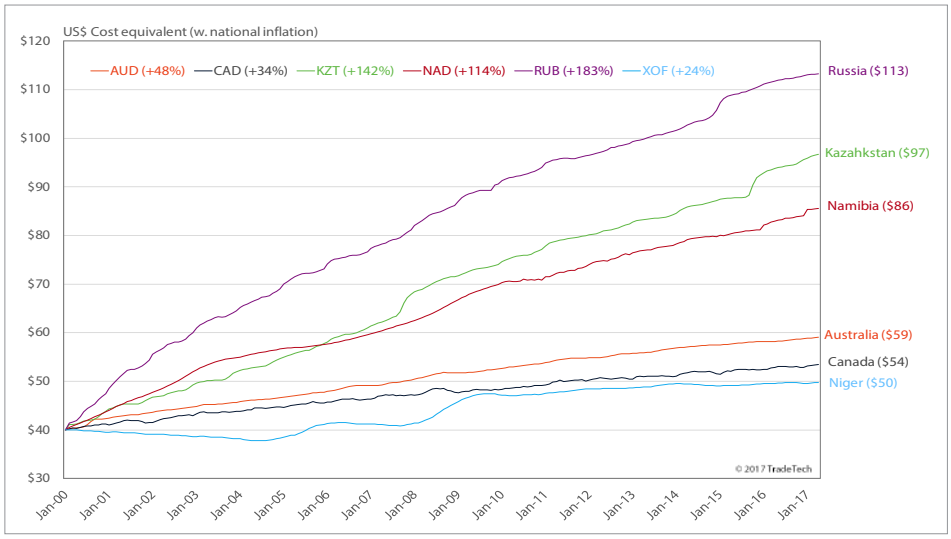


Figure 3 **National Inflation Rates on US$40 Uranium Production Cost Equivalent, 2000 – 2017 (April)**

devaluation of a country's currency.

Figure 2 identifies several macro-economic dimensions that can influence uranium producer profit margins, in addition to exchange rate fluctuations.

National Inflation Rates on Production Costs

A country's inflation rate represents the sustained increase in the general level of prices for goods and services. This is expressed by most countries as the Consumer Price Index (CPI), which is generally reported on an annual, quarterly, and monthly basis. As the inflation rate rises, a given unit of currency, for example $1, will purchase fewer goods and services today than what $1 purchased a week, a month, or a year ago.

Exchange rates work hand-in-hand with inflation. Depreciating currencies can trigger heightening inflation, and as a result, governments may increase interest rates to stem inflation and shore up their currencies. Rising inflation will place upward pressure on production costs, and to some degree counter the initial benefit gained through favorable exchange rates. Unfavorable exchange rates and a lagged inflationary impact can penalize cost structures. Likewise, inflation that offsets the cost benefit of favorable exchange rates can whither company profit margins.

It is important to note that national inflation rates can deviate significantly from mine cost inflation. Mine cost inflation can run well ahead of national inflation, and similarly, when the mining sector is under pressure, productivity gains can limit mine cost inflation. All this considered, national CPI as a broad inflation measure provides a useful gauge.

Figure 3 demonstrates how cumulative national inflation calculated using CPI would impact a $40 uranium production cost equivalent, assuming exchange rates remained static from the year 2000.

On this basis, production costs in May 2017 were between 24 percent (Niger) and 183 percent (Russia) more expensive relative to their 2000 US dollar cost equivalent. **Figure 3** exemplifies how the effect of national inflation in one country can be very different to the inflationary impact on another country.

Creating a Combined FX/Inflation Index

The countering effect of national inflation on exchange rates demonstrates an added complexity to the producer-country cost dynamic.

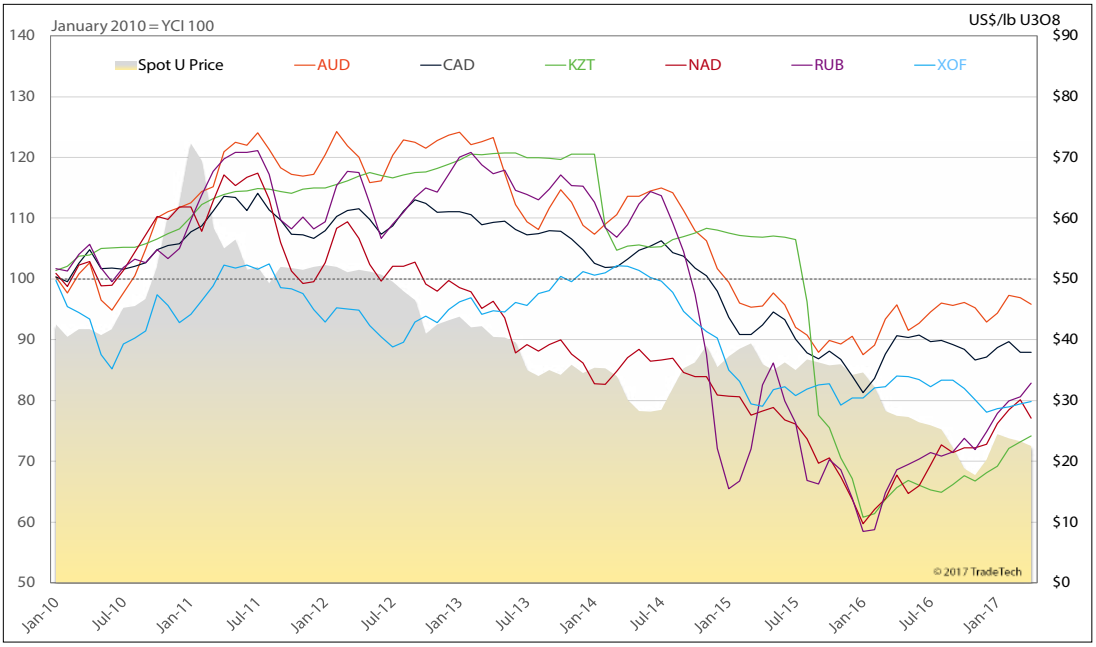


Figure 4 **Yellowcake Index, 2010 – June 2017 (January 2010 = YCI 100)**

When combined, these elements generate a clearer reflection of economic influence than they do individually.

The Yellowcake Index

With this in mind, TradeTech has brought together these macroeconomic factors with the aim of introducing a new indicator—the Yellowcake Index (YCI). The YCI blends monthly inflation rates with the overall performance of each currency relative to the US dollar. The output value is expressed as indices that fluctuate from the nominated base case (100), rather than the $40 cost scenario in Figures 1 and 3.

The analysis shown in **Figures 4 and 5** set the base value of the index to January 2010 (=100). The selected time frame accurately captures recent, post-Fukushima uranium market fundamentals coupled with a wide range of post-recession monetary policies. The monthly spot uranium price is also shown for reference in Figure 4.

A YCI value above 100 means that exchange rates and inflation have increased the cost of uranium production in the domestic currency relative to the 2010 US dollar cost equivalent. Conversely, an index below 100 means exchange rates and inflation have improved the cost-competitiveness of the country; production costs have been lowered due to the depreciation of the urrency relative to the strength of the US dollar.

Figure 4 highlights how weak currencies have saved some uranium producers. The results also reveal that producers in all nations shown are currently operating below their 2010 US dollar cost equivalents, despite very high levels of national inflation in certain cases.

The Yellowcake Index—a Commentary

The YCI provides a view of the macroeconomic pressures that the uranium mining industry has experienced since 2010. During the mid 2000s, a global commodity super cycle began and uranium, buoyed by the promises of the nuclear power renaissance, also began its own extraordinary price journey. Through this period the increasing cost pressures were comfortably absorbed by firm market prices.

The upward trajectory of the YCI through 2011 reflects the recovery of global commodity markets following the GFC in 2008. Inherently, this also captures upward cost pressures on non-US miners. The uranium market, however, became decoupled from external markets and their respective pathways by the Fukushima event in March 2011. This presented a challenging period for uranium producers as prices declined while cost pressures increased. Although, for many operators at the time, revenue was largely hedged by long-term supply contracts with fixed or base-escalated prices.

The YCI clearly demonstrates the cost pressure relief that has been delivered to uranium producers over time. The likely coincidental timing has been fortuitous, as the uranium market—although marching to the beat of its own drum—has also been testing historic price lows.

Since 2013, global commodity markets have been particularly depressed, with oil reaching record lows in early 2016. The oil-driven central Asian economy of Kazakhstan, as well as the economy of Russia, have worn the impact of collapsing oil prices on

		Year-End Index Value					2015				2016				2017					
Country/Region	**Rank**	2010	2011	2012	2013	2014	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Jan	Feb	Mar	Apr	May	Jun
Australia (AUD)	**6**	102	119	121	116	110	97	96	90	90	90	93	95	95	94	97	97	96	95	96
Canada (CAD)	**5**	103	110	110	108	103	92	93	88	86	84	91	90	87	89	90	88	88	87	89
Kazakhstan (KZT)	**1**	105	114	117	120	108	107	107	93	71	62	66	65	67	69	72	73	74	74	73
Namibia (NAD)	**2**	104	110	103	92	85	80	78	73	67	62	66	71	72	76	78	80	77	78	80
Russia (RUB)	**4**	103	115	113	117	104	68	83	70	68	61	69	71	74	78	80	81	83	82	81
West Africa (XOF)[1]	**3**	93	99	93	97	99	83	81	82	81	82	84	83	80	79	79	79	80	82	84

[1] The West African Franc (XOF) is the currency of eight independent states in West Africa, including: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Sénégal, and Togo.

Figure 5 **Yellowcake Index Values**

Determined from average annual, quarterly, and monthly foreign exchange rate fluctuations and national inflation rates, January 2010 = 100

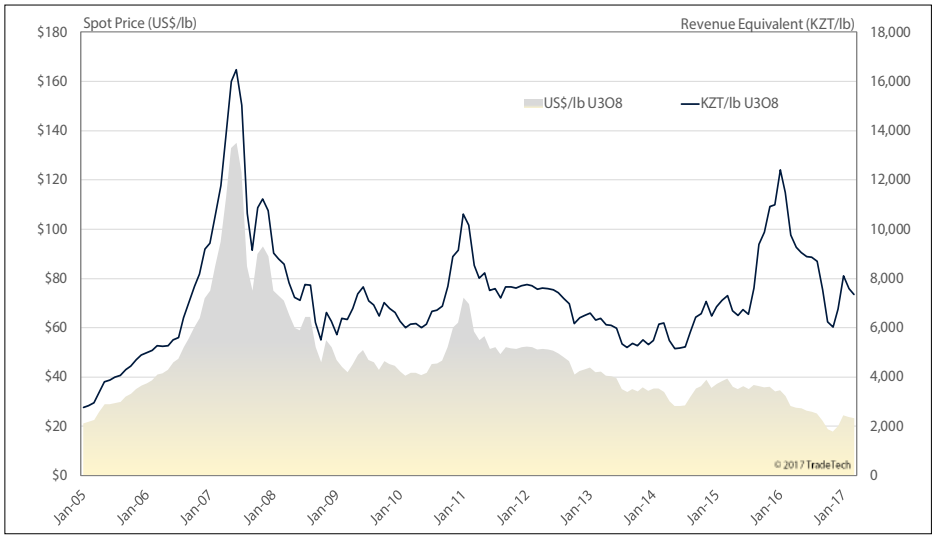


Figure 6 **Spot Uranium Price (US$/lb) and Sales Equivalent in Kazakh Tenge, January 2005 – January 2017**

production costs more than any of the top six uranium-producing nations. For instance, Russia's YCI plummeted from 117 in 2013, to just 61 during the first quarter of 2016. Likewise, between early 2015 and 2016, costs in Kazakhstan fell from 7 percent to 38 percent below their 2010 cost equivalent.

Indeed, during the first quarter of 2016, the YCI in some of the world's top uranium-producing countries, including Kazakhstan, slumped to its lowest level since the punitive "$10 market" at the turn of the millennium.

Kazakhstan, Namibia, and Russia are now experiencing the least macroeconomic pressure with the cost index between 19 to 27 percent below the 2010 cost equivalent. In January 2014, however, Kazakhstan's YCI measured 120 (i.e. the cost index was 20% above the 2010 equivalent), while Namibia's YCI remained low at 82.

While the results highlight how weak currencies have aided some producers, the YCI also demonstrates how national inflation has augmented producer costs to varying degrees, thereby countering the favorable exchange rate benefit. Inflation may therefore erode the profit margins of companies that have benefited from a weaker currency in the past.

Understanding the YCI—Kazakhstan vs. Australia

An example of how a hypothetical producer's profit margin is affected by various macroeconomic influences is demonstrated in **Figures 6-9**.

Figures 6 and 7 assume a hypothetical Kazakh producer operating a low-cost *in-situ* recovery operation with full production costs in 2005 through 2017 of ₸2,500 (Kazakh tenge). In 2005, ₸2,500 was the equivalent to around US$20 per pound U_3O_8. For demonstration purposes, the producer sells all production at the spot price, however, in reality producers may have a proportion of production (and therefore revenue) derived from contracted material sold forward at the mid- and/or long-term market prices.

Figure 6 shows the revenue equivalent—a function of sales revenue per pound at the monthly USD/KZT exchange rate and displayed in tenge per pound U_3O_8 produced. The ability to profit—a combination of full production cost, mine cost inflation, and sales revenues in domestic currency (using exchange rates)—are shown in **Figure 7**.

The persistent weakening of the Kazakh tenge has enabled the Kazakh producer in Figure 7 to profit each year since 2005, irrespective of a falling uranium price. This demonstrates how foreign exchange rates have benefited some uranium producers. It also highlights how heightening inflation, sometimes triggered by weakening currencies,

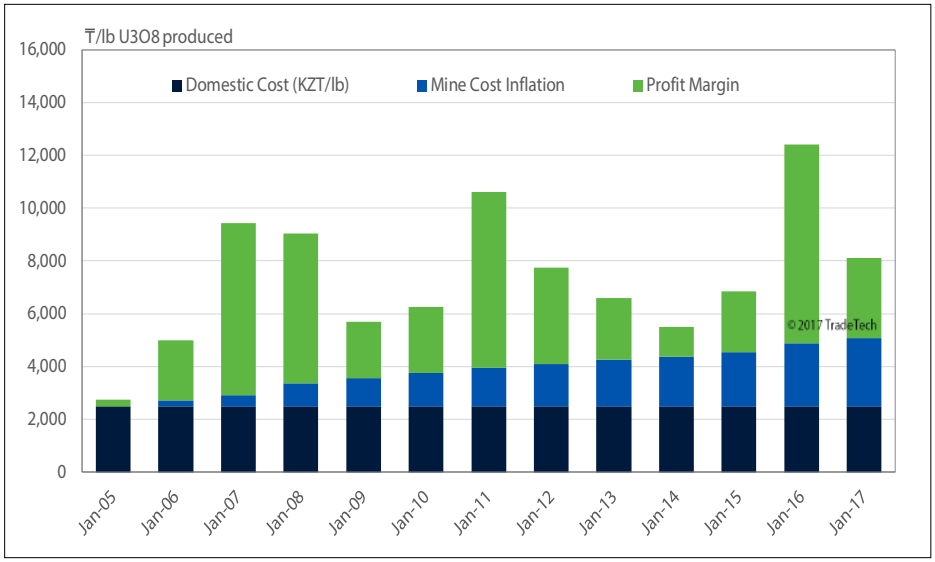


Figure 7 **Ability to Profit, Kazakhstan, January 2005 - January 2017**

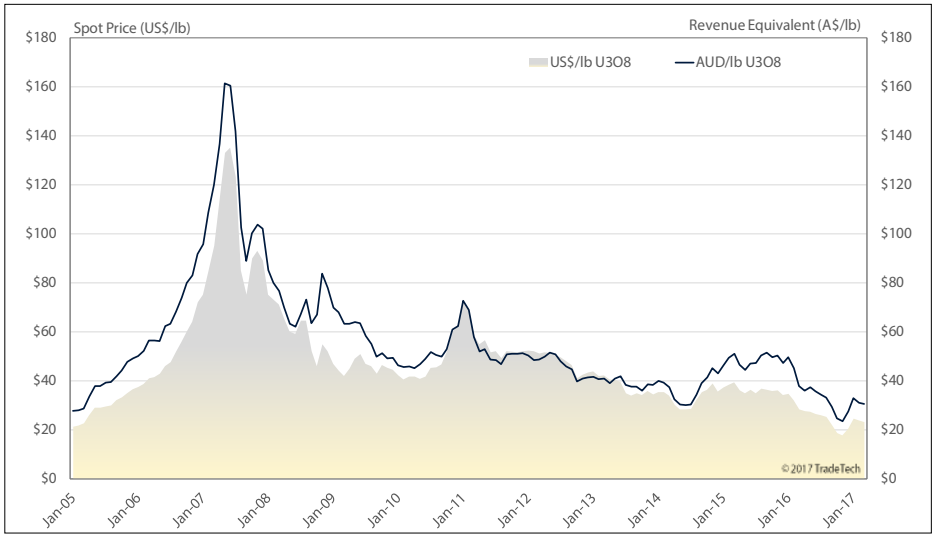


Figure 8 **Spot Uranium price (US$/lb) and Sales Equivalent in Australian-denominated dollars, January 2005 – January 2017**

can eat away at the profit margins of producers.

For comparison, **Figures 8 and 9** demonstrate the same hypothetical scenario for an Australian open-pit producer operating at around A$40 (US$30) per pound U_3O_8 from 2005.

Sales revenues in Australian dollars (A$ per U_3O_8 produced) are shown in **Figure 8**. Australian dollar denominated sales revenues mimic the US dollar uranium price. Importantly, revenues translated to Australian dollars do not exhibit the same benefit displayed in Figure 6 for Kazakhstan; notably, Australia has a more diverse export portfolio and a more resilient economy. This means the Australian dollar has not weakened to the same extent as the Kazakh tenge, and so uranium sales revenues denominated in Australian dollars have fallen almost in tandem to the US dollar uranium price.

This Australian producer has struggled to profit beyond 2012. Were it not for the consideration of mine cost inflation, then this producer would have been able to achieve a small margin through 2017.

Figures 6-9 demonstrate that changes in the uranium price, foreign exchange rates, and national inflation figures can have a marked impact on producer cost structures over time, and between different countries. Sales revenues and profit margins are principally affected by changes in the spot price of uranium, which in this instance fell from a monthly high of US$135 per pound U_3O_8 in June 2007, to below $18 per pound in November 2016.

The figures also reinforce how inflationary pressures augment production costs and erode a producers' ability to profit.

Compound inflation in Kazakhstan totaled 103 percent in the period between January 2005 and January 2017; this was the equivalent of an additional ₸2,575 on top of full production costs in 2005. Yet, the weakening of the tenge over that same period has propped up Kazakh producers and enabled them to profit against a backdrop of falling uranium prices and crippling inflation.

By comparison, compound inflation in Australia totaled 30 percent over the same period; the equivalent to an additional A$12 on top of full production costs in 2005. However, the comparative strength of a robust Australian dollar over that same period has hindered Australian producers, which have struggled to profit against a backdrop of falling uranium prices with little or no foreign exchange benefit.

Yellowcake Index Outlook

Commodity-driven economies that depend on foreign-denominated revenues are likely to be more susceptible to exchange rate volatility, compared to those with more diverse export portfolios. For example, the strength of the Kazakh tenge and

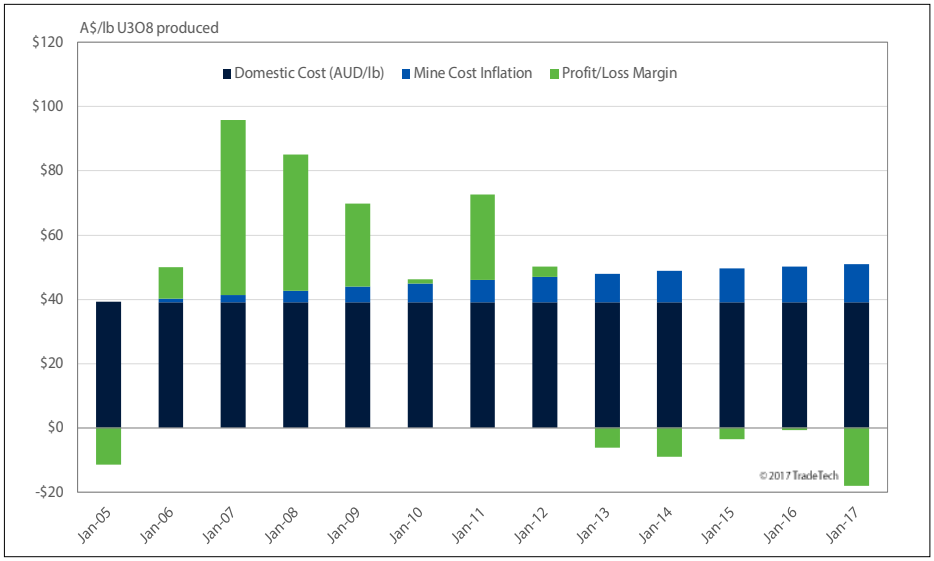


Figure 9 **Ability to Profit, Australia, January 2005 – January 2017**

Russian ruble will be heavily influenced by the degree to which oil prices fluctuate over the second half of 2017.

Namibia, which was tied with Kazakhstan as the lowest-cost uranium producer through the first half of 2016, could face a turbulent year ahead. Pegged to the South African rand, the Namibian dollar is at the mercy of poor economic fundamentals instructed by its principle trade partner, South Africa. Although South Africa and Namibia's non-fuel exports (like gold, diamonds, and platinum) are less volatile than oil, fumbling political competence in South Africa has shackled the Namibian economy. Likewise, South Africa's largest trade partner, China, could impact the rand if Chinese imports are tightened.

Until now, the negative effects of a rapid currency devaluation for the rand (and Namibian dollar) have been offset by low oil prices elsewhere. However, should oil prices recover over extended supply cuts, and the rand continues to trade low against major currencies, then the economic suffering will inherently reverberate through to the Namibian economy. As a result, the Namibian YCI could plausibly drop further this year before rebounding.

South Africa President Jacob Zuma is in the final year of his final term. His dismissal of Finance Minister Pravin Gordhan in March has exposed fissures in the African National Congress. Yet, South Africa (and Namibia) are not alone in facing political uncertainty. With events such as the UK's "Brexit," the election of President Donald Trump in the USA, and European political instability, there has been a convergence between the economic uncertainty of developed and emerging markets.

Meanwhile, Niger's Euro-pegged Central Africa franc, known as the CFA, has enjoyed support triggered by the outcome of the French election. Despite low inflation imposed by the European Central Bank, Niger's YCI could be subject to a period of sustained increase, which would see rising domestic costs over the course of 2017. The strength of Niger's economy is heavily reliant on the uranium price since uranium exports provide the principle source of the country's national export revenue (US$604 million, or 47% of export revenue in 2015). Niger's economy could be affected once legacy contracts at AREVA's COMINAK and SOMAÏR mines expire into a weak uranium spot market.

A Yellowcake Index value above 100 means that exchange rates and inflation have increased the cost of uranium production in a specific domestic currency relative to the 2010 US dollar cost equivalent. Conversely, an index below 100 means exchange rates and inflation have improved the cost-competitiveness of the country.

In Australia, there have been conflicting pressures from mineral and precious metals markets. BHP (formerly BHP Billiton), Rio Tinto, and Fortescue Iron Ore all welcomed stock gains through 2016, but have struggled through the first half of 2017. Iron ore prices have rallied since Chinese data revealed that its steel mills produced a record 72.8 million tonnes of steel in April 2017. Demand for safe haven commodities has also caused gold prices to firm amid prevailing global political uncertainty. Resilient commodity prices, especially iron ore and gold, are likely to mean that the Australian dollar remains stronger than most other currencies pertaining to uranium-producing regions.

The Canadian dollar is another commodity currency heavily influenced by oil prices; crude and refined petroleum products accounted for 16 percent (US$62 billion) of Canadian export revenues in 2015. The Canadian dollar typically weathers low-oil prices better than most oil-focused economies owing to a diversified export portfolio, which includes a large manufacturing sector. The ascendancy of US President Trump boosted the US dollar against the Canadian dollar, which suffered under speculation of a trade-related fallout. But in 2017, President Trump's plans to grow the US economy have lost momentum, which has had a negative impact on the US dollar, and consequently, the Canadian dollar/US Dollar is trading more steadily.

The US Dollar & the Global Economy

The margin between uranium sales revenues and domestic production costs for non-US producers also hinges on the value of the US dollar. In June, the US Federal Reserve (Fed) raised interest rates to take its benchmark target to between 1 and 1.25 percent, a decision based on strengthening US economic data. However, uncertainty surrounding President Trump's tax reform and infrastructural spending packages, which have curbed investor sentiment.

Still, the US dollar generally enjoys favorable exchange rates, partially because it is the reserve currency for much of the world and is perceived as a safe haven. When determining the value of the US dollar in the past, these characteristics have outweighed inflation and other considerations. While the Fed's interest rate policy has started its slow journey back to normality, the USA can no longer be considered immune to turbulence that may hit the global economy.

Still, all the major non-US uranium producer currencies have fallen against the strength of the US dollar since 2010. An interesting observation is the strong correlation between the 66 percent decline in the uranium spot price since the Fukushima accident in March 2011, and the weakness of non-US producer currencies, especially the Kazakh tenge, Russian ruble, and South African-pegged Namibian dollar. Although uranium prices are currently low, and the US dollar remains relatively strong, this situation is unlikely to persist indefinitely.

At some point in the future, the economies of non-US uranium producer countries will recover, which will strengthen domestic currencies against the US dollar. Consequently, non-US producers will need more US dollars to cover production costs incurred in a stronger domestic currency. In turn, this could contribute to a significant increase in the production cost base, as production costs of non-US producers are pressed higher.

In Conclusion . . .

Through times of weak prices, weak currencies can provide some relief for uranium producers. However, weakening currencies provide an inflationary sting in the tail. Moreover, this inflationary effect can lag and continue beyond a currency correction. Predicting when or if a currency correction will change as a result of a strengthening or weakening US dollar is subject to trends in multiple macro-economic dimensions. However, this could well be triggered by improving global commodity prices and a disruption to the US economy.

TradeTech's Yellowcake Index tracks the broad macroeconomic performances of top uranium-producing regions on a monthly basis. It provides a reference point to evaluate the past and present cost pressures affecting uranium producers.

Over the past year, the UK's decision to leave the European Union and the US election have added to the turbulent uncertainties facing the global economy, like volatile oil prices and China's slowing economy. Over the second half of 2017, a combination of economic and geopolitical dimensions is likely to exert tangible influence on the strength of the US dollar and the cost performances of non-US uranium producers.

TradeTech's YCI will track the broad macroeconomic performances of the top uranium-producing regions on a monthly basis. In doing so, the YCI provides a reference point to evaluate the past and present cost pressures affecting uranium producers. Moreover, the relationship between the YCI and other indices, such as the oil price, offers a valuable insight into where production cost trajectories may travel, and how these could impact on uranium-producing regions in the future.

Editor's Notes:

[1] TradeTech's initial analysis introducing the Yellowcake Index was published in the *Nuclear Market Review* on June 2, 2017.

[2] The monthly Yellowcake Index will be published in the Market Review section of *The Nuclear Review* beginning in the September 2017 issue.

Calendar of Events 2017–2018

Sep 11-15

Uranium 2017 Int'l Conference
Swakopmund Hotel
& Entertainment Centre
Swakopmund, Namibia
Hosted by: Southern African Institute of Mining and Metallurgy
Contact: Camielah Jardine
Phone: +264-834-1273/7
Fax: +264-833-8156
Email: camielah@saimm.co.za
http://www.saimm.co.za/saimm-events/upcoming-events/uranium-2017-international-conference/

Sep 13-15

World Nuclear Association Symposium 2017
Park Plaza Westminster Bridge
London, UK
Sponsor: World Nuclear Association
Contact: Sharan Gallagher
Phone: +44-0-20-7451-1520
Fax: +44-0-20-7839-1501
Email: events@world-nuclear.org
http://www.wna-symposium.org

Oct 2-4

Mines and Money Americas
Delta Hotel Toronto
Toronto, Canada
Phone: +44-0-207-216-6056
Email: cs@minesandmoney.com
http://americas.minesandmoney.com

Oct 9-11

Charge: Energy Branding Conference Reykjavík, Iceland
Harpa Conference Hall
Organizer: LarsEn Energy Branding
Phone: +354-787-7007
Email: conference@branding.energy
http://branding.energy/

Oct 18-19

5th Turkey–Middle East and Africa Nuclear Industry Congress 2017
Istanbul, Turkey
Phone: +86-21-5830-0710
Email: maisiec@szwgroup.com
http://www.szwgroup.com/nuclear-industry-congress-turkey-mena-2017/index.aspx

Oct 22-25

International Uranium Fuel Seminar
Fairmont Olympic Hotel
Seattle, Washington, USA
Sponsor: Nuclear Energy Institute
Contact: Denise Bell
Phone: +1-202-739-8039
Fax: +1-202-785-4019
Email: registrar@nei.org
http://www.nei.org/Conferences

Oct 23-27

4th International Conference on Nuclear Power Plant Life Management
Lyon, France
Organizer: International Atomic Energy Agency (IAEA)
Contact: Conference Secretariat, IAEA
Phone: +43-1-2600-0
Fax: +43-1-2600-2007
Email: Official.Mail@iaea.org
http://www-pub.iaea.org/iaeameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management

Oct 29-Nov 2

ANS Winter Meeting & Nuclear Technology Expo
Marriott Wardman Park
Washington, DC, USA
Sponsor: American Nuclear Society
Phone: +1-800-323-3044
Fax: +1-708-352-0499
Email: http://www.ans.org/contact/form.php?r=meetings
http://www.ans.org/meetings/c_1

Nov 14-15

2017 Low Emission and Technology Minerals Conference
Hyatt Regency Perth
Perth, Western Australia
Organizer: Vertical Events
Phone: +61-8-9388 2222
Fax: +61-8-9381-9222
Email: info@verticalevents.com.au
http://verticalevents.com.au/LETM2017

Dec 5-7

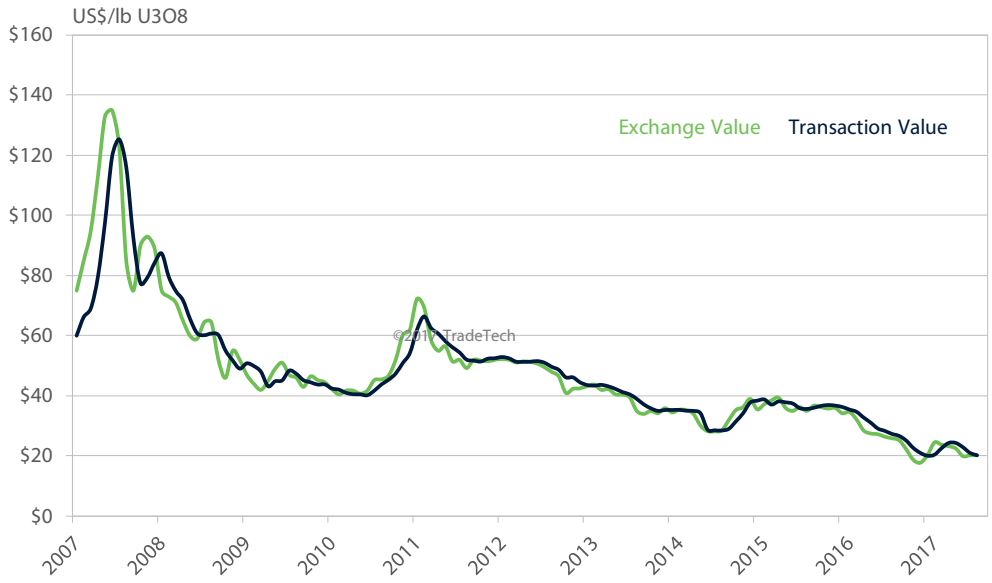
POWER-GEN International
Las Vegas Convention Center
Las Vegas, Nevada, USA
Phone: +1-918-831-9160
Email: pgiconference@pennwell.com
http://www.power-gen.com/event-information/nuclearpowerinternational.html

Jan 18

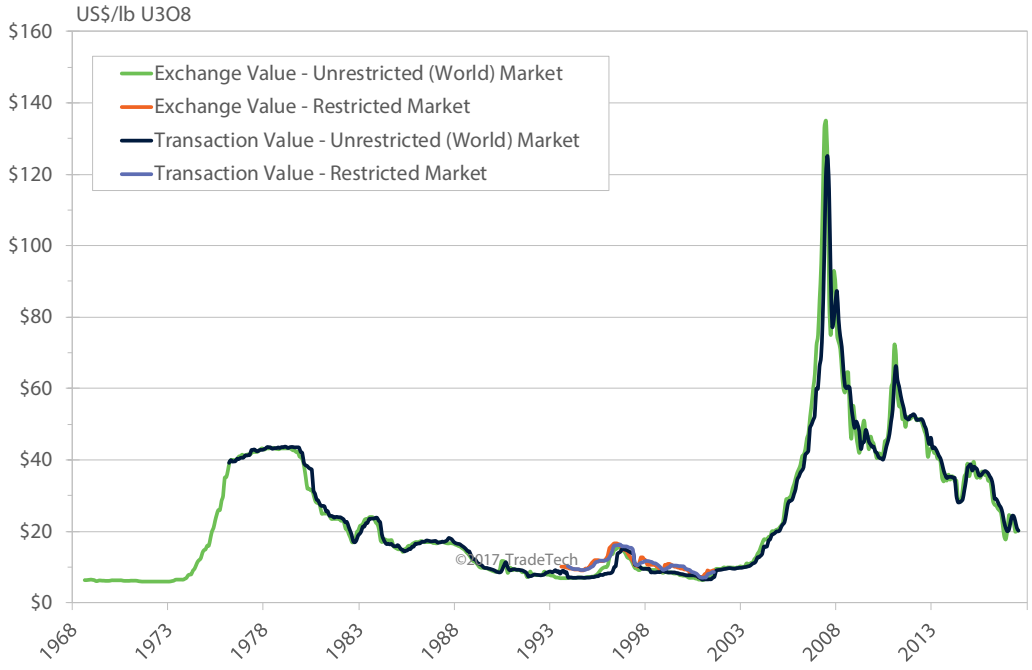
Nuclear Fuel Supply Forum
The Mayflower Hotel
Washington, DC, USA
Sponsor: Nuclear Energy Institute
Contact: Denise Bell
Phone: +1-202-739-8039
Fax: +1-202-785-4019
Email: registrar@nei.org
http://www.nei.org/Conferences

Historical Exchange & Transaction Values

Exchange Value & Transaction Value
2007-2017



Exchange Value & Transaction Value
1968-2017



Historical Market Values & Indicators[1]

Exchange Value[2]

Determined as of the last day of the month indicated (US$ / lb U_3O_8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	37.50	38.75	41.00	41.50	43.00	46.00	47.50	52.00	55.75	60.25	64.00	72.00
2007	75.00	85.00	95.00	113.00	133.00	135.00	123.00	85.00	75.00	90.00	93.00	89.00
2008	75.00	73.00	71.00	65.00	60.00	59.00	64.50	64.50	52.00	46.00	55.00	52.00
2009	47.00	44.00	42.00	45.00	49.00	51.00	47.00	46.00	43.00	46.50	45.25	44.50
2010	42.25	40.50	41.75	41.75	40.75	41.75	45.25	45.50	46.75	52.00	60.25	62.00
2011	72.25	69.50	58.50	55.00	56.50	51.50	52.00	49.25	52.00	51.75	51.50	52.00
2012	52.25	52.00	51.10	51.50	51.25	50.75	49.50	48.00	46.50	41.00	42.50	43.25
2013	43.75	42.00	42.25	40.50	40.40	39.55	35.00	34.00	35.00	34.25	35.90	34.50
2014	35.40	35.25	34.00	30.10	28.25	28.20	28.50	32.00	35.30	36.25	39.00	35.50
2015	37.25	38.50	39.40	36.00	35.00	36.25	35.00	36.75	36.25	35.75	36.00	34.20
2016	34.65	32.15	28.25	27.50	27.25	26.40	25.90	25.25	22.25	18.75	17.75	20.25
2017	24.50	23.75	23.25	22.50	19.95	20.20	20.25					

Transaction Value[3]

Determined as of the last day of the month indicated (US$ / lb U_3O_8)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	35.35	36.50	37.15	38.05	41.45	42.00	42.70	48.95	50.00	51.25	52.50	60.00
2007	60.00	66.20	69.05	79.55	97.55	119.45	125.25	116.00	92.55	77.45	79.40	84.20
2008	87.30	79.50	74.80	71.75	65.55	60.80	60.15	60.70	60.30	55.05	51.80	49.05
2009	50.80	49.90	48.00	43.20	44.85	45.15	48.40	47.30	45.20	44.50	43.75	43.80
2010	42.45	42.05	41.00	40.55	40.50	40.20	41.75	43.80	45.35	47.40	50.90	54.20
2011	61.90	66.40	62.50	60.70	58.20	56.15	54.45	52.05	51.70	51.40	52.35	52.50
2012	52.90	52.45	51.35	51.30	51.35	51.55	51.00	49.65	48.65	46.15	44.50	43.60
2013	43.40	43.65	43.15	42.30	41.25	40.50	39.00	37.15	35.85	35.00	35.30	35.30
2014	35.35	35.05	35.00	34.20	28.75	28.55	28.50	29.05	31.55	34.20	37.75	38.40
2015	38.80	37.10	38.15	37.85	37.45	35.90	35.65	36.05	36.65	36.95	36.75	36.30
2016	35.45	34.70	32.80	31.10	29.15	28.35	27.35	26.70	25.15	22.70	21.05	20.10
2017	20.45	22.60	24.35	24.35	22.95	21.05	20.25					

1 Complete definitions, including derivations and comments, can be found on page 4.
2 The Exchange Value is TradeTech's judgement of the price at which spot and near-term transactions for significant quantities of natural uranium concentrates could be concluded a of the last day of the month.
3 The Transaction Value is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
a) transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
b) at least 10 transactions; and
c) transactions involving a sum total of at least 2 million pounds equivalent U_3O_8.

UF_6 Value[4]

Determined as of the last day of the month indicated (US$ / kgU as UF_6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	108.00	112.00	119.00	120.00	124.00	132.00	136.00	148.00	157.00	169.00	179.00	199.00
2007	199.00	230.00	260.00	306.00	358.00	358.00	325.00	225.00	207.00	245.00	240.00	241.00
2008	204.00	199.00	195.00	178.00	166.00	163.00	178.00	178.00	145.00	125.00	150.00	140.00
2009	131.00	124.00	121.00	126.00	135.00	137.00	128.00	126.00	117.00	127.00	123.00	120.00
2010	118.00	110.00	115.00	114.00	112.00	116.00	129.00	131.00	135.00	149.00	170.00	173.00
2011	200.00	195.00	164.50	155.75	157.40	145.50	145.50	139.00	144.00	143.50	141.25	143.25
2012	141.50	141.00	137.00	139.00	139.00	139.00	136.00	133.00	130.00	117.00	120.50	123.50
2013	124.75	120.00	120.75	116.00	115.00	113.50	100.00	98.00	100.00	98.50	102.50	98.65
2014	100.75	100.00	96.00	86.50	81.50	80.75	81.50	90.00	99.00	102.25	109.50	100.50
2015	105.25	108.30	109.25	101.75	98.75	101.50	98.50	102.50	100.00	100.00	100.00	98.50
2016	97.00	91.00	81.00	78.25	77.25	75.50	73.50	72.00	64.25	55.00	53.00	58.75
2017	69.50	67.75	66.50	64.25	57.50	58.15	57.75					

Loan Rate[5]

Determined as of the last day of the month indicated (percent / annum)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	7.50	7.50	7.50
2007	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
2008	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
2009	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
2010	6.00	4.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	2.50	2.00	2.00
2011	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.75	1.75	1.75
2012	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
2013	1.75	1.75	1.75	1.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2014	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2015	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2016	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2017	1.00	1.00	1.00	1.00	1.00	1.00	1.00					

4 The UF_6 Value is TradeTech's judgement of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the last day of the month.

5 The Loan Rate is TradeTech's judgement of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Conversion Value[6]

Determined as of the last day of the month indicated (US$ / kgU as UF6)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006 - NA	11.00	11.50	11.50	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75
2006 - E	11.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.25	12.25
2007 - NA	11.75	11.75	11.75	11.75	11.75	11.75	11.75	10.75	10.75	10.75	8.00	8.00
2007 - E	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	11.15	10.00	10.00
2008 - NA	8.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	8.00	8.50	8.50
2008 - E	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	9.00	9.50	9.50
2009 - NA	8.50	8.50	8.50	8.50	8.50	7.50	6.50	6.50	6.25	6.00	5.50	5.50
2009 - E	9.50	9.50	9.50	9.50	9.50	8.50	8.00	8.00	8.00	8.00	8.00	8.00
2010 - NA	5.50	5.00	5.50	5.50	5.50	7.00	10.50	13.00	13.00	13.00	12.50	12.50
2010 - E	8.00	7.50	7.50	7.50	7.50	8.00	11.00	12.00	12.00	12.00	12.00	12.00
2011 - NA	13.00	13.00	12.00	12.00	11.00	11.00	10.50	10.00	9.50	9.00	8.50	7.50
2011 - E	12.50	13.00	12.00	12.00	11.00	11.00	10.50	10.00	9.50	9.00	8.50	8.00
2012 - NA	7.00	7.00	6.75	6.75	6.75	6.75	7.25	9.00	9.50	10.50	10.50	10.50
2012 - E	7.50	7.50	7.00	7.00	7.00	7.00	8.00	9.25	10.00	11.00	11.00	11.00
2013 - NA	10.50	10.50	10.50	10.50	10.00	10.00	9.25	9.00	9.00	9.00	8.50	8.50
2013 - E	11.00	11.00	11.00	11.00	10.50	10.50	9.75	9.50	9.50	9.50	9.00	9.00
2014 - NA	8.25	8.25	7.50	7.50	7.50	7.25	7.25	7.25	7.25	7.60	7.60	8.50
2014 - E	8.75	8.75	8.00	8.00	7.75	7.50	7.50	7.50	7.50	8.00	8.00	9.00
2015 - NA	8.50	7.75	7.50	7.50	7.50	7.50	7.50	7.00	7.00	7.00	7.00	7.00
2015 - E	9.00	8.50	8.00	8.00	8.00	8.00	8.00	7.50	7.50	7.50	7.50	7.50
2016 - NA	7.00	7.00	7.00	7.00	7.00	7.00	6.50	6.00	6.00	6.00	6.00	6.00
2016 - E	7.50	7.50	7.50	7.50	7.50	7.50	7.00	6.50	6.50	6.50	6.50	6.50
2017 - NA	6.00	6.00	6.00	5.25	5.25	5.25	5.00					
2017 - E	6.50	6.50	6.50	6.00	6.00	6.00	6.00					

6 The Conversion Value is TradeTech's judgement of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded as of the last day of the month.
7 North American delivery
8 European delivery

SWU Value[9]

Determined as of the last day of the month indicated (US$ / SWU)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006 - U	90	105	105	105	107	107	110	115	117	120	124	126
2006 - R	118	120	122	124	125	125	128	129	131	134	135	135
2007 - U	128	133	133	133	133	135	137	137	138	141	141	141
2007 - R	136	140	140	140	140	140	140	140	141	143	143	143
2008 - U	141	143	143	145	147	149	153	155	156	157	158	158
2008 - R	143	145	145	147	149	151	156	158	159	159	160	160
2009 - U	158	159	160	161	162	162	162	162	162	162	162	162
2009 - R	160	162	163	164	165	165	165	165	165	165	165	165
2010 - U	165	162	160	158	153	153	153	153	153	155	155	155
2010 - R	165	162	160	158	153	153	153	153	153	155	155	155
2011	155	155	155	153	153	153	150	148	146	144	140	140
2012	140	139	138	138	134	134	125	125	125	120	120	120
2013	120	117	115	112	110	110	110	105	101	100	100	99
2014	98	98	96	96	96	93	90	89	89	89	89	88
2015	88	82	79	75	72	70	68	66	62	61	61	61
2016	61	60	60	59	58	58	57	55	52	49	48	47
2017	47	47	47	47	42	42	42					

9 The SWU Value is TradeTech's judgement of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the last day of the month.
10 Unrestricted
11 Restricted
12 The designation of Unrestricted/Restricted Market Values for SWU products was dropped in Review No. 510, since the Unrestricted Market distinction had become irrelevant with the revision to the US-Russian Suspension Agreement, which allows Russia to provide up to 20 percent of US utility enrichment requirements in 2014-2020, at which time the Suspension Agreement is scheduled to be terminated.

Mid-Term/Long-Term Price Indicators[13]

Determined as of the last day of the month indicated

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014												
Mid-Term U_3O_8 ($ / lb U_3O_8)												
	38.50	37.75	37.00	33.00	31.00	31.00	31.00	34.50	37.75	38.75	42.00	39.00
Long-Term U_3O_8 ($ / lb U_3O_8)												
	50.00	50.00	45.00	45.00	45.00	44.00	44.00	44.00	45.00	45.00	50.00	50.00
Long-Term Conversion ($ / kgU as UF_6)												
N. American	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
European	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00
Long-Term SWU ($ / SWU)												
	114	102	99	99	99	95	92	90	90	90	90	90
2015												
Mid-Term U_3O_8 ($ / lb U_3O_8)												
	41.25	42.50	43.50	40.25	39.00	39.50	38.25	40.00	39.50	38.75	38.50	36.00
Long-Term U_3O_8 ($ / lb U_3O_8)												
	50.00	50.00	50.00	49.00	46.00	46.00	45.00	44.00	44.00	44.00	44.00	44.00
Long-Term Conversion ($ / kgU as UF_6)												
N. American	16.00	16.00	16.00	16.00	16.00	16.00	16.00	15.00	15.00	14.00	14.00	14.00
European	17.00	17.00	17.00	17.00	17.00	17.00	17.00	16.50	16.50	15.00	15.00	15.00
Mid-Term SWU ($ / SWU)												
	—	—	—	—	—	—	—	—	—	—	—	65
Long-Term SWU ($ / SWU)												
	90	90	87	85	82	82	82	80	75	72	69	72
2016												
Mid-Term U_3O_8 ($ / lb U_3O_8)												
	36.50	33.90	29.90	29.25	29.00	28.15	27.40	26.70	23.70	20.50	19.00	22.00
Long-Term U_3O_8 ($ / lb U_3O_8)												
	44.00	44.00	43.00	42.00	41.00	40.00	38.00	38.00	37.00	35.00	34.00	30.00
Long-Term Conversion ($ / kgU as UF_6)												
N. American	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.00
European	14.00	14.00	14.00	14.00	14.00	14.00	14.00	13.00	13.00	12.50	13.00	13.00
Mid-Term SWU ($ / SWU)												
	65	65	65	64	64	62	59	57	56	53	50	50
Long-Term SWU ($ / SWU)												
	70	70	70	70	70	69	67	63	62	59	55	53
2017												
Mid-Term U_3O_8 ($ / lb U_3O_8)												
	27.75	28.25	28.00	27.00	24.25	24.45	24.40					
Long-Term U_3O_8 ($ / lb U_3O_8)												
	35.00	35.00	35.00	35.00	34.00	34.00	32.00					
Long-Term Conversion ($ / kgU as UF_6)												
N. American	14.00	14.00	14.00	15.00	15.00	15.00	15.00					
European	14.00	14.00	14.00	14.50	14.50	14.50	14.50					
Mid-Term SWU ($ / SWU)												
	50	50	48	48	44	44	44					
Long-Term SWU ($ / SWU)												
	53	53	50	50	50	50	50					

13 The Mid-Term Price Indicator for U_3O_8 is TradeTech's judgement of the base price at which transactions for mid-term or intermediate delivery of natural uranium concentrates could be concluded as of the last day of the month, for transactions in which the price at the time of delivery would be an escalation of the base price from a previous point in time. The Long-Term Price Indicators for U_3O_8, Conversion, or SWU are TradeTech's judgement of the base price at which transactions for long-term delivery of that product or service could be concluded as of the last day of the month, for transactions in which the price at the time of delivery would be an escalation of the base price from a previous point in time.

Australia

Year	Period	Consumer Price Index[1] (1989/1990 = 100) (2011/2012=100)	Producer Price Index Final Commodities[2] (1998/1999 = 100)	Average Weekly Ordinary Time Earnings Adult Australia[3] (Australian Dollars)	Wage Price Index — Australia[4] (2003-04 = 100)
2002	Avg	138.1	110.0	868.44	94.0
2003	Avg	141.9	111.1	923.25	98.3
2004	Avg	145.2	114.1	958.43	101.8
2005	Avg	149.1	118.0	1,007.90	105.9
2006	Avg	154.4	122.6	1,047.28	110.2
2007	Avg	158.0	125.8	1,093.78	114.7
2008	Avg	164.8	132.5	1,141.38	119.5
2009	Avg	167.9	134.0	1,201.45	112.6
2010	Avg	172.6	136.0	1,257.83	105.0
2011	Avg	178.5	140.1	1,312.40	109.0
2012	Avg	180.0 / 101.9[5]	121.0	1,373.30	112.9
2013	Avg	103.5	102.2	1,430.20	116.1
2014	Avg	106.1	104.0	1,465.10	119.1
2015	Avg	107.7	105.4	1,491.90	121.7
2016	Avg	109.1	106.3	1,524.55	124.2
Jan	2016	—	—	—	—
Feb	2016	—	—	—	—
Mar	2016	108.2	105.9	—	123.2
Apr	2016	—	—	—	—
May	2016	—	—	1,516.00	—
Jun	2016	108.6	106.0	—	123.7
Jul	2016	—	—	—	—
Aug	2016	—	—	—	—
Sep	2016	109.4	106.3	—	124.6
Oct	2016	—	—	—	—
Nov	2016	—	—	1,533.10	—
Dec	2016	110.0	106.8	—	125.1
Jan	2017	—	—	—	—
Feb	2017	—	—	—	—
Mar	2017	110.5	107.3	—	—
Apr	2017	—	—	—	125.6
May	2017	—	—	—	—
Jun	2017	110.7	107.8	—	126.1

P = Preliminary **R** = Revised since last month

1 Weighted average of eight capital cities of Australia; through the June 2012 quarter, the Base Year was the Financial Year July 1989 to June 1990 = 100.0. Starting with September 2012 quarter, the Base Year was adjusted to Financial Year July 2011-June 2012 = 100.0

2 Australian Bureau of Statistics: "Producer Price Indexes, Australia, Final Commodities." From the September quarter 1999 through the July quarter 2012, the Base Year was 1998-99; beginning in the September quarter of 2012, the Base Year was adjusted to new index reference period of 2011-12.

3 Australian Bureau of Statistics: "Average Weekly Earnings, States & Australia"

4 Australian Bureau of Statistics: 2001-August 2004 data from "Wage Cost Index of Total Hourly Rates of Pay, Excluding Bonuses - Sector Mining" report; from September 2004 to the present data from "Wage Cost Index of Total Hourly Rates of Pay, Excluding Bonuses" was changed to the Labor Price Index, Australia, with a new base year of 2003-04; changed to Wage Price Index in September 2012

5 Average Consumer Price Index for first two quarters/last two quarters of 2012, due to Base Year change starting with the September 2012 quarter.

Canada

Year	Period	Industrial Products Price Index: All Commodities[6] (2010 = 100)[7]	Consumer Price Index: All Items[6] (2002=100)[8]	Wage-earner Data: Average Hourly Earnings (C$)[9, 11]			
				Metal Ore Mining[10] (NAICS 2122)	Mining, Quarrying, & Oil & Gas Extraction (NAICS 21)	Fabricated Metal Products Manufacturing (NAICS 332)	Other Chemical Products Manufacturing (NAICS 3259)
2002	Avg	100.0	100.0	23.60	22.83	18.04	19.78
2003	Avg	98.8	102.8	22.88	23.12	18.85	20.21
2004	Avg	102.0	104.7	21.75	23.70	18.92	20.07
2005	Avg	103.6	107.0	23.77	26.06	19.23	20.22
2006	Avg	106.0	109.1	23.10	26.48	19.06	20.20
2007	Avg	107.6	111.8	23.71	27.74	19.24	22.18
2008	Avg	112.3	114.1	26.62	28.80	22.24	21.64
2009	Avg	108.4	114.4	30.89	30.99	23.24	20.21
2010	Avg	109.4	116.5	30.72	31.59	21.31	20.82
2011	Avg	114.5	119.9	34.99	35.09	23.71	22.42
2012	Avg	115.1	121.6	37.93	36.35	23.95	26.65
2013	Avg	116.1 / 111.2[7]	122.8	38.36	40.92	24.64	27.65
2014	Avg	111.3	125.2	40.83	41.12	24.89	26.73
2015	Avg	110.3	126.6	37.79	39.33	25.73	27.30
2016	Avg	110.1	128.5	39.77	38.94	25.62	26.66
Jan	2016	110.2	126.8	44.49	38.92	26.36	27.08
Feb	2016	109.2	127.1	38.14	39.32	24.34	26.02
Mar	2016	108.5	127.9	41.84	39.31	27.33	25.23
Apr	2016	107.9	128.3	38.26	37.84	24.48	23.72
May	2016	109.2	128.8	33.31	36.62	25.46	23.59
Jun	2016	110.1	129.1	34.19	36.64	26.29	32.12
Jul	2016	110.4	128.9	40.07	38.95	25.78	28.50
Aug	2016	110.0	128.7	38.45	39.03	25.31	25.61
Sep	2016	110.5	128.8	42.38	40.53	24.85	24.70
Oct	2016	111.3	129.1	44.44	41.26	26.01	26.33
Nov	2016	111.9	128.6	41.01	39.33	25.84	27.52
Dec	2016	112.2	129.4	40.68	39.49	25.40	29.50
Jan	2017	112.8	129.5	39.46	39.93	24.83	26.65
Feb	2017	113.2 **R**	129.7	41.75	39.54	26.31	25.81
Mar	2017	114.1 **R**	129.9	44.51	41.82	25.58	27.65
Apr	2017	114.8 **R**	130.4	38.23 **R**	38.14 **R**	25.27 **R**	28.50 **R**
May	2017	114.9 **R**	130.5	35.93 **P**	37.08 **P**	25.39 **P**	29.57 **P**
Jun	2017	113.7 **P**	130.4	—	—	—	—

P = Preliminary **R** = Revised since last month

6 Statistics Canada: "Industry Price Indexes." Indexes for the most recent six months shown are subject to revision.
7 The Base Year changed from 1997 to 2002 as of August 1, 2010. The Base Year changed from 2002 to 2010 as of October 1, 2013.
8 The Base Year changed from 1992 to 2002 as of April 1, 2007.
9 Statistics Canada: "Employment, Earnings and Hours"
10 As of April 1992, Statistics Canada no longer provides specific information on uranium mine wages. The data has been included with Metal Ore Mining.
11 2009 average hourly earnings represents partial year (January - October) as data for November and December was too unreliable to be published by Statistics Canada.

South Africa

Year	Period	Average Declared Working Costs/ Operating Costs per Metric Ton of Gold Ore Milled[12] (Rand)	Average Operating Profit per Metric Ton of Gold Ore Milled[12] (Rand)	Consumer Price Index[13] (Dec 2016 = 100)	Production Price Index All Group[14] (Dec 2016 = 100)
2002	Avg	258.57	--	72.1	123.8
2003	Avg	314.64	--	76.3	125.9
2004	Avg	335.97	--	77.4	126.7
2005	Avg	376.59	--	80.0	130.6
2006	Avg	374.44	--	83.7	140.6
2007	Avg	405.87	210.28	89.7	154.7
2008	Avg	449.47	327.98	78.9	180.8
2009	Avg	405.78	255.20	84.6	180.7
2010	Avg	388.74	230.80	88.2	191.6
2011	Avg	405.60	324.34	92.6	207.6
2012	Avg	507.63	323.88	97.8	220.5
2013	Avg	424.15	200.06	103.4	106.0
2014	Avg	466.10	151.90	109.7	113.9
2015	Avg	451.59	104.96	114.7	118.0
2016	Avg	—	—	122.0	123.9
Jan	2016	—	—	117.7	122.5
Feb	2016	—	—	119.3	123.5
Mar	2016	—	—	120.2	124.4
Apr	2016	—	—	121.2	125.4
May	2016	—	—	121.4	125.8
Jun	2016	—	—	122.1	126.5
Jul	2016	—	—	123.1	127.5
Aug	2016	—	—	123.0	127.4
Sep	2016	—	—	123.2	127.0
Oct	2016	—	—	123.8	128.1
Nov	2016	—	—	124.2	128.6
Dec	2016	—	—	124.7	100.0
Jan	2017	—	—	100.6	100.4
Feb	2017	—	—	101.7	101.0
Mar	2017	—	—	102.3	101.3
Apr	2017	—	—	102.4	101.6
May	2017	—	—	102.7	102.1
Jun	2017	—	—	102.9	101.8

P = Preliminary **R** = Revised since last month

12 Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly
13 Consumer Price Index represents all income groups-weighted average; base year changed from 2000 to 2008 in *The NUCLEAR Review*, Report no. 487; base year changed from 2008 to December 2012 in *The NUCLEAR Review*, Report no. 534; base year changed from December 2012 to December 2016 in *The NUCLEAR Review*, Report no. 583.
14 Producer Price Index represents all commodities for consumption in South Africa; base year changed from 1995 to 2000 in *The NUCLEAR Review*, Report no. 393; base year changed from 2000 to 2012 in *The NUCLEAR Review*, Report no. 537.

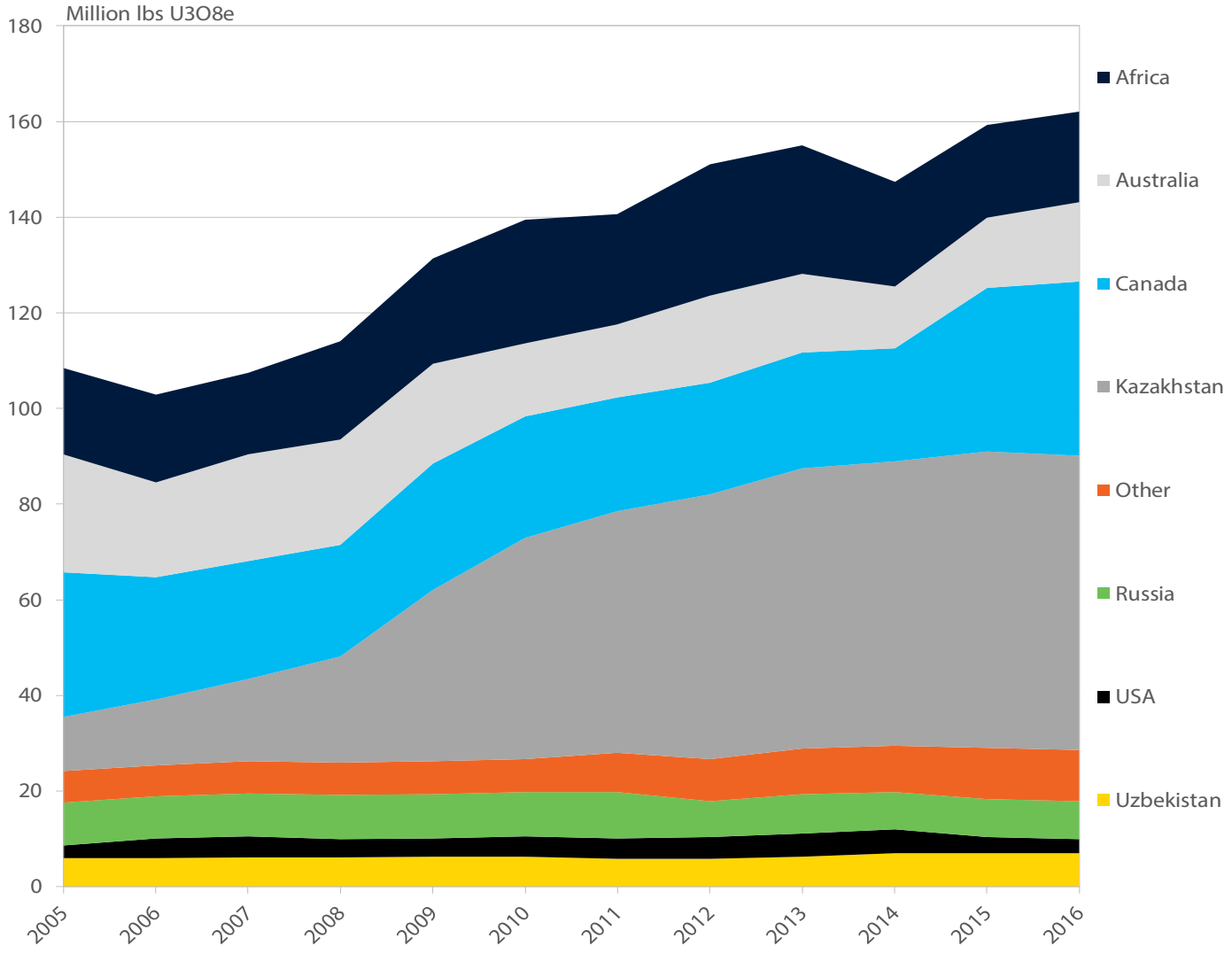
United States

Year	Period	Producer Price Index[15]		Consumer Price Index[16] (1982-84=100)	GNP Implicit Price Deflator[17] (2005 = 100)	GDP Implicit Price Deflator[17] (2005 = 100)	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[18]			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)				Mining, Except Oil & Gas (NAICS212)[20]	Primary Metal Manufacturing (NAICS 331)[19]	Chemical Products Manufacturing (NAICS 325)	Electrical Equipment & Appliances (NAICS 335)[21]
2002	Avg	132.4	131.1	179.9	92.1	92.1	18.81	19.77	19.17	15.00
2003	Avg	139.1	138.1	184.0	94.1	94.1	21.90	18.69	18.52	14.75
2004	Avg	147.6	146.7	188.9	96.8	96.8	22.91	19.49	19.16	15.27
2005	Avg	160.2	157.4	195.3	100.0	100.0	22.66	20.08	19.67	15.75
2006	Avg	168.8	164.7	201.6	103.3	103.3	22.39	19.95	19.60	15.82
2007	Avg	175.1	172.6	207.3	106.2	106.2	23.50	19.46	19.56	16.71
2008	Avg	192.3	189.6	215.3	108.5	108.5	25.94	19.35	19.49	16.69
2009	Avg	174.8	172.9	214.5	109.8	109.8	25.93	18.72	20.30	17.25
2010	Avg	187.0	184.7	218.1	111.0	111.0	28.85	19.46	21.08	17.82
2011	Avg	202.0	201.0	224.9	113.4	113.4	29.96	20.84	21.46	18.50
2012	Avg	202.1	202.2	229.6	115.4	115.5	31.75	21.57	21.45	18.73
2013	Avg	203.0	203.4	233.0	106.7	106.6	31.30	21.46	21.40	18.87
2014	Avg	204.2	205.3	236.7	108.4	108.3	32.20	22.40	21.49	19.32
2015	Avg	173.1	191.0	237.0	109.0	109.8	31.66	22.44	21.76	20.07
2016	Avg	184.6	185.4	240.0	111.8	111.4	26.47	23.11	22.72	19.29
Jan	2016	180.9	182.6	236.9	—	—	26.57	22.46	21.99	19.12
Feb	2016	179.4	181.3	237.1	—	—	26.85	22.64	21.73	19.07
Mar	2016	180.4	182.1	238.1	110.7	110.6	26.86	22.93	21.94	19.12
Apr	2016	181.9	183.2	239.3	—	—	26.25	23.05	22.11	19.21
May	2016	184.0	185.3	240.2	—	—	26.35	22.93	22.43	19.36
Jun	2016	186.3	187.6	241.0	111.3	111.3	26.16	23.24	22.83	19.21
Jul	2016	186.7	187.7	240.6	—	—	26.32	23.31	23.24	19.35
Aug	2016	186.2	186.6	240.9	—	—	26.05	23.24	23.08	19.27
Sep	2016	186.7	186.9	241.4	111.7	111.6	26.35	23.77	23.26	19.42
Oct	2016	187.3	186.7	241.7	—	—	26.58	23.18	23.40	19.53
Nov	2016	186.5	186.3	241.4	—	—	26.52	23.33	23.23	19.36
Dec	2016	188.3	188.2	241.4	112.3	112.2	26.73	23.29	23.34	19.44
Jan	2017	191.0	190.7	242.8	—	—	27.05	23.04	23.31	19.60
Feb	2017	191.7	191.6	243.6	—	—	26.99	23.06	23.41	19.48
Mar	2017	191.4 **R**	191.5 **R**	243.8	112.9	113.0 **R**	27.03	23.07	23.61	19.46
Apr	2017	193.0 **P**	193.0 **P**	244.5	—	—	26.62	23.14	24.32	19.59
May	2017	192.5 **P**	192.9 **P**	244.7	—	—	26.81 **R**	22.97	23.93 **R**	19.47 **R**
Jun	2017	193.2 **P**	193.7 **P**	245.0	—	—	26.49 **P**	23.06 **R**	23.91 **R**	19.50 **R**
Jul	2017	*192.8* **P**	193.4 **P**	244.8	—	—	—	23.35 **P**	24.66 **P**	19.74 **P**

P = Preliminary **R** = Revised since last month

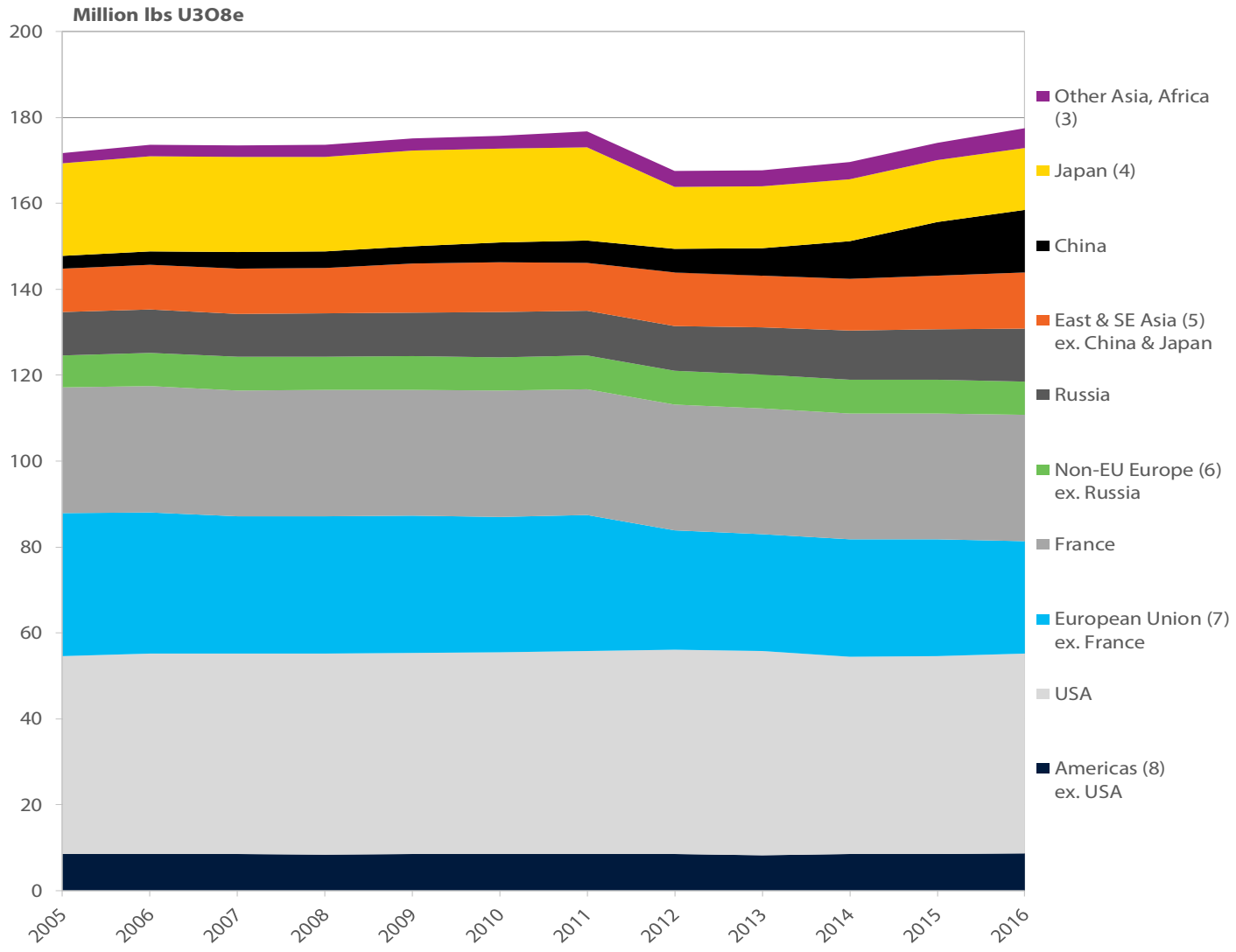
15 US Bureau of Labor Statistics, "Producer Prices and Price Indexes;" Producer Price Indexes are revised four months after they are first released, to reflect the availability of late reports and corrections by respondents.
16 US Bureau of Labor Statistics: Consumer Price Index for All Urban Consumers, US City Average
17 US Department of Commerce: Bureau of Economic Analysis; the Gross National Product (GNP) and Gross Domestic Product (GDP) Implicit Price Deflators (IDP) are published quarterly, and seasonally adjusted; base year change from 2000 to 2005 in *The NUCLEAR Review*, no. 492; base year change from 2005 to 2009 in *The NUCLEAR Review*, no. 540
18 US Bureau of Labor Statistics: "Employment and Earnings." 2002 data based on 1972 revision of SIC Manual; 2003 to present, data reflects new NAICS industry classification
19 Category change in January 2014, to Primary Metal Manufacturing (NAICS 331); includes previously reported subcategory Other Nonferrous Metal Production (NAICS 3314) discontinued in February 2014
20 Category change in January 2016, to Mining, Except Oil & Gas (NAICS 212); includes previously reported subcategory Metal Ore Mining (NAICS 2122) discontinued in December 2015
21 Category change in January 2016, to Electrical Equipment & Appliances (NAICS 335); includes previously reported subcategory Other Electrical Equipment & Components (NAICS 3359) discontinued in December 2015

World Uranium Production[1] 2005-2016



1 World uranium production in 2016 totaled 162.0 million pounds equivalent U_3O_8.

World Uranium Requirements[2] 2005-2016



2 Calculated by TradeTech, based on installed capacity available for commercial operation (GWe). Uranium requirements are calculated from a generic set of assumptions (Thermal Efficiency = 33%, Load Factor = 90%, Product Assay = 4.25%, Tails Assay = 0.25%, Discharge Burn-up Rate = 50 GWD/pound U_3O_8).
3 Other Asian, Africa includes: India, Iran, Pakistan, and South Africa.
4 Not all installed capacity in Japan was available for commercial operation in 2011-2014.
5 East & SE Asia includes: South Korea and Taiwan.
6 Non-EU Europe includes: Armenia, Switzerland, and Ukraine.
7 European Union includes: Belgium, Bulgaria, Czech Republic, Finland, Germany, Hungary, Lithuania, Netherlands, Romania, Slovakia, Slovenia, Spain, Sweden, and the UK.
8 Americas includes: Argentina, Brazil, Canada, and Mexico.

World Historical Uranium Production

(thousand pounds U_3O_8)

Region/ Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Africa	17,001	20,676	22,115	25,861	23,037	26,743	26,619	22,786	19,391	18,972
Australia	22,387	21,917	20,752	15,339	15,524	17,710	16,600 R	13,061	16,809	16,589
Canada	24,636	23,399	26,448	25,434	23,800	23,281	24,243	23,640	34,300	36,400
Kazakhstan	17,255	22,153	35,929	46,284	50,570	55,424	58,625	59,506	61,944	61,500
Russia	8,873	9,154	9,266	9,260	9,675	7,441	8,151	7,776	7,833	7,905
USA	4,541	3,879	3,778	4,316	4,266	4,573	4,872	4,995	3,787	2,940
Uzbekistan	6,032	6,078	6,315	6,239	5,850	5,850	6,264	7,020	7,020	7,020
Other [7]	6,751	6,856	6,802	6,780	8,151	8,766	9,526	9,619	10,706	10,706
TOTAL	**107,476**	**114,112**	**131,405**	**139,513**	**141,076**	**150,232**	**154,901**	**148,403**	**161,790**	**162,031**

P = Preliminary R = Revised since last month

7 Other includes: Argentina, Brazil, China, Czech Republic, India, Pakistan, Romania, and Ukraine.

Natural Uranium Deliveries to European Union Utilities/End Users[8]

Compiled from data published by the Euratom Supply Agency

Year	Volume of Deliveries to EU Utilities/ Users[9] (tU)	Percentage of Deliveries under Spot Contracts[10]	Spot Contracts[11] Average Price		Multiannual Contracts[11] Average Price		Multiannual Contracts (MAC-3) Average Price[12]	
			in Euros per kgU	in US Dollars per pound U_3O_8	in Euros per kgU	in US Dollars per pound U_3O_8	in Euros per kgU	in US Dollars per pound U_3O_8
2002	16,900	8.0	25.50	9.27	34.00	12.37	—	—
2003	16,400	18.0	21.75	9.46	30.50	13.27	—	—
2004	14,600	4.0	26.14	12.51	29.20	13.97	—	—
2005	17,600	5.0	44.27	21.19	33.56	16.06	—	—
2006	21,400	7.8	53.73	25.95	38.41	18.55	—	—
2007	21,932	2.4	121.80	64.21	40.98	21.60	—	—
2008	18,622	2.9	118.19	66.86	47.23	26.72	84.75	47.94
2009	17,591	5.2	77.96	41.83	55.70	29.88	63.49	34.06
2010	17,566	4.1	79.48	40.53	61.68	31.45	78.11	39.83
2011	17,832	3.9	107.43	57.52	83.45	44.68	100.02	53.55
2012	18,639	3.8	97.80	48.33	90.03	44.49	103.42	51.11
2013	17,023	7.1	78.24	39.97	85.19	43.52	84.66	43.25
2014	14,751	3.5	74.65	38.15	78.31	40.02	93.68	47.87
2015	15,990	5.0	88.73	37.87	94.30	40.24	88.53	37.78
2016	14,325	3.1	88.56	37.71	86.62	36.88	87.11	37.09

P = Preliminary R = Revised since last month

8 The 14 European Union (EU) member nations are: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

9 The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Union are also excluded. The quantities covered are those which were entered into accounting records during the year stated. Quantities do not include reprocessed uranium.

10 "Spot" contracts are defined as those providing for either only one delivery or deliveries extending over a period of a maximum of 12 months, whatever the time between the conclusion of the contract and the first delivery.

11 "Multiannual" contracts are defined as those providing for deliveries extending over more than 12 months.

12 New "MAC-3" price index introduced in 2008 is based on a three-year moving average.

US Uranium Marketing Data[13]

Compiled from data published by the US Energy Information Administration

Year	Utility Domestic Purchases Average Price & Quantity of Deliveries to Domestic Utilities from US Suppliers		Import Average Price & Quantity of Deliveries to US Utilities Suppliers from Foreign Suppliers[14]	
	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)
2002	21.5	10.35	52.7	10.05
2003	20.5	10.84	53.0	10.59
2004	26.5	11.91	66.1	12.25
2005	27.2	13.98	38.5	14.63
2006	27.1	18.54	38.7	18.66
2007	17.8	33.13	32.5	32.58
2008	20.1	43.43	31.4	47.46
2009	16.9	44.53	32.2	46.55
2010	16.2	44.88	29.8	51.69
2011	19.4	53.41	34.9	56.87
2012	21.5	56.51	35.5	54.08
2013	23.3	52.51	34.1	51.64
2014	20.5	43.99	32.9	47.51
2015	18.7	43.03	35.8	44.70
2016	18.3	41.64	26.8	44.08

P = Preliminary R = Revised since last month

13 1984-2002: Energy Information Administration, *Uranium Industry Annual*.
2003 to present: Energy Information Administration, *Uranium Marketing Annual Report*.

14 Foreign suppliers are defined to include non-US based firms that market uranium into and from the USA.

US Uranium Marketing Data[15]

Compiled from data published by the US Energy Information Administration

Year	Utility Spot Purchases Average Price & Quantity of Deliveries to US Utilities under Spot Contracts[16]		Utility Total Purchases Average Price & Quantity of of Total Deliveries of US Utilities[17]	
	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)
2008	8.7	66.95	53.4	45.88
2009	8.1	46.45	49.2	45.86
2010	8.2	43.99	46.6	49.29
2011	12.0	54.69	54.8	55.64
2012	8.1	51.04	56.9	54.99
2013	11.3	43.83	57.4	51.99
2014	14.5	36.64	53.3	46.16
2015	11.3	36.80	56.5	44.13
2016	10.6	29.62	50.6	42.43
US Utility Receipts of US-Origin Uranium[18]				
	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)		
2008	7.7	59.55		
2009	7.1	48.92		
2010	3.7	45.25		
2011	5.2	52.12		
2012	9.8	59.44		
2013	9.5	56.37		
2014	3.3	48.11		
2015	3.4	43.86		
2016	5.4	43.92		
Imports of Uranium Directly by US Utilities[19]				
	(million lbs U_3O_8 eq.)	(US$ per pound U_3O_8 eq.)		
2008	45.6	43.47		
2009	42.8	45.35		
2010	42.9	49.64		
2011	49.6	55.98		
2012	47.7	54.07		
2013	47.9	51.13		
2014	50.0	46.03		
2015	53.1	44.14		
2016	45.2	42.26		

P = Preliminary R = Revised since last month

15 Source: Energy Information Administration, *Uranium Industry Annual*.
16 "Spot" contract is defined as a one-time delivery of the entire contract within one year of contract execution.
17 Includes deliveries of uranium under all contract types, including spot, short-term, medium-term, and long-term contracts.
18 Includes US utility receipts for all forms, including uranium concentrates (U_3O_8), uranium hexafluoride (UF_6) and enriched uranium product.
19 Includes US utility receipts for all origins and all forms, including uranium concentrates (U_3O_8), uranium hexafluoride (UF_6) and enriched uranium product, but under contracts with only non-US suppliers

Australian Annual U_3O_8 Exports[20]

Year[21]	Average Price (A$ / kg U_3O_8)	Volume (tonnes U_3O_8)
2002-03	44.5	9,592
2003-04	40.0	11,215
2004-05	42.4	11,215
2005-06	53.2	10,252
2006-07	69.1	9,518
2007-08	87.3	10,139
2008-09	97.9	10,114
2009-10	99.4	7,555
2010-11	87.8	6,950
2011-12	87.8	6,917
2012-13	98.1	8,391
2013-14	92.8	6,701
2015	115.1	6,969
2016	93.1	7,679

P = Preliminary R = Revised since last month

20 Source: ABARE, *Australian Mineral Statistics* (previously *Quarterly Mineral Statistics*) and/or Uranium Information Centre
21 Annual data are reported on the basis of the Australian financial year, which extends from July 1 of the first year, through June 30 of the following year; 2015 data is reported for the calendar year.

TradeTech
uranium prices & analysis since 1968

Denver, Colorado USA
Denver Tech Center
7887 E. Belleview Avenue, Suite 888
Englewood, Colorado 80111
Phone +1 (303) 573-3530
Fax +1 (303) 573-3531
review@tradetech.com
U3O8tradetech@outlook.com
www.uranium.info

Dallas, Texas USA
Phone +1 (972) 503-3931
Fax +1 (972) 503-3936
editor@tradetech.com

Charlotte, North Carolina USA
Phone +1 (704) 574-0009

London, England
Phone +44 (0) 20-8798-0336

Tokyo, Japan
Phone +81 (0) 3-5443-2779
Fax +81 (0) 3-5443-4081

Shanghai, China
Phone +86 (135) 2456-7757

Exhibit 17

Exhibit 17
Constructed Annual Mine Capacity and Spot Price

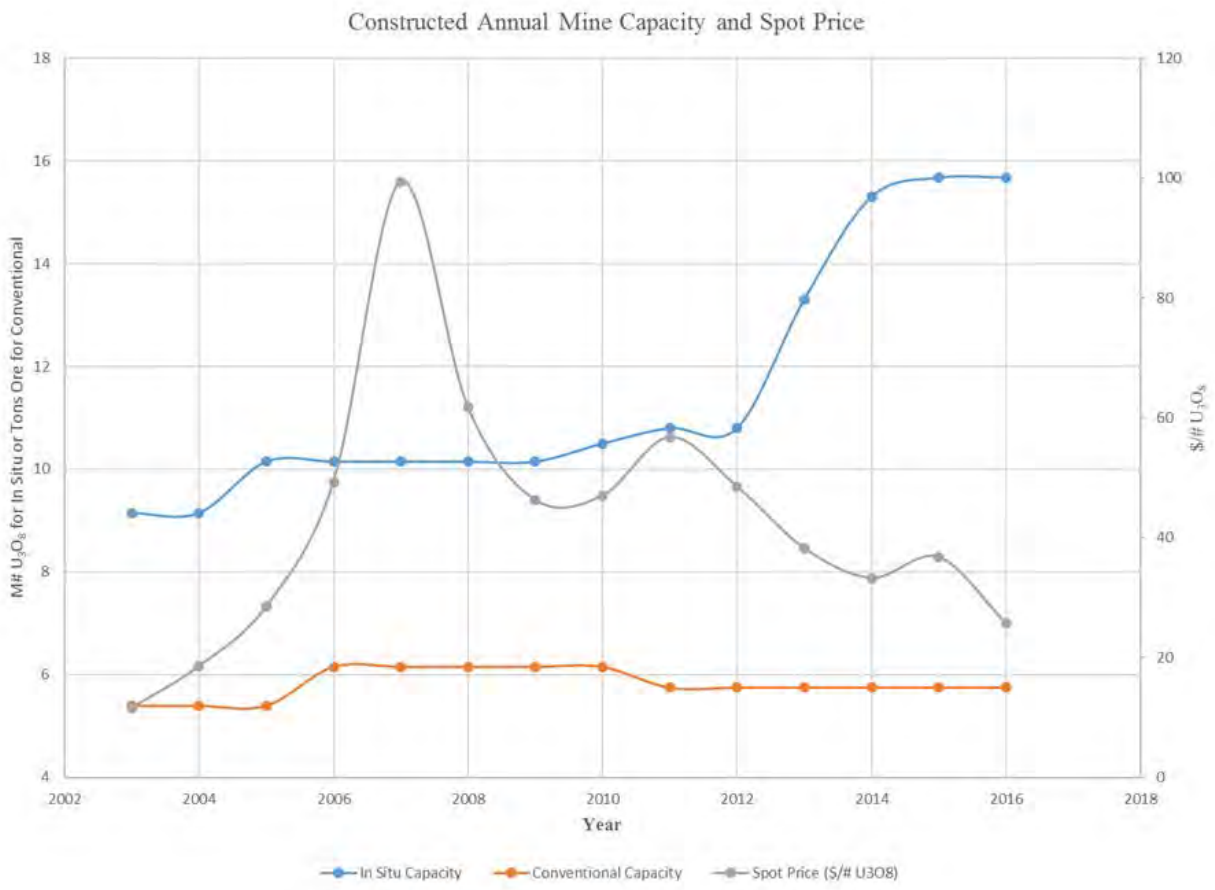


Exhibit 18

Exhibit 18
Nuclear Mining Industry Training Requirements and Timing

Position	Education Level	Minimum Months of On The Job Training
Automation Instrumentation Specialist	Trade School	4
Casing Construction Laborer	High School	2
Casing Crew Lead	High School	24
Casing Tech	High School	2
Casing Tech II	High School	18
Drilling Supervisor	4-Year Bachelor of Science	24
EHS Technician	High School	4
Field Geologist GIS	4-Year Bachelor of Science	12
Health Physics Tech	4-Year Bachelor of Science	12
HR Office Administrator	High School	4
Lab Manager	4-Year Bachelor of Science	12
Lab Tech	High School	4
Maintenance Foreman	High School	12
Maintenance Tech I	High School	4
Maintenance Tech II	High School	18
Mechanic	High School	1
Mine Geologist	4-Year Bachelor of Science	24
Mine Manager	4-Year Bachelor of Science	60
Plant Operator	High School	6
Plant Operator Lead	High School	12
Process Engineer Plant Manager	4-Year Bachelor of Science	6
Project Engineer	4-Year Bachelor of Science	6
Wellfield Construction I	High School	4
Wellfield Construction II	High School	18
Wellfield Construction Supervisor	High School	24
Wellfield Electrician	Trade School	4
Wellfield Maintenance Tech	High School	12
Wellfield Operations Supervisor	High School	24
Wellfield Operator	High School	4
WF Maintenance Tech	High School	4

Exhibit 19

Exhibit 19
Project Status and Capacity

Company	Mine/Mill Name	Type of Facility	State	Annual Capacity (Million lbs. U_3O_8)	Year					Status
					2013	2014	2015	2016	Est. 2017	
Mines/Mills That are Licensed and Constructed										
Energy Fuels Resources Corp.	White Mesa	Mill	UT	8.00	1.01	0.94	0.30	0.68	0.30	Operating
Ur-Energy USA Inc.	Lost Creek	ISR	WY	2.00	0.13	0.55	0.78	0.56	0.28	Operating
Peninsula/Strata	Ross	ISR	WY	0.38	0.00	0.00	0.00	0.13	<0.15	Operating
Energy Fuels Resources Corp.	Alta Mesa	ISR	TX	1.50	0.00	0.00	0.00	0.00	0.00	Standby
Cameco Resources Inc.	Smith Ranch-Highland w/ Satellites	ISR	WY	5.50	1.68	2.12	1.45	0.93	<0.3	Operating but development halted. Potential sale of properties as Cameco considers exiting the U.S.
Energy Fuels Resources Corp.	Nichols Ranch	ISR	WY	2.00	0.00	0.20	0.27	0.34	0.25	Operating but development halted
Cameco	Crow Butte	ISR	NE	1.00	0.71	0.59	0.40	0.23	<0.10	Operating but development halted
Uranium One	Willow Creek	ISR	WY	1.30	0.94	0.56	0.12	0.06	<0.50	Operating but development halted
Anfield	Shootaring Canyon	Mill	UT	2.00	0.00	0.00	0.00	0.00	0.00	Standby; facility requires significant upgrades before starting
Rio Tinto	Sweetwater	Mill	WY	4.10	0.00	0.00	0.00	0.00	0.00	Standby
UEC	Hobson w/ Satellites	ISR	TX	1.00	0.00	0.03	0.01	0.00	0.00	Standby
Sub-Total				29.58	4.47	4.99	3.32	2.93	<1.43	
Projects That are Fully Licensed/Permitted but Not Constructed										
Laramide Resources Ltd	Church Rock/Crownpoint	ISR	NM	1.0						
UEC	Reno Creek	ISR	WY	2.0						
Uranium One	Moore Ranch	ISR	WY	0.5						Will be satellite to Willow Creek
Western Uranium	Pinon Ridge	Mill	CO	2.0						
Sub-Total				5.5						

Production data from 2013-2016 from World Nuclear Association website updated November 2017 at http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/us-uranium-mining.aspx. Data converted from tonnes U to pounds U_3O_8.

Green text indicates the facility is in operations with ongoing development. Blue text indicates facility is in production but development suspended. Red text indicates the facility is not currently in production.

Exhibit 19
Domestic Industry

In addition to Petitioners, there are several other uranium mining companies in the U.S. The group includes a range of companies from those who hold exploration projects through to Petitioners, Strata, Cameco and Uranium One who are all currently operating production sites. The information below is intended as a snapshot of each company's uranium project(s), based upon publicly available information from their websites or public filings. Websites for each company are provided.

Anfield Energy Inc.

Anfield Energy Inc (formerly, Anfield Resources) has uranium landholdings in Arizona, Colorado, and Utah. On its Utah projects, Anfield reports 4.6 million pounds measured and indicated uranium resource, and an additional 3.2 million pounds historic uranium resource. More recently, Anfield has reported a combined resource at two of its Wyoming projects which includes 1.1 million pounds in the indicated category and 2.6 million pounds inferred mineral resource. Anfield also owns the Shootaring Canyon Mill in Utah, which is one of only three licensed and constructed uranium mills in the U.S. It is currently on standby.

Anfield's website is found at http://anfieldresources.com/.

Azarga Uranium

Azarga Uranium is currently permitting the Dewey Burdock project in South Dakota. The company estimates the uranium project contains 8.6 million pounds of measured and indicated resources, with another 3.5 million pounds inferred resources. The project has obtained its NRC license, although certain aspects of the licensure remain under review. All other permitting and licensing requirements are being pursued; prior to commencing construction and operations at the project, the company requires regulatory approvals from two other major agencies: the EPA and the South Dakota Department of Environment and Natural Resources.

Azarga has three other uranium exploration projects located in Wyoming and one exploration project in Colorado. The Colorado project has an estimated 10.4 million pounds U_3O_8 indicated resource, with an additional 2.3 million pounds inferred uranium resource.

Azarga's website is found at http://azargauranium.com/.

Cameco

Cameco is one of the world's largest uranium producers. In 2016, its production in several countries accounted for about 17% of the world's production. In the U.S., Cameco operates Crow Butte (Nebraska) and Smith Ranch-Highland (Wyoming). Each has its own processing facilities, but the Highland plant is currently idle. At Smith Ranch-Highland, production for 2016 was 36% lower than in 2015. At Crow Butte, 2016 production was 25% lower than in 2015. Production at both operations was lower due to company's decision, in early 2016, to curtail production.

Although curtailed, due to the nature of ISR mining and wellfield restoration requirements, production at Smith Ranch-Highland and at Crow Butte is expected to continue, but at a decreasing rate over time as head grade and flow rate declines. In 2017, Cameco projected production of 0.4 million pounds at Smith Ranch-Highland and 0.1 million pounds at Crow Butte.

The curtailment of Cameco's U.S. operations resulted in a reduction of 85 positions in 2016, including employees and long-term contractors, with a workforce of 160 remaining to operate the sites at year-end 2016. Cameco began its cost-cutting and consolidation efforts in the U.S. as early as 2014 when it consolidated its Wyoming non-operational offices and closed its Cheyenne office, losing two employees at that time. It is believed that Cameco's Crow Butte and Smith Ranch sites laid off additional employees in 2017.

Cameco's website is found at https://www.cameco.com/.

enCore Energy Corporation

enCore Energy Corporation has uranium mineral projects in New Mexico, including the Crownpoint and Hosta Butte uranium deposits. The company estimates that these deposits contain an indicated resource of 26.6 million pounds U_3O_8 and an inferred resource of 6.1 million pounds U_3O_8. A portion of these resources are under NRC license. The company also holds certain processing rights at the White Mesa Uranium Mill of Energy Fuels in Utah.

enCore Energy's website is found at http://encoreenergycorp.com/.

Kennecott Uranium (subsidiary of Rio Tinto)

Kennecott owns the Sweetwater mine and mill in Sweetwater County, Wyoming. With a four million pounds per year capacity, the mill is only one of three licensed and constructed uranium mills in the U.S. Currently, it is on standby.

Rio Tinto's website is found at http://www.riotinto.com/.

Laramide Resources Ltd

Laramide Resources has both conventional and ISR uranium projects in the U.S., which are in various stages of exploration, development, permitting or beyond. These projects include the Church Rock ISR project in New Mexico (with an estimated 51 million pounds inferred resource) and La Sal conventional project in Utah (estimated to have a 7.3 million pounds measured and indicated resource and an additional 3.2 million pounds inferred resource).

Laramide Resource's website it found at https://laramide.com/.

Strata Energy

Strata Energy commenced ISR operations at its fully licensed and permitted Ross-Lance uranium project in Wyoming in December 2015. The company has several long-term contracts for its

uranium production. Having only explored a portion of their area of interest in the Powder River Basin, Strata currently reports a JORC Code mineral resource on the project of nearly 54 million pounds U_3O_8. The Lance Projects covers an area of over 46 square miles.

Strata's website is found at http://www.stratawyo.com/; its parent company's website is found at http://www.pel.net.au/.

Uranium Energy Corporation

Uranium Energy Corporation (UEC) is a Texas-based uranium mining company which owns the fully licensed and permitted Hobson processing facility, which is central to all of its uranium projects in South Texas, including the Palangana ISR mine and the Goliad ISR project which is fully permitted for production and under construction.

Additionally, UEC holds uranium projects in Wyoming, New Mexico, Arizona and Colorado. The company also controls significant databases of historic U.S. uranium exploration and development projects. At July 31, 2014, UEC had 61 full time employees; at July 31, 2017, the company had 45 full time employees.

Uranium Energy Corporation's website is found at http://www.uraniumenergy.com/.

Uranium One America, Inc.

Uranium One Americas operates the Willow Creek ISR uranium mine in Johnson and Campbell Counties in Wyoming's Powder River Basin. The mine includes the licensed and permitted Irigaray ISR central processing plant, the Christensen Ranch satellite ISR facility and associated uranium ore bodies. The company acquired the property in 2010 and resumed commercial production at Willow Creek in 2012. The design capacity of Willow Creek is 1.3 million lbs. U_3O_8 per year. In 2014 – 2016, production was scaled back and well field development put on hold due to low uranium prices. In 2016, Willow Creek produced 59,900 lbs. of U_3O_8. Willow Creek is reported as having an indicated resource of 11.653 million pounds U_3O_8

In addition to Willow Creek, Uranium One has a number of development and exploration projects in Wyoming's Powder River Basin, including Ludeman, Allemand Ross, Moore Ranch and Barge, as well as in the Great Divide Basin, including Antelope and JAB. No development or exploration activities are currently being conducted on these projects and properties. Uranium One has laid off employees and contractors in Wyoming in the past several years.

Uranium One's website is found at http://www.uranium1.com/, with its U.S. operations being highlighted at http://www.uranium1.com/our-operations/#united-states.

URZ Energy

URZ Energy is a uranium company that owns properties in the Gas Hills, Juniper Ridge, and Shirley Basin areas of Wyoming as well as properties in Utah and Colorado. URZ Energy reports an indicated mineral resource of 4.7 million pounds and an inferred resource of 2.5 million pounds

eU_3O_8 at its Gas Hills Project. URZ Energy estimates a mineral resource at its Juniper Ridge Project of 6 million pounds eU_3O_8 indicated resources and 0.2 million pounds eU_3O_8 inferred resource.

URZ Energy's website is found at http://urzenergy.com/.

Virginia Uranium Inc.

Virginia Uranium owns the Coles Hill uranium project in Virginia which is thought to hold the largest uranium deposit in the U.S. The company estimates an indicated uranium resource of 133 million pounds. There is currently a moratorium on development of uranium mining in Virginia. The State of Virginia commissioned an independent economics study in 2011 which projects that if the mine and mill were constructed, it is estimated that Coles Hill could support over 1,000 jobs for the 35-year life span of the mine, generate $5 billion in revenue for Virginia companies, and generate $112 million in state and local taxes.

Virginia Uranium Inc.'s website is found at http://www.virginiauranium.com/.

Western Uranium

Based in Colorado, Western Uranium holds nine uranium mineral projects in Utah and Colorado. It owns the Pinon Ridge Project in Colorado which has a licensed and permitted mill, although it has not yet been constructed.

Western Uranium's website is found at http://western-uranium.com/.

Westwater Resources

Westwater Resources (formerly Uranium Resources, Inc.) holds a portfolio of properties throughout the Grants mineral belt of west-central New Mexico. Included within the property portfolio are owned and leased lands. Westwater Resources currently controls three idled production properties and several exploration projects in South Texas.

Westwater Resources website is located at http://www.westwaterresources.net/.

Exhibit 20

Exhibit 20
Table 2. Uranium purchased by owners and operators of U.S. civilian nuclear power reactors by origin and delivery year, 2012-16

thousand pounds U_3O_8 equivalent; dollars per pound U_3O_8 equivalent

Deliveries	2012	2013	2014	2015	2016
U.S.-origin uranium (Mined + DOE)					
Purchases	9,807	9,484	3,316	3,419	5,424
DOE Transfers	7,415	9,255	7,899	7,452	5,631
U.S. Mined/Milled	2,392	229	-4,583	-4,033	-207
Weighted-average price	59.44	56.37	48.11	43.86	43.92
Foreign-origin uranium					
Purchases	47,713	47,919	50,033	53,106	45,171
Weighted-average price	54.07	51.13	46.03	44.14	42.26
Total					
Purchases	**57,520**	**57,403**	**53,349**	**56,524**	**50,595**
Weighted-average price	**54.99**	**51.99**	**46.16**	**44.13**	**42.43**

Data from these two rows derived from UPA numbers

Notes: Totals may not equal sum of components because of independent rounding. Weighted-average prices are not adjusted for inflation.

Source: U.S. Energy Information Administration: Form EIA-858 "Uranium Marketing Annual Survey" (2012-16).

Exhibit 21

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Uranium One and UrAsia Energy Announce Combination to Create Emerging Senior Uranium Company

<<
Trading Symbols: SXR - Toronto Stock Exchange,
JSE Limited (Johannesburg Stock Exchange)
UUU - TSX Venture Exchange,
AIM (London Stock Exchange)
>>

TORONTO, ON, VANCOUVER, BC and JOHANNESBURG, South Africa Feb. 12 /CNW/ - sxr Uranium One Inc. ("Uranium One") and UrAsia Energy Ltd. ("UrAsia") are pleased to announce that the two companies have entered into a definitive arrangement agreement whereby Uranium One will acquire all of the outstanding common shares of UrAsia. The acquisition will result in the creation of a new, globally diversified uranium producer with an exciting growth profile and a combined fully-diluted market capitalization of approximately US$5 billion. Subject to shareholder approval, the combined company will continue under the name of Uranium One Inc.

Under the terms of the acquisition, UrAsia shareholders will receive 0.45 common shares of Uranium One for each issued share of UrAsia, representing a value of C$7.05 per share based upon the closing price of Uranium One on the TSX on February 9, 2007. This represents a 13% premium to the closing share price of UrAsia's shares on the TSX Venture Exchange on February 9, 2007 and a 21% premium to the 20 day volume weighted average trading prices of Uranium One's and UrAsia's shares on the TSX and TSX Venture Exchange, respectively.

The new Uranium One will be one of the world's largest uranium companies ranked by market capitalization. The profile of Uranium One will be:

<<
- Estimated combined attributable annual production in excess of 7 million pounds U3O8 from five operations in 2008 (Dominion, Akdala, South Inkai, Kharassan and Honeymoon)

- Estimated cash operating costs of approximately US$10 to US$12 per pound U3O8 in steady state

- Un-hedged and un-capped sales contracts provide exposure to further uranium price increases on substantially all projected production

- Attributable proven and probable reserve base of 49 million pounds of U3O8, indicated resources of 102 million pounds of U3O8 and inferred resources of 269 million pounds of U3O8

- Substantial Russian P1 resources at South Inkai and Kharassan and upside potential at Dominion to drive organic resource growth

- A strong balance sheet with a pro forma cash balance of approximately US$389 million at December 31, 2006

- Industry leading expertise in both conventional and in situ leach (ISL) mining techniques
>>

Further detailed information on reserves and resources can be found in the Additional Reserve and Resource Data section below and in the Other Matters and Cautionary Statement at the end of this release.

The transaction creates an emerging senior uranium company based on the combined project pipeline. The new Uranium One will provide shareholders with the benefits of scale through an increased market capitalization. The combined

entity will be the only company in the uranium sector with production and asset exposure to each of the world's five largest resource jurisdictions, namely Kazakhstan, South Africa, Australia, the United States and Canada.

The Board of Directors of UrAsia has determined that the transaction is in the best interest of UrAsia and its shareholders and that the exchange ratio is fair to the UrAsia shareholders. The Board unanimously recommends that holders of UrAsia shares vote in favour of the transaction.

Paradigm Capital Inc. has provided a fairness opinion to the Board of Directors of UrAsia that the consideration offered pursuant to the transaction is fair, from a financial point of view, to the common shareholders of UrAsia.

Senior officers and directors of UrAsia have agreed to vote in favour of the transaction and lock-up as well as support agreements have been executed.

Commenting on the transaction, Neal Froneman, Uranium One CEO said:

"The combination of Uranium One and UrAsia creates a new, globally diversified uranium company with compelling investment appeal. With imminent production from Dominion in South Africa, combined with an established production profile from the Akdala ISL mine, the new Uranium One will be an exciting low-cost, growth-oriented uranium company, with five mines in operation by Q1 2008. As a result of this acquisition, the competitive advantages of the new Uranium One will be significant, as we will have the technical and financial capabilities to pursue further value enhancing growth opportunities, both organically and through further consolidation."

Phillip Shirvington, CEO of UrAsia added:

"The new Uranium One will be the pre-eminent growth company in the sector, with an unrivalled production growth profile. The Company is well positioned to gain maximum benefit from rising uranium prices. As a director of the new Uranium One, I look forward to contributing to its continued development and growth."

Summary of the Transaction

The business combination of Uranium One and UrAsia will be completed by way of a statutory plan of arrangement under the Business Corporations Act (British Columbia) whereby each UrAsia common share will be exchanged for 0.45 Uranium One common shares. After completion of the transaction, it is expected that current Uranium One shareholders will own approximately 40% of the combined company and current UrAsia shareholders will own approximately 60%.

The combination has been unanimously approved by the Boards of Directors of both Uranium One and UrAsia and will be subject to, among other things, approval by a two-thirds majority of holders of UrAsia common shares and regulatory approvals. A meeting of UrAsia shareholders to approve the transaction will be held on or about May 15, 2007. The notice of meeting, information circular and related materials is expected to be mailed in mid-April, 2007.

Paradigm Capital Inc. has provided an opinion to the Board of Directors of UrAsia that the consideration offered pursuant to the transaction is fair, from a financial point of view, to the common shareholders of UrAsia.

The Board of Directors of Uranium One has determined that this transaction is in the best interests of Uranium One shareholders and BMO Capital Markets has provided an opinion to the Board of Directors of Uranium One that the consideration offered pursuant to the arrangement is fair, from a financial point of view, to Uranium One.

If the transaction is not completed, UrAsia has agreed to pay a break fee to Uranium One under certain circumstances of US$90 million. UrAsia has also provided Uranium One with certain other customary rights, including a right to match competing offers.

As the new Uranium One will have a significant United Kingdom and continental European shareholder base, the company will investigate all available alternatives to facilitate continued liquidity for these shareholders.

Management Team and Board of Directors

Neal Froneman will continue as President and Chief Executive Officer of the combined company.

The Board of Directors of the new Uranium One will ultimately consist of nine members, comprising three nominees of UrAsia and six nominees of Uranium One. Ian Telfer will be Non-Executive Chairman and Phillip Shirvington will be one of the UrAsia nominees to the Uranium One Board. Frank Giustra resigned from the Board of UrAsia effective February 11, 2007 in order to permit the UrAsia Board to pursue this transaction without any perception of conflict, as he is also Chairman of Endeavour Financial (UrAsia's financial advisor). Mr. Giustra has confirmed to Uranium One and the UrAsia Board his continued support for the transaction and will assist UrAsia, as financial advisor, to bring the transaction to a timely and successful conclusion. Messrs. Telfer and Shirvington and a third nominee from UrAsia will join Andrew Adams, Ken Williamson, David Hodgson, Terry Rosenberg and Mark Wheatley as Non-Executive Directors of the new Uranium One. At closing, the Board of Directors will be comprised of eight members with the ninth member (one of the Uranium One nominees), being nominated at the next AGM.

Advisors and Counsel

Uranium One's exclusive financial advisor is BMO Capital Markets and its legal counsel is Fasken Martineau DuMoulin LLP. UrAsia's financial advisors are Endeavour Financial International Corporation, Canaccord Adams Limited and Paradigm Capital Inc. and its legal counsel is Stikeman Elliott LLP.

Conference Call

A conference call will be held on February 12, 2007 at 11:00 AM Eastern time to discuss this transaction. A copy of the presentation is available on www.uranium1.com.

Via Telephone:

The local dial-in number will be 416-340-2217. The North American toll free dial-in will be 1-866-696-5910. International participants must dial their international access code followed by 800-8989-6336. The passcode for the live call is 3214593 followed by the number sign.

A replay of the conference call will be available for one week at 416-695-5800 (local) or 1-800-408-3053 (North America toll free). The passcode for the replay is 3214593 followed by the number sign.

Via Webcast:

A live audio webcast of the call will be available at http://events.startcast.com/events/50/B0001

Additional Reserve and Resource Data

In conjunction with the following tables, readers are also urged to read the Other Matters and Cautionary Statement at the end of this press release.

UrAsia Energy Ltd.

<<

Proven Mineral Reserves

Asset	Tonnes (thousands)	Grade Uranium (% U)	Contained U (tonnes U)	Contained U3O8 (million lbs)
Akdala(1)	2,769	0.057	1,590	4.1

(1) Attributable

Probable Mineral Reserves

Asset	Tonnes (thousands)	Grade Uranium (% U)	Contained U (tonnes U)	Contained U3O8 (million lbs)
Akdala(1)	8,966	0.057	5,110	13.3

(1) Attributable

Indicated Mineral Resources(2,3)

Asset	Tonnes (thousands)	Grade Uranium (% U)	Contained U (tonnes U)	Contained U3O8 (million lbs)
Akdala(1)	12,011	0.057	6,850	17.8
Kharassan(1)	791	0.201	1,590	4.1

(1) Attributable
(2) Mineral resources are inclusive of mineral reserves
(3) Mineral resources are not mineral reserves and do not have demonstrated economic viability

Inferred Mineral Resources(2)

Asset	Tonnes (thousands)	Grade Uranium (% U)	Contained U (tonnes U)	Contained U3O8 (million lbs)
Akdala(1)	6,788	0.062	4,200	10.9
South Inkai(1)	40,390	0.043	16,720	43.5
Kharassan(1)	9,160	0.095	8,700	22.6

(1) Attributable
(2) Mineral resources are not mineral reserves and do not have demonstrated economic viability

Probable Mineral Reserves

Asset	Tonnes (thousands)	U3O8 Grade (kg/tonne)	Contained U3O8 (thousands of lbs)	Gold Grade (g/tonne)	Contained Gold (thousands of ozs)
Dominion	18,454	0.77	31,327	0.99	589

Indicated Mineral Resources(1,2)

Asset	Tonnes (thousands)	U3O8 Grade (kg/tonne)	Contained U3O8 (thousands of lbs)	Gold Grade (g/tonne)	Contained Gold (thousands of ozs)
Dominion	36,385	0.81	64,889	0.91	1,060

Dominion

Dumps	3,375	0.16	1,195	0.51	55
Honeymoon	1,200	2.40	6,500	n/a	n/a
East Kalkaroo	1,200	0.74	2,000	n/a	n/a
Goulds Dam	1,700	1.20	4,400	n/a	n/a

(1) Mineral resources are inclusive of mineral reserves
(2) Mineral resources are not mineral reserves and do not have demonstrated economic viability

Inferred Mineral Resources(1)

Reef Unit	Tonnes (thousands)	U3O8 Grade (kg/tonne)	Contained U3O8 (thousands of lbs)	Gold Grade (g/tonne)	Contained Gold (thousands of ozs)
Dominion	219,375	0.38	183,630	0.67	4,752
Billeroo	12,000	0.30	7,900	n/a	n/a

(1) Mineral resources are not mineral reserves and do not have demonstrated economic viability

>>

About Uranium One

Uranium One Inc. is a Canadian uranium and gold resource company with a primary listing on the Toronto Stock Exchange and a secondary listing on the JSE Limited (the Johannesburg stock exchange). The Corporation owns the Dominion Uranium Project in South Africa and the Honeymoon Uranium Project in South Australia, and is actively pursuing growth opportunities in the uranium sector in the United States. The Corporation holds an approximate 71.4% interest in Aflease Gold Limited, which owns the Modder East Gold Project in South Africa. Through a 50/50 joint venture with Pitchstone Exploration Ltd., the Corporation is also engaged in uranium exploration activities in the Athabasca Basin of Saskatchewan.

About UrAsia Energy

UrAsia is a Canadian-based uranium producer that offers investors exposure to low-cost uranium production and growth. The Company creates shareholder value by focusing on the development and operation of low-cost, in-situ leach uranium projects in Central Asia. UrAsia is listed on the TSX Venture Exchange and the Alternative Investment Market (AIM) of the London Stock Exchange, trading under the symbol UUU on both exchanges.

Other Matters and Cautionary Statement

Investors are advised to refer to independent technical reports on Uranium One's material properties are available at www.sedar.com for detailed information with respect to the Corporation's properties. Those technical reports provide the date of each resource or reserve estimate, details of the key assumptions, methods and parameters used in the estimates, details of quality and grade or quality of each resource or reserve and a general discussion of the extent to which the estimate may be materially affected by any known environmental, permitting, legal, taxation, socio-political, marketing, or other relevant issues. The technical reports also provide information with respect to data verification in the estimation.

This document uses the terms "measured", "indicated" and "inferred" resources as defined in accordance with National Instrument 43-101 - Standards of Disclosure for Mineral Projects. United States investors are advised that while these terms are recognized and required by Canadian regulations, the SEC does not recognize them. Investors are cautioned not to assume that all or any part of the mineral deposits in these categories will ever be converted into reserves. In addition, "inferred resources" have a great amount of uncertainty as to their existence and economic and legal feasibility and it cannot be assumed that all or any part of an inferred mineral resource will be ever be upgraded to a higher category. Investors are cautioned not to assume that all or any part of an inferred resource exists or is economically or legally mineable. Mineral resources are not mineral reserves and do not have demonstrated economic viability. Scientific and technical information contained herein has been reviewed on behalf of Uranium One by Mr. M.H.G. Heyns, Pr.Sci.Nat. (SACNASP), MSAIMM, MGSSA, Consulting Geologist or by Ms. J.M. Smith, P.GEO Sr VP Corporate Development sxr Uranium One Inc.- both qualified persons for the purposes of NI 43-101.

Neither Uranium One nor Mr. Heyns or Ms. Smith have done sufficient work to classify the historical estimates of UrAsia's P1 resources or Uranium One's resources at Dominion as current mineral reserves or resources. Uranium One does not intend to treat such historical estimates of reserves and resources as a current estimate and the historical estimates should not be relied upon.

Scientific and technical information contained herein has been reviewed on behalf of UrAsia by C. Stewart Wallis, P.Geo. Consulting Geologist - a Qualified Person for the purpose of NI 43-101. Technical Reports prepared by Scott Wilson RPA (formerly Roscoe Postle Associates Inc.) in accordance with NI 43-101. Kharassan Technical Report, dated October 13, 2005, as revised March 25, 2006; South Inkai Technical Report, October 8, as revised March 20, 2006; and Akdala Technical Report, dated October 3, 2005 as revised March 3, 2006. The Technical Reports are available at www.sedar.com.

Historical estimates referred to herein as Russian P1 resources are derived from Kazatomprom documents, an entity of the Government of Kazakhstan. Although Russian P1 Resources do not meet Canadian Institute of Mining, Metallurgy and Petroleum (CIM) standards on Mineral Resource and Reserve definitions, they are considered relevant because of previous pilot plant production, but should not be relied upon. The CIM resource definition which most closely resembles P1 resources is that of Inferred Resources. However, there is less confidence attributed to a P1 resource since a P1 resource is estimated on the basis of a lower drill density than an inferred resource.

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

Forward-looking statements: Certain of the statements made herein, including any information as to the Corporation's future financial or operating performance, may be forward-looking and subject to important risk factors and uncertainties, many of which are beyond the Corporation's ability to control or predict. Forward-looking statements are necessarily based on a number of estimates and assumptions that are inherently subject to significant business, economic and competitive uncertainties and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, among others: gold and uranium price volatility; impact of any hedging activities, including margin limits and margin calls; discrepancies between actual and estimated production, between actual and estimated reserves and resources and between actual and estimated metallurgical recoveries; changes in national and local government legislation, taxation, controls, regulations and political or economic developments in Canada, the United States, South Africa, Australia or other countries in which the Corporation does or may carry on business in the future; risks of sovereign investment; the speculative nature of gold and uranium exploration and development, including the risks of obtaining necessary licenses and permits; dilution; competition; loss of key employees; additional funding requirements; and defective title to mineral claims or property. In addition, there are risks and hazards associated with the

business of gold and uranium exploration, development and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold bullion losses (and the risk of inadequate insurance or inability to obtain insurance, to cover these risks), as well as the factors described or referred to in reports filed by the Corporation with the Canadian securities administrators. Accordingly, readers should not place undue reliance on forward-looking statements. The Corporation undertakes no obligation to update publicly or release any revisions to forward-looking statements to reflect events or circumstances after the date of this document or to reflect the occurrence of unanticipated events.

%SEDAR: 00005203E

/For further information: Neal Froneman, Chief Executive Officer, sxr Uranium One Inc., Tel: (416) 350-3657; Jean Nortier, Chief Financial Officer, sxr Uranium One Inc., Tel: + 27 11 482 3605; Chris Sattler, Vice President, Investor Relations, sxr Uranium One Inc., Tel: (416) 350-3657; Phillip Shirvington, Chief Executive Officer, UrAsia Energy Ltd., Tel: (604) 609-5130; Sally Eyre, Vice President, Corporate Affairs, UrAsia Energy Ltd., Tel: (604) 377-2757; Ben Willey, Buchanan Communications, Tel: + 44 (0)207 466 5118; sxr Uranium One Inc., 390 Bay Street, Suite 1610, Toronto, Ontario, M5H 2Y2; UrAsia Energy Ltd., Suite 3123, 595 Burrard Street, Vancouver, British Columbia, V7X 1J1; For further information about Uranium One or UrAsia, please visit www.uranium1.com or www.urasiaenergy.com/

(SXR.)

CO: sxr Uranium One Inc.; UrAsia Energy Ltd.

CNW 03:55e 12-FEB-07

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Uranium One Signs Definitive Agreement to Acquire U.S. Energy Corp.'s Shootaring Canyon Uranium Mill and U.S. Uranium Properties

Trading Symbol: SXR - Toronto Stock Exchange, JSE Limited (Johannesburg Stock Exchange)

TORONTO and JOHANNESBURG, South Africa, Feb. 23 /CNW/ - sxr Uranium One Inc. ("Uranium One") is pleased to announce that it has entered into a definitive agreement with U.S. Energy Corp. and its affiliate, Crested Corp., for the purchase of the Shootaring Canyon Uranium Mill in Utah, as well as a land package comprising approximately 38,763 acres of uranium exploration properties in Utah, Wyoming, Arizona and Colorado and a substantial database of geological information with respect to an additional 1,582,036 acres in a five-mile zone surrounding the purchased properties.

Neal Froneman, Chief Executive Officer of Uranium One, said: "The execution of this agreement marks a major step forward in our U.S. growth strategy. The acquisition of the Shootaring Canyon Mill and related uranium property interests will serve as the foundation for our growth in the United States. We look forward to closing this transaction and to expanding our U.S. business in line with our growth strategy."

Terms of the Acquisition

The asset purchase agreement follows a period of detailed due diligence conducted by Uranium One under an exclusivity agreement entered into between the parties on July 10, 2006.

Under the asset purchase agreement, Uranium One has agreed to purchase through certain of its subsidiaries the Shootaring Canyon Mill and related property interests for consideration equal to 6,607,605 Uranium One common shares plus the sum of US $750,000 in cash paid by Uranium One on execution of the exclusivity agreement. In addition, in accordance with the provisions of the exclusivity agreement, Uranium One has agreed to pay U.S. Energy US $20,000,000 upon the Shootaring Canyon Mill reaching commercial production and US $7,500,000 on the first delivery to the Mill after commercial production of mineralized material from any of the purchased properties; U.S. Energy will also receive a royalty equal to 5% of the gross proceeds from the sale of commodities produced at the Mill, to a maximum amount of US $12,500,000.

The purchase agreement also provides for the assignment of U.S. Energy's right to receive US $4,100,000 in cash and 1,500,000 common shares of Uranium Power Corp. ("UPC") after closing under a purchase and related joint venture agreement between U.S. Energy and UPC relating to certain of the purchased properties for a cash payment equal to a 5.25% annual discount rate applied to US $4,100,000 plus the value of such shares (determined with reference to the weighted average closing price thereof on the TSX Venture Exchange prior to closing). In addition, in accordance with the provisions of the exclusivity agreement, Uranium One will on closing reimburse U.S. Energy for certain exploration expenditures relating to the purchased properties and incurred with Uranium One's approval since July 2006.

The purchase agreement also provides that Uranium One and U.S. Energy will enter into an agreement on closing under which Uranium One will be given the first opportunity to earn into or fund uranium property interests which may in the future be owned or acquired by U.S. Energy outside the five mile area surrounding the purchased properties for a period of two years after closing. Under this agreement, Uranium One will also have access without charge for a period of three years to the database of geological information assembled by U.S. Energy on properties in the western United States beyond the purchased properties and the area of interest surrounding them.

Closing of the purchase agreement is subject, among other things, to the receipt of all required governmental and regulatory approvals, including the approval by the Utah Division of Radiation Control of the transfer of the Mill's radioactive materials licence and final acceptance by the Toronto Stock

Exchange for the listing of the Uranium One common shares to be issued on closing.

The Shootaring Canyon Mill

The Shootaring Canyon Mill, located approximately 48 miles south of Hanksville, Utah, was the last conventional uranium mill to be built in the United States and is strategically situated amongst several known uranium deposits. The Mill was commissioned and operated for a period of four months in 1982, meeting all applicable performance guarantees. Approximately 30 tons of U3O8 were produced and shipped before the Mill was mothballed due to declining uranium prices. The Mill has been maintained in excellent condition since being placed on standby.

The Mill is an acid leach facility with a 750 tons per day throughput capacity that could be upgraded to an estimated throughput rate of 1,000 tons per day. There is also the potential to add a vanadium processing circuit to the existing Mill infrastructure. The Mill currently has a reclamation licence, which U.S. Energy is working to convert to an operating licence subject to applicable regulatory approval.

The U.S. Energy Uranium Properties

The U.S. Energy uranium properties consist of eight separate claim groupings in Utah, Wyoming, Arizona and Colorado. Four of these claim groupings (White Canyon, Henry Mountain, Lisbon Valley and Sage Plains) are wholly-owned by U.S. Energy; the other four (Sheep Mountain, Green River North, Burro Canyon and the Breccia Pipes) are held by U.S. Energy in the joint venture with UPC.

The most advanced of the U.S. Energy properties is the Sheep Mountain property in Wyoming. On August 29, 2006, UPC announced the completion by Scott Wilson Roscoe Postle Associates, Inc. of an NI 43-101-compliant mineral resource estimate (the "Resource Estimate") for the Sheep Mountain property, comprising inferred mineral resources of 4.56 MT grading 0.17% eU3O8 (15.6 million pounds of contained metal) contained in the Sheep 1 and 2 deposits.

The acquired assets also include an extensive database containing historical data from past producing uranium mines, as well as exploration data from uranium projects ranging from grassroots to advanced exploration status.

About sxr Uranium One

sxr Uranium One Inc. is a Canadian uranium and gold resource company with a primary listing on the Toronto Stock Exchange and a secondary listing on the JSE Limited (the Johannesburg stock exchange). Uranium One owns the Dominion Uranium Project in South Africa and the Honeymoon Uranium Project in South Australia, and is actively pursuing growth opportunities in the uranium sector in the United States and Kazakhstan. Uranium One holds an approximate 71.4% interest in Aflease Gold Limited, which owns the Modder East Gold Project in South Africa. Through a 50/50 joint venture with Pitchstone Exploration Ltd., Uranium One is also engaged in uranium exploration activities in the Athabasca Basin of Saskatchewan.

Other Matters and Cautionary Statement

Readers are advised to refer to the Resource Estimate, which is set out in the technical report entitled "Technical Report on the Sheep Mountain Uranium Project, Wyoming" prepared by Scott Wilson RPA for UPC and dated October 10, 2006. The Resource Estimate is available under UPC's profile located at www.sedar.com. The Resource Estimate provides the date of the estimate, details of the key assumptions, methods and parameters used in the estimate, details of grade or quality and quantity of each resource and a general discussion of the extent to which the estimate may be materially affected by any known environmental, permitting, legal, taxation, socio-political, marketing or other relevant issues. The Resource Estimate

also provides information with respect to data verification in the estimation.

This document uses the terms "measured", "indicated" and "inferred" resources as defined in accordance with National Instrument 43-101 - Standards of Disclosure for Mineral Projects. United States investors are advised that, while these terms are recognized and required by Canadian regulations, the SEC does not recognize them. Investors are cautioned not to assume that all or any part of the mineral deposits in these categories will ever be converted into measured or indicated resources or into reserves. In addition, "inferred resources" have a great amount of uncertainty as to their existence and economic and legal feasibility, and it cannot be assumed that all or any part of an inferred resource will ever be upgraded to a higher category. Under Canadian rules, estimates of inferred mineral resources may not form the basis of feasibility or pre-feasibility studies or economic studies except for preliminary assessments as defined under NI 43-101. Investors are cautioned not to assume that all or any part of an inferred resource exists or is economically or legally mineable. Mineral resources are not mineral reserves and do not have demonstrated economic viability.

Scientific and technical information contained herein has been reviewed on behalf of Uranium One by Ms. J.M. Smith, P.Geo., Senior Vice President, Corporate Development, sxr Uranium One Inc., who is a qualified person for the purposes of NI 43-101.

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

The Uranium One common shares described in this release have not been registered under the United States Securities Act of 1933, as amended, and may not be offered or sold in the United States or to a U.S. person absent such registration or an available exemption therefrom.

Forward-looking statements: Certain of the statements made herein, including any information as to Uranium One's future financial or operating performance and statements regarding the timing and completion of the U.S. Energy transaction, may be forward-looking and subject to important risk factors and uncertainties, many of which are beyond Uranium One's ability to control or predict. In addition, resource estimates may be forward-looking statements (or forward-looking information) to the extent that they constitute estimates of mineralization that may be discovered in the future. Forward-looking statements are necessarily based on a number of estimates and assumptions that are inherently subject to significant business, economic and competitive uncertainties and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, among others, uranium and gold price volatility, impact of any hedging activities including margin limits and margin calls, discrepancies between actual and estimated production, between actual and estimated reserves and resources and between actual and estimated metallurgical recoveries, changes in national and local government legislation, taxation, controls, regulations and political or economic developments in South Africa, Australia, the United States, Canada or other countries in which Uranium One does or may carry on business in the future, risks of sovereign investment, the speculative nature of uranium and gold exploration and development including the risks of obtaining necessary licences and permits, dilution, competition, loss of key employees, additional funding requirements, and defective title to mineral claims or property. In addition, there are risks and hazards associated with the business of uranium and gold exploration, development and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold bullion losses (and the risk of inadequate insurance or inability to obtain insurance to cover these risks), as well as the factors described or referred to in reports filed by Uranium One with the Canadian securities administrators. Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One undertakes no obligation

to update publicly or release any revisions to forward-looking statements to reflect events or circumstances after the date of this document or to reflect the occurrence of unanticipated costs.

To receive the Corporation's news releases by email, please register on Uranium One's website - www.uranium1.com.

%SEDAR: 00005203E

/For further information: Neal Froneman, Chief Executive Officer, Tel: + 27 11 482 3605; Chris Sattler, Vice President, Investor Relations, Tel: (416) 350-3657/

(SXR.)

CO: sxr Uranium One Inc.

CNW 09:15e 23-FEB-07

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Energy Metals Securityholders Approve Arrangement with Uranium One

<<
Trading Symbols: SXR - Toronto Stock Exchange, JSE Limited (Johannesburg Stock Exchange)
EMC - Toronto Stock Exchange; EMU - NYSE Arca
>>

TORONTO, VANCOUVER and JOHANNESBURG, July 31 /CNW/ - Uranium One Inc. ("Uranium One") and Energy Metals Corporation ("EMC") are pleased to announce today that the securityholders of EMC have voted overwhelmingly to approve the proposed Plan of Arrangement with Uranium One. The transaction was approved by 99.68% of the votes cast by shareholders and by 100% of the votes cast by optionholders, for approval by an aggregate of 99.73% of EMC securityholders voting in person or by proxy at the meeting.

Under the terms of the Plan of Arrangement, EMC securityholders will receive 1.15 Uranium One common shares for each EMC common share, and 1.15 options to acquire Uranium One common shares for each option to acquire EMC common shares, held at the time of closing.

The acquisition of EMC by Uranium One has been cleared by the Committee on Foreign Investments in the United States under the provisions of the Exon-Florio Amendment to the Defense Production Act of 1950.

Paul Matysek, EMC President and CEO commented:

"Today's vote reflects the strong support our securityholders have shown for this transaction. By combining with Uranium One, EMC securityholders will gain exposure to existing production and cash flow, while maintaining a significant interest in our portfolio of near-term production visible projects in the United States."

Neal Froneman, President and CEO of Uranium One commented:

"We are extremely pleased to see this overwhelming approval for the transaction. The addition of EMC's assets to those of Uranium One will enhance Uranium One's status as a geographically diversified emerging senior uranium producer with an unrivalled production growth profile."

An application to the Supreme Court of British Columbia for a final court order approving the Plan of Arrangement is scheduled for August 3, 2007. The transaction is expected to close on or about August 10, 2007.

About Uranium One

Uranium One Inc. is a Canadian-based uranium producing company with a primary listing on the Toronto Stock Exchange and a secondary listing on the JSE Limited (the Johannesburg stock exchange). The Corporation owns 70% of the operating Akdala Uranium Mine in Kazakhstan and is also developing the South Inkai and Kharasan Uranium Projects in Kazakhstan. Uranium One owns the Dominion Uranium Project in South Africa, as well as the Honeymoon Uranium Project in South Australia. The Corporation recently acquired the Shootaring Canyon Mill and associated assets in the western United States. Uranium One is also engaged in uranium exploration activities in the Athabasca Basin of Saskatchewan, South Africa, Autralia and the Kyrgyz Republic.

About Energy Metals Corporation

Energy Metals Corporation is a TSX and NYSE Arca listed company focused on advancing its industry leading uranium property portfolio towards production in what is the world's largest uranium consumer market, the United States of America. Energy Metals Corporation has extensive advanced property holdings in Wyoming, Texas and New Mexico that are amenable to ISR (in-situ recovery). This form of uranium mining was pioneered in Texas and Wyoming and utilizes oxygenated groundwater to dissolve the uranium in place and pump it to the surface through water wells. Energy Metals is currently development drilling the La Palangana uranium deposit and upgrading the Hobson Uranium

Processing Plant in Texas for an anticipated 2008 production date. Energy Metals is also actively advancing other significant uranium properties in the States of Colorado, Utah, Nevada, Oregon and Arizona.

Cautionary Statement

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

Certain of the statements made herein, including any information as to the timing and completion of the proposed transaction, the potential benefits thereof, the future activities of and developments related to EMC and Uranium One prior to the proposed transaction and the combined company after the proposed transaction, market position, and future financial or operating performance of Uranium One or EMC, are forward-looking and subject to important risk factors and uncertainties, many of which are beyond the corporations' ability to control or predict. Forward-looking statements are necessarily based on a number of estimates and assumptions that are inherently subject to significant business, economic and competitive uncertainties and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, among others: uranium and gold price volatility; impact of any hedging activities, including margin limits and margin calls; discrepancies between actual and estimated production, between actual and estimated reserves and resources and between actual and estimated metallurgical recoveries; costs of production, capital expenditures, costs and timing of construction and the development of new deposits, success of exploration activities and permitting time lines; changes in national and local government legislation, taxation, controls, regulations and political or economic developments in Canada, the United States, South Africa, Australia, Kazakhstan or other countries in which either corporation does or may carry out business in the future; risks of sovereign investment; the speculative nature of uranium and gold exploration, development and mining, including the risks of obtaining necessary licenses and permits; dilution; competition; loss of key employees; additional funding requirements; and defective title to mineral claims or property. In addition, there are risks and hazards associated with the business of uranium and gold exploration, development and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold bullion losses (and the risk of inadequate insurance or inability to obtain insurance, to cover these risks), as well as the factors described or referred to in the section entitled "Risk factors" in Uranium One's Annual Information Form for the year ended December 31, 2006 which is available on SEDAR at www.sedar.com, and the section entitled "Risk factors" in EMC's Annual Information Form for the year ended June 30, 2006 which is available on SEDAR at www.sedar.com and from the SEC at www.sec.gov and which should be reviewed in conjunction with this document. Accordingly, readers should not place undue reliance on forward-looking statements. Neither corporation undertakes any obligation to update publicly or release any revisions to forward-looking statements to reflect events or circumstances after the date of this document or to reflect the occurrence of unanticipated events.

For further information about Uranium One, please visit www.uranium1.com. For further information about Energy Metals, please visit www.energymetalscorp.com.

%SEDAR: 00005203E

/For further information: Neal Froneman, Chief Executive Officer, Uranium One Inc., Tel: + 27 83 628-0226; Chris Sattler, Senior Vice President, Investor Relations, Uranium One Inc., Tel: (416) 671-3341; Paul Matysek, M.Sc., P. Geo., Chief Executive Officer, Energy Metals Corporation, Tel: (604) 684-9007; William M. Sheriff, B.Sc., Chairman, Energy Metals Corporation, Tel: (972) 333-2214/

(SXR. EMC. EMU)

CO: Uranium One Inc.; Energy Metals Corporation

CNW 19:23e 31-JUL-07

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Uranium One Enters into Definitive Agreement to Acquire Christensen Ranch and Irigaray in Wyoming

<<
Trading Symbols: UUU - Toronto Stock Exchange, JSE Limited (Johannesburg Stock Exchange)
>>

VANCOUVER and JOHANNESBURG, Aug. 10 /CNW/ - Uranium One Inc. ("Uranium One") announced today that it has entered into a definitive agreement to acquire 100% of the MALCO Joint Venture ("MALCO") from wholly-owned subsidiaries of AREVA and EDF for US$ 35 million in cash.

The assets of MALCO include the licensed and permitted Irigaray ISR central processing plant, the Christensen Ranch satellite ISR facility and associated U(3)O(8) resources located in the Powder River Basin of Wyoming.

The Irigaray and Christensen Ranch facilities are expected to form the basis of a new operating plan for the Company's projects in Wyoming. Uranium One anticipates that its Moore Ranch project will now become a satellite ISR operation, with loaded resins being transported to Irigaray for further processing into dried U(3)O(8). Uranium One's additional projects in the Powder River Basin, including Ludeman, Peterson, Allemand-Ross and Barge could also be developed as satellite operations with final processing through Irigaray.

Jean Nortier, President and Chief Executive Officer of Uranium One said:

"The acquisition of the Irigaray and Christensen Ranch ISR facilities is an excellent complement to our current Wyoming uranium resource portfolio. By acquiring existing, licensed production facilities, we will reduce the permitting and construction risk associated with developing our own central production plant. Now, with a clear path to commencing uranium production in the U.S., we believe that the underlying value of our Wyoming asset base will become apparent."

Closing of the transaction is expected to take place during H1 2010 and is subject to regulatory approvals including U.S. Nuclear Regulatory Commission ("NRC"), Wyoming Department of Environmental Quality ("WDEQ"), Texas Commission on Environmental Quality and the Committee on Foreign Investment in the United States. Closing is also subject to a financing condition which the Company expects will be satisfied by the completion of the previously announced private placement of 117,000,000 common shares of Uranium One to a consortium of Japanese companies for proceeds of approximately C$ 270 million.

Overview of Irigaray and Christensen Ranch

Operations at Christensen Ranch commenced in 1989 and production continued until 2000. Including uranium recovered from restoration activities, a total of 4.7 million pounds U(3)O(8) was produced at Christensen Ranch and Irigaray.

All major permits and licenses are in place for the re-start of operations at Christensen Ranch and Irigaray. These include the NRC Source Material License, the WDEQ Permit to Mine, and permits for disposal well operations. The NRC license for the Irigaray central processing plant allows a maximum of 2.5 million pounds of dried U(3)O(8) production per year and an application for a 10 year renewal of the license was submitted in early 2008. Operations may be carried on while the NRC approval is pending.

Upon closing of the transaction Uranium One plans to develop and mine the resources at Christensen Ranch and Irigaray commencing with the continued development of well fields at Christensen Ranch. Once in operation, uranium laden resins from the Christensen Ranch satellite facility will be transported for final processing at the Irigaray central processing plant. The Irigaray central processing plant currently has the capacity to produce approximately 1.3 million pounds of dried U(3)O(8) per year. Uranium One intends to expand

the processing capacity at Irigaray in line with the NRC license to approximately 2.5 million pounds U(3)O(8) per year by incorporating a vacuum dryer that was purchased for use at Moore Ranch. The excess capacity at Irigaray can be used to process resins from other satellite operations in the Powder River Basin, including Moore Ranch and other Uranium One properties.

About Uranium One

Uranium One is one of the world's largest publicly traded uranium producers with a globally diversified portfolio of assets located in Kazakhstan, the United States, Australia and South Africa.

Cautionary Statement

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

Investors are advised to refer to independent technical reports containing detailed information with respect to the material properties of Uranium One. These technical reports are available under the profiles of Uranium One Inc., UrAsia Energy Ltd., and Energy Metals Corporation at www.sedar.com. Those technical reports provide the date of each resource or reserve estimate, details of the key assumptions, methods and parameters used in the estimates, details of quality and grade or quality of each resource or reserve and a general discussion of the extent to which the estimate may be materially affected by any known environmental, permitting, legal, taxation, socio-political, marketing, or other relevant issues. The technical reports also provide information with respect to data verification in the estimation.

Scientific and technical information contained herein has been reviewed on behalf of Uranium One by Mr. M.H.G. Heyns, Pr.Sci.Nat. (SACNASP), MSAIMM, MGSSA, Senior Vice President of Uranium One Inc., a Qualified Person for the purposes of NI 43-101.

Forward-looking statements: This press release contains certain forward-looking statements. Forward-looking statements include but are not limited to those with respect to the price of uranium, the estimation of mineral resources and reserves, the realization of mineral reserve estimates, the timing and amount of estimated future production, costs of production, capital expenditures, costs and timing of the development of new deposits, success of exploration activities, permitting time lines, currency fluctuations, requirements for additional capital, government regulation of mining operations, environmental risks, unanticipated reclamation expenses, title disputes or claims and limitations on insurance coverage and the timing and possible outcome of pending litigation. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes" or variations of such words and phrases, or state that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved. Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Uranium One to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and uncertainties include, among others, the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, accidents, labour disputes or other risks of the mining industry, delays in obtaining government approvals or financing or in completion of development or construction activities, risks relating to the integration of acquisitions, to international operations, to prices of uranium as well as those factors referred to in the section entitled "Risk Factors" in Uranium One's Annual Information Form for the year ended December 31, 2008, which is available on SEDAR at www.sedar.com, and which should be reviewed in conjunction with this

document. Although Uranium One has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One expressly disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except in accordance with applicable securities laws.

For further information about Uranium One, please visit www.uranium1.com.

%SEDAR: 00005203E

/For further information: Jean Nortier, Chief Executive Officer, Tel: (604) 601-5642; Chris Sattler, Executive Vice President, Corporate Development and Investor Relations, Tel: (416) 350-3657/

(UUU.)

CO: Uranium One Inc.

CNW 00:03e 10-AUG-09

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Uranium One Provides Kazakhstan Update

<<
Trading Symbols: UUU - Toronto Stock Exchange, JSE Limited (Johannesburg Stock Exchange)
>>

VANCOUVER and JOHANNESBURG, May 27 /CNW/ - With respect to recent media reports regarding Uranium One's Kazakh assets, the Company is aware that the Kazakh authorities are conducting an investigation into certain of the activities of Kazatomprom, the Kazakh state-owned uranium mining company. The terms of reference of this investigation have not been disclosed but the Company and its Kazakh joint ventures are cooperating with the Kazakh authorities in their investigation.

Recent media reports have indicated that Uranium One's interest in the Kyzylkum joint venture may be one of the matters which the Kazakh authorities are investigating. Uranium One's Kazakh assets were acquired in November 2005 from a group of Kazakh investors by UrAsia Energy Ltd., which became a subsidiary of Uranium One in April 2007. UrAsia paid full value for these assets, including $75 million for its 30% interest in Kyzylkum, which operates the Kharasan uranium project, and $350 million for its 70% interest in the Betpak Dala joint venture, which operates the Akdala and South Inkai mines.

UrAsia's acquisition of these assets, as well as Uranium One's subsequent acquisition of UrAsia, were completed in accordance with the requirements of Kazakh law, and both transactions were approved by the Kazakh authorities. Since November 2005, Uranium One has provided loans of more than $119 million to its Kazakh joint ventures to assist in the development of these assets. Operations at Uranium One's Kazakh projects are continuing and production remains in line with the Company's guidance for the year.

Senior officials of Uranium One have requested a meeting with the new administration of Kazatomprom next week in Kazakhstan. The Company will provide further updates as additional information becomes available.

Cautionary Statement

<<
No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.
>>

Forward-looking statements: This press release contains certain forward-looking statements. Forward-looking statements include but are not limited to those with respect to the price of uranium, the estimation of mineral resources and reserves, the realization of mineral reserve estimates, the timing and amount of estimated future production, costs of production, capital expenditures, costs and timing of the development of new deposits, success of exploration activities, permitting time lines, currency fluctuations, requirements for additional capital, government regulation of mining operations, environmental risks, unanticipated reclamation expenses, title disputes or claims and limitations on insurance coverage and the timing and possible outcome of pending litigation. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes" or variations of such words and phrases, or state that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved. Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Uranium One to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and uncertainties include, among

others, the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, accidents, labour disputes or other risks of the mining industry, delays in obtaining government approvals or financing or in completion of development or construction activities, risks relating to the integration of acquisitions, to international operations, to prices of uranium as well as those factors referred to in the section entitled "Risk Factors" in Uranium One's Annual Information Form for the year ended December 31, 2008, which is available on SEDAR at www.sedar.com, and which should be reviewed in conjunction with this document. Although Uranium One has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One expressly disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except in accordance with applicable securities laws.

For further information about Uranium One, please visit uranium1.com.

%SEDAR: 00005203E

/For further information: Jean Nortier, Chief Executive Officer, Tel: (778) 384-6217; Chris Sattler, Executive Vice President, Corporate Development and Investor Relations, Tel: (416) 644-3981/

(UUU.)

CO: Uranium One Inc.

CNW 12:32e 27-MAY-09

News release via Canada NewsWire, Toronto 416-863-9350

Attention Business Editors:
Uranium One Acquires 50% of Karatau Uranium Mine

VANCOUVER and JOHANNESBURG, South Africa, Dec. 15 /CNW/ - Uranium One Inc. today announced that, following receipt of all required governmental and regulatory approvals, the Company has closed in escrow the acquisition of a 50% interest in the Karatau Uranium Mine in Kazakhstan from JSC Atomredmetzoloto ("ARMZ"), the Russian state-owned uranium mining company. In accordance with the June 14, 2009 purchase agreement between the Company and ARMZ, escrow will be lifted upon registration of the transfer of the Karatau interest with the South Kazakhstan Region Department of Justice, which is expected to be completed later this month.

In connection with today's closing, Uranium One has issued 117 million common shares to ARMZ, representing a 19.9% ownership interest in the common shares of the Company, as well as a US$ 90 million promissory note due not later than 12 months from closing. The purchase agreement also provides for a contingent payment to ARMZ of up to US$ 60 million, payable in three equal tranches over the period 2010 to 2012 subject to certain post-closing tax-related adjustments.

Uranium One's 50% share of production from Karatau in 2010 is expected to be 2.3 million pounds of U(3)O(8) at an average cash cost of approximately US$14 per pound sold. At full production levels, Uranium One's share of production from Karatau is expected to be 2.6 million pounds per year. It is expected that the annualized rate of production from Karatau will reach this level during 2010.

Concurrently with the execution of the Karatau purchase agreement, Uranium One also entered into a long-term offtake agreement and a framework agreement with ARMZ. Both of these agreements have now become effective.

Under the offtake agreement, so long as the framework agreement remains in effect, ARMZ has an option to purchase on an annual basis, on industry-standard terms, the greater of 50% of Karatau's annual production or 20% of Uranium One's available attributable production from assets in respect of which it has the marketing rights.

Under the terms of the framework agreement, Uranium One has been granted a right of first offer on ARMZ's assets outside the Russian Federation, in the event that ARMZ determines to offer any of these for sale in the future.

ARMZ has also agreed to assist Uranium One in the opening of accounts with Russian uranium converters and to use Russian uranium conversion and enrichment facilities for the benefit of Uranium One's customers. Since Uranium One currently receives payment for its production from customers at conversion facilities located in North America and Europe, access to Russian facilities will potentially significantly shorten the time period required for the Company to turn production into sale proceeds, and assist utility customers with access to enrichment services, particularly those customers located in Europe and Asia.

As previously announced, in accordance with the purchase agreement, Uranium One has appointed Vadim Zhivov, Director General of ARMZ, to its board of directors. The Company has also agreed to appoint a second representative of ARMZ to its board in May 2010, subject to receipt of shareholder approval to increase the size of its board by one additional director.

About ARMZ

ARMZ is the world's fifth largest uranium producer with operating mines in Russia and Kazakhstan. During 2008, operations in which ARMZ is involved produced 9.6 million pounds of U(3)O(8). ARMZ is part of Rosatom - the Russian State Corporation controlling the Russian Federation's nuclear activities. Together with its affiliates and subsidiaries, the company employs over 14,000 people.

About Uranium One

Uranium One is one of the world's largest publicly traded uranium producers, with a globally diversified portfolio of assets located in Kazakhstan, the United States, South Africa and Australia.

Cautionary Statement

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

Forward-looking statements: This press release contains certain forward-looking statements. Forward-looking statements include but are not limited to those with respect to the price of uranium, the estimation of mineral resources and reserves, the realization of mineral reserve estimates, the timing and amount of estimated future production, costs of production, capital expenditures, costs and timing of the development of new deposits, success of exploration activities, permitting time lines, currency fluctuations, requirements for additional capital, government regulation of mining operations, environmental risks, unanticipated reclamation expenses, title disputes or claims and limitations on insurance coverage and the timing and possible outcome of pending litigation. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes" or variations of such words and phrases, or state that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved. Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Uranium One to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and uncertainties include, among others, changes in market conditions, the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, project cost overruns or unanticipated costs or expenses, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, accidents, labour disputes or other risks of the mining industry, exchange rate and uranium price fluctuations, delays in obtaining government approvals or financing or in completion of development or construction activities, changes in, and the effect of government policy, risks relating to the timing and completion of the transactions described in this press release, the potential benefits thereof, risks relating to the benefits derived by the Corporation from the strategic relationship described in this press release, risks relating to the integration of acquisitions, to international operations, to the price of uranium as well as those factors referred to in the section entitled "Risk Factors" in Uranium One's Annual Information Form for the year ended December 31, 2008, which is available on SEDAR at www.sedar.com, and which should be reviewed in conjunction with this document. Although Uranium One has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One expressly disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except in accordance with applicable securities laws.

For further information about Uranium One, please visit www.uranium1.com.

%SEDAR: 00005203E

/For further information: Jean Nortier, Chief Executive Officer, Tel:

(778) 384-6217; Chris Sattler, Executive Vice President, Corporate Development and Investor Relations, Tel: (416) 350-3657/
(UUU.)

CO: Uranium One Inc.

CNW 07:00e 15-DEC-09

News Release

March 10, 2017 Toronto, Ontario

Uranium One Announces 2016 Production of 12.7 Million Pounds at an Average Total Cash Cost of $9 per Pound Sold

Uranium One Inc. ("Uranium One" or the "Corporation") today reported headline revenue of $314.6 million for 2016. Attributable revenue was $405.7 million for 2016 based on sales of 13.5 million pounds of produced material at an average realized sales price of $27 per pound sold of produced material, with an average cash cost per pound sold of produced material at $9 per pound. Attributable production for 2016 was 12.7 million pounds.

2016 Highlights

Operational

- Total attributable production during 2016 was 12.7 million pounds, compared with total attributable production of 12.5 million pounds during 2015.

- The average total cash cost per pound sold of produced material decreased to $9 per pound during 2016, compared to $11 per pound during 2015.

Financial

- Attributable sales volumes of produced material for 2016 were 13.5 million pounds sold from the Corporation's operations and equity accounted investees compared to 12.3 million pounds sold during 2015.

- Headline revenue was $314.6 million in 2016, compared to $324.7 million in 2015.

- Attributable revenues consistent with the Corporation's segment reporting, which includes revenues from its interests in equity accounted investees, amounted to $405.7 million in 2016, compared to $541.2 million in 2015.

- The average realized sales price of produced material during 2016 was $27 per pound, compared to $36 per pound in 2015. The average spot price in 2016 was $26 per pound compared to $37 per pound in 2015.

- Gross profit was $41.9 million during 2016, compared to gross profit of $4.4 million in 2015.

- Gross profit, including the Corporation's share of gross profit from equity accounted investees, totaled $132.5 million in 2016, a 35% decrease compared to $204.5 million in 2015, mainly due to a decrease of 22% in the average realized sales price, partly offset by an increase of 10% in sales volume.

Uranium One Inc.
333 Bay Street • Suite 1200
Bay Adelaide Centre
Toronto • ON • CANADA • M5H 2R2
tel +1 647 788 8500 • **fax** +1 647 788 8501
www.uranium1.com

- Net earnings for 2016 were $252.6 million or $0.26 per share, compared to net earnings of $70.7 million or $0.07 per share for 2015.

- The adjusted net earnings for 2016 were $54.7 million or $0.06 per share after exclusion of a net gain received through business combination of $198.3 million, Ruble Bonds non-hedged derivative gains of $9.3 million, Ruble Bonds hedged derivative gains of $59.1 million, loss due to inventory valuation adjustment of $28.0 million, net foreign exchange losses of $17.3 million, loss due to impairment of non-current assets of $17.2 million, transfer pricing expenses of $3.2 million, loss on disposal of certain non-material US mineral claims and leases of $2.6 million and corporate development expense of $0.5 million, compared to an adjusted net earnings of $42.6 million or $0.04 per share for 2015.

Corporate Matters

- Since March 2014, the United States and Canadian governments and the European Union have implemented a number of orders, directives and regulations in response to the situation in Ukraine. These measures generally impose visa restrictions and asset freezes on certain designated individuals and entities considered to have contributed to the situation in Ukraine, restrict access by certain designated Russian institutions and entities to Western capital markets and prohibit the supply of equipment for use in Russian offshore deepwater, Arctic or shale exploration or production projects. The Corporation's operations have not been impacted by the foregoing orders, directives or regulations or any designations made thereunder and the Corporation continues to carry on business as usual.

- On June 29, 2016, the Corporation closed the tender offer for, and accepted for purchase, $60.5 million principal amount of the Senior Secured Notes of its subsidiary, Uranium One Investments Inc., at a price of $1,000 per $1,000 of face value. The total amount of the transaction was $60.8 million including $0.3 million of accrued interest, as well as legal fees and transaction costs. The settlement of the tender offer was completed on July 7, 2016.

- On December 5, 2016, the Corporation redeemed RUB 2,499,957,000 aggregate principal amount of its Series 1 Ruble Bonds at their face value. RUB 43,000 aggregate principal amount of Series 1 Ruble Bonds remains outstanding, but such bonds ceased to bear interest after November 30, 2016. The redemption was partially funded by a loan from an affiliate.

- On December 13, 2016 the Corporation redeemed the balance of the outstanding Senior Secured Notes at a redemption price equal to 103.125% of the principal amount of the notes plus accrued and unpaid interest. The $90.1 million aggregate principal amount of the Senior Secured Notes that the Corporation had purchased earlier were cancelled before the redemption. The redemption was partially funded by a loan from an affiliate.

- On December 30, 2016 Feroz Ashraf resigned as Chief Executive Officer of the Corporation and Eduards Smirnovs, formerly the Corporation's Manager, Corporate Projects, was appointed as Acting Chief Executive Officer. Feroz Ashraf continues as a member of the Board of Directors of the Corporation.

Uranium One Inc.
333 Bay Street • Suite 1200
Bay Adelaide Centre
Toronto • ON • CANADA • M5H 2R2
tel +1 647 788 8500 • **fax** +1 647 788 8501
www.uranium1.com

- The Board of Directors also decided that the Corporation will no longer prepare and publish quarterly unaudited financial statements and operating and financial reviews, as it is no longer legally or contractually obliged to do so. The Corporation will continue to prepare and publish audited consolidated annual financial statements, as well as the quarterly and annual reports required under Russian securities laws and the rules of the Moscow Exchange, where the Corporation's Ruble Bonds are listed for trading.

2016 Operations

During 2016, Uranium One achieved total attributable production of 12.7 million pounds, compared to 12.5 million pounds during 2015.

Operational results for Uranium One's assets for 2016 were:

Asset	2016 Attributable Production (millions lbs U_3O_8)	2016 Total Cash Costs (per lb sold U_3O_8)
Akdala	1.8	$9
South Inkai	3.6	$11
Karatau	2.7	$4
Akbastau	2.3	$5
Zarechnoye	1.1	$12
Kharasan	1.1	$9
Willow Creek	0.1	-
Total	**12.7**	**$9**

The following table provides a summary of key financial results:

FINANCIAL	Q4 2016	Q4 2015	FY 2016	FY 2015
Attributable production (lbs U_3O_8) [1]	3,336,700	3,164,100	12,687,500	12,450,000
Attributable sales (lbs) [1] – Produced material	4,565,800	4,471,800	13,515,800	12,256,400
Average realized sales price ($ per lb) [2] – Produced material	21	34	27	36
Average total cash cost per pound sold ($ per lb)[2] – Produced material	8	9	9	11
Revenues ($ millions) – as reported on consolidated income statement	76.0	71.8	314.6	324.7
Attributable revenues ($ millions)[2]	114.2	178.4	405.7	541.2
Gross (loss) profit ($ millions) – as reported on consolidated income statement	(7.9)	3.1	41.9	4.4
Attributable gross profit ($ millions)[2]	14.9	90.8	132.5	204.5
Net earnings ($ millions)	43.1	60.8	252.6	70.7
Net earnings per share – basic and diluted ($ per share)	0.05	0.06	0.26	0.07
Adjusted net earnings ($ millions)[2]	(22.3)	40.3	54.7	42.6
Adjusted net earnings per share – basic ($ per share)[2]	(0.02)	0.04	0.06	0.04

Notes:

Uranium One Inc.
333 Bay Street • Suite 1200
Bay Adelaide Centre
Toronto • ON • CANADA • M5H 2R2
tel +1 647 788 8500 • **fax** +1 647 788 8501
www.uranium1.com

(1) Attributable production pounds and attributable sales pounds are from assets owned and from joint ventures in commercial production during the period. All figures are rounded to reflect appropriate levels of confidence. Columns may not add up correctly due to rounding. Commercial production excludes pilot uranium production from the Inkuduk horizon at the South Inkai mine.

(2) The Corporation has included the following non-GAAP performance measures: average realized sales price per pound – produced material, average total cash cost per pound sold – produced material, attributable revenues, attributable gross profit, adjusted net earnings (loss) and adjusted net earnings (loss) per share. See the section on "Non-GAAP Measures" in the Corporation's Operating and Financial Review for the year ended December 31, 2016.

Non-GAAP Measures

Adjusted Net Earnings (Loss)

The Corporation has included the following non-GAAP performance measures throughout this news release: adjusted net earnings (loss) and adjusted net earnings (loss) per share. Adjusted net earnings (loss) and adjusted net earnings (loss) per share do not have any standardized meaning prescribed by IFRS and are therefore unlikely to be comparable to similar measures reported by other companies. The Corporation believes that, in addition to conventional measures prepared in accordance with IFRS, certain investors use this information to evaluate the Corporation's performance and ability to generate cash flow. This is provided as additional information and should not be considered in isolation, or as a substitute for, measures of performance prepared in accordance with IFRS. Please refer to the Operating and Financial Review for further details.

The financial statements, as well as the accompanying Operating and Financial Review, are available for review at www.uranium1.com and should be read in conjunction with this news release. All figures are in U.S. dollars unless otherwise indicated. All references to pounds sold or pounds purchased are to pounds of U_3O_8.

Uranium One Inc.
333 Bay Street • Suite 1200
Bay Adelaide Centre
Toronto • ON • CANADA • M5H 2R2
tel +1 647 788 8500 • **fax** +1 647 788 8501
www.uranium1.com

About Uranium One

Uranium One is one of the world's largest uranium producers, with a globally diversified portfolio of assets located in Kazakhstan, the United States and Tanzania. ROSATOM State Atomic Energy Corporation, through its affiliates, is the main shareholder of Uranium One.

For more precise information about Uranium One, please visit www.uranium1.com

Eduards Smirnovs
Acting Chief Executive Officer
Email: Eduard.smirnov@uranium1.com
Tel: +1 647 788 8515

Cautionary Statements

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

This press release contains certain forward-looking statements. Forward-looking statements include but are not limited to those with respect to, the price of uranium, the estimation of mineral resources and reserves, the realization of mineral reserve estimates, the timing and amount of estimated future production, costs of production, capital expenditures, costs and timing of the development of new deposits, success of exploration activities, permitting time lines, currency fluctuations, market conditions, corporate plans, objectives and goals, requirements for additional capital, government regulation of mining operations, environmental risks, unanticipated reclamation expenses, the timing and potential effects of proposed transactions, title disputes or claims, limitations on insurance coverage and the timing and possible outcome of pending litigation. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes" or variations of such words and phrases, or state that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved. Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of the Corporation to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and uncertainties include, among others, the possibility of sanctions that may be imposed on the Corporation, its shareholders or affiliates or third parties with which the Corporation deals, that may have a material adverse effect on the Corporation's ability to carry on its business or perform its contractual obligations, the future steady state production and cash costs of Uranium One, the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, possible changes to the tax code in Kazakhstan, accidents, labour disputes or other risks of the mining industry, delays in obtaining government approvals or financing or in completion of development or construction activities, risks relating to the completion of transactions, integration of acquisitions and the realization of synergies relating thereto, to international operations and to prices of uranium, as well as those factors referred to in the section entitled "Risk Factors" in Uranium One's Operating and Financial Review for the year ended December 31, 2016. Although Uranium One has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements.

Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One expressly disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required under applicable securities laws.

Exhibit 22

Commerce to be sold at LTFV.[55] Accordingly, on February 12, 2002, Commerce issued one antidumping and four countervailing duty orders.[56] On July 7, 2006, Commerce determined that all programs found to have provided countervailable subsidies on LEU from Germany, the Netherlands, and the United Kingdom had been abolished for at least three consecutive years. Commerce found that continued application of these CVD orders was no longer warranted, and revoked the CVD orders on imports of LEU from Germany, the Netherlands, and the United Kingdom.[57]

THE PRODUCT

Commerce's scope

Commerce has defined the subject merchandise as follows:

> The merchandise covered by this Suspension Agreement (Section III, "Product Coverage") includes the following products from Russia:[58] Natural uranium in the form of uranium ores and concentrates; natural uranium metal and natural uranium compounds; alloys, dispersions (including cermets), ceramic products, and mixtures containing natural uranium or natural uranium compounds; uranium enriched in U^{235} and its compounds; alloys, dispersions (including cermets), ceramic products, and mixtures containing uranium enriched in U^{235} or compounds of uranium enriched in U^{235}; and any other forms of uranium within the same class or kind. Uranium ore from Russia that is milled into U_3O_8 and/or converted into UF_6 in another country prior to direct and/or indirect importation into the United States is considered uranium from Russia and is subject to the terms of this Suspension Agreement. For purposes of this Suspension Agreement, uranium enriched in U^{235} or compounds of uranium enriched in U_{235} in Russia are covered by this Suspension Agreement, regardless of their subsequent modification or blending. Uranium enriched in U^{235} in another country prior to direct and/or indirect importation into the United States is not considered uranium from

---

[55] *Low Enriched Uranium From France, Germany, the Netherlands, and the United Kingdom-Determinations*, 67 FR 6050, February 8, 2002.

[56] *Notice of Amended Final Determination of Sales at Less Than Fair Value and Antidumping Duty Order: Low Enriched Uranium From France*, with antidumping margins of 19.95 percent ad valorem for CogemaEurodif and all others (67 FR 6680, February 13, 2002); and *Notice of Amended Final Determinations and Notice of Countervailing Duty Orders: Low Enriched Uranium From Germany, the Netherlands and the United Kingdom*, with subsidy rates in all three countries of 2.23 percent ad valorem for Urenco and all others (67 FR 6689, February 13, 2002), and France, with subsidy rates of 12.15 percent ad valorem for Eurodif/Cogema and all others (67 FR 6691, February 13, 2002).

[57] *Low Enriched Uranium from Germany, the Netherlands, and the United Kingdom: Final Results of Countervailing Duty Administrative Reviews and Revocation of Countervailing Duty Orders*, 71 FR 38626, July 7, 2006.

[58] *See 1992 Suspension Agreements*, at 49235.

Russia and is not subject to the terms of this Suspension Agreement.[59] HEU is within the scope of the underlying investigation, and HEU is covered by this Suspension Agreement. For the purpose of this Suspension Agreement, HEU means uranium enriched to 20 percent or greater in the isotope uranium-235.[60] Imports of uranium ores and concentrates, natural uranium compounds, and all forms of enriched uranium are currently classifiable under the Harmonized Tariff Schedule of the United States (''HTSUS'') subheadings: 2612.10.00, 2844.10.20, 2844.20.00, respectively. Imports of natural uranium metal and forms of natural uranium other than compounds are currently classifiable under HTSUS subheadings: 2844.10.10 and 2844.10.50. HTSUS subheadings are provided for convenience and Customs purposes. The written description of the scope of this proceeding is dispositive. The Department has not received any scope requests or made any scope determinations in this proceeding since the Second Sunset Review.[61]

Description and uses[62]

Uranium (U) is a heavy, naturally and slightly radioactive, metallic element (atomic number 92). Uranium is one of over 100 basic chemical elements, or types of atoms, known to occur in nature. Each element is defined by the number of its atoms' protons, one of the atom's three building blocks along with electrons and neutrons. The uranium atom has 92 protons and thus ranks 92nd among the elements. Although the number of protons and electrons in the element's atoms (assumed to be neutral) is equal and consistent, the number of neutrons can vary, resulting in different "isotopes" of the same element, each with slightly different properties. Natural uranium has three principal isotopes—U^{238}, U^{235}, and U^{234}—which constitute 99.285 percent, 0.71 percent, and 0.005 percent, respectively, of the element's

---

[59] As noted above, the second amendment of two amendments to the Suspension Agreement effective on November 4, 1996, in part included within the scope of the Suspension Agreement Russian uranium which had been enriched in a third country prior to importation into the United States. According to the amendment, this modification remained in effect until October 3, 1998. See *Amendments to the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation*, 61 FR 56665, November 4, 1996.

[60] Section IV .M of the Suspension Agreement in no way prevents Russia from selling directly or indirectly any or all of the HEU in existence at the time of the signing of the Suspension Agreement and/or LEU produced in Russia from HEU to the U.S. Department of Energy ("DOE"), its governmental successor, its contractors, assigns, or U.S. private parties acting in association with DOE or the United States Enrichment Corporation and in a manner not inconsistent with the agreement between the United States and Russia concerning the disposition of HEU resulting from the dismantlement of nuclear weapons in Russia. See *1992 Suspension Agreements*, at 49237.

[61] *Uranium From the Russian Federation; Final Results of Expedited Sunset Review of the Suspension Agreement*, 76 FR 68404, November 4, 2011.

[62] Unless otherwise noted, this information is based on *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, pp. I-17—I-19.

weight in its natural elemental state. U^{235} is the only naturally occurring fissionable nuclide, i.e., when bombarded by thermal neutrons, the U^{235} atom disintegrates, creating a self-perpetuating chain reaction with the release of energy. It is the fissionable property of the U^{235} isotope that is important for uranium's principal uses – primarily as a fuel to generate electricity in nuclear power plants and secondarily as a fuel to propel naval vessels and as an active ingredient in atomic weaponry.

The half-lives of U^{235} and U^{238} are 7.13×10^8 and 4.51×10^9 years, respectively. Because of these slow rates of radioactive decay, natural uranium is only mildly radioactive. Elemental uranium (uranium metal) is highly reactive chemically. A fresh surface of elemental uranium is silvery gray in color, but rapidly oxidizes to black oxide in air at room temperature. Chips and powder of uranium are highly pyrophoric (igniting spontaneously when exposed to air), and the metal is a strong reducing agent.

Uranium is one of the less common elements but its compounds are readily soluble and widely distributed in many mineral and rock types throughout the world. Most of the large economic deposits have a uranium content greater than 0.10 percent triuranium octoxide (U_3O_8). Uranium does not occur in nature in the elemental state but only in chemical combinations with other elements. It is an important constituent in 155 minerals and a measurable constituent in nearly 500 minerals. Therefore, as a first step, natural uranium is mined or recovered from naturally occurring mineral deposits.

"Yellowcake" is the term often applied to the concentrate produced at uranium mills. The exact chemical composition of uranium concentrate is variable and the industry generally includes purified natural uranium oxides in its definition of uranium concentrate. In the United States, the terms uranium concentrate, yellowcake, and natural uranium oxides are used interchangeably in the industry. The uranium industry has adopted the practice of expressing the natural uranium content of uranium concentrates in terms of U_3O_8 equivalent. Most uranium concentrates contain a minimum of 75 percent U_3O_8, and average 80 to 85 percent U_3O_8.

"Enriched uranium" is uranium in which the concentration of isotope U^{235} has been increased (i.e., the product has been "enriched in U^{235}") relative to the natural state. Uranium enrichment is essentially taking a feedstock consisting of a mixture of U^{235} and U^{238} and increasing the relative amount of U^{235} in one batch while necessarily reducing the relative amount of U^{235} in a second batch. The first batch is the product (the enriched uranium) whereas the second batch which contains less U^{235} than in the feedstock is referred to as depleted uranium or tails and is often considered a waste product.

U^{235} is indispensable to the nuclear energy industry because it is the only isotope existing in nature, to any appreciable extent, that is fissionable by thermal neutrons, i.e., at about room temperature. Enrichment of uranium fuel lowers the size of the "critical mass" assemblies of "light-water" nuclear reactors and, therefore, lowers capital cost requirements for the reactors. Enriched uranium for use by commercial power plants in the United States generally has 3 to 5 percent U^{235} by weight. Depleted uranium usually contains between about 0.2 percent to 0.35 percent U^{235} but there are exceptions to this rule, particularly in relationship to Russia's nuclear industry.

The industry has accepted a basic unit of quantity derived from thermodynamics to measure the effort needed to enrich a given amount of uranium from the initial enrichment

level to a higher enrichment level. This unit of measurement is referred to as "SWU". As is intuitively obvious, the amount of SWU required is proportional to the amount of uranium to be enriched and increases (but not linearly) the greater the level of enrichment. In other words, it requires more SWU to enrich a given amount of natural uranium (containing about 0.7 percent U^{235}) to 5 percent U^{235} than to enrich the same amount of natural uranium to 3 percent U^{235}.

Uranium is enriched by gaseous-diffusion or gas-centrifuge technology. In order to use these processes, the uranium must be present in a compound that can be readily converted to a gas. For a number of technical reasons, such as a relatively low boiling point, uranium hexafluoride is well suited for this purpose. Uranium hexafluoride (UF_6) is a white solid at ambient temperature and pressure and is obtained by the chemical treatment of uranium concentrate or oxides. UF_6 forms a vapor at temperatures above 56 degrees Centigrade and is the form of uranium used for the enrichment process. Consequently, two types of UF_6 are of commercial significance (i.e., "natural" and "enriched").

After enrichment in U^{235}, the uranium hexafluoride is converted to a fuel form for use in the manufacture of nuclear fuel assemblies. These forms include the oxides (usually enriched UO_2), or metals, alloys, carbides, nitrides, and salt solutions of enriched uranium. Pelletized ceramic UO_2 is the most common fuel form used in light-water reactors, which are the type of reactors used by utilities in the United States. Enriched uranium is then encapsulated in protective metal sheaths to produce a "fuel rod." Fuel rods are then assembled into the required configuration for use in a power plant's nuclear reactor.

Nuclear fuel for commercial power reactors for the generation of electricity is the predominant commercial application for uranium. In the United States and most other countries, natural uranium must first be converted into enriched uranium, i.e., the U^{235} component must be increased. However, in a few reactor designs, e.g., CANDU reactors deployed in Canada, Argentina, China, India, Pakistan, Romania, and South Korea, electricity can be generated from reactors containing natural uranium.[63] Other uses for uranium include Government-sponsored nuclear programs, including weapons, propulsion (particularly nuclear powered submarines and aircraft carriers), underground tests, isotope production, research and development, and space applications.

Relatively small quantities of uranium, depleted in U^{235}, are used in specialized non-energy applications, principally for military ordnance. Depleted uranium readily forms alloys with other metals, has a very high density, and is easy to fabricate, which makes it useful for some applications. However, there are also some concerns over the short and long-term health effects from exposure to depleted uranium, even though it is less radioactive than natural uranium. The U.S. currently produces much greater quantities of depleted uranium than it uses.

---

[63] WNA, "Uranium Enrichment", November 2016, http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx; Canadian Nuclear Association, "CANDU Technology", https://cna.ca/technology/energy/candu-technology/ (accessed April 14, 2017).

Depleted uranium with no commercial use is either disposed of as low-level radioactive waste or transferred to DOE, which currently has about 750,000 metric tons in storage.[64]

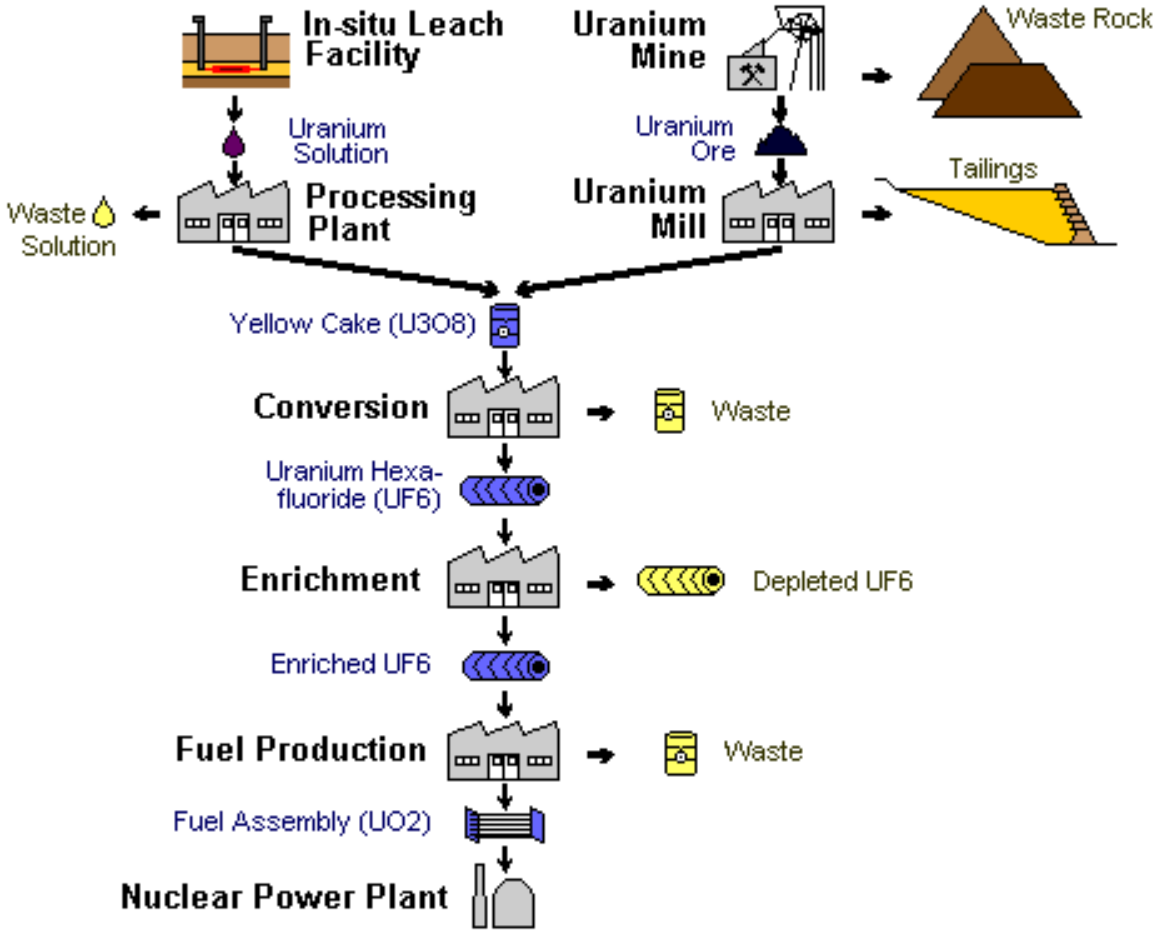
Manufacturing process[65]

Uranium is generally found in molecular combination with oxygen, embedded in various concentrations in rock formations, known as uranium ores, throughout the world. Unlike the production of other mineral or metallic products, the process by which uranium is transformed into a nuclear fuel for the generation of electricity involves four successive processes administered by four types of generally independent producers. The various steps in converting uranium ore to nuclear fuel suitable for use in light water reactors is shown in figure I-1.

[64] U.S. Nuclear Regulatory Commission, "Background Information on Depleted Uranium," February 24, 2017, https://www.nrc.gov/waste/llw-disposal/llw-pa/uw-streams/bg-info-du.html

[65] Unless otherwise noted, this information is based on *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, pp. I-19—I-23.

Figure I-1
Nuclear Fuel Production Chain for Light Water Reactors



Source: WISE, *Nuclear Fuel Production Chain*, retrieved at http://www.wise-uranium.org/nfp.html (as cited in *Uranium From Russia: Investigation No. 731-TA-539-C (Second Review)*, USITC Publication 3872, August 2006, p. I-19.)

Table I-2 below identifies the producers and products for the four main steps involved in manufacturing uranium-based nuclear fuel.

Table I-2
Stages of Nuclear Fuel Production

Producer	Product	Process
Miners/ Concentrators	Natural uranium concentrate, also known as "yellowcake"	Mining uranium-containing ores and concentrating the uranium into the molecular form U_3O_8
Converters	Natural uranium hexafluoride	Converting the U_3O_8 into UF_6
Enrichers	Enriched uranium hexafluoride	Enriching the UF_6 by increasing the proportion of U^{235}
Fabricators	Enriched uranium oxides, nitrates, and metals	Fabricating the enriched uranium in a final form suitable for positioning and use in a nuclear reactor

Further details on the production process for each of the key forms of uranium in the nuclear fuel cycle are provided in the descriptions below.

Miners/ Concentrators (Natural Uranium Concentrate—U_3O_8)

In the uranium industry, the milling operation comprises the entire mechanical and chemical processing from the crushing and grinding of the ore to the precipitation of a marketable uranium concentrate. Mine-run ores are crushed before going to the grinding circuit. Jaw or impact-type crushers are commonly used for the primary crush. Impact, cone, or gyratory crushers are used for the secondary crushing stage.

"Unconventional uranium mining" includes various leaching methods and byproduct operations. For example, uranium is leached from the ore slime by either alkaline treatment (sodium carbonate or sodium bicarbonate) or acid treatment (usually sulfuric acid). In both techniques, oxidation is necessary to convert uranium to the soluble form. Uranium in leach solutions is recovered and purified by solvent extraction or ion exchange. Uranium is precipitated as uranium concentrate that is then filtered, dried, and packaged for shipment. Uranium concentrate is chemically stable and is usually stored and shipped in 55-gallon steel drums.

In-situ and heap leaching are employed to recover uranium from deposits that may not be economically recoverable by conventional mining methods. The in-situ method involves leaching uranium from mineralized ground in place and is also referred to as "solution mining." The leaching solution is generally a carbonate, and an oxidant, such as oxygen, is added to improve leaching. In-situ leaching ("ISL") is a very cost-effective method of production because of the low capital and labor costs compared with the costs of a conventional mine. The use of in-situ leaching has grown dramatically, especially in the United States. However, not all uranium deposits are geologically suitable for in-situ mining. Uranium concentrates are also produced as a byproduct of phosphoric acid production; from gold, copper, and other minerals mining; and from mine water. Extracting uranium from seawater is not yet cost competitive with these other recovery techniques, but researchers at two of DOE's national laboratories,

Pacific Northwest (PNNL) and Oak Ridge (ORNL), have made recent advances on developing seawater extraction as a renewable alternative to uranium mining.[66]

Converters (Natural Uranium Hexafluoride—UF_6)

Conversion of uranium concentrate to natural uranium hexafluoride (UF_6) is not done in the United States at the mills but is done by "converters." Several processes have been used to convert uranium concentrate to UF_6. Converdyn's facility in the U.S. uses what is known as the "dry process," strongly heating uranium oxide concentrate to remove some of the impurities and then agglomerating and crushing the U_3O_8. Other facilities more commonly use the "wet process", dissolving the uranium concentrate in nitric acid, purifying the solution by solvent extraction, removing the uranium with a dilute nitric acid solution, and then subjecting the resulting uranium nitrate solution to heat and decomposing it to an oxide. For both processes, the resulting crushed U_3O_8 or purified uranium oxide is then typically reacted with hydrofluoric acid and fluorine to produce UF_6.[67] The natural UF_6 is then held in inventory until instructions are issued for shipment to an enrichment plant. UF_6 is a highly reactive chemical and is stored and transported in heavy-wall steel cylinders.

Enrichers (Enriched Uranium Hexafluoride)

Before uranium can be used as a fuel in most nuclear power plants, the proportion of its U^{235} isotope must be increased relative to that of its other isotopes.[68] In the enrichment process, the proportion of U^{235} of the uranium in natural UF_6 is increased from 0.71 percent to about 3-5 percent by weight of UF_6 in LEU.[69]

There are two traditional methods of uranium enrichment: gaseous diffusion enrichment and gas centrifuge enrichment.[70] Gaseous diffusion involves the passage of UF_6 in a gaseous form through thousands of barriers or cascades, containing millions of microscopic holes, until the desired assay is reached. Because U^{235} is lighter than U^{238}, the U^{235} passes

---

[66] Jennifer Hackett, "Uranium Extraction from Seawater Takes a Major Step Forward," *Scientific American,* July 1, 2016, https://www.scientificamerican.com/article/uranium-extraction-from-seawater-takes-a-major-step-forward/

[67] WNA, "Conversion and Deconversion," January 2017, http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/conversion-and-deconversion.aspx

[68] Most of the world's and all of the U.S. nuclear power plants are so-called "light-water" reactors and require enriched uranium for fuel; however, there are a small number of others, known as "heavy-water" reactors, that are capable of using natural uranium.

[69] As indicated previously, the industry uses a standard of measure of effort or service employed in the uranium enrichment industry known as SWUs. It is a measure of the effort that is required to transform a given amount of natural uranium feed stock (UF_6) into two streams of uranium, one enriched in the U^{235} isotope and the other depleted in the U^{235} isotope.

[70] Extensive research and development on enrichment technologies employing lasers has been conducted and is discussed later in this section.

through the barriers more readily than the U^{238}. At the end of the gaseous diffusion process, there are two UF_6 streams, both of which contain primarily U^{238}, but one stream contains a higher concentration of U^{235} suitable for use in a nuclear reactor for the generation of electricity. The stream with the higher concentration of U^{235} is LEU which will be transformed into nuclear fuel; the other is the depleted UF_6 (also known as tails) often considered to be a waste product.

Enrichment by gas centrifuges is based on the principle that a partial separation of the components of a gaseous mixture results when the gas is subjected to a pressure gradient. The isotopic separation of UF_6 is effected by the high-speed rotation in centrifuges in which the lighter U^{235} isotope moves at a greater velocity in the pressure gradient in the centrifuges. The UF_6 gas is spun in a series of centrifuges; the heaver U^{238} tends to move toward the outer walls of the centrifuge whereas the lighter U^{235} tends to remain near the center. After the uranium is subjected to repeated spins, appreciable separation is achieved between the lighter U^{235} and the heavier U^{238}. The gas centrifuge plants traditionally had higher capital costs than gaseous diffusion plants, but used substantially less electricity. Centrifuge technology also enjoys other advantages, including a modular design which allows for incremental expansion of capacity and production as well as a higher effective operating capacity that approaches the nameplate capacity. Both processes result in an enriched UF_6 that is chemically and functionally identical, but the industry increasingly has favored centrifuge technology. USEC's plant in Paducah, Kentucky was the last remaining gaseous diffusion facility in the world and shut down in 2013.[71]

Various country governments and companies have been involved in developing laser enrichment processes as a possible more efficient third-generation technology for enriching uranium. There are two categories of laser enrichment technologies, atomic (e.g. atomic vapor laser isotope separation or AVLIS) and molecular (separation of isotopes by laser excitation or SILEX). The U.S. has focused on advancing SILEX, also referred to as global laser enrichment (GLE). A consortium consisting of GE, Hitachi, and Cameco Corp. ("Cameco") received a license from the U.S. Nuclear Regulatory Commission to develop a GLE plant at an existing fuel fabrication facility in Wilmington, North Carolina. The consortium also has proposed developing a GLE plant at the location of the shutdown gaseous diffusion plant in Paducah, Kentucky, reaching an agreement with DOE in 2016 to enrich about 300,000 metric tons of high-assay tails in storage to natural uranium levels over a 40-year period. If these plans go forward, a GLE plant would likely be constructed in the United States in the early 2020s.[72]

---

[71] World Nuclear News, "Paducah enrichment plant to be closed," May 28, 2013, http://www.world-nuclear-news.org/ENF_Paducah_enrichment_plant_to_be_closed_2805132.html

[72] WNA, "Uranium Enrichment," November 2016, http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx

Fabricators (Fabricated Fuel)

Generally considered the final step in the production of nuclear fuel, enriched uranium hexafluoride from an enrichment plant must be converted to other uranium compounds or uranium metal for use in reactor applications.[73] LEU conversion is generally done by fuel fabricators as one step in the production of fuel rods and fuel assemblies to be used in commercial nuclear reactors. Fuel fabricators react uranium hexafluoride with water and hydrogen to obtain uranium dioxide (UO_2) that is used to make fuel rods and assemblies. Specifically, this involves converting the enriched UF_6 to enriched uranium oxides (primarily UO_2), nitrates, and metals, pelletizing this material, encapsulating the pellets into protective metal sheaths, called “fuel rods,” and then assembling the rods into “fuel rod assemblies” in the specific configuration the nuclear power facility requires. In contrast to other steps in the fuel cycle, the production of fabricated fuel and fuel assembles is largely consider to be a customized part of the production process.

Value added by segment

The estimated cost of processing uranium ore through the various stages of the nuclear fuel cycle to produce 1 kg of uranium as $U0_2$ reactor fuel at March 2017 uranium prices is presented in table I-3. Information regarding the relative cost of processing for the various stages of the front end of the nuclear fuel cycle for 2017 and for time periods examined in the Commission's three prior reviews of this order are presented in table 1-4.

[73] LEU is most often converted from uranium hexafluoride to uranium oxide for use in commercial nuclear reactors, whereas HEU is generally reduced from uranium hexafluoride to uranium metal for use in nuclear weapons or small nuclear reactors.

Table I-3

Uranium: Front-end fuel cycle costs of 1 kg of uranium as UO2 fuel, by stage (as of March 2017)

Process	Amount required x price	Cost (in U.S. Dollars)	Proportion of total (in percent)
Uranium (concentrate)	8.9 kg U_3O_8 x $68	605	43.0
Conversion	7.5 kg U x $14	105	8.0
Enrichment	7.3 SWU x $52	380	27.0
Fuel fabrication	per kg	300	22.0
Total		1390	100

Source: World Nuclear Association ("WNA"), "The Economics of Nuclear Power", http://www.world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power.aspx Accessed April 18, 2017.

Table I-4

Uranium: Processing cost, by stage, 2000, 2004, 2006, 2011, 2017

Processing Stage	Share of total processing cost (in percent)					
	2000[1]	2004[1]	2006[2]	2006[3]	2011[4]	2017[5]
Uranium concentrate	31.0	47.1	***	32.0	46.9	43.0
Conversion	3.0	5.4	***	6.0	3.5	8.0
Enrichment	59.0	31.6	***	44.0	40.9	27.0
Fuel fabrication	7.0	15.8	***	18.0	8.7	22.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

[1] Based on published market prices for the individual line items (default values) as used in the Wise Nuclear Fuel Cost Calculator (found at http://www.wise-uranium.org/nfcc.html).
[2] Revised valuations provided by USEC to reflect commercial considerations (e.g., long-term contract values) in the U.S.market.
[3] Presentation in Urenco's Eurobond offering of November 2005 (http://www.urenco.con/investors/index.aspx).
[4] Because the Wise Nuclear Fuel Cost Calculator has not been updated since 2009, the data presented for 2011 are from the World Nuclear Association, "The Economics of Nuclear Power," http://www.world-nuclear.org/info/inf02.html, March 9, 2011.
[5] Derived from table I-3.

Note.–Figures may not add to totals shown because of rounding.

Source: *Investigation No. 731-TA-539C (Third Review): Uranium from Russia--Staff Report*, INV-JJ-129, December 19, 2011, pp. I-31; *Uranium From Russia: Investigation No. 731-TA-539-C (Second Review)*, USITC Publication 3872, August 2006, p. I-25 (for data presented for 2000, 2004, and 2006); World Nuclear Association, "The Economics of Nuclear Power," http://www.world-nuclear.org/info/inf02.html, March 9, 2011 (for data presented for 2011); and World Nuclear Association, "The Economics of Nuclear Power", http://www.world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power.aspx April 18, 2017 (for data presented for 2017)

U.S. tariff treatment

Uranium is currently imported under HTS statistical reporting numbers 2612.10.0000; 2844.10.1000; 2844.10.2010; 2844.10.2025; 2844.10.2055; 2844.10.5000; 2844.20.0010; 2844.20.0020; 2844.20.0030; and 2844.20.0050. For most of these statistical reporting numbers, uranium imported from Russia enters the U.S. market at a column 1-general duty rate of "free"; uranium imported under HTS statistical reporting numbers 2844.10.1000 and 2844.10.5000 imported from Russia enters the U.S. market at a column 1-general duty rate of 5 percent.

The definition of the domestic like product

The domestic like product is defined as the domestically produced product or products which are like, or in the absence of like, most similar in characteristics and uses with, the subject merchandise.

In the 1991 preliminary determination for the original investigation of uranium from the U.S.S.R., the majority of the Commission found that the five-factor semifinished product analysis dictated a single like product encompassing all four forms of uranium.[74] In its first[75] and second[76] full five-year review determination concerning Russia, and in its third expedited five-year review determination concerning Russia, the Commission defined the domestic like product consisting of all four forms of uranium coextensive with Commerce's scope.[77]

In its notice of institution for this review, the Commission solicited comments from interested parties regarding what they deemed to be the appropriate definition of the domestic like product. According to their response to the notice of institution, the domestic interested

---

[74] *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, p. 8.

[75] In the first review, the Commission addressed two domestic like product issues: a contention by Russian respondents that Commerce's inclusion of HEU in the scope was invalid, and the other by a domestic interested party that uranium tails are within the scope. The Commission explained that both of these arguments involve the scope, not the domestic like product. *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, p. 8.

[76] In the second review, the Commission analyzed four different arguments concerning domestic like product, including that it find that each of the four segments of the uranium fuel cycle is a separate like product. The Commission rejected these arguments and settled on its finding that there was a single domestic like product consisting of all forms of uranium coextensive with the scope of the review. *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, pp. 8-9.

[77] This paragraph uses information from *Uranium from Russia: Investigation No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, pp. 5-9, which cites *Soviet Uranium* (i.e. *Uranium from U.S.S.R., Inv. No. 731-TA-539 (Preliminary),* USITC Pub. 2471, December 1991); *First Review Determinations*; and *Second Review Determination*.

parties agreed with the Commission's definition of the domestic like product consisting of all forms of uranium as stated in the last five-year review.[78]

ACTIONS AT COMMERCE

There have been no completed administrative reviews of the suspension agreement. There have also been no changed circumstances reviews or duty absorption findings concerning the suspension agreement. The suspension agreement remains in effect for all manufacturers, producers, and exporters of uranium from Russia.[79]

Current five-year review

Commerce is conducting an expedited review with respect to uranium from Russia and intends to issue the final results of this review based on the facts available not later than June 1, 2017.[80]

THE INDUSTRY IN THE UNITED STATES

U.S. producers

U.S. Concentrate Producers

Based on the amount of producers involved, the segment of the industry producing uranium concentrate has seen the most volatility since the original investigation.

At least 15 firms were cited as concentrate producers in the United States during the 1989-91 period of investigation.[81] During the first five-year review, the Commission identified seven U.S. concentrate producers, only five of which were producing at the end of the period examined.[82]

---

[78] *Centrus' Response to the Notice of Institution,* March 3, 2017, p. 12; *LES' Response to the Notice of Institution,* March 3, 2017, p. 36; and uranium concentrate producers' *Response to the Notice of Instituation*, March 3, 2017, p. 62.

[79] *Memorandum to Paul Piquado, Assistant Secretary for Import Administration, from Carole Showers, Acting Deputy Assistant Secretary for Policy and Negotiations, " Issues and Decision Memorandum for the Third Sunset Review of the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation; Final Results,"* October 28, 2011, p. 4.

[80] *Letter from Jim Doyle, Director, AD/CVD Operations, Enforcement and Compliance, U.S. Department of Commerce to Michael G. Anderson*, March 27, 2017.

[81] *Uranium From Russia, Inv. No. 731-TA-539-C (Third Review)*, USITC Publication 4307, February 2012, p. I-32.

[82] These firms were COGEMA, Inc., a subsidiary of COGEMA; PRI; Rio Algom (one of the original petitioners); International Uranium; Cotter; as well as Uranium Resources and IMC Global, both of which ceased production in 1999. The decline in the number of producers was caused by

(*continued*...)

Exhibit 23

Exhibit 23

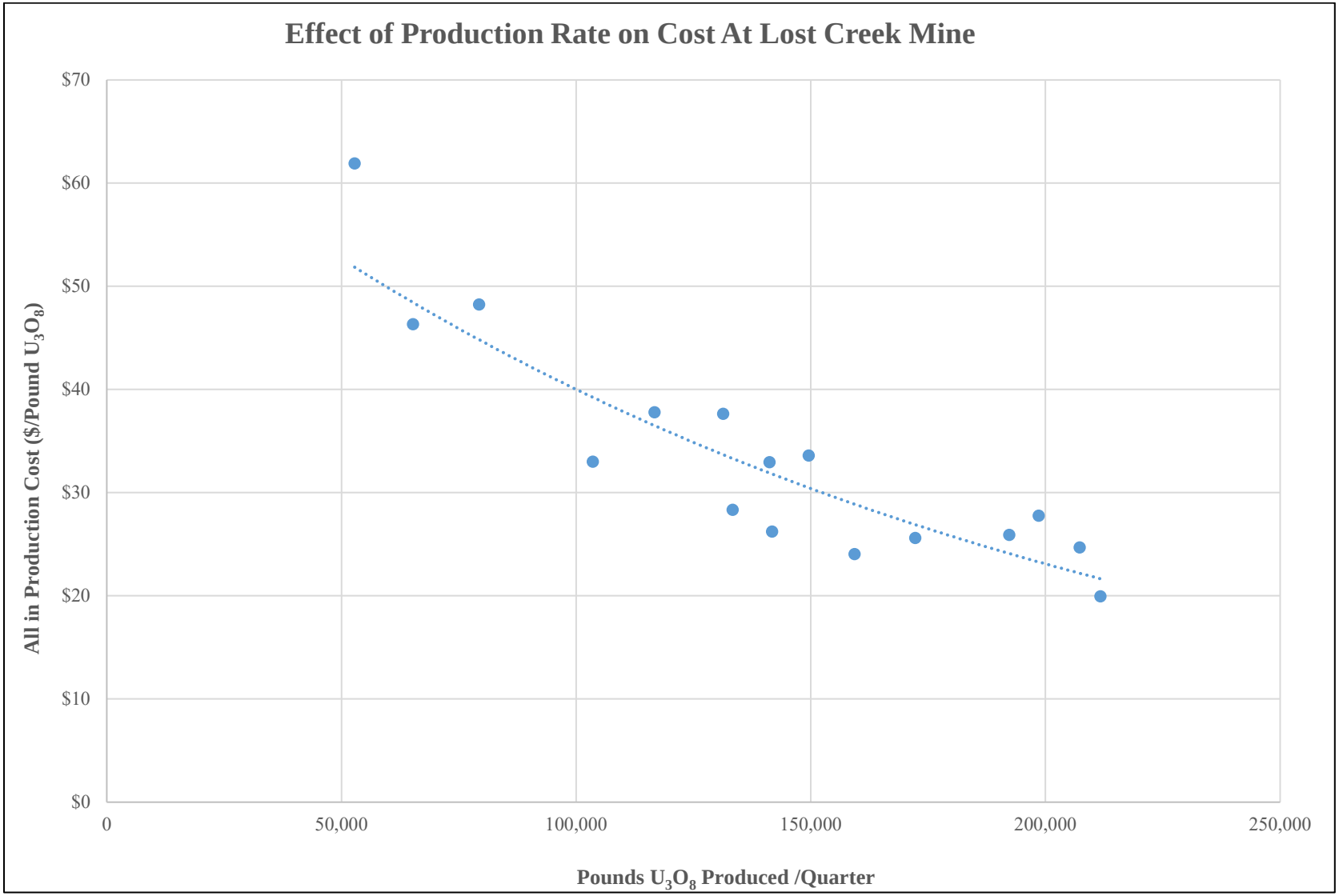

Effect of Production Rate on Cost At Lost Creek Mine
$70
$60
$50
$40
$30
$20
$10
$0
0
50,000
100,000
150,000
200,000
250,000
All in Production Cost ($/Pound U3O8)
Pounds U3O8 Produced /Quarter

Exhibit 24

Forbes / Energy / #ChangeTheWorld

NOV 2, 2017 @ 06:00 AM 3,221

Nuclear Energy In America Is Teetering On A Cusp

James Conca, CONTRIBUTOR
I write about nuclear, energy and the environment FULL BIO

Opinions expressed by Forbes Contributors are their own.

ANS

The American Nuclear Society held its Annual Winter Meeting in Washington D.C. this week, and our nuclear community is excited and eager to move forward.

Nuclear in America is on a cusp between two very different paths. One path leads to continued global leadership. The other leads to a slow fading of our nuclear program to that of a third-rate power, leaving Russia and China to lead the world.

The American Nuclear Society wrapped up its annual meeting in Washington, D.C. yesterday and these paths, plus other critical issues, were front and center. American Nuclear Society President Bob Coward set the stage with a strong call to arms.

The need to maintain America's leadership in nuclear is clearer than ever before. Not just to have any hope of reigning in the worst of global warming and to prevent weapons proliferation, but to ensure our outstanding nuclear safety record is replicated everywhere else on Earth.

Given that the global nuclear power industry is set to expend over $1.5 trillion by 2030, it certainly is important that the United States maintains itself as a leader in this field. We have the largest, safest and the most effective nuclear program in the world. Our nuclear power program, the Nuclear Regulatory Commission and our non-proliferation statutes have set the norms and expectations for the world. And the world is generally following them.

When Bob Coward asked, 'Do we really want China and Russia filling that nuclear leadership role world-wide?', the answer was a resounding NO.

The United States also has the largest and best trained and educated nuclear community in the world, over 150,000 professionals and workers spread out among government, academia and industry.

Being among a thousand nuclear professionals is an uplifting experience. If you understand how nuclear works, you understand how the Universe works. That's why when people get into it, they really appreciate it. And have fun discussing it. It was a wonderful meeting.

However, it's critical to attract students and young scientists to take over as we oldsters pass on to the great reactor in the sky. If we do not, then our scientific will may fade as much as our political will.

That's why the theme of this ANS meeting was *Generations in Collaboration: Building for Tomorrow*. It takes a long time and a lot of effort to educate and train a nuclear scientist, engineer or plant operator. It's not something you can just decide to do when you need them.

We are not the only ones worried about global nuclear. The International Atomic Energy Agency declared this week that the global nuclear power industry needs to accelerate growth to satisfy the world's energy demands and to meet any useful climate change goals.

'More use of nuclear power will be needed to provide the steady supply of baseload electricity to power modern economies if countries are to meet the goals for greenhouse gas emissions which they set for themselves in the Paris Agreement,' said IAEA Director General Yukiya Amano.

All leading climate scientists in the world agree.

But the loss of American leadership in nuclear has ramifications far beyond nuclear power. For 50 years, most discussions surrounding the three major powers was who between Russia and China would be second, and who would be third, after America. America becoming third was not even considered.

While Putin is trying to bully his way into being the most powerful man on earth, China's President Xi Jinping will probably take that position, now that he has consolidated power in China's new Politburo Standing Committee to help him rule the world's most populous country for another five years.

Besides having the world's largest floating solar power plant, the largest water project in history and being set to launch the largest emissions trading system, China has 22 nuclear reactors under construction and is breaking ground on a new nuclear power plant every month.

China plans to have about 400 nuclear reactors by mid-century, dwarfing all other nations. They recently fired up a new-design fast reactor, the kind that will eventually burn old spent nuclear fuel. They are close to completing their first offshore nuclear reactor.

China is also putting a larger version of our post-WWII Marshall Plan in place, called the 'One Belt, One Road' project, to bring Asia and Africa into their sphere of influence and away from ours. In addition, China is building a new generation of small tactical nuclear weapons.

On the other side, Russia is succeeding at gaining political and economic influence and control over its old Soviet satellites, and is throwing monkey wrenches into the democratic processes of the U.S. and Europe so we will not interfere. Russia is buying up uranium interests in Kazakstan (the real reason for the US-Russia uranium deal), is also building new tactical nuclear weapons, and is completing a floating nuclear power plant, which should be operational within a year. It's sad that we didn't have one on hand to send to Puerto Rico.

Russia is bent on becoming the major supplier of nuclear technology in the world, especially to emerging countries. Its share of the market is now 60%. Russia has contracts to build 34 reactors in 13 countries, including India, Nigeria, Egypt, Hungary, Iran, Turkey and Jordan, totaling about $300 billion. The last two are American allies. Russia provides nuclear fuel, supplies and technical cooperation to another 7 countries.

Russia is courting these countries with amazing financing opportunities, full scientific and technical support, and even plans for taking back their nuclear waste. Some of the deals, like for India, include possible non-nuclear sophisticated weapons side deals.

Of course, along with these nuclear technologies, comes the Russian safety standards.

America, on the other hand, seems disengaged. We have no contracts to build nuclear plants in any other country, although we provide some supplies, scientific and engineering consulting and safety planning to many.

Instead, we're struggling just to keep perfectly good nuclear reactors in our own country from being shut down prematurely, because politics, warped market forces, cheap natural gas and subsidies for renewables are making them slightly less profitable over the short-term.

This, despite nuclear being our main weapon against global warming, the only energy source immune to extreme weather and the fact that closing them early costs Americans money and doesn't solve whatever the anti-nukes think it will solve. These retiring nuclear plants are all being replaced with natural gas plants, not renewables, so closing them doesn't add anything to our environmental or energy security and makes a mockery of our climate goals.

Short-term thinking of this magnitude is the opposite of what a Great Nation needs to do, the opposite of what we did for most of the 20th century. If we do not re-energize our nuclear program, we will not lead in climate action nor in nuclear non-proliferation. We will throw away a century of global leadership as well as a hundred-thousand high-paying jobs and let Oil&Gas become our nation's biggest source of energy.

As was on display this week in D.C., the nuclear community is willing and ready to step into this breach and expand our nuclear program to be worthy of the Greatest Nation On Earth.

Dr. James Conca is an expert on energy, nuclear and dirty bombs, a planetary geologist, and a professional speaker. Follow him on Twitter @jimconca and see his book at Amazon.com

#ENVIRONMENT
OCTOBER 12, 2017 / 4:00 PM / 3 MONTHS AGO

U.S. energy head: Nuclear power rescue helps national security

Timothy Gardner

WASHINGTON (Reuters) - The U.S. energy secretary defended his plan to reward nuclear plants with incentives against criticism it would manipulate markets by telling a congressional hearing on Thursday that a strong domestic nuclear industry boosted national security.

U.S. Energy Secretary Rick Perry attends the opening of the International Atomic Energy Agency (IAEA) General Conference at their headquarters in Vienna, Austria September 18, 2017. REUTERS/Leonhard Foeger

Rick Perry pushed the Federal Energy Regulatory Commission on Sept. 29 to issue a rule within 60 days that would reward aging nuclear and coal-fired power plants that store 90 days of fuel on site. He has said those plants should be supported for their ability to boost the reliability of the U.S. power grid.

Many U.S. representatives at the hearing, including Democrat Frank Pallone, said the plan favored aging industries, killed free markets and would saddle consumers with higher power bills. One lawmaker pointed to a study by ICF Consulting that said power bills could rise $800 million to $3.2 billion annually if FERC issued Perry's plan.

But Perry said the federal government had disregarded nuclear power for decades at a risk to national security.

"If we lose our supply chain, if we lose our intellectual chain of supply of bright scientists because we basically pushed the nuclear industry back, then we're going to lose our role as a leader when it comes to nuclear energy in the world," Perry said. That in turn could hurt the country's ability to address nuclear nonproliferation, Perry said.

The United States has more nuclear power reactors than any other country. But Russia, China and other countries are rapidly building nuclear plants and some in the industry worry those countries could become the world's top nuclear innovators.

Perry's plan has divided the energy industry, with coal and nuclear interests squaring off against natural gas drillers, solar and wind power, and consumer groups. It is unclear what FERC will decide on the plan. The agency, an independent arm of the Energy Department, declined a request to lengthen a comment period on Perry's plan.

Republican Representative Pete Olson suggested that Perry was more in favor of free energy markets when he was governor of Texas. But Perry said the notion that energy markets were free and without subsidies was a "fallacy."

Pallone said a study that Perry had directed Energy Department staff to conduct concluded the grid was already reliable and that most recent grid outages were caused by problems in energy transmission, not by power plants.

Several coal plants were forced to shut by recent hurricanes because their mounds of coal supply were soaked by heavy rains.

Perry said his plan was a directive for FERC, but he added that he initiated it to start a conversation about protecting people from outages during extreme storms.

Reporting by Timothy Gardner; Editing by Peter Cooney

Our Standards: The Thomson Reuters Trust Principles.

S&P Global
Platts

PLATTS SNAPSHOT

US URANIUM PRODUCERS PLAGUED BY LOW PRICES, SCANT UTILITY PURCHASING

Jim Ostroff, senior editor, Platts nuclear publications

October 17, 2017 06:00:00 EST (4:18)

Market sources say US companies appear to be on course to produce about 1.6 million pounds of uranium this year, the lowest amount since 1951. **Jim Ostroff** explains that it isn't just production that has fallen off; prices have also plummeted. Uranium is facing stiff competition from natural gas and renewable mandates, so utilities are buying it differently in the market—but will that last?

VIDEO TRANSCRIPT

US URANIUM PRODUCERS PLAGUED BY LOW PRICES, SCANT UTILITY PURCHASING

By **Jim Ostroff, senior editor, Platts nuclear publications**

Welcome to the Snapshot, a series examining the forces shaping and driving global commodities markets today.

US uranium production totaled 2.9 million pounds last year after plummeting 40% from 2014, when it was about 5 million pounds.

With uranium production continuing to ramp down in Wyoming and Nebraska, market sources say US companies this year appear to be on course to produce about 1.6 million pounds, the lowest amount since 1951. Producers have shut-in virtually all facilities, halted all new investment and are producing only enough uranium to meet contractual obligations signed years ago.

US production has tanked because uranium spot prices have, as well. They're just over $20 a pound today, down 71% since reaching $70 in early 2011.

URANIUM PRODUCERS HAVE SIGNIFICANTLY REDUCED OUTPUT IN LIGHT OF LOW PRICES

At that price, no uranium producer in the US — or other countries — can make a profit extracting uranium for sale on the spot market. That's why the world's largest producers have significantly reduced production, including Canada's Cameco, Kazakhstan's Kazatomprom, the US's Energy Fuels and a host of Australian companies

The issues are manifold: Years ago, many utilities – concerned about a run-up in uranium prices by the middle of this decade — signed long-term supply contracts that run through 2020 or so.

WORLDWIDE URANIUM SURPLUS OF AROUND 150 MILLION POUNDS COULD LAST FOR YEARS

Utility fuel buyers are also convinced there's currently a worldwide uranium supply surplus of around 150 million pounds globally that will last for years. Uranium market sources say this oversupply resulted in a decrease in utility purchasing under long-term contracts, as they believe instead that the material will be available in spot or mid-term contracts in the future at attractive prices.

MANY UTILITIES BUY ONLY SMALL AMOUNTS OF URANIUM TO MEET NEAR-TERM NEEDS

Hard pressed by competition from natural gas and renewable mandates, many utilities are using just-in-time procurement, buying only small amounts of uranium to meet near-term needs.

In the virtual absence of utility buying, the market is dominated by trading companies, who often "arbitrage" prices slightly higher, or lower, to profit from month-ahead contracts. Consequently, uranium spot prices have been below the $35-a-pound breakeven point for virtually all producers since early 2015.

Even with producer cutbacks, supplies likely will outpace demand for another three-plus years, according to the World Nuclear Association's nuclear fuel report. This will pressure uranium prices — and producers, many of whom will step up M&A activities to survive.

URANIUM PRODUCERS FORESEE A PRICE UPTICK IN THE 2020S

Producers that do find a way to hang on say they will be in the driver's seat when demand picks up. The ongoing production cutbacks, they aver, invariably will make uranium dear — setting up the next price boom — which they foresee sometime in the 2020s.

Until next time on the Snapshot, we'll keep an eye on the markets.

Honeywell | Metropolis, Illinois

NOVEMBER 20, 2017

Statement from Honeywell

The nuclear industry continues to experience significant challenges and is currently oversupplied with UF_6 worldwide. In particular, the decrease in demand in Japan and Germany following the Fukushima disaster has had a significant impact on the industry and continues to create an over-supplied market for the uranium fuel cycle, and a downward trend in the uranium markets. According to analysis from Energy Resource International, since Fukushima, global demand for nuclear fuel has dropped 15 percent, with demand not anticipated to rise before 2020.

As a result of this business outlook, Honeywell plans to temporarily idle production of UF_6 at its Metropolis site, while maintaining minimal operations to support a future restart should business conditions improve. Because of this, the company intends to reduce the full-time workforce at the plant by 170 positions, as well as a number of contractor positions. Honeywell intends to restart once business conditions improve and will keep the plant in a state of readiness and continue to support minimal on-site operations to ensure a successful restart.

world nuclear news

US conversi on plant su sp ends UF6 production

21 November 2017

Honeywell is temporarily to suspend uranium hexafluoride (UF6) produ ction at its Metropolis, Illinois plant pending an improvement in bu siness conditions, the company announced yesterday. The USA's o nly uranium conversion plant has been in a scheduled outage since O ctober.

The company said its decision to suspend production was a result of "significant challenges" faced by the nuclear industry, including a situation with a current worldwide oversupply of UF6. In particular, it said, the decrease in demand from Japan and Germany following the Fukushima accident of 2011 has had a significant impact, and continues to create an oversupplied market for the uranium fuel cycle and a downward trend in uranium markets.

The company cited analysis from Energy Resources International, which found that, since Fukushima, global demand for nuclear fuel has dropped 15%. It is not anticipated to rise before 2020.

"As a result of this business outlook, Honeywell plans to temporarily idle production of UF6 at its Metropolis site, while maintaining minimal operations to support a future restart as business conditions improve," a company spokesman said. "Honeywell intends to restart once business conditions improve and will keep the plant in a state of readiness and continue to support minimal on-site operations to ensure a successful restart. In the interim, the company has made alternative plans to meet all customer contractual commitments."

The plant has been in a routine annual outage since October. "This action means we will not restart production as originally scheduled," Honeywell told World Nuclear News.

The maximum output of the Metropolis plant had already been reduced to align with demand.

Uranium must be converted from uranium oxide - the "yellowcake" that is shipped from uranium mines and mills - to gaseous UF6 before it can be enriched in fissile uranium-235 for use in nuclear fuel. In addition to Metropolis, commercial conversion plants are also in operation in Canada, China, France and Russia. According to the latest edition of World Nuclear Association's biennial report on the nuclear fuel market, The Nuclear Fuel Report: Global Scenarios for Demand and Supply Availability 2017-2035, published in September, conversion and enrichment

capacity should be sufficient to meet demand under Reference scenario assumptions until 2030.

Speaking at the Association's annual symposium in September, Tenam Corporation President Fletcher Newton, who chaired the working group responsible for drafting the report, said the segmented nature of the markets, with production centred on a limited number of plants, presented a challenge.

"If either one of those [conversion] facilities were to go down, even though the conversion markets are on aggregate oversupplied, it would have a tremendous impact," he said at that time.

Metropolis was built in the 1950s to meet military conversion requirements, and began providing UF6 for civilian use in the late 1960s. The plant's output is exclusively marketed by ConverDyn.

Researched and written
by World Nuclear News

ISSN 2040-5766

http://trib.com/business/energy/uranium-miner-cameco-to-cut-jobs-in-wyoming-and-nebraska/article_05bb6741-0930-56ce-a814-e5c53dbc1285.html

BREAKING FEATURED

Uranium miner Cameco to cut 85 jobs in Wyoming and Nebraska

Benjamin Storrow 307-335-5344, Benjamin.Storrow@trib.com Apr 21, 2016

Drilling rigs lay the framework for a new well field Aug. 31, 2012 at Cameco's Smith Ranch-Highland uranium operation near Glenrock. Smith Ranch-Highland is the largest uranium production facility in the U.S. Cameco announced Thursday it would cut 85 jobs.

Alan Rogers, Star-Tribune

Uranium miner Cameco Corp. announced Thursday it would cut 85 jobs in Wyoming and Nebraska.

The Canadian-based company said the move was a response to a prolonged downturn in prices, which have remained depressed since the disaster at the Fukushima Daiichi nuclear power plant in Japan in 2011.

The majority of Cameco's American operations are in Wyoming, where the company operates the Smith Ranch-Highland mine near Glenrock and the North Butte mine south of Gillette. The company also has an office in Casper and operates the Crow Butte mine in Crawford, Nebraska.

Ken Vaughn, a Cameco spokesman, said all three of the company's Wyoming locations would be affected, though he said exact numbers for each facility have yet to be determined. Employees will be notified personally about their status with the company before the end of May, he said.

"It's an unfortunate reality of the uranium market right now," Vaughn said.

The layoffs at one of Wyoming's largest uranium producers come within a wider downturn in the energy market, which has pushed up the state's unemployment rate in recent months. Wyoming's unemployment rate was 5.2 percent in March, up from 3.9 percent over the same time in 2015.

In Cameco's case, the layoffs are a part of larger cost cutting measures undertaken by the company. The company also announced it was suspending production at its Rabbit Lake operation in northern Saskatchewan, where 500 jobs will be eliminated.

Cameco has a U.S. workforce of roughly 255 people, the vast majority of whom are employed in Wyoming. The company's Crow Butte operation employs 42 people.

Production at Cameco's mines is expected to fall this year as a result of the moves, dropping from 1.4 million pounds last year to 1.1 million pounds this year.

New wellfield development in the U.S. will be halted while 170 employees will be kept on to maintain existing fields in Nebraska and Wyoming, the company said.

Cameco's U.S. operations employ in-situ mining techniques, which are more akin to oil and gas development than traditional mining. Water is essentially injected into uranium bearing formations, dissolving the element, which is then pumped the surface.

Permitting and reclamation will continue to ensure that operations can be boosted should market conditions improve, Vaughn said.

Follow energy reporter Benjamin Storrow on Twitter @bstorrow

world nuclear news

Cameco to suspend McArthur River and Key Lake

09 November 2017

Cameco will temporarily suspend production from the McArthur River mining and Key Lake milling operations in northern Saskatchewan by the end of January "due to continued uranium price weakness", the Canadian uranium producer announced yesterday. The duration of the suspension and temporary layoff of about 845 workers is expected to last 10 months, it said.

Uranium prices have fallen by more than 70% since the Fukushima accident in March 2011 and remain at low levels. Cameco said it has been partially sheltered from the full impact of weak prices by its portfolio of long-term contracts, but those contracts are running out and it is necessary to position the company today to generate cash flow if prices do not improve.

Cameco plans to meet its commitments to customers from inventory and other supply sources during the suspension, which will be reviewed on an ongoing basis "until inventory is sufficiently drawn down or market conditions improve". It will continue to evaluate the "optimal mix" of its sources of uranium supply to feed into its contract portfolio, which could see it make further changes to its inventory position, production profile or purchasing activity, it said.

The company's annual dividend in 2018 will be $0.08 per common share, a reduction of $0.32 per common share on an annual basis.

"With the continued state of oversupply in the uranium market and no expectation of change on the immediate horizon, it does not make economic sense for us to continue producing at McArthur River and Key Lake when we are holding a large inventory, or paying dividends out of proportion with our earnings," said Tim Gitzel, Cameco's president and CEO.

Cameco expects its share of the costs to maintain both operations during the suspension to range between CAD 6.5 and CAD 7.5 million per month. However, some of the items affecting these costs won't be known until the operations are actually shut down. More details will be provided in the company’s fourth-quarter results, which will be released in February.

Cameco has committed sales volumes of 28 to 30 million pounds in 2018. Using inventory to help meet contract commitments now allows Cameco to draw down its inventory without suffering a loss by selling at low market prices, it said. It also

avoids the risk of holding excess inventory valued above market prices on its balance sheet if prices remain low.

"This measure is consistent with other actions Cameco has implemented over the past five years as part of a deliberate and disciplined strategy to strengthen the company in the long term. We have reduced supply, avoided selling into a weak spot market, resisted locking-in long-term sales commitments at low prices, and significantly reduced costs, " it said.

"To decrease costs, we suspended production at the Rabbit Lake operation, stopped development and curtailed production at our US operations, reduced workforce across all our sites including head office, changed air commuter services for operations in Saskatchewan, changed shift schedules at two Saskatchewan sites, and downsized corporate office functions including a consolidation of our global marketing activities," it added.

As discussed in the company's third quarter 2017 Management Discussion & Analysis, the year-on-year, average unit cost of sales (including depreciation and amortisation) is down 13%, its cash production costs are down 10%, and direct administration costs are down 20%. Planned capital expenditures for 2017 are expected to be 26% lower than in 2016.

"To date, we have made good progress in reducing costs but unfortunately given the continued market weakness, more needs to be done," said Gitzel. "We can't control the market, so our focus is on positioning the company to weather the continued low uranium prices and have uncommitted, low-cost supply to deliver into a strengthening market."

As a result of the suspension, the workforce at the operations will be reduced temporarily by about 845 workers - 560 employees and 285 contractors. About 210 workers - 160 employees and 50 contractors will be retained to maintain the facilities in safe shutdown state.

Gitzel said: "We regret the impact these actions will have on our workforce and other stakeholders and are doing what we can to cushion it while ensuring the long-term sustainability of the company. We believe these actions will help shield the company from the nearer term risks we face and will benefit all our stakeholders for their continued patience and support of our strategy to build long-term value."

Cameco will also review its corporate support activities for McArthur River and Key Lake operations, which may result in temporary workforce reductions at the corporate office.

Cameco is the operator of both McArthur River mine and the Key Lake mill that processes all the ore from McArthur River to uranium concentrate. Cameco owns 70% of McArthur River and 83% of Key Lake. Areva Resources Canada Inc. owns the remainder. Together, the operations produced 11.1 million pounds of uranium in the first nine months of 2017, with Cameco's share being 7.8 million pounds.

Researched and written
by World Nuclear News

THEWORLDPOST Published by the BERGGRUEN INSTITUTE

Russia: A Global Energy Powerhouse That's Much More Than a Petro-State

By The Conversation US

Scott L Montgomery, *University of Washington*

Russia is not what you think. Most discussion about its energy influence has focused on oil and gas, particularly gas. Russia can be described, and is routinely described, as a petro-state. This is only partly accurate.

In truth, Russia has been building an altogether new kind of energy state, one with more global influence than even OPEC. A fundamental reason is Russian prominence in multiple energy domains, especially oil, gas, coal and nuclear power.

This multi-pronged energy strategy — from fossil fuels to a reinvigorated nuclear power program — has geopolitical and economic implications that stretch from its neighbors in Europe to developing countries around the world.

Full steam ahead on oil and gas

Let us begin with Russian oil and gas. For several years now, the country has been the world's largest exporter of hydrocarbons (oil and gas combined). Despite many predictions that this would never last, including those from the Russian Academy of Sciences, it shows no sign of changing.

An important point is that this includes not only crude oil and natural gas but also refined petroleum products (gasoline, diesel, jet fuel, etc.), which are exported to Europe and Asia. Russia has been the

The collapse in oil prices, combined with sanctions on the oil/gas industry because of aggression in Ukraine, has been very hard on the Russian economy and has postponed many new oil/gas projects. At the same time, use of advanced recovery technologies has given Russia the ability to offset decline in older fields, while new production from the East Siberian Basin and Sakhalin Island has helped support a slow but continued rise in output.

Will Russia threaten to turn off the flow of hydrocarbons for political leverage again?
Sergei Karpukhin/Reuters

There remain the vast resources in Russia's Arctic to be explored, plus future potential in the Caspian Sea, North Caucasus, and parts of East Siberia and Sakhalin. This does not include the enormous shale oil/gas potential in the West Siberian Basin.

Like it or not, we must accept that the country is far richer in hydrocarbon resources than previously thought. Though prices for both oil and gas have fallen considerably since 2014, Russia has little choice but to continue producing at high rates given the importance of these exports to its economy and

gas, which the country is now estimated to possess in immense volumes.

But here's what's not widely understood: Russia's current export clients are in Europe, yet they are increasingly in East Asia, specifically China, Japan, and South Korea. European nations depend on Russia for an average of 30 percent of their hydrocarbons, especially gas. Nearly half these nations (including Germany) are in the range of 40 percent to 100 percent.

Official claims that such dependence will be cut and vaporized have proven hollow, countered by the reality of increased imports. Europe's weak economic situation has forced it to choose cheaper pipeline gas from Russia over more expensive LNG (liquefied natural gas) from abroad.

East Asia, we might say, is at an earlier but still significant stage of dependence (Japan, world's largest LNG importer, now gets 10 percent of its total from Russia), but has been eager for new deals. In this region of needy hydrocarbon importers, Russia bestrides the energy landscape as a supply colossus with a helping hand and large promises.

The upshot is this: Russian oil and gas have become vital commodities in a majority of the world's most advanced economies. If the forecasts of the International Energy Agency and other such organizations run true, the demand for natural gas will surge over the next few decades, due both to the growing need for more electricity and, in the wake of COP21, expanded use of low-carbon fuels. It would be a circumstance much favored by the Great Bear. Even so, this is only half the story.

King coal and nuclear

To this we should add Russia's huge coal reserves, second only to those in the U.S. Its exports here, too, though well below those of oil/gas in value and significance, have also been steadily rising.

Since 2000, they have tripled from about 45 million tons to more than 150 tons, third in the world after Indonesia and Australia. As with oil and gas, these exports go to Europe and East Asia, but in this case the volume going to China, Japan and South Korea is over 40 percent and growing. Where import demand in China has fallen, it has been rising in India, South Korea, Turkey and a number of countries in Southeast Asia.

It is worth pointing out that Russia is geographically positioned very well to deliver its exports both by sea and rail to major customers west and east. Lower coal prices therefore have partly aided the Russian industry in competitiveness.

presently have nuclear power programs) and include most of those noted above having contracts or agreements with Russia. But there are others in Africa, Southeast Asia and South America who have expressed interest and might well join the new nuclear era later on.

The point is that Russia has proven itself able to compete for a large share of this new, expanding global market. Globalizing NP has given Russia the opportunity to compete successfully against firms from Japan, South Korea, France, the U.S. and soon China and the U.K. as well.

Russia's success here is far from monolithic. Saudi Arabia, for instance, has plans to build 16 reactors by 2035 and has entertained proposals from Russia, Japan and South Korea for both large-scale plants and small modular reactors. Turkey now has plans in place for a minimum of three reactors, the first to be built by Rosatom, the second by a Franco-Japanese consortium, the third by a group from China.

Nonetheless, the importance of Russia as a provider of both nuclear technology and fuel will only grow, giving Moscow a robust presence in many parts of the developing world that the Soviet Union never achieved.

New nuclear empire?

Many, even most, of the energy relationships discussed have a primary commercial intent. It isn't clear how many of those regarding oil and gas may play out in the long run, particularly if the low-price environment remains in place.

But for the time being, and probably for the next decade at minimum, Putin's Russia presents the world with a new species of energy state, historically speaking, one with potential influence far beyond economics.

What the long-term meaning of this influence might be is not yet clear, but must be considered in cool-headed terms. Talk about a Russian "nuclear empire" is premature and probably unhelpful.

Yet we can't ignore the possibility that some form of influence will be wielded, if not with the aggression of Moscow's use of natural gas as a tool in its conflicts with Ukraine and, more recently, Turkey, then perhaps more quietly. Either way, Russia must be understood as a state whose interests and reach extend far beyond its near abroad.

Scott L Montgomery, Lecturer, Jackson School of International Studies, *University of Washington*

This article was originally published on The Conversation. Read the original article.

Moscow's Nuclear Energy Advantage

Assessments

Sep 20, 2017 | 20:02 GMT

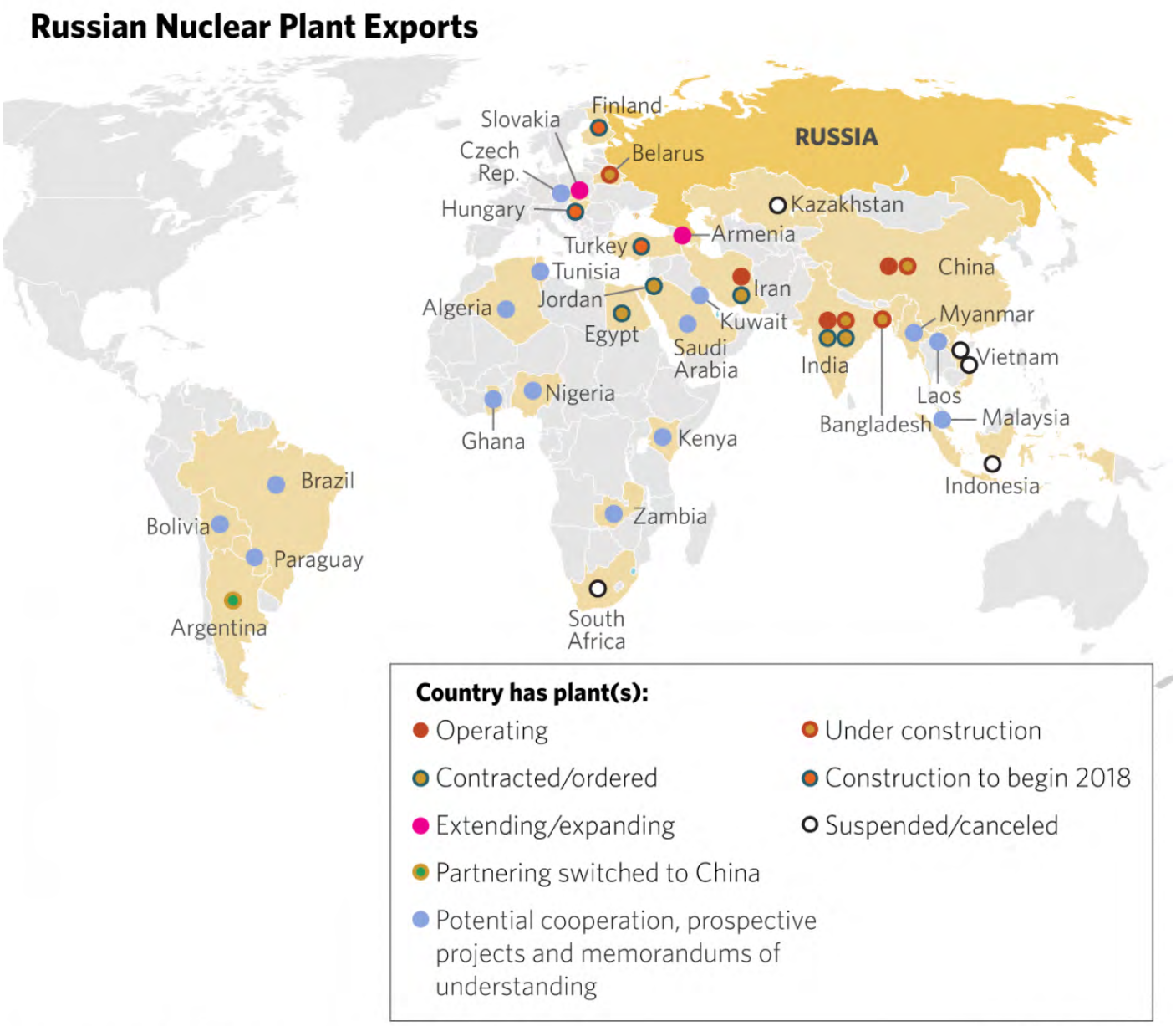
2 mins read

(iStock)

Using energy exports as an engine of geopolitical influence is nothing new for Russia. Natural gas as a lever of influence across Europe is a staple of Moscow's playbook. And the global demand for alternative energy sources is expected to grow. However, the Western and Asian nuclear powers have not been able to capitalize because a combination of market forces (and the high capital costs of nuclear plants), political flux and negative social opinions have turned the tide against nuclear in many of the traditional powers.

Still, Russia has for the last several years been looking to expand its nuclear energy export strategy and to garner political influence on the global stage outside its oil and natural gas sectors. The approval of contracts (and the finalization of details) by Egypt's State Council with Russia's State Atomic Energy Corp. (Rosatom) earlier this month, along with a pending visit by President Vladimir Putin to Cairo, brought the strategy back to the forefront. As the rest of the world's nuclear power companies struggle, Russia has become the biggest player on the global scene. And because Rosatom is state-owned, it is not as subject to market principles as other builders. The company's strong order book is supported by attractive financing and contract conditions. Instead of focusing on advanced nuclear or small modular reactors, as Western leaders do, Russia has looked to end-to-end solutions, including waste disposal.

Moscow's dominant global position is not guaranteed and not without constraints. While Russia is not controlled by market forces as much as other major players, it is limited by its budget and simply cannot finance all its prospects. Beijing will soon be looking to compete for market share, especially in the developing world. China's domestic program isn't there quite yet, but Argentina's apparent shift from Russia to China on its latest nuclear project may indicate the competition is gaining on Moscow.



Source: World Nuclear Association

world nuclear news

Rosatom chief outlines commercial vision

08 March 2017

Russia's Rosatom aims to become one of the three most successful global technology companies by the beginning of the 2040s, transformed from the state-backed nuclear power corporation it is today, according to its new director-general. "I know some will be sceptical about this, as if it's a fantasy, but I believe it's possible," Alexey Likhachov said in an interview for the company's weekly newspaper Strana Rosatom.

Alexey Likhachov (Image: Rosatom)

The former deputy minister of economic development and trade, Likhachov took over the helm of Rosatom in October last year, when Russian President Vladimir Putin appointed Sergey Kirienko as first deputy head of the Presidential Administration. Kirienko had been in charge of Rosatom since December 2007, after leading the Russian Federal Atomic Energy Agency for two years.

Likhachov said the Russian nuclear industry had enjoyed a "revival" over the past 10 years, for which Kirienko deserved credit. "When he was appointed head of the Federal Agency for Atomic Energy, there was no a priori readiness from the state to invest significant funds in the development of the nuclear industry, and sceptical attitudes towards the possibility of a revival were quite common. Kirienko formed a team that in a short time developed and presented to the President a plan for the development of the nuclear industry, and was able to enlist his support."

Putin's "active and deep participation" in the implementation of this plan was a "decisive factor", Likhachov said. "The federal program for the construction of nuclear power plants in the country with ambitious deadlines was adopted and funding flowed to the industry and the separate enterprises were merged into a corporation." The nuclear sector was thus able to "breathe" again.

"The industry, which 10 to 15 years ago was still in a semi-disassembled state, turned into a state corporation and became one of the leaders of the Russian economy and the international market," he said. It is important, he added, that Kirienko is chairman of Rosatom's supervisory board.

Strategic objectives

But the state's ability to support the nuclear industry is not unlimited, especially in the current economic climate, Likhachov said, and by 2020, state support for the construction of nuclear power plants will "be completed".

"In this situation, commercial projects will be the driver of the corporation's progress and of its research, innovation and technological renewal. In other words, we must learn how to earn money independently. At the same time, if we want to be a truly global company, we must learn how to earn money in the world market. Moreover, the domestic market alone won't be enough to ensure development, or even to maintain the current size of the corporation," he said.

In 2014, Rosatom set three long-term strategic goals out to 2030: to increase its share in international markets; to reduce the cost and schedule of production; and to create new products for the Russian and international markets. These goals determine the priorities when choosing management solutions for the development of Rosatom, Likhachov said.

"I'm aware that these strategic goals are often perceived simply as slogans that do not directly affect the daily lives of people. To overcome this misunderstanding, we need to do two things. First, turn strategic declarations into medium-term and totally concrete plans of action that are understandable to each and every employee. And secondly, to realise the seriousness of the challenge that is thrown at us: either we achieve the goals set out in the strategy, or we lose and return to that uncertain state in which the Russian nuclear industry found itself 15 to 20 years ago," he said.

"We praise ourselves a lot and deservedly so. Within 10 years we've gone from a consortium of disparate enterprises - very often disadvantaged, deeply unprofitable, losing staff and skills - to a vertically integrated corporation with a single strategy, a common logic for development as well as solid production and financial indicators. We are much stronger than before. But, honestly, we understand that the decisive reason for this success was a large-scale program of state support, or, if we give it its proper name, a program for the revival of the nuclear industry. This does not detract from the merits of each employee, because that assistance still needed to be made use of, to be turned into success, and Rosatom coped with this task 100%.

"But, looking back and acknowledging the success of the stage that is now behind us, we must recognise that we are only at the very start of the journey. Making success irreversible and justifying the state's investment in the nuclear industry will take a lot of work."

The Rosatom chief warned that competition in the market for construction of nuclear power plants abroad will get tighter. "New, rapidly developing and

potentially powerful players with large financial resources and the considerable support of projects at the inter-governmental level are emerging. It is expected that South Korea will achieve a reference for its [latest technology] as soon as this year, while China will follow one year after that. Toughening global competition is a huge challenge for Rosatom," he said.

To respond to this - "continue to receive orders and transform these into profits" - Rosatom needs to move towards achieving its second strategic goal - increasing the efficiency of its production processes.

Global leadership

On the world stage, the "leaders and outsiders are rapidly changing places", he said. "In the global market, there is no place for triumphalism, and this is clearly demonstrated by the history of our closest competitors. France's Areva was the undisputed world leader just 15 years ago, but today 75% of its nuclear power plant construction business is absorbed by EDF, and the state is forced to pull the reactor designers out of a financial hole with billions in cash injections. It is hard to imagine what French nuclear scientists can do to restore their reputation," Likhachov said. "In the world market, no one is guaranteed a place under the sun forever. Including us."

Rosatom is often compared with a large ship, he said, and this is now in the open ocean where a storm is raging. "As Eastern wisdom says, when the wind blows, it's necessary to build not windshields but windmills. In our case - wind turbines. Today we must answer the question, what technologies will become the basis of our competitiveness in 20-30 years. The nuclear industry has long cycles of development and implementation of innovations. If we want to preserve and increase what has been accumulated, then we need to start building for the future today, ideally even before today."

Likhachov referred to Rosatom's 'Proryv', or Breakthrough, project to enable a closed nuclear fuel cycle. The ultimate aim of this is to eliminate production of radioactive waste from nuclear power generation. "We took a punt on the Breakthrough project, on fast reactor technologies, and today we are leading in this field. It's necessary to make this leadership absolute and to deprive our competitors of their hopes of overcoming the gap in the technological race," he said.

"Is this enough to form the future image of Rosatom for 2040-2050? Obviously not. We need several equally ambitious projects, based on the best competencies of the industry. The search for these is the main challenge for the corporation's management," he added.

"A lot has been said about the fourth industrial revolution. Additive technologies, artificial intelligence, robotics, flexible control systems. We are obliged to participate in this trend and we are participating." For example, he said, VNIIEF (the All-Russian Scientific Research Institute for Experimental Physics) is successfully developing supercomputer technologies; the Alabuga Fibre facility Rosatom established in 2015 has "created from scratch" the production of carbon fibre; and

mobile laser technological systems have been created at the Troitsk Institute for Innovation and Fusion Research (TRINITI).

"A lot has been done and it's worked out really well, but the speed and scale of change among our global competitors is incomparably higher. For example, GE and Siemens have set a course for digitalisation of their business and are now experiencing the largest transformation in their history," he said. "GE develops the printing of jet engine parts on 3D printers, uses artificial intelligence technologies in the production of aircraft engines, while optimising technical indicators and the location of wind parks. By 2021, GE plans to enter the top 10 of the world's software developers with revenues of more than $15 billion."

Appetite for change

Rosatom needs to change in order to keep pace, he said. "We have everything we need for this: the highest qualified personnel, the production facilities and the technology. The only things missing are the speed and ability to adapt quickly to change."

The corporation has "plenty of examples of success" in increasing its efficiency. Since 2011, Rosatom has managed to reduce the cost of electricity production at Russian nuclear power plants by 36%. "This is a good result, but let's look at the competitors to nuclear energy. In terms of the present value of electricity, mature alternative technologies are already on a par with gas generation. In 2015, world investments in renewable energy were about 13 times higher than in nuclear energy," he said.

An equally important aspect of competitiveness is construction time, he said, since being just one month behind schedule leads to a 1% increase in the cost of an investment. "During the development of the nuclear industry in the Soviet era, it was possible to achieve indicators with which our competitors are now only catching up," he said. Unit 5 of the Zaporozhe nuclear power plant in Ukraine was built in 48 months, he noted, and "this is best practice today". In China, there are examples of record construction times, he added. Unit 1 of the Qinshan III nuclear power plant project in Zhejiang province was built in 51 months, and unit 3 of the Ling Ao II project in Guangdong province was completed in 53 months, he said. South Korea is committed to completing units 3 and 4 of the Barakah nuclear power plant in the United Arab Emirates in 43-48 months, he added.

Rosatom needs to work on the development of serial production for its nuclear power plant projects. "We need to learn how to build quietly, confidently, quickly and technologically, in a conveyor way. Working in the mode of heroism, of emergency, of overcoming permanent crises during construction, has to become a thing of the past," he said.

Efficiency

Likhachov referred to a story he had heard from Russian power engineering company Atomenergomash, which is "extremely indicative" of efficiency challenges. "About half of the customers there are from the nuclear industry and half are from

the gas industry, from energy, from defence enterprises, etc. Within the framework of a single project, they measured the work hours of employees who deal with counterparties and discovered an amazing fact. It turns out that these specialists spend only 10% of their time working with external contractors. For the same work with intra-industry counterparties it's 90%! It should be the other way around, but in energy, the working time of well-paid specialists is spent on understanding each other.

"Disputes they have between themselves sometimes last for years. Two of our organisations spent one-and-a-half years trying to agree the price of design work for one foreign project. One-and-a-half years! Did they, during this time, earn a single kopeck for Rosatom? No, they didn't. But the work was on a gigantic scale and everyone involved was incredibly tired. How does this happen? Because often organisations that are part of Rosatom are fighting for their own profits and don’t care about the corporation's consolidated results."

Rosatom's subsidiaries need to lose their "small-town thinking" and focus on the revenue and profit of the corporation as a whole, he said. Moreover, having a "narrow specialism" in traditional products makes the corporation "strategically unstable and critically exposed to changes in market conditions and global political risks".

He said: "Ten years ago, everyone was talking about a nuclear renaissance and looked with optimism at the prospects for the development of nuclear energy and related markets, primarily in the nuclear fuel cycle and nuclear engineering. After Fukushima, that optimism declined and now we understand that in the coming decades, on a global scale, nuclear power indicators will remain about where they are today. We are successfully fighting to expand our share in the global market, but the market itself is not growing. This is a serious strategic constraint, but even if there was no such restriction, building a strategy based on a single market is like standing on one leg."

Rosatom needs to create new products and businesses for the Russian and international markets, he said. "But it's obvious that in choosing new directions, we can't deal with everything in a row. There are three criteria. First, we must have the appropriate competencies. Secondly, we must be able to work in the markets for which we produce new products and understand how these markets are arranged. The third criterion, the most important one, is potential profitability. We do not need projects with zero or low profitability. This makes no economic sense. We need profit."

Work on new products requires a "change in psychology", he said, to "persistence and a desire to make money". And individual responsibility is essential, he added. "Responsibility can't be spread out; every project must have a surname, a first name and a patronymic."

Rosatom has achieved some success, he said, in increasing the share of revenue from its new businesses - by 30% at the end of last year.

Change in mentality

"The ability to change in response to new challenges in the world is probably the most important quality of a viable organisation and a critical condition for its long-term success. The domestic nuclear industry from its earliest days possessed this quality - strategic flexibility, repeatedly demonstrating a readiness to change and adopting organisational and technological innovations.

"Ten years ago, the organisational structure of the corporation and the management system were created for a specific task - gathering the industry together and overcoming the anarchy and disunity of the 1990s. The task was completed and today we are a global company. But the world has changed, the tasks have changed and we have changed. And what helped us to grow in the beginning, is now starting to hold us back and prevent us from developing. So, we again need to change."

The "imminent" changes, he said, will be to the corporation's management system, which should be "ahead of the curve by taking into account tomorrow's demands and securing our entry into the future".

"We must move from a policy of harmonising the interests of many players with the integrated management of the main products. Already now we see that simplicity and clarity of the management system, where this has been achieved, make it possible to reduce bureaucracy and destroy intra-departmental barriers that are a legacy of the time when the industry was fragmented.

"Optimisation of the management system should become the main theme of 2017," he said, and this "requires the full mobilisation" of the potential of the corporation's personnel.

"I know that a number of leaders have a model in their heads where the upper levels of management are the bearers of the correct strategy of transformation, and the workers simply have to follow directions and change according to the overhead templates. This is a mistake. The correct strategy and correct tactics for its implementation can only be the result of teamwork."

The corporation's work collectives are the director-general's "main partners" in improving the management system, he said. Transformation and innovation should not become a "dead bureaucratic thing".

"Some enterprises carry out an overhaul and the walls of the director-general's corridor are pasted with fresh posters. It's not clear who we are deceiving here; people are well aware of those kind of tricks."

The Russian nuclear industry needs to have an "honest and responsible" conversation in order to adapt to changes and work towards increasing efficiency, he said.

"Participation in the development of the corporation and making a real contribution to its success should be rewarded with career growth and good pay. Much has already been done in this direction, but the work should continue. If we want to be among the global technological leaders, then both the working conditions and the level of compensation should not be worse. But we can achieve this only when the

productivity of labour at our enterprises is the same and even better than at our competitors.

"I'm convinced that most of the corporation's employees are ready for real and involved participation in the changes. We have great human capital. We have retained and are developing a well thought out system of training. And we managed to stop the brain drain from our industry. But we are unlikely to achieve a breakthrough without excitement, without the audacity and keenness of thinking that the founders of the nuclear industry showed and during altogether different times, I should say. We need their example, their passion, today more than ever before."

Researched and written
by World Nuclear News

ISSN 2040-5766

News Release

March 10, 2017 Toronto, Ontario

Uranium One Announces 2016 Production of 12.7 Million Pounds at an Average Total Cash Cost of $9 per Pound Sold

Uranium One Inc. ("Uranium One" or the "Corporation") today reported headline revenue of $314.6 million for 2016. Attributable revenue was $405.7 million for 2016 based on sales of 13.5 million pounds of produced material at an average realized sales price of $27 per pound sold of produced material, with an average cash cost per pound sold of produced material at $9 per pound. Attributable production for 2016 was 12.7 million pounds.

2016 Highlights

Operational

- Total attributable production during 2016 was 12.7 million pounds, compared with total attributable production of 12.5 million pounds during 2015.

- The average total cash cost per pound sold of produced material decreased to $9 per pound during 2016, compared to $11 per pound during 2015.

Financial

- Attributable sales volumes of produced material for 2016 were 13.5 million pounds sold from the Corporation's operations and equity accounted investees compared to 12.3 million pounds sold during 2015.

- Headline revenue was $314.6 million in 2016, compared to $324.7 million in 2015.

- Attributable revenues consistent with the Corporation's segment reporting, which includes revenues from its interests in equity accounted investees, amounted to $405.7 million in 2016, compared to $541.2 million in 2015.

- The average realized sales price of produced material during 2016 was $27 per pound, compared to $36 per pound in 2015. The average spot price in 2016 was $26 per pound compared to $37 per pound in 2015.

- Gross profit was $41.9 million during 2016, compared to gross profit of $4.4 million in 2015.

- Gross profit, including the Corporation's share of gross profit from equity accounted investees, totaled $132.5 million in 2016, a 35% decrease compared to $204.5 million in 2015, mainly due to a decrease of 22% in the average realized sales price, partly offset by an increase of 10% in sales volume.

- Net earnings for 2016 were $252.6 million or $0.26 per share, compared to net earnings of $70.7 million or $0.07 per share for 2015.

- The adjusted net earnings for 2016 were $54.7 million or $0.06 per share after exclusion of a net gain received through business combination of $198.3 million, Ruble Bonds non-hedged derivative gains of $9.3 million, Ruble Bonds hedged derivative gains of $59.1 million, loss due to inventory valuation adjustment of $28.0 million, net foreign exchange losses of $17.3 million, loss due to impairment of non-current assets of $17.2 million, transfer pricing expenses of $3.2 million, loss on disposal of certain non-material US mineral claims and leases of $2.6 million and corporate development expense of $0.5 million, compared to an adjusted net earnings of $42.6 million or $0.04 per share for 2015.

Corporate Matters

- Since March 2014, the United States and Canadian governments and the European Union have implemented a number of orders, directives and regulations in response to the situation in Ukraine. These measures generally impose visa restrictions and asset freezes on certain designated individuals and entities considered to have contributed to the situation in Ukraine, restrict access by certain designated Russian institutions and entities to Western capital markets and prohibit the supply of equipment for use in Russian offshore deepwater, Arctic or shale exploration or production projects. The Corporation's operations have not been impacted by the foregoing orders, directives or regulations or any designations made thereunder and the Corporation continues to carry on business as usual.

- On June 29, 2016, the Corporation closed the tender offer for, and accepted for purchase, $60.5 million principal amount of the Senior Secured Notes of its subsidiary, Uranium One Investments Inc., at a price of $1,000 per $1,000 of face value. The total amount of the transaction was $60.8 million including $0.3 million of accrued interest, as well as legal fees and transaction costs. The settlement of the tender offer was completed on July 7, 2016.

- On December 5, 2016, the Corporation redeemed RUB 2,499,957,000 aggregate principal amount of its Series 1 Ruble Bonds at their face value. RUB 43,000 aggregate principal amount of Series 1 Ruble Bonds remains outstanding, but such bonds ceased to bear interest after November 30, 2016. The redemption was partially funded by a loan from an affiliate.

- On December 13, 2016 the Corporation redeemed the balance of the outstanding Senior Secured Notes at a redemption price equal to 103.125% of the principal amount of the notes plus accrued and unpaid interest. The $90.1 million aggregate principal amount of the Senior Secured Notes that the Corporation had purchased earlier were cancelled before the redemption. The redemption was partially funded by a loan from an affiliate.

- On December 30, 2016 Feroz Ashraf resigned as Chief Executive Officer of the Corporation and Eduards Smirnovs, formerly the Corporation's Manager, Corporate Projects, was appointed as Acting Chief Executive Officer. Feroz Ashraf continues as a member of the Board of Directors of the Corporation.

- The Board of Directors also decided that the Corporation will no longer prepare and publish quarterly unaudited financial statements and operating and financial reviews, as it is no longer legally or contractually obliged to do so. The Corporation will continue to prepare and publish audited consolidated annual financial statements, as well as the quarterly and annual reports required under Russian securities laws and the rules of the Moscow Exchange, where the Corporation's Ruble Bonds are listed for trading.

2016 Operations

During 2016, Uranium One achieved total attributable production of 12.7 million pounds, compared to 12.5 million pounds during 2015.

Operational results for Uranium One's assets for 2016 were:

Asset	2016 Attributable Production (millions lbs U_3O_8)	2016 Total Cash Costs (per lb sold U_3O_8)
Akdala	1.8	$9
South Inkai	3.6	$11
Karatau	2.7	$4
Akbastau	2.3	$5
Zarechnoye	1.1	$12
Kharasan	1.1	$9
Willow Creek	0.1	-
Total	**12.7**	**$9**

The following table provides a summary of key financial results:

FINANCIAL	Q4 2016	Q4 2015	FY 2016	FY 2015
Attributable production (lbs U_3O_8) [1]	3,336,700	3,164,100	12,687,500	12,450,000
Attributable sales (lbs) [1] – Produced material	4,565,800	4,471,800	13,515,800	12,256,400
Average realized sales price ($ per lb) [2] – Produced material	21	34	27	36
Average total cash cost per pound sold ($ per lb)[2] – Produced material	8	9	9	11
Revenues ($ millions) – as reported on consolidated income statement	76.0	71.8	314.6	324.7
Attributable revenues ($ millions)[2]	114.2	178.4	405.7	541.2
Gross (loss) profit ($ millions) – as reported on consolidated income statement	(7.9)	3.1	41.9	4.4
Attributable gross profit ($ millions)[2]	14.9	90.8	132.5	204.5
Net earnings ($ millions)	43.1	60.8	252.6	70.7
Net earnings per share – basic and diluted ($ per share)	0.05	0.06	0.26	0.07
Adjusted net earnings ($ millions)[2]	(22.3)	40.3	54.7	42.6
Adjusted net earnings per share – basic ($ per share)[2]	(0.02)	0.04	0.06	0.04

Notes:

(1) Attributable production pounds and attributable sales pounds are from assets owned and from joint ventures in commercial production during the period. All figures are rounded to reflect appropriate levels of confidence. Columns may not add up correctly due to rounding. Commercial production excludes pilot uranium production from the Inkuduk horizon at the South Inkai mine.

(2) The Corporation has included the following non-GAAP performance measures: average realized sales price per pound – produced material, average total cash cost per pound sold – produced material, attributable revenues, attributable gross profit, adjusted net earnings (loss) and adjusted net earnings (loss) per share. See the section on "Non-GAAP Measures" in the Corporation's Operating and Financial Review for the year ended December 31, 2016.

Non-GAAP Measures

Adjusted Net Earnings (Loss)

The Corporation has included the following non-GAAP performance measures throughout this news release: adjusted net earnings (loss) and adjusted net earnings (loss) per share. Adjusted net earnings (loss) and adjusted net earnings (loss) per share do not have any standardized meaning prescribed by IFRS and are therefore unlikely to be comparable to similar measures reported by other companies. The Corporation believes that, in addition to conventional measures prepared in accordance with IFRS, certain investors use this information to evaluate the Corporation's performance and ability to generate cash flow. This is provided as additional information and should not be considered in isolation, or as a substitute for, measures of performance prepared in accordance with IFRS. Please refer to the Operating and Financial Review for further details.

The financial statements, as well as the accompanying Operating and Financial Review, are available for review at www.uranium1.com and should be read in conjunction with this news release. All figures are in U.S. dollars unless otherwise indicated. All references to pounds sold or pounds purchased are to pounds of U_3O_8.

About Uranium One

Uranium One is one of the world's largest uranium producers, with a globally diversified portfolio of assets located in Kazakhstan, the United States and Tanzania. ROSATOM State Atomic Energy Corporation, through its affiliates, is the main shareholder of Uranium One.

For more precise information about Uranium One, please visit www.uranium1.com

Eduards Smirnovs
Acting Chief Executive Officer
Email: Eduard.smirnov@uranium1.com
Tel: +1 647 788 8515

Cautionary Statements

No stock exchange, securities commission or other regulatory authority has approved or disapproved the information contained herein.

This press release contains certain forward-looking statements. Forward-looking statements include but are not limited to those with respect to, the price of uranium, the estimation of mineral resources and reserves, the realization of mineral reserve estimates, the timing and amount of estimated future production, costs of production, capital expenditures, costs and timing of the development of new deposits, success of exploration activities, permitting time lines, currency fluctuations, market conditions, corporate plans, objectives and goals, requirements for additional capital, government regulation of mining operations, environmental risks, unanticipated reclamation expenses, the timing and potential effects of proposed transactions, title disputes or claims, limitations on insurance coverage and the timing and possible outcome of pending litigation. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes" or variations of such words and phrases, or state that certain actions, events or results "may", "could", "would", "might" or "will" be taken, occur or be achieved. Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of the Corporation to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and uncertainties include, among others, the possibility of sanctions that may be imposed on the Corporation, its shareholders or affiliates or third parties with which the Corporation deals, that may have a material adverse effect on the Corporation's ability to carry on its business or perform its contractual obligations, the future steady state production and cash costs of Uranium One, the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, possible changes to the tax code in Kazakhstan, accidents, labour disputes or other risks of the mining industry, delays in obtaining government approvals or financing or in completion of development or construction activities, risks relating to the completion of transactions, integration of acquisitions and the realization of synergies relating thereto, to international operations and to prices of uranium, as well as those factors referred to in the section entitled "Risk Factors" in Uranium One's Operating and Financial Review for the year ended December 31, 2016. Although Uranium One has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements.

Accordingly, readers should not place undue reliance on forward-looking statements. Uranium One expressly disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required under applicable securities laws.

world nuclear news

ARMZ takes hold o f Uranium O ne

09 June 2010

Russia's AtomRedMetzoloto (ARMZ) and Toronto- and Johannesburg-registered Uranium One have signed an agreement that will place Uranium One among the top five global uranium producers and see ARMZ ta ke a controlling interest in the company. Meanwhile, Russia may be a bout to open an enrichment plant to part-foreign ownership.

ARMZ will contribute to the deal its interests in two Kazakh in-situ leach uranium mines - its holdings of 50% in the Akbastau mine and 49.7% in the Zarechnoye uranium mine - plus $610 million in cash. In return, the mining division of Russia's Rosatom state nuclear corporation will receive 356 million common shares in Uranium One, which along with ARMZ's existing 23.1% holding will give it an interest of at least 51% in the company.

Zarechnoye yellowcake (Image: ARMZ)

The addition of ARMZ's assets to Uranium One's existing projects will see the company's production in Kazakhstan increase by about 60% from its current 10 million pounds U_3O_8 per year to 16 million pounds U_3O_8 per year, at consolidated cash costs of less than $20 per pound, according to Uranium One. Akbastau is contiguous to the Karatau operation in which Uranium One has a 50% holding, giving scope for management and operating systems synergies.

Uranium One CEO Jean Nortier said the deal would position the company "to be among the world's top 5 uranium producers by 2011," while ARMZ director general Vadim Zhivov said that developing and operating projects in Kazakhstan was a priority for the Russian company. "We are confident that Rosatom’s controlling interest in Uranium One will allow it to further strengthen its excellent relationship with its partners in Kazakhstan and to open up new promising avenues for cooperation," he said.

The transaction is subject, among anti-trust and other conditions, to Kazakh regulatory approvals, approval under Canadian investment law, clearance by the US Committee on Foreign Investment, and approvals from both the Toronto and Johannesburg stock exchanges, but is expected to be finalised by the end of 2010. It also contains various protections covering the possible future sales of ARMZ's common shares in the company.

The board of Uranium One will be reduced from thirteen to nine, with five independent directors, two of whom will be nominated by ARMZ. Ian Telfer will continue as chairman and Jean Nortier as CEO, and ARMZ will also be entitled to nominate three additional board members. It is not yet clear how Uranium One's Japanese shareholders, which together hold 20% of the company through Japan Uranium Management Inc, will be affected by the transaction.

Uranium One also confirmed that it has recently sold "substantially all" its shares in Paladin Energy, and will use the proceeds to help fund the cash outflows needed for the proposed transaction with ARMZ. The company had recently acquired about 3% of Paladin, which has uranium interests in Australia and Africa. Uranium One sold its Dominion uranium mine in South Africa in April, but it has US holdings in Utah and Wyoming which are likely to come on line in 2011, and is bringing the Honeymoon mine in South Australia into production at the end of this year in a joint venture with Mitsui of Japan.

Earlier this year, Canadian-based Khan Resources, currently embroiled in legal wranglings over its uranium mining licences in Mongolia, rejected a hostile takeover bid from ARMZ in favour of a bid from Chinese company CNNC Oversees Holdings. The CNNC bid subsequently fell through.

Researched and written
by World Nuclear News

Kazatomprom t o buy into Russian enrichment?

Rosatom is planning to sell a stake in one of its uranium enrichment plants to Kazakh national nuclear corporation Kazatomprom, according to reports in the Russian and Kazakh media.

According to Interfax, Rosatom departmental deputy chief Vladislav Korogodin told reporters that Rosatom was prepared to sell Kazatomprom up to 49% one of its enrichment plants, either the Urals Electrochemical Combine or the Electrochemical Plant. The Moscow Times and Interfax both cited Kazatomprom chief Vladimir Shkolnik as saying that he hoped the deal would be completed before the end of September.

According to press reports, it would appear that the deal could supersede the 50-50 joint venture set up by Kazatom and Tenex in 2008 to finance a 5 million SWU/yr increment to the Angarsk plant.

Shkolnik also confirmed that he hoped that Russia and Kazakhstan would sign an intergovernmental agreement on the construction of nuclear power plants in Kazakhstan by the end of 2010.

The comments were made during the ATOMEXPO-2010 forum being held in Moscow.

ISSN 2040-5766

USEC's Supply Agreement with TENEX Takes Effect

- U.S. and Russia complete final administrative arrangements -

December 21, 2011 12:32 PM Eastern Standard Time

BETHESDA, Md.--(BUSINESS WIRE)--The supply agreement signed in March between JSC "Techsnabexport" (TENEX) and United States Enrichment Corporation, a wholly owned subsidiary of USEC Inc. (NYSE:USU), took effect today. The supply agreement is a multi-year contract for the supply of low enriched uranium (LEU) beginning in 2013 that will build on USEC's long-term relationship with TENEX.

"We are excited to continue our fruitful relationship with TENEX, which has been built on the foundation of the successful Megatons to Megawatts™ program," said Phil Sewell, USEC senior vice president of American Centrifuge and Russian HEU. "This supply agreement will be a key component to helping us continue to meet our customers' needs. We appreciate the work and support of the U.S. government to complete the administrative arrangements under the U.S. - Russia nuclear cooperation agreement that now allows this commercial contract to move ahead."

Under the terms of its agreement with TENEX, the supply of LEU to USEC will begin in 2013 and ramp up until it reaches a level in 2015 that is approximately one-half the level currently supplied by TENEX to USEC under the Megatons to Megawatts program with the mutual option to increase the quantities up to the same level as that program. The Megatons to Megawatts program is scheduled to expire at the end of 2013. Unlike the Megatons to Megawatts program, the quantities supplied under the new contract will come from Russia's commercial enrichment activities rather than from downblending of excess Russian weapons material.

Deliveries under the agreement are expected to continue through 2022. USEC will purchase the separative work units (SWU) contained in the LEU and deliver natural uranium to TENEX for the LEU's uranium component. The pricing terms for SWU under the agreement are proprietary but are based on a mix of market-related price points and other factors.

Effectiveness of the agreement occurred following an exchange of notices between TENEX and USEC that the administrative arrangements under the U.S.-Russia nuclear cooperation agreement have been completed. These administrative arrangements, among other things, provide the framework for the return to Russia of natural uranium delivered by USEC to TENEX under the supply agreements.

The supply agreement assures USEC continued access to an important part of its existing supply mix. USEC continues to work towards the deployment of the American Centrifuge Plant in Piketon, Ohio. As it does, the Company is also continuing to review structuring options and strategic alternatives in evaluating the best path forward to realize long-term shareholder value. In that context, USEC and TENEX have agreed to conduct a feasibility study to explore the possible

deployment of an enrichment plant in the United States employing Russian centrifuge technology. Any decision to proceed with such a project would depend on the results of the feasibility study and would be subject to further agreement between the parties and their respective governments.

The Megatons to Megawatts program is a unique, commercially financed government-industry partnership in which bomb-grade uranium from dismantled Russian nuclear warheads is being recycled into LEU used to produce fuel for American nuclear power plants. USEC, as executive agent for the U.S. government, and TENEX, acting for the Russian government, implement this 20-year, $8 billion program at no cost to taxpayers. This program is on track to complete the downblending of the equivalent of 20,000 nuclear warheads into commercial nuclear fuel by the program's conclusion at the end of 2013.

USEC Inc., a global energy company, is a leading supplier of enriched uranium fuel and nuclear industry related services for commercial nuclear power plants.

Forward-Looking Statements

This news release contains "forward-looking statements" – that is, statements related to future events. In this context, forward-looking statements may address our expected future business and financial performance, and often contain words such as "expects," "anticipates," "intends," "plans," "believes," "will" and other words of similar meaning. Forward-looking statements by their nature address matters that are, to different degrees, uncertain. For USEC, particular risks and uncertainties that could cause our actual future results to differ materially from those expressed in our forward-looking statements include, but are not limited to: limitations on our ability to import the Russian LEU we buy under the new supply contract into the United States and other countries; uncertainty regarding the results of the feasibility study to be conducted regarding the possible deployment of an enrichment plant in the United States employing Russian centrifuge technology; risks related to the deployment of the American Centrifuge technology, including risks related to performance, cost, schedule and financing; the outcome of ongoing discussions with the U.S. Department of Energy ("DOE") regarding a potential research, development and demonstration ("RD&D") program for the American Centrifuge project, including uncertainty regarding the timing, amount and availability of funding for such RD&D program and the dependency of government funding on Congressional appropriations and the potential for us to make a decision at any time to further reduce spending and demobilize the project based on the timing and likelihood of an agreement with DOE and any government funding; the economics of extended Paducah plant operations beyond May 2012, including our ability to negotiate an acceptable power arrangement, our ability to obtain a contract to enrich DOE's depleted uranium and sufficient market demand for the remaining output; the competitive environment for our products and services; and other risks and uncertainties discussed in our filings with the Securities and Exchange Commission, including our Annual Report on Form 10-K and quarterly reports on Form 10-Q, which are available on our website at www.usec.com. We do not undertake to update our forward-looking statements except as required by law.

Contacts

USEC Inc.
Media:
Paul Jacobson, 301-564-3399
or
Investors:
Steve Wingfield, 301-564-3354

Rosatom Secures New State Funding

Energo - CEE/FSU Power
20 October 2016, Week 41 Issue 832

Russian nuclear corporation Rosatom has secured new subsidies from the state over the next three years to complete the construction of new plants and refurbish existing facilities.

The country's draft budget for 2017-2019, which was approved by the government on October 13, allocated Rosatom 21.2 billion rubles (US$336.2 million) in state funding for 2017. State support will later fall to 20.5 billion rubles (US$325.1 billion) and 20.7 billion rubles (US$328.2 million) in 2018 and 2019 respectively. Approximately 68.7 billion rubles (US$1.1 billion) in total were granted to Rosatom over the three-year period under the state programme entitled "Development of the Nuclear Energy Complex."

State subsidies are estimated to cover between 30% and 40% of Rosatom's capital expenditure per year.

The state-owned firm is currently constructing new plants in the Russian regions of Kursk, Rostov, Leningrad and Novoronezh. Newly

appointed Rosatom CEO Sergey Likhachev told Prime Minister Dmitry Medvedev last week that a sixth reactor unit was currently being installed at the Novoronezh plant.

"This is the first such project worldwide," Likhachev said, adding: "it is not only important for the Russian energy industry but a serious point of reference for the world."

Russia currently has 10 functioning nuclear power plants (NPPs), which house 36 operating reactors and generate 27.1 GWe, or 11.5% of national electricity generation. Rosatom aims to hoist that share to 19.7% by 2035.

Earlier this year, the government attempted to allocate a combined 5.7 trillion rubles (US$90.3 billion) in state funding over that period to boost nuclear power generation in Russia. These plans, however, were sent back to the Ministry of Energy for revision earlier this year following resistance from rival energy companies and consumers. A government decree signed in August stipulated that 11 new reactors beyond the Kursk and others currently under construction should be commissioned by 2030. Early last year, Rosatom said that nine reactors would also be decommissioned by 2023 and a further three by 2027.

Under the new federal budget for 2017-2019, 15.1 billion rubles (US$239.3 million) were also assigned to the construction of new, state-of-the-art icebreakers to be used to escort vessels through Russia's Arctic waters. The ships will be operated by Rosatom's maritime subsidiary Rosatomflot, which currently numbers five nuclear-powered icebreakers in its fleet.

Edited by
Richard Lockhart
Editor
Any questions? Please get in touch
richardl@newsbase.com

Share this page

Sign up for a free Trial

NewsBase tells you what's going on and why in the global energy industry.

SIGN UP NOW

Contact Us

Tel: +44 (0)131 478 7000
E-mail: news@newsbase.com

Twitter

- Sign up to our daily newsletter & get a selection of our premium content for #free: https://t.co/EgzJdkHj7Q… https://t.co/LRxruMXvAG — *4 hours 52 min* ago
- RT @JGreenDC: "The only difference between the two administrations is one brags about it and one didn't" https://t.co/DlGZvTVfT1 — *5 hours 53 min* ago

around the globe

Reuters Staff

(Hannah Thoburn is a Eurasia analyst at the Foreign Policy Initiative. She tweets on Russia and Ukraine at @HannahThoburn. The opinions expressed here are her own.)

By Hannah Thoburn

May 5 (Reuters) - Russia has been notoriously brazen in using state-owned companies as instruments of national power. President Vladimir Putin's natural-gas wars with Belarus and Ukraine made headlines and sometimes left substantial parts of Europe in the cold. But Moscow's exploits in other energy-related areas have been less noticed.

Recent revelations about the concerted Russian effort to buy up uranium resources across the globe may change that. For Moscow's state-owned nuclear-energy company, Rosatom, has made successful inroads into markets around the world. It is Rosatom - not France's Areva or the

United States' Westinghouse - that has 29 nuclear reactors in various stages of planning and construction in more than a dozen countries, the largest number of nuclear reactors being built internationally. In contrast, Areva, though largely owned by the French state, has not sold one reactor since 2007.

Much of Rosatom's success can be ascribed to the strong support provided by the Russian government. Moscow recognized roughly 10 to 15 years ago that Rosatom's work enables Russia to add another energy-related means of extending its long-term political influence throughout the world. Unlike oil or gas projects, Russia's nuclear developments need not be in neighboring countries or even in its region - a fact that broadens the Kremlin's investment options.

Globe-trotting deals

The countries that Russia and its state-owned nuclear company have signed agreements with in the past year are diverse indeed. The most recent deal is with Jordan, a land-locked, energy-poor Middle Eastern nation, which just agreed to have Rosatom complete two nuclear reactors by 2022.

Less than a month before the Jordanian agreement, Putin finalized a deal with Hungary for Rosatom to build and install two reactors to the already existing Soviet-built plant at Paks in south-central Hungary. The deal has come under intense scrutiny from the European Union over the source of the nuclear fuel, but looks set to go ahead.

Only days before the Hungary deal, Putin used his visit to Egypt to conclude a preliminary agreement with Egyptian President Abdel Fattah el-Sisi. Moscow is set to build Egypt's first nuclear power plant, in the northern city of Alexandria.

In November, Russia signed a contract with Iran to build two more reactors at the Bushehr site, where Russia has already built one reactor that is now operational. The deal left open the possibility of Rosatom building an additional four reactors at a site yet to be determined.

India has long had a relationship with Rosatom, as New Delhi has worked desperately over the past years to increase its electricity production capacity. A Russian-built reactor came online at the Kudankulam Nuclear Power Plant in 2013, a project conceived under the Soviet regime.

Another reactor is to begin operation at Kudankulam later this year. Two more nuclear reactors are planned for construction at the same site. When Putin visited India in December 2014, the two governments confirmed that their cooperation in the nuclear sector would continue, with at least 10 more reactors planned in the coming years.

In northern Finland, Rosatom has started preliminary work on a site where a new nuclear plant is scheduled to come online in 2024. Turkey's first nuclear plant, also built by Rosatom, is set to break ground this spring.

Rosatom is also looking toward Latin America. While Putin was touring South America in July 2014, the Russian leader and Argentine President Cristina Kirchner signed nuclear energy cooperation agreements and in April 2015 agreed to have Rosatom build a reactor at the Atucha-3 plant outside Buenos Aires. In February 2015, Rosatom concluded an agreement with Brazil's National Nuclear Energy Commission to provide supplies of Molybdenium-99, an element used in many nonmilitary nuclear applications.

Crucial Moscow support

So why, tender after tender, are Russia and Rosatom having more success than Western nuclear firms? There are four key reasons:

Favorable financing. Though Russia may be hurting for cash because of international sanctions, Moscow is still willing to undertake projects that promise long-term gains. The returns are expected to be more than financial. The Putin regime sees these projects as part of its national strategy. It is willing to heavily subsidize Rosatom and also provide loans to countries too poor to afford its products. These subsidies mean that Rosatom can sell nuclear reactors at a far lower price than its competitors.

Rosatom's Build, Own and Operate scheme. Many developing countries are keen to develop nuclear power as a source of comparatively cheap energy but are unable to raise the funds to build reactors. In addition, they have neither the desire nor the expertise to operate the reactors once they are built. The build, own and operate deals remove these obstacles and put the responsibility on the Russians. But they also hold the countries hostage to Russian desires and demands. Under these controversial deals, Russia and Rosatom provide nuclear fuel, processing when it has been depleted, education for workers and technicians, maintenance and installation

of any needed upgrades. Turkey's new plant at Akkuyu is the first set to be built under these conditions.

Rosatom's relative freedom from governmental oversight. In comparison to the world's other large companies engaged in nuclear construction, Areva of France, Westinghouse of the United States and Tokyo Electric Power Company of Japan, Rosatom is not dissuaded from building in certain countries. In contrast, U.S. companies are prevented from building reactors in all but the 46 countries with which the United States has already concluded so-called 123 Agreements on the sharing of nuclear expertise. Countries such as Vietnam and Bangladesh, where Rosatom is building reactors, are not on that list, effectively keeping U.S. companies from even competing for those deals.

Deal sweeteners. In certain circumstances, a nuclear deal with Russia is only part of a larger package. Vietnam's collaboration with Russia, for example, has also allowed it to purchase submarines and other military equipment from Moscow.

West versus Rosatom

For all these reasons, competing against Russia and Rosatom has become increasingly difficult for Western corporations, which are steadily falling behind.

France's Areva, for example, is in serious financial straits and must address recent revelations of technological problems with one of its reactor designs. Westinghouse is hamstrung by Americans' reluctance to build new reactors. Foreign buyers often want to see how the reactor models they decide to build are running in a company's base, and Westinghouse has nothing to show them. Japanese companies have been adversely affected by the 2011 meltdowns at the Fukushima power plant.

Meanwhile, Rosatom, backed by the full power of the Putin government, is expanding its international reach and, in doing so, widening the scope of Russian power. As it has begun to do in other arenas - media and finance, for example - Europe and the United States must identify and counter Russian influence in the energy sphere.

Sooner or later, Washington's and Brussels' instinct to ignore these challenges will not only seriously undermine Western businesses, it will also cede to Russia the international influence it

so ardently seeks to purchase. (Hannah Thoburn)

Kazakhstan's triple crisis: a perfect storm in the making?

Commentary

Nicolás de Pedro & Ryskeldi Satke

15th July, 2016

This article is part of ECFR's Wider Europe Forum

Increased radicalism, crackdowns, and controversial reforms make for an uncertain succession in troubled times.

Kazakhstan is facing a number of simultaneous crises that are calling into question Astana's official triumphalist narrative. Recent protests across the country against the government's land reform are a clear reflection of growing discontent among the population due to the worsening economic environment. The overdependence of the Kazakh economy on oil exports makes prospects uncertain at best. Up to now, the government has been unable to promote alternative sources of growth and prosperity. Social unrest might then lead to a potential crisis of legitimacy of President Nursultan Nazarbayev's model of development and governance. Conscious of this, the government is warning of the risk of a "color revolution" or "Ukrainian scenario" in Kazakhstan, as the President Nazarbayev himself has stated.

The latest outbreak of armed violence in western Kazakhstan also raises concerns about stability and security in the country. Since 2011, the western regions, where 70 percent of the country's oil facilities are located, have seen a growing number of violent incidents. The Kazakh authorities claim that these attacks are being carried out by homegrown Islamist terrorists. However, a direct link to Syria - where according to various reports nearly 300 Kazakh citizens are fighting alongside the so-called Islamic State - has been pointed out by the interior minister. Whether purely homegrown or externally-organised this wave of attacks raises serious concerns about a potential crisis of security .

Homegrown radicalism in Kazakhstan is, so far, a distinctly unique phenomenon in this region. While migration of Central Asian natives to Russia plays a larger part in the radicalisation trend in Eurasia, Kazakhstan has been grappling with a dilemma of domestic terrorism since 2011, if not earlier. Many migrant workers from the neighboring republics travel to Kazakhstan and Russia for seasonal jobs. However, Kazakhstan's economic development is the main reason for country's citizens to be viewed as separate to the regional migration pattern which distinguishes Kazakhstan from its neighbours. A string of violent incidents had swept through country's oil rich western provinces in spring-summer 2011 including a suicide bombing and mass shootout that resulted in a high number of casualties. The Kazakh authorities were seemingly reluctant to admit that the country has domestic issues with homegrown terrorism although President Nursultan Nazarbayev acknowledged the persistent challenge of extremism in the country.

Coincidentally, social tensions in the western town of Zhanaozen have led to a brutal crackdown on the protests staged by the Kazakh oil workers in December 2011 which left more than a dozen dead and scores wounded. Following bloody confrontation between the police and oil workers, President Nazarbayev blamed criminal elements that were influenced by an "external force". Kazakh authorities haven't clarified what this "external force" might have been, nor have they explained the link between the criminal groups and the demonstrations in Zhanaozen. The government's method of casting the blame on outside influences when it comes to violent protests and acts of terrorism in western Kazakhstan seems to have achieved short term goals in the immediate aftermath. However, temporary gains made in suppressing protests have only exacerbated unresolved social-economic grievances throughout the country.

The controversial land-reform legislation bill triggered mass rallies this spring throughout the country. Nationwide protests are rare events in Kazakhstan, yet public anger against the land-reform bill has revealed deep-rooted fears about China, but more importantly it has brought to light poor governance as a result of institutional weaknesses, dysfunctional communication between citizens and authorities; and a growing rift among factions in the Kazakh political elite that is likely to widen in the years to come. The politically organised opposition is minimal and has operated in a shrinking environment since the second half of the 1990s. However, public discomfort is growing and a weak yet opaque parliament offers no space for inclusive political dialogue at the national level.

In addition, the geopolitical context diminishes Astana's room for manoeuvre. The Russian military intervention in Ukraine and the Russia-EU rift has put Kazakhstan in a highly uncomfortable position that undermines its multi-vector foreign policy. It has also put strain on Kazakhstan's "nation-building process" and "interethnic harmony". Astana fears what it perceives as a "regime-changing" global strategy that is promoted by the West, but the Kazakh leadership is no less concerned with the Kremlin's Eurasian identity. The Eurasian Economic Union (EEU) seems unpopular for citizens of Kazakhstan and this is due both to the worsening economic situation and to Moscow's growing assertiveness in the region. At the moment, Astana seems trapped in a project which was, ironically, firstly proposed by President Nazarbayev himself. Russia's hegemonic ambitions in the former Soviet space include at times overt questioning of Kazakh borders and its existence as an independent state. Therefore Kazakhstan faces a serious dilemma that might lead to a crisis of identity . In light of the Ukrainian crisis and given the fact that the Kremlin's narrative to justify the intervention can be easily applied to the northern part of Kazakhstan, Astana might feel tempted to appeal to ethnic (Kazakh) nationalism as a way to strengthen the country's sovereignty and identity. But this might also erode the largely peaceful interethnic bonds in the country.

It must be borne in mind that, contrary to the pervasive official narrative, the Kazakh model is far from being "unique" and whether its approach and foundations are the most appropriate to build up an integrated and pluralistic society in the mid-to-long term is an open question. However, big changes shouldn't be expected under Nazarbayev's rule. The key dilemma will appear during the process of succession. We don't know when, who and how the incumbent president will be replaced but we can be relatively certain that he will be succeeded by an ethnic Kazakh who will need to forge his own sources of domestic legitimacy based on the premises of

Kazakhstan's independence and sovereignty; while at the same time – unless the Kremlin's political identity is completely transformed – staving off a Russia that will try to take advantage of the process of succession to reinforce its leverage over the country.

Kazakhstan has, so far, been the most prosperous, stable and promising Central Asian republic and is at the heart of the EU's efforts and presence in the region. These simultaneous crises might create a perfect storm in the country that could seriously harm the recently-announced aim to strengthen relations with the region.

Nicolás de Pedro is Research Fellow at CIDOB, Barcelona

Ryskeldi Satke is a Contributing Writer and Freelance Analyst

Read more on: Wider Europe Forum