends to keep operations at all 15 of its reactors going throughout the pandemic, although eight of its units are currently in outage.

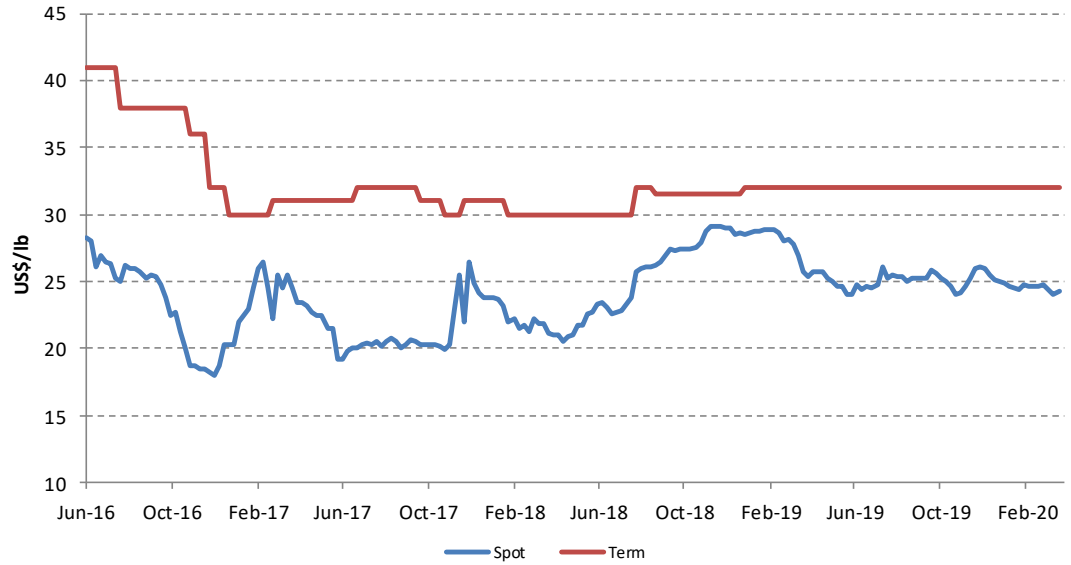
French power demand falls 15%; EDF cuts 2020 production target (Source: UxC)

- France's electricity grid operator RTE announced March 19 that electricity demand fell approximately 15% compared to the same time in 2019 following a decline in economic activity in the wake of the COVID-19 outbreak.
- French citizens have been ordered to stay at home since March 19 to help mitigate the spread of the virus, and the decision to quarantine the country has prompted a precipitous drop in energy demand.
- Accordingly, French nuclear power supplier EDF reported March 23 that the decline in energy demand should "have a relatively limited financial impact on supply and distribution activities."

U.S. NEI and NRC respond to COVID-19 pandemic (Source: UxC)

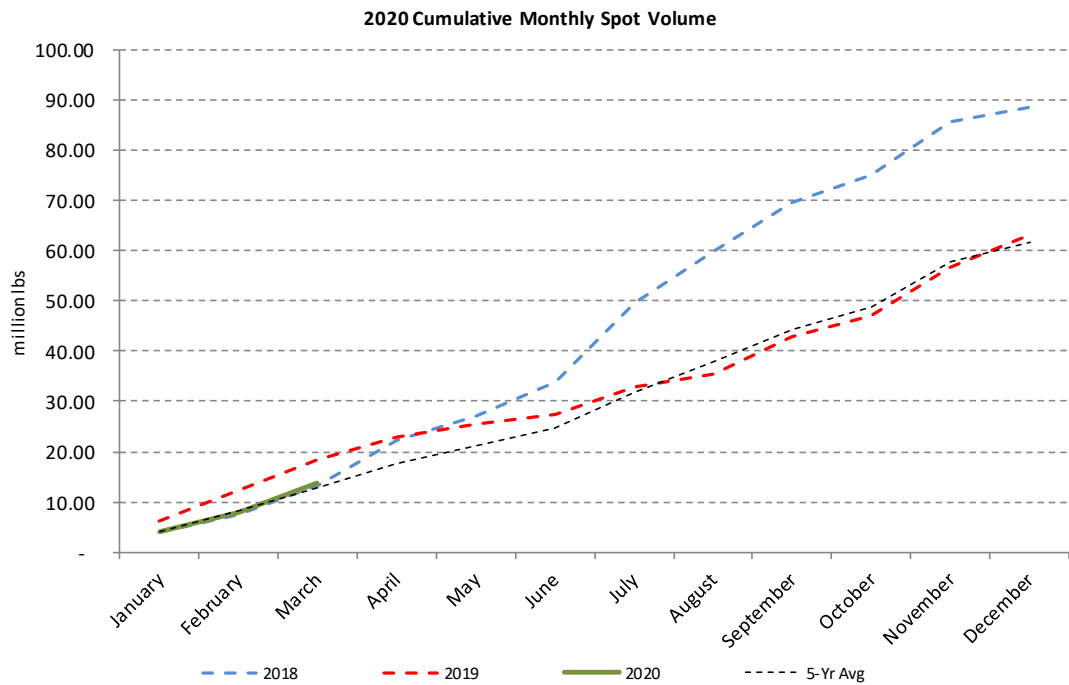
- Several U.S.-based nuclear power entities released updates and press releases regarding the ongoing COVID-19 pandemic.
- The U.S. Nuclear Energy Institute (NEI) reported March 21 that while the coronavirus outbreak is constantly evolving, the organization is working to convene members of the U.S. nuclear industry to communicate, coordinate, and share best practices, including: web-based status boards demonstrating current site status; "operations" calls to utility and suppliers; calls with Chief Nuclear Officers; and status updates with utilities, suppliers, government affairs, legal, and communications departments.
- The U.S. Nuclear Regulatory Commission (NRC) issued a press release on March 19 noting the actions the Commission is taking to maintain important safety and security missions despite the challenges posed by COVID-19.

Exhibit 3. Spot and Term Uranium Prices (US\$/lb)



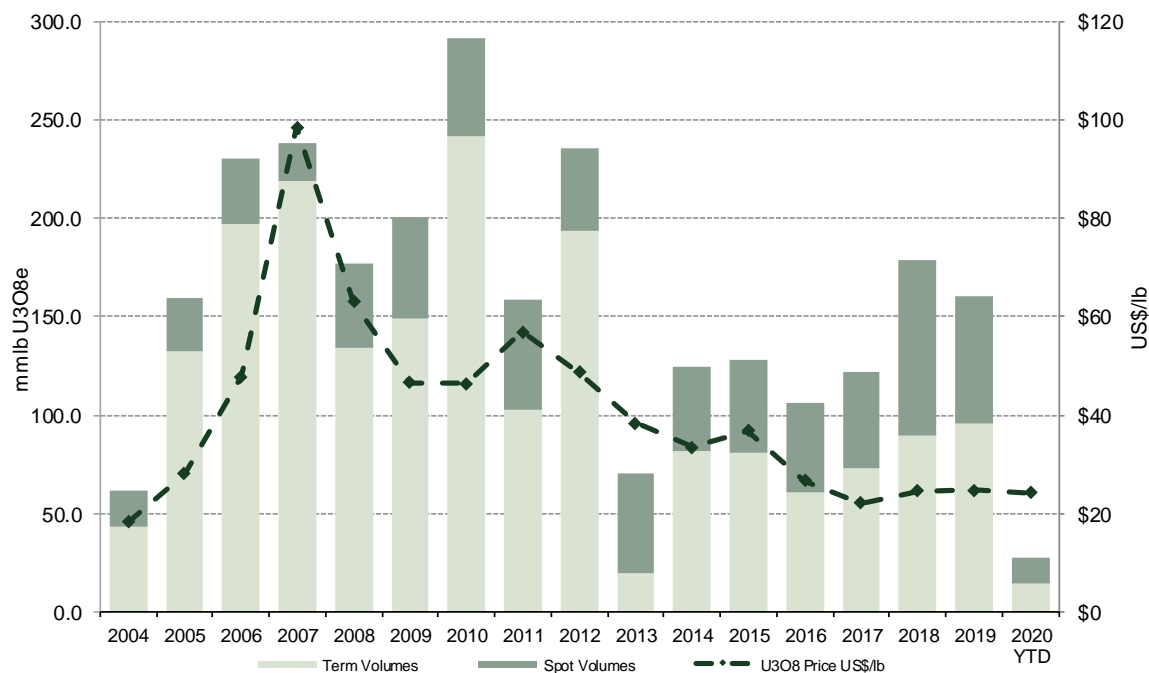
Source: UxC

Exhibit 4. Cumulative Monthly Spot Market Volume



Source: UxC

Exhibit 5. Annual Spot Plus Term Uranium Market Volumes



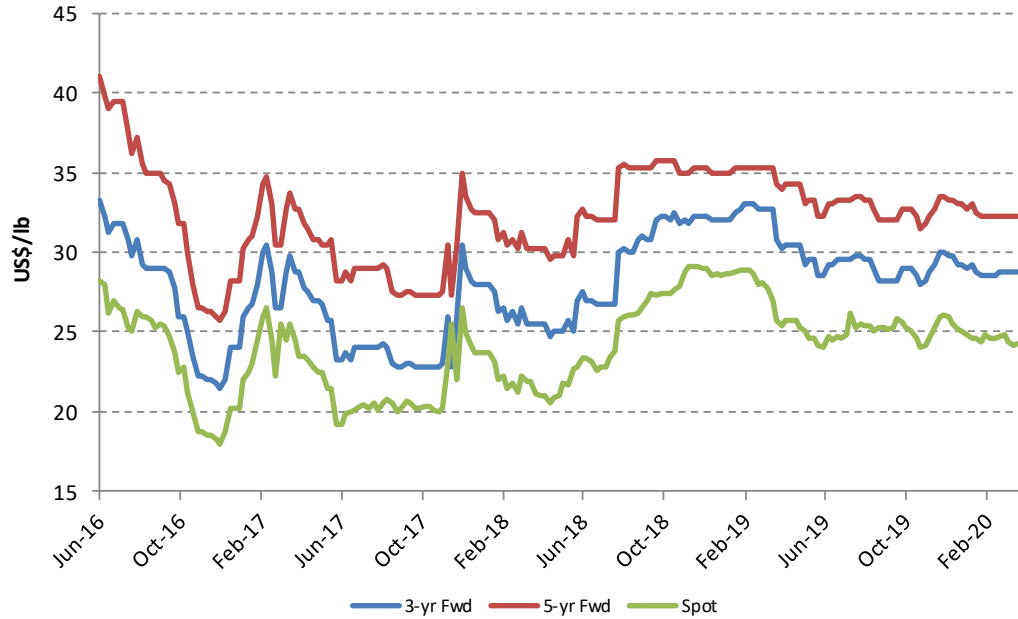
Source: UxC

Exhibit 6. Uranium Term Price Premium to Spot (US\$/lb)



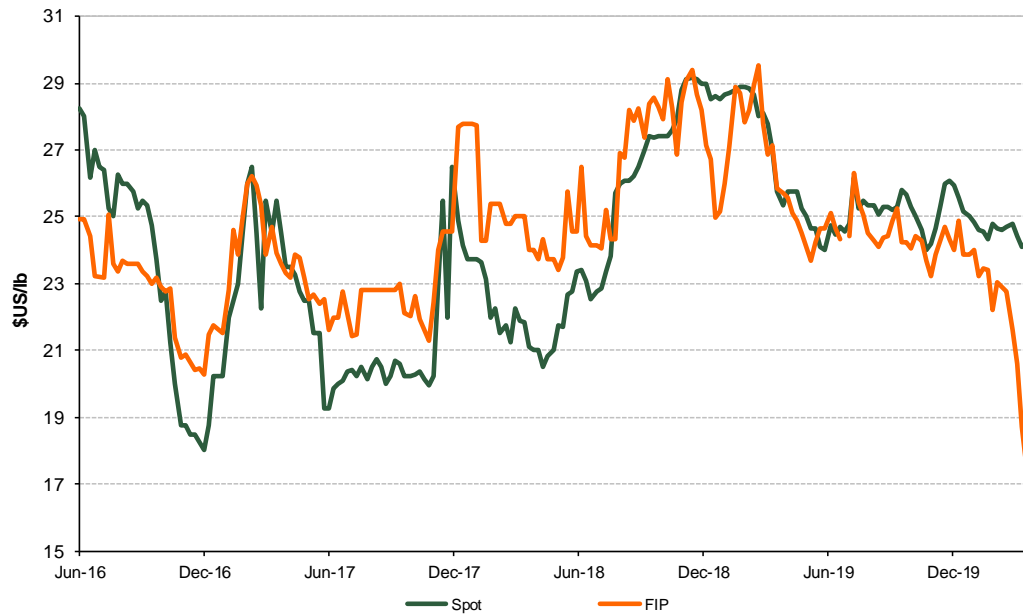
Source: UxC

Exhibit 7. Uranium Prices – Spot, 3yr Fwd and 5yr Fwd



Source: UxC

Exhibit 8. Fund Implied Price (FIP) and Spot Price



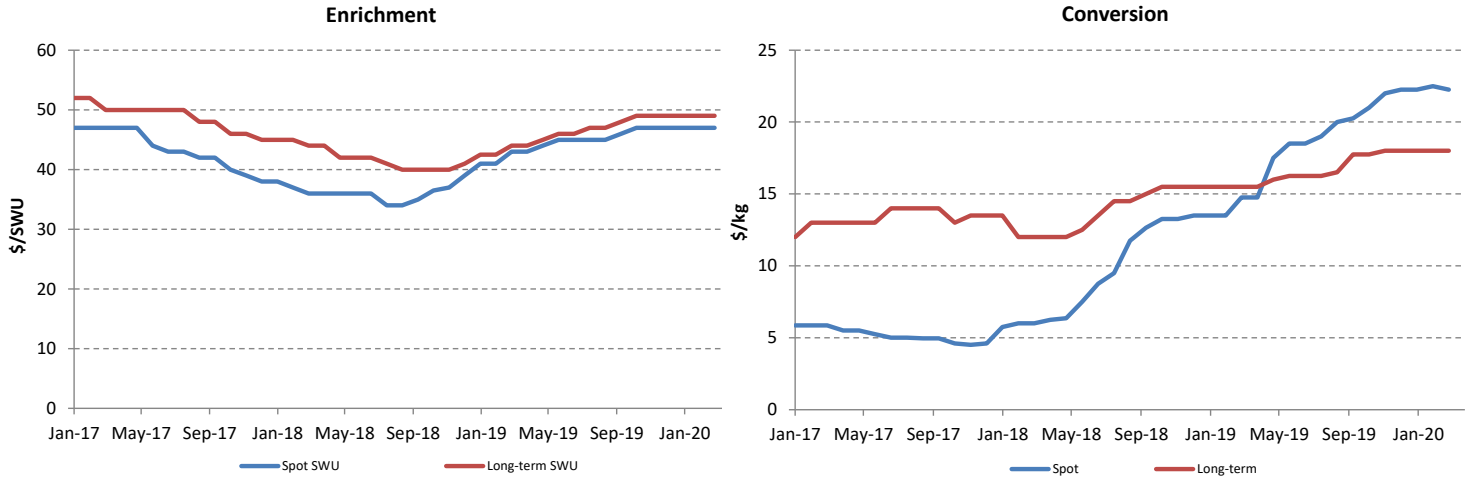
Source: UxC

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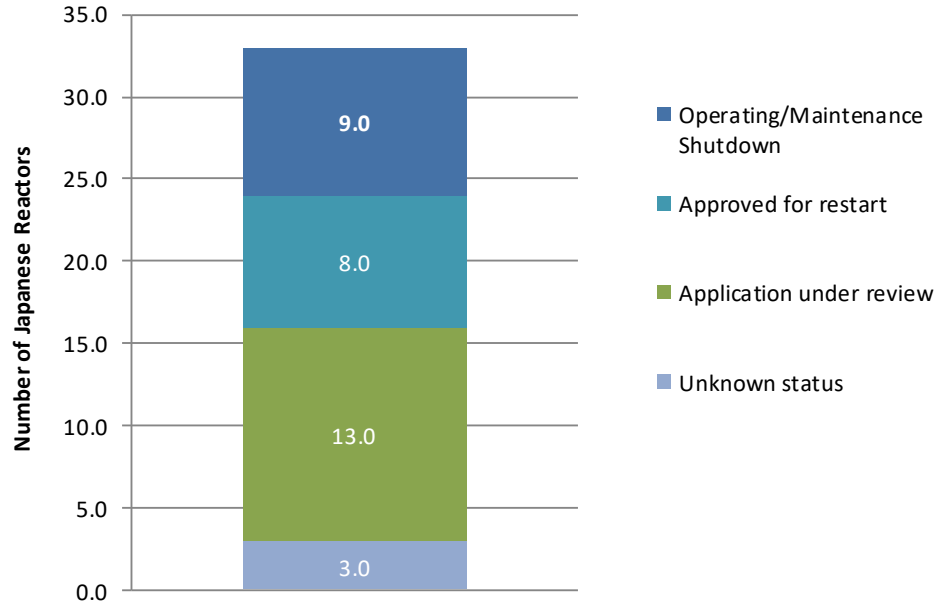
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Exhibit 9. Monthly SWU and Conversion Pricing



Source: UxC

Exhibit 10. Japanese Reactor Status



Source: UxC, Bloomberg, World Nuclear Association

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Exhibit 11. TD Securities Uranium Supply/Demand Model

	2012	2013	2014	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E	2024E
Mine Supply - Western World (mm lbs U3O8)													
Total Mine Supply - Western World	90	93	85	106	104	100	83	86	88	84	84	88	90
Net Eastern Mine Supply (lbs U3O8)	59	60	60	57	62	54	54	55	55	55	60	60	66
Total World Mine Supply (mmlb U3O8)	150	153	145	163	166	154	138	141	144	139	144	148	156
YoY % change	5.9%	2.4%	-5.3%	12.2%	2.1%	-7.6%	-10.2%	2.3%	1.9%	-3.4%	3.8%	2.6%	5.8%
Secondary Supply													
Global underfeeding and tails re-enrichment*	5	15	20	20	18	19	18	18	16	16	15	15	14
Mixed Oxide Fuel (MOX)*	10	8	8	4	5	5	5	6	6	6	6	6	7
US government sales (DOE Proposed)*	5	8	8	7	4	3	2	2	1	0	0	0	0
Additional Russian secondary supply*	24	24	5	2	2	0	0	0	0	0	0	0	0
Other			0	0	0	0	0	0	0	0	0	0	0
Total Secondary Supply (mmlb)	43	55	41	34	29	27	24	26	24	22	21	21	21
Secondary supply as % of global reactor demand	28%	32%	26%	21%	17%	16%	14%	15%	13%	12%	12%	12%	11%
Mobilization of Commercial Inventory			4	8	7	7	7	7	7	7	7	7	7
Total Supply	193	208	190	205	202	187	169	174	174	168	172	176	185
Total World Demand													
Total World Nuclear Generating Capacity (MWe) *				345,377	351,271	358,819	368,571	372,978	379,182	384,508	385,211	389,242	394,906
Uranium requirements per MWe				464	474	472	472	472	472	472	472	472	472
Uranium demand (mmlb)				160	167	169	174	176	179	181	182	184	186
First Core Requirement (2 year lead)				-	-	-	-	-	-	-	-	-	-
Total World Demand (mmlbs U3O8)	155	170	155	160	167	169	174	176	179	181	182	184	186
YoY % change	0.0%	9.7%	-8.8%	3.4%	3.9%	1.7%	2.7%	1.2%	1.7%	1.4%	0.2%	1.0%	1.5%
Supply / Demand Balance (mmlb)	38	38	35	44	35	18	-5	-2	-5	-14	-9	-8	-2
Spot Uranium Price (US\$/lb U3O8)	\$48.73	\$38.57	\$33.60	\$36.89	\$26.57	\$22.12	\$24.82	\$25.94	\$25.13	\$27.00	\$30.00	\$35.00	\$40.00

* Source: World Nuclear Association - Nuclear Fuel Report 2019-2040 Reference Case

Note - TD LT price assumption starts in 2025; a flat US\$45/lb price is assumed for 2025 and beyond.

Source: UxC, Bloomberg, TD Securities Inc.



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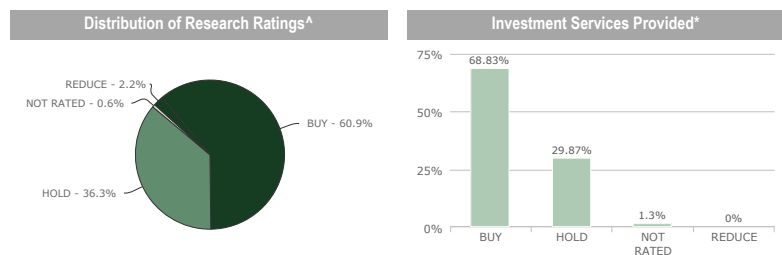
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