

**Via Electronic Submission**

September 19, 2016

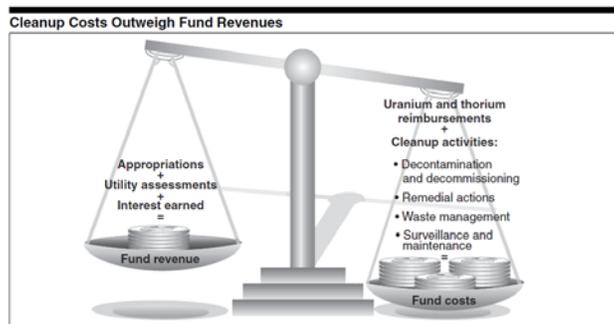
Ms. Cheryl Moss Herman  
 U.S. Department of Energy  
 Office of Nuclear Energy  
 Mailstop B-409  
 19901 Germantown Road  
 Germantown, MD 20874-1290

Subject: Excess Uranium Management: Effects of DOE Transfers of Excess Uranium on Domestic Uranium Mining, Conversion, and Enrichment Industries;  
Request for Information, 81 FR 46,917 (Jul 19, 2016, Extended Sep 19, 2016)

Dear Ms. Moss Herman:

On July 19 DOE issued a request for information on the effects of DOE transfers of excess uranium on the domestic uranium mining, conversion and enrichment industries. The information provided will be considered in the formulation of a new Secretarial Determination as to whether or not DOE transfers at current volumes have an adverse material impact on the domestic industries. Fluor-BWXT Portsmouth LLC (FBP) is currently the Decontamination & Decommissioning (D&D) contractor as set forth in our Prime contract (Contract DE-AC30-010CC4017) at the Portsmouth Ohio site administered by the the Environmental Management Paducah-Portsmouth Project Office (PPPO) in Lexington KY. In addition to managing approximately 2,000 D&D employees FBP receives transfers of Department of Energy (DOE) owned UF6 as barter transfers and then FBP performs equivalent value D&D services for DOE at the site.

**CONGRESSIONAL APPROPRIATIONS.** FBP would prefer to execute the Portsmouth D&D contract with 100% of the funds flowing from congressional budget appropriations, but since June 2011 DOE has contractually transferred over 10,000 MTU to FBP through August 31, 2016. In turn, FBP has granted DOE over \$1.1 Billion in D&D scope credits towards FBP Decontamination & Decommissioning (D&D) services carried out at the Portsmouth Ohio site for DOE. These uranium barter sales have met over 50% of the total Portsmouth D&D site budget needs over the last five years.



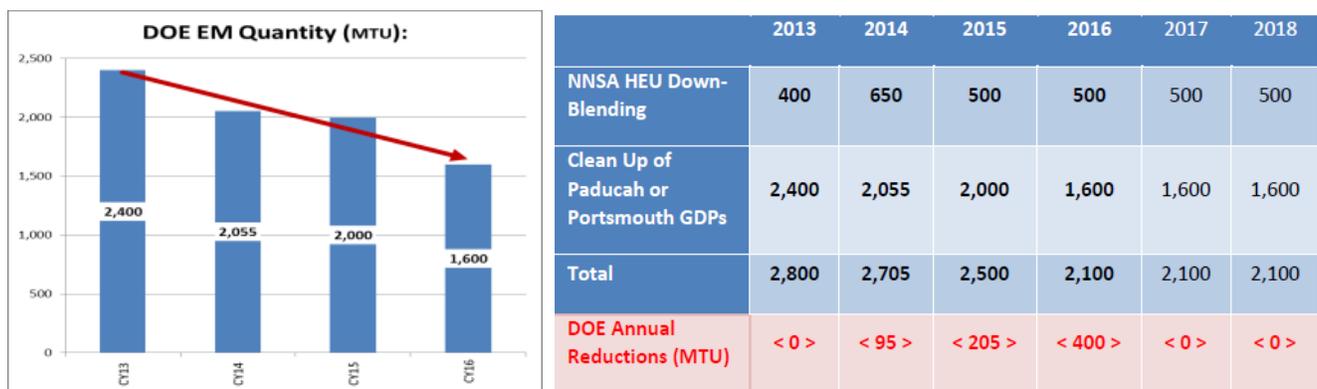
Source: GAO.

United States General Accounting Office

The consumers have a particularly large interest in the outcome of the Secretarial determination. Not only may DOE’s actions affect the prices they pay but they could also have another impact. Currently DOE funds the D&D of the former enrichment sites from two sources: the barter of excess uranium and the D&D fund created from utility and government contributions. GAO has determined that these funds are inadequate and DOE has proposed collecting additional funds from the users of the enriched uranium produced. If DOE is successful the funds not provided by the barter would come from the consumers, mostly U.S. electricity providers. If the uranium barter sales are delayed D&D costs will rise substantially and require significant additional funds.

**RETURN TO THE US TAXPAYER.** In 1999, as part of the now historical US-Russian HEU Deal, the US government/taxpayer paid \$325 million to Russia for the natural uranium content of the 1997 and 1998 LEU deliveries under that agreement. Furthermore, the US agreed to hold this ~11,000 MTU of UF<sub>6</sub> off of the commercial market for 10 years—until 2009. Now, that UF<sub>6</sub> has been bartered to FBP during 2011-2016 to supplement the appropriations from the Uranium Enrichment D&D fund for D&D cleanup at Portsmouth OH. That \$30 per kgU cost in 2009 has now brought over \$100 per kgU in value to DOE and the taxpayer—while benefiting the work to be done using UED&D funding and uranium barter sales.

**PREDICTABLE AND TRANSPARENT QUANTITIES.** In the 2012 Secretarial Determination, released on May 15, 2012, DOE concluded that sales up to 2,800 MTU of natural equivalent would not have an adverse material impact. In the May 15, 2014 Secretarial Determination, the quantity was reduced to 2,705 MTU. The May 1, 2015 Secretarial Determination again reduced the threshold quantities further to 2,500 MTU natural equivalent for 2015 and to 2100 MTU for future subsequent years. Since 2013 DOE has reduced its annual EM (Portsmouth & Paducah) volumes twice—a 33% reduction. At the current 2,100MTU/1,600MTU rate the balance of DOE EM’s natural UF<sub>6</sub> disposition will clear the market overhang of all remaining excess surplus natural uranium by early 2020.



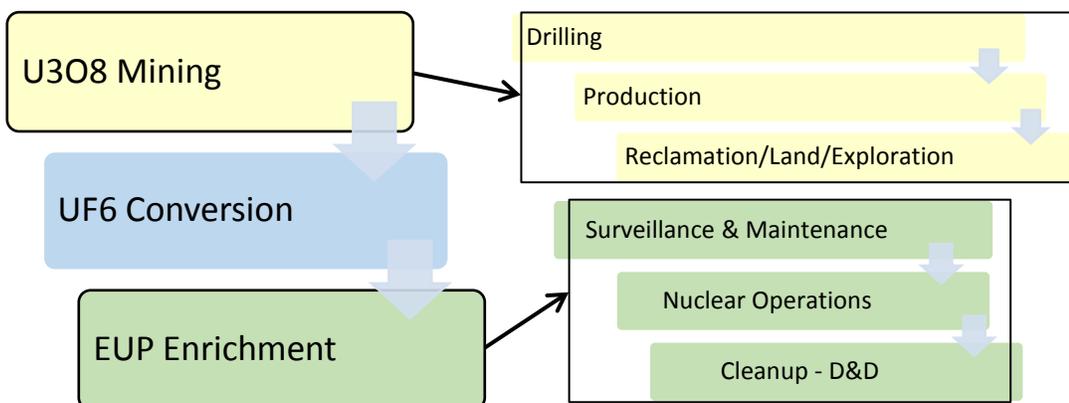
**MINIMIZE THE IMPACT ON URANIUM MARKETS.** In 2011 the industry communicated to FBP that the method by which this material entered the market through the DOE barter to USEC, who conducted quarterly auctions in 2009 and 2010, was extremely disruptive to the nuclear fuel markets. They wished for FBP to find a different method for future excess uranium barter sales, and we conceived a new market approach. FBP selected Traxys based on competitive offers received from a broad cross section of industry participants, including producers. **The Traxys selection allowed FBP to provide the resulting “best value” to the government, and thereby the**

**U.S. Taxpayer.** Additionally, it diversified the uranium supply and avoided exacerbating the Concentration of Supply trend that domestic uranium buyers for nuclear power plants faced.

Since 2011 this material has been sold by FBP to Traxys North America under commercial contract terms that were designed to structure a predictable and reliable source of supply that minimized the impact upon the near-term spot market Supply-Demand-Price balance. FBP eliminated the auctions and Traxys has now placed over 90% of the material purchased from FBP into future forward-delivery contracts.

FBP pursued, vetted and then discarded the simplistic option of entering into a long-term contract (LTC). With a LTC first deliveries would not start until 3 or 4 years into future leaving the early years with no barter sales funds. Additionally, DOE could not, or would not, make a firm fixed delivery schedule commitment to FBP that could then be offered into the long-term contract market. One possible reason is uranium barter sales are subject to a Secretarial Determination review at least every 2 years, and LTC delivery commitments could be prematurely stopped and voided if the Secretary’s review did not authorize continued annual sales. DOE is required by law to make a Secretarial determination every two years and DOE is not allowed to sell any uranium unless that Secretarial determination concludes there is no material adverse impact on the domestic industries. Thus the legal framework may have precluded DOE from selling under long-term contracts. This injected a supply risk that replacement material may need to be obtained on short notice. This is a substantial risk that Traxys has been willing to absorb to mitigate the market impact of DOE barter quantities. It should be noted that Traxys is not guaranteed that any barter material will be available. Instead based upon Traxys’ response to the 2015 RFI they stated “they entered into purchase contracts, over and above the DOE-FBP-Traxys purchase quantities, to provide the assurance buyers required to assure supply under long-term contracts”—something that DOE and/or FBP could not provide.

**DOMESTIC URANIUM MINING, CONVERSION AND ENRICHMENT INDUSTRIES.** FBP believes the definition of the “Domestic Uranium Mining, Conversion and Enrichment Industries” should be made as follows. FBP believes its 1,345 site employees and 479 subcontractors should also be included and considered in the industry analyses of the impact of uranium transfers (This 1,824 increases to 2,518 when the on-site DUF6 contractor staff is added). Every industry trade association in the world includes not only primary suppliers, but also secondary suppliers and supply chain companies in their “Industry” populations. In 2016 there is only one operating U.S. enrichment producer (URENCO-LES in Eunice NM), but there are 3 other active D&D sites (Oak Ridge TN, Portsmouth OH and Paducah KY) performing important nuclear operations, cleanup and D&D functions within the domestic enrichment industry.



Domestic Industries	Domestic Location(s)	Source of Reference	No. of Employees/ Subcontractors	No. of Employees by Industry
Uranium	List in EIA Uranium Production Report (CO, NE, TX, UT, WY,...)	EIA Annual Report	625	625
Conversion	Honeywell Metropolis IL	Honeywell website	250	330
Conversion*	FBP Portsmouth – Piketon OH	DOE PPPO Reports	80	
Enrichment	URENCO-LES Eunice NM	Public Information	370	5,700
Enrichment	Portsmouth – Piketon OH Includes: FBP, BWCS, Centrus, Subs	DOE PPPO Reports	2,400	
Enrichment	FGG - Paducah KY	DOE PPPO Contractor Reports	1,400	
Enrichment**	BWXT/NFS– Erwin TN	Public Information	130	
Enrichment	UCOR - Oak Ridge TN	2015 Annual Review -UCOR	1,400	

\* As an additional part of FBP’s commitment to the U.S. DOE to perform D&D services in a safe and cost-effective manner for the benefit of U.S. taxpayers we also include reclamation and recovery of materials that have potential commercial value—such as 30 year old natural uranium hexafluoride (UF6). FBP recovers, processes and then DOE barter the Excess Uranium Transfers to the commercial nuclear fuel supply chain through FBP. This reclaimed bartered resource has provided over 50% of the payroll in recent years to conduct D&D operations at the Portsmouth OH site.

\*\* As an integral part of the U.S. National Non-proliferation mission NFS is the only active commercial plant that can downblend HEU into LEU (4.95%) for the U.S. Government. It requires a Category 1 U.S. NRC license to carry out such an elevated enrichment mission.

Legislation requires DOE to assess whether there is an adverse material impact on the domestic industries—not just the production segment of the industry. Industry includes more than just the primary producers. For example the 625 person years set forth in the 2015 EIA Domestic Uranium Production Report-Table 6 captures the employment of the domestic uranium mining industry by the following categories: Exploration, Mining, Milling, Processing and Reclamation. Therefore the industry also includes the service providers such as companies that provide drilling, transportation, reclamation and D&D services. A domestic production facility (mine, mill, converter, enricher, etc.) must set aside funds to cover D&D and satisfy the oversight regulator (e.g. NRC, State, EPA, etc.) that these funds, plans and actions are adequate to return the project to the public at end-of-life. These entities have a significant stake in the industry and their interests should also be considered.

**IMPACT OF DOE TRANSFERS.** Despite the significantly lower quantities transferred by DOE, both U<sub>3</sub>O<sub>8</sub> market prices and US production have fallen. Some producers continue to attribute blame to the small quantities of DOE transfers, ignoring the real problem- the huge increases in Kazakh and Canadian production that have occurred in spite of lower market prices.

**URANIUM MINING, CONVERSION AND ENRICHMENT ARE INTERNATIONAL MARKETS.** Over 50% of each nuclear fuel cycle segment is being met by non-US supply: 94%, 70% and 68% respectively. According to the EIA's Uranium Marketing Annual Report 2015, owners and operators of US nuclear power plants purchased 94% of their 2015 uranium concentrates and 68% of their enrichment deliveries from non-US sources. EIA does not publish the amount of non-US conversion bought by utilities, but NAC International's fuel-trac database shows 70% of deliveries where the source is known were from non-US sources. Therefore when assessing the impact of DOE transfers on the domestic markets, international supply and demand balances must be considered.

**DOE URANIUM BARTER SALES DO NOT CAUSE ADVERSE MATERIAL IMPACT TO THE DOMESTIC INDUSTRIES.** In order for the US industries to suffer such impact, the DOE transfers must be solely responsible for reduced market prices received and/or the loss of sales volumes by US producers. It is FBP's position that the barter volumes have impacted neither. It is true even though market prices have fallen since the last Secretarial Determination. The midpoint of the UxC reported broker average price fell from \$30.31 on April 30, 2014 to \$26.31 by August 1, 2016. However this fall was the result of the continued expansion of non-US production and lower demand due to the continuing effect of the Fukushima accident and the premature closure of some operating nuclear power plants. It is FBP's position that even entirely eliminating DOE transfers would not materially benefit US uranium mining producers since they are far less competitive than available non-US supply. Even under the most optimistic assumptions all of the analyses provided to DOE during the 2015 Secretarial Determination have shown that any increase in price would be small and a small increase in price will be insufficient to allow US production to compete. More importantly any decreases in the quantities will be absorbed by non-US producers (not US production) which have the desire to expand market share and the capability to provide these quantities at production costs below those of US producers.

**CONTINUED INTERNATIONAL EXPANSION OF LOWER-COST AND SOVEREIGN-OWNED PROJECTS.** Primary World production has expanded continuously (see the figure 1 below<sup>1</sup>) for a decade despite an 80% drop in spot prices since the 2007 peak<sup>2</sup>. From 2007 through 2015 world production increased by about 45% while reactor needs actually fell slightly. Kazakhstan alone increased its production, adding 45 million pounds to annual production, from its' lower-cost ISL projects. With the announced expansions of operating projects, production will continue to increase another 7% by 2018. This increase is mostly driven by the ramp up of the highest-grade Cigar Lake project in Canada and the Chinese sovereign-financed low-grade Husab mine/mill in Africa.

The failure of primary supply to reduce production to match needs is encouraged by long-term contracts at higher than current spot market prices and the significant supply controlled by Sovereign governments. Suppliers that signed long-term contracts in the period around 2007 have insulated their production from today's lower prices. Governments do not reduce supply because they are motivated by factors other than profits. It is estimated that around 60% of the 2016 production was controlled by governments<sup>3</sup>. This is referred to as inelastic supply—that is independent, or inelastic, to changing uranium market prices.

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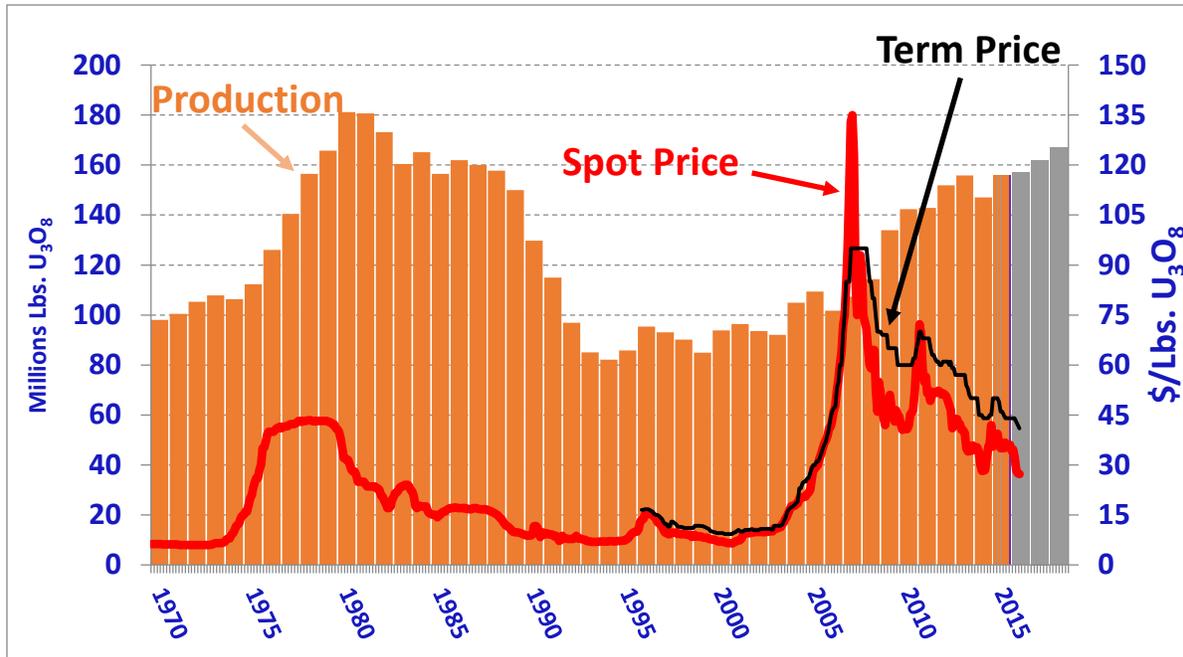
<sup>1</sup> NAC International's fuel-trac data base

<sup>2</sup> As shown in figure 1, although today's prices are much lower than the 2007 peak, current prices are much higher than the prevailing prices for the prior 10 years.

<sup>3</sup> NAC International's fuel-trac data base

Kazakhstan is not the only country increasing production. Canada (Cameco) increased production by 8.6 million pounds (43%) in the 2007 through 2015 period and they will increase Cigar Lake from startup last year to 18 million pounds in 2017. Cameco and its partners have recently announced the approval of increased licensed capacity of the mills supporting its Canadian production at Cigar Lake and McArthur River to over 49 million pounds of U3O8 per year. Thus they are positioned to substantially increase production at both mill facilities.

**Figure 1 World Uranium Production**



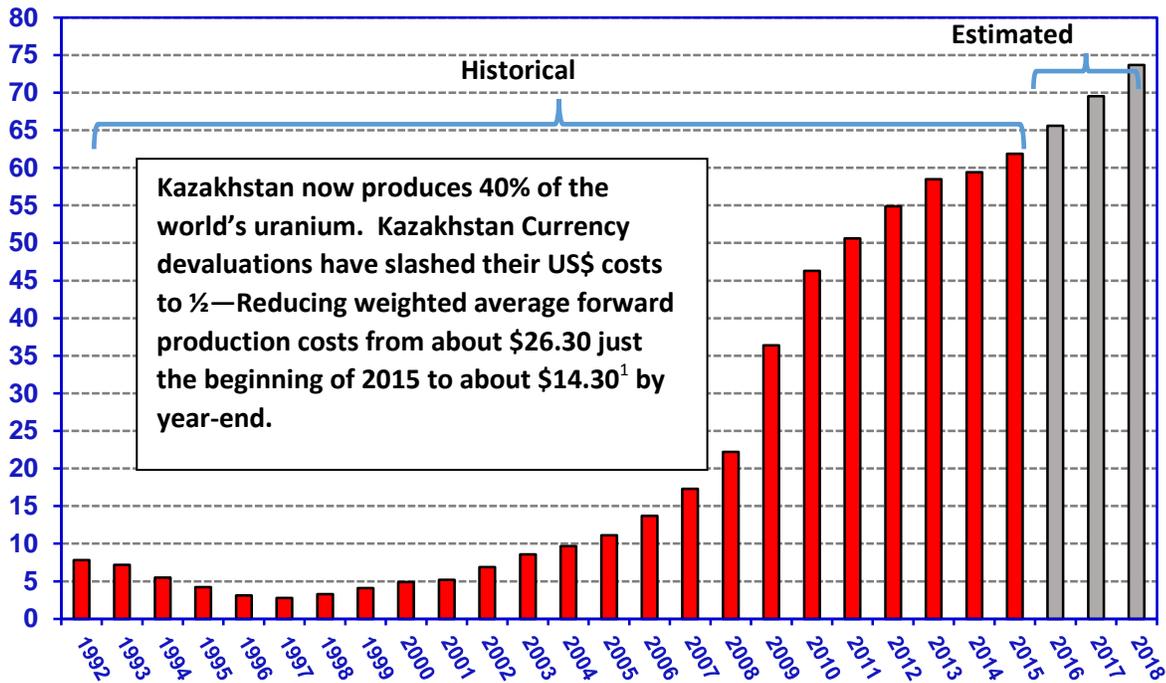
**KAZAKHSTAN STATES THEY WILL DOMINATE MARKET SHARE.** They have led the world in this international mining over expansion. Since 2007 Kazakhstan has increased its production by almost 360%, adding 45 million pounds to annual production, see figure 2 below<sup>4</sup>. Despite periodic statements to the contrary, they would not increase production, Kazakh production has expanded every year since 1997. Kazakhstan has announced that it will double one of its largest mines, Inkai, in the foreseeable future. This would increase the Inkai production by 5 million pounds<sup>5</sup> per year. Figure 2 captures how Kazakhstan production would continue to evolve if they expand at the same rate it demonstrated over the last five years.

<sup>4</sup> NAC international's Fuel-trac data base

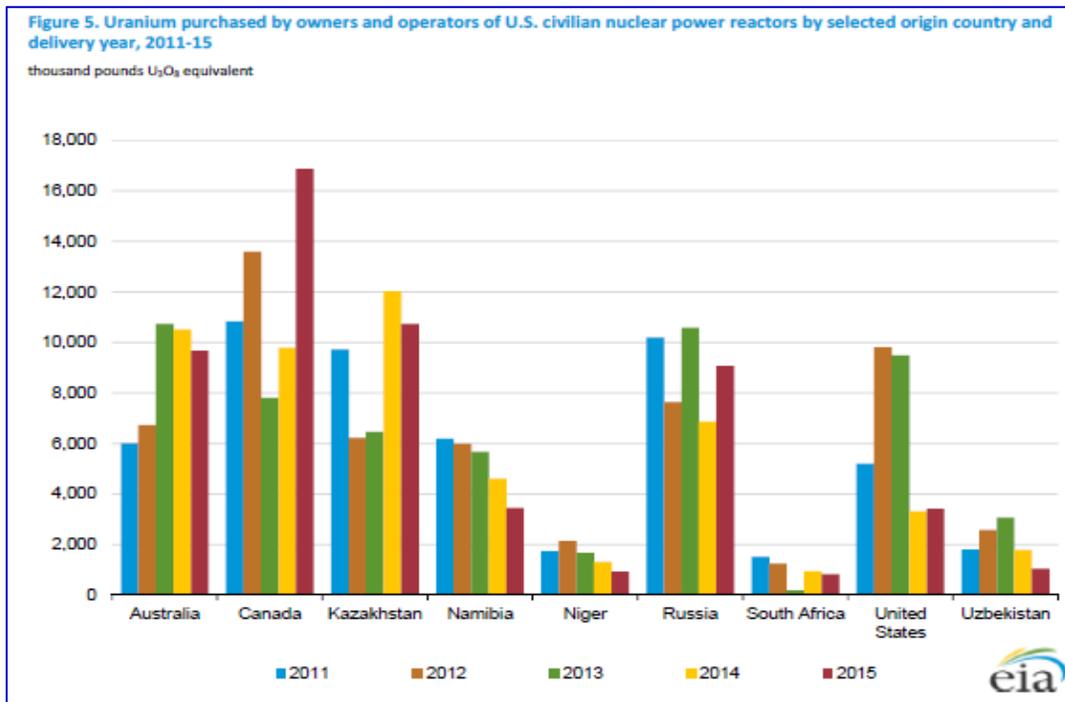
<sup>5</sup> May 27, 2016 Cameco Press Release

**Figure 2 Kazakhstan Production**

Millions Lbs.



**US REACTOR OPERATOR BUYERS PURCHASED 90% OF NON-US URANIUM OVER THE LAST DECADE—AND 94% IN 2015.** Canada and Kazakhstan are now the #1 supplier and #2 suppliers to US owners and operators of civilian nuclear power reactors. By 2014 Kazakhstan sold over 12 Million pounds U<sub>3</sub>O<sub>8</sub><sup>6</sup>. Canadian deliveries to US buyers rose from 7.8 Million pounds in 2013 to 16.9 Million in 2015, more than doubling.



<sup>6</sup> EIA's 2015 Uranium marketing Annual Report

Curtailling DOE transfers will not help US producers but it will make the US utility buyers more dependent on foreign supplies [unless they choose to enter into higher cost long term contracts greater than a US producers' higher costs of production]. As previously stated 94% of all 2015 uranium deliveries to owners and operators of US civilian nuclear power plants were imported. If US producers managed to obtain the same market share of an increase in demand from the complete elimination of DOE transfers, the increase in US producers sales would be only 126 MTU or less than 328,000 pounds of U<sub>3</sub>O<sub>8</sub>. It is not credible to conclude that losing this extraordinarily small volume of sales (equivalent to 0.2% of world demand) would result in an adverse material impact on the US uranium mining industry. Due to the large excess worldwide production increases, neither spot market prices nor US production competitiveness are expected to improve appreciably in the near term.

**US DOMESTIC MINING INDUSTRY IS NOT COMPETITIVE INTERNATIONALLY.** Currently operating or under construction US properties have a relatively small capacity, limited cost-effective reserves and are at the upper end of the worldwide production cost curve. Figure 3 shows the capacity of worldwide operating and under construction properties by incremental cost of production (forward cost) including a return on future expenditures<sup>7</sup>. The figure excludes any properties in the process of shutting down. Only three of the US properties are estimated to have incremental costs below \$30 per pound. The lowest cost property has a very small capacity and is believed to have already sold most of its capacity under contracts with pricing terms that would not increase if market prices rose modestly due to the elimination of DOE transfers. The highest cost property in this group is not currently producing.

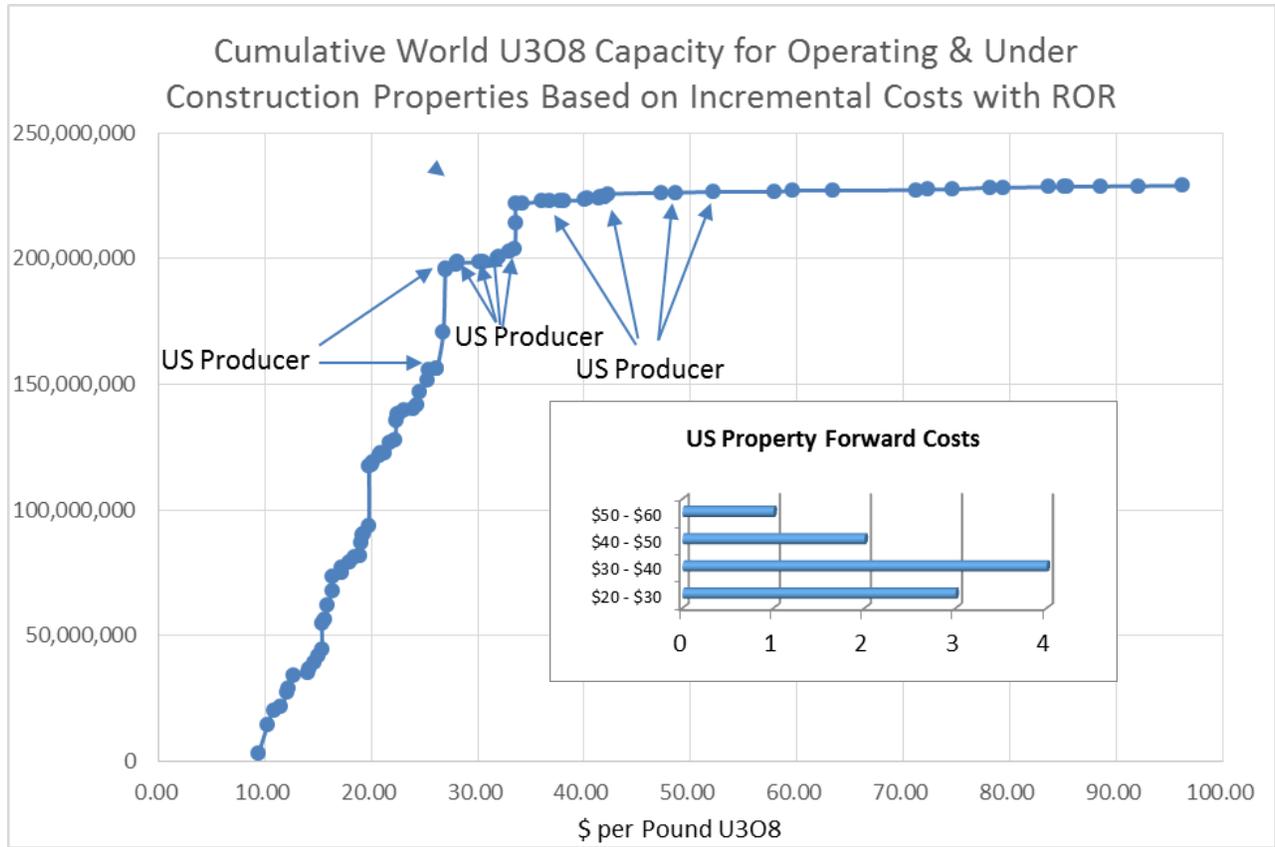
Consequently as long as the elimination of DOE transfers on market prices when added to the current spot price is less than \$30 per pound there would be no impact on the price received by the domestic uranium mining industry. Even if spot prices increase somewhat, the combination of lower cost foreign supply, small capacity and the terms in existing contracts means there would be little benefit to the US mining industry. Therefore there can be no adverse material impact.

The US uranium mining industry's lack of competitiveness is confirmed by a statement made by the former UPA president and current US uranium mining executive, Scott Melbye, in a July Nuclear Energy Institute meeting when he stated that US producers need \$50 to \$70 per pound prices in order to support new production. It is inconceivable that even totally eliminating DOE transfers would result in prices even close to the lower bound of Mr. Melbye's range.

EIA Domestic Uranium Production Reports (\$/Lb.)						
Year	Drilling	Production	Land	Exploration	Reclamation	Totals
2006	\$ 9.77	\$ 16.05	\$ 9.99	\$ 5.67	\$ 12.40	\$ 53.87
2007	\$ 14.89	\$ 19.94	\$ 17.14	\$ 11.09	\$ 11.07	\$ 74.15
2008	\$ 20.99	\$ 56.69	\$ 16.71	\$ 12.87	\$ 12.58	\$ 119.84
2009	\$ 9.55	\$ 38.03	\$ 4.67	\$ 6.53	\$ 16.83	\$ 75.65
2010	\$ 10.55	\$ 31.53	\$ 4.78	\$ 8.16	\$ 10.57	\$ 65.59
2011	\$ 13.43	\$ 42.30	\$ 4.91	\$ 10.90	\$ 8.44	\$ 79.98
2012	\$ 16.06	\$ 45.08	\$ 4.05	\$ 8.03	\$ 11.89	\$ 85.12
2013	\$ 10.71	\$ 36.10	\$ 3.13	\$ 4.64	\$ 11.68	\$ 66.26
2014	\$ 5.77	\$ 28.13	\$ 2.37	\$ 2.19	\$ 10.57	\$ 49.01
2015	\$ 8.59	\$ 35.45	\$ 3.62	\$ 1.41	\$ 17.77	\$ 66.86

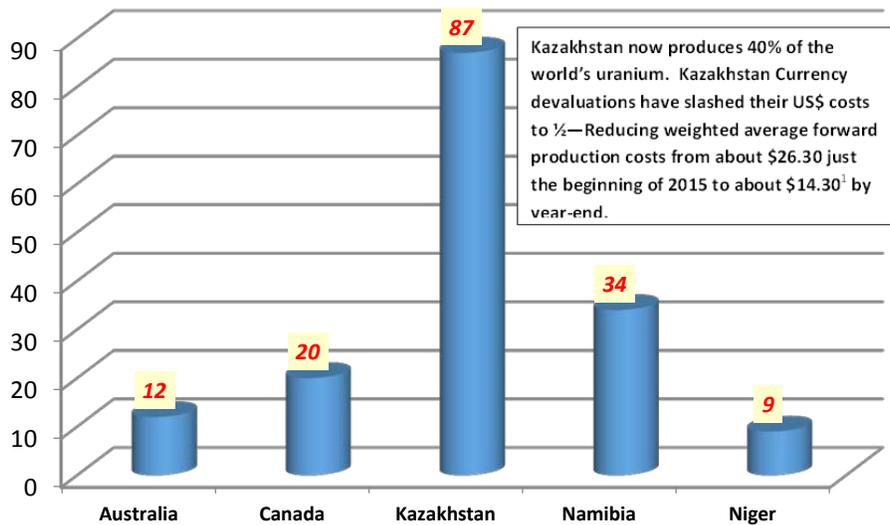
**NOTE:** Table 8. US Uranium Expenditures divided by Table 3. US Uranium Concentrate Production

<sup>7</sup> IBID



**EXCHANGE RATES.** During 2015 the U.S. dollar strengthened against the currencies of the key non-U.S. countries in which primary production facilities are located. Australia, Canada, Kazakhstan, Namibia and Niger accounted for 83 percent of estimated non-U.S. U<sub>3</sub>O<sub>8</sub> production in 2015<sup>8</sup>. Based on the values as of January 1, 2015 and January 1, 2016, the U.S. dollar strengthened by:

**Currency Devaluation % vs. US \$**



<sup>8</sup> NAC International's Uranium Supply Analysis System

Most contracting for nuclear fuel is consummated in US dollars. Therefore a strengthening of the U.S. dollar against a producer country’s currency tends to result in lower effective production costs for that country in U.S. dollar terms. In general a strengthening of the U.S. dollar tends to reduce US production competitiveness.

The substantial strengthening of the US dollar in the past year has significantly disadvantaged the US mining industry’s competitiveness and contributed to lower prices [and that was before Kazakhstan devalued their currency, not once but twice recently]. Kazakh production now has 16 out of 20 of the lowest cost mines in the world. It also encourages further market share expansion and increases its power to keep prices below other countries—especially US domestic projects. Consequently Kazakh production has positioned its industry to take advantage of any reduction in DOE transfers.

The US uranium industry’s relatively high production costs means that any increase in demand will likely be supplied by foreign production and any price increase would not benefit the US mining industry, but the larger, lower-cost non-US uranium production projects. There are a couple of US producers who have overcome this trend, even in the most recent difficult price periods. They will be discussed further in an upcoming section.

**INTERNATIONAL STRUCTURE OF THE US DOMESTIC URANIUM MINING INDUSTRY.** Most of the US production (about 67% over the last 3 years) has historically been owned by companies with the vast majority of their production in Kazakhstan and Canada. These companies (Cameco and Uranium One) have been reducing US production<sup>9</sup> while expanding their production in Kazakhstan and Canada. Since the US production tends to be higher cost, this is rational and expected. ***It also emphasizes why any decrease in DOE transfers will predominately benefit foreign instead of US production.***

**Table 2 Estimated US Production by Company**

(Thousands Lbs. of U3O8)

Company	Facility	2013	2014	2015	2016e	2017e	2018e	Total	Share of Total
Cameco	Crow Butte	700	600	400	200	50	25	1,975	9%
Cameco	Smith Ranch	1,700	2,100	1,400	900	500	250	6,850	32%
Denison	White Mesa	0	0	0	0	0	0	0	0%
Energy Fuels	Alta Mesa	24	0	0	0	0	0	24	0%
Energy Fuels	Nichols Ranch	0	199	172	300	300	350	1,321	6%
Energy Fuels	White Mesa	1,007	943	296	650	450	450	3,796	18%
Peninsula	Lance	0	0	0	250	645	1020	1,915	9%
Uranium Energy	Hobson	157	35	13	0	0	0	205	1%
Uranium One	Willow Creek	940	563	117	40	0	0	1,660	8%
Ur-Energy	Lost Creek	131	548	727	650	730	730	3,516	16%
<b>Total - U.S.</b>		<b>4,659</b>	<b>4,988</b>	<b>3,125</b>	2,990	2,725	2,825	<b>21,312</b>	<b>100%</b>
<i>EIA Total – U.S.</i>	<i>(for reference only)</i>	4,659	4,891	3,343					
<b>Cameco + Uranium One-US Production</b>		<b>3,340</b>	<b>3,263</b>	<b>1,917</b>	<b>1,140</b>	<b>550</b>	<b>275</b>	<b>10,485</b>	<b>49%</b>
		72%	65%	61%	38%	20%	10%		

<sup>9</sup> NAC International’s Uranium Supply Analysis System

This conclusion is further supported by information published by these companies increasing non-US production while decreasing US production:

**CAMECO:** In its report of its second quarter 2016 financial results Cameco states *“Primary supply has simply not responded to decreased demand, and coupled with the abundance of secondary material available today, the uranium market continues to be oversupplied. As a result, prices have remained under pressure, and because we don’t know how long the current weak conditions will persist, we must manage the company with this uncertainty in mind.”* The company then goes on to say **“Our strategy is to profitably produce from our tier-one assets at a pace aligned with market signals to increase long-term shareholder value, and to do that with an emphasis on safety, people and the environment. We believe the best way to create value is to focus our investible capital on maintaining a strong balance sheet and on preserving the production flexibility of our tier-one assets. This approach provides us with the opportunity to meet rising demand with increased production from our best margin assets, and helps to mitigate risk during a prolonged period of uncertainty. In the context of the continued depressed market conditions, we have positioned our production to come from our lower-cost operations. Going forward, we plan to:**

- *ensure continued safe, reliable, low-cost production from our tier-one assets- McArthur River/Key Lake, Cigar Lake and Inkai*
- *complete the ramp up of production at Cigar Lake*
- ***continue to evaluate the position of the other sources of supply in our portfolio, including Rabbit Lake and the US operations, and retain the flexibility to respond to market signals and take advantage of the value of adding opportunities, including expanded production capacity at McArthur River/Key Lake and at Inkai***
- *maintain our low-cost advantage by focusing on execution and operational excellence”*

**Table 3 Cameco Production (1,000 Lbs. U3O8)**

	2013	2014	2015	2016e	2017e	2018e
<b>Cameco US Production</b>	<b>2,400</b>	<b>2,700</b>	<b>1,800</b>	1,100	550	275
Delta from prior year	<b>500</b>	<b>300</b>	<b>&lt;900&gt;</b>	<b>&lt;700&gt;</b>	<b>&lt;550&gt;</b>	<b>&lt;275&gt;</b>
<b>Non-US Production</b>	<b>21,075</b>	<b>20,603</b>	<b>26,458</b>	24,700	25,250	25,525
Delta from prior year	<b>1,075</b>	<b>&lt;472&gt;</b>	<b>5,855</b>	<b>&lt;700&gt;</b>	<b>&lt;550&gt;</b>	<b>&lt;275&gt;</b>
<b>Worldwide Production</b>	<b>23,475</b>	<b>23,303</b>	<b>28,258</b>	25,800	25,800	25,800
<i>US Production %</i>	<b>10.2%</b>	<b>11.6%</b>	<b>6.4%</b>	0.6%	0.2%	0.1%

**URANIUM ONE.** According to its annual report, Uranium One produced most (99% or 12,347,000 pounds in 2015 and 95% or 9,848,000 in 2014) of its uranium in Kazakhstan and a small amount in the US. In 2014 Uranium One’s Willow Creek mine produced 563,100 pounds of U3O8. This fell to 117,200 pounds all in the first half of 2015. The company actually reports a negative 23,100 pounds in the second half of the year in the US. This negative production is reported to be Converter adjustment of prior delivered quantities. Since the company is not developing new well fields, no production is expected until prices recover significantly. ***The elimination of US production and the reliance on Kazakh production is certainly rational based on the respective reported operating costs. The 2015 annual report states operating costs for 2015 ranged from \$8 to \$19 per pound for the Kazakh properties and \$35 for Willow Creek.*** Vasily Konstantinov, Uranium One’s

president stated that *Uranium One is suspending production or selling assets at deposits where efficient operation "in the current price situation" is impossible. This includes the US, where the company is being forced to suspend production. "It can be resumed once the uranium prices exceed \$50<sup>10</sup>.*

**Table 4 Uranium One Production (Lbs. U3O8)**

	2013	2014	2015	2016e	2017e	2018e
<b>U1 US Production</b>	<b>940</b>	<b>563</b>	<b>117</b>	40	0	0
Delta from prior year	<b>320</b>	<b>&lt;377&gt;</b>	<b>&lt;446&gt;</b>	<b>&lt;77&gt;</b>	<b>&lt;40&gt;</b>	<b>&lt;0&gt;</b>
<b>Non-US Production</b>	<b>12,038</b>	<b>12,057</b>	<b>12,341</b>	12,423	12,460	12,500
Delta from prior year	<b>630</b>	<b>19</b>	<b>284</b>	<b>&lt;77&gt;</b>	<b>&lt;40&gt;</b>	<b>&lt;0&gt;</b>
<b>Worldwide Production</b>	<b>12,978</b>	<b>12,620</b>	<b>12,458</b>	12,500	12,500	12,500
<i>US Production %</i>	<i>7.2%</i>	<i>4.5%</i>	<i>0.9%</i>	<i>0.3%</i>	<i>0%</i>	<i>0%</i>

In addition to higher costs, **US producers have a very small reserve base to support additional production. In its 2015 Domestic Uranium Production Report EIA stated "that at the end of 2015 estimated uranium reserves for mines in production were 16 million pounds at a maximum forward cost of \$50 per pound"**. This is an extraordinarily low quantity of reserves, around 4 years of production. Taking into account previously contracted quantities; this means US producers have little lower-cost uranium to sell. It also shows the lack of competitiveness of the US mining industry at \$50 per pound is almost double the current spot price, and 30% higher than current long-term prices.

There were five companies producing uranium in the United States in 2015 and one other company that began producing recently in 2016. Information on these companies is provided in the following table 5.

**Table 5 US Uranium Producing Projects as of 2015**

Company	Multi-Nationals with US and Non-US Production		Domestic Only Production Centers (1,000 Lbs of U3O8)			
	Cameco	Uranium One	Ur-Energy	Strata Energy	Energy Fuels	UEC
Parent Country of Registration	Canada	Russia	Canada	Australia	Canada	Canada
US Properties	Smith Ranch, Crow Butte, North Butte	Willow Creek	Lost Creek	Lance	Nichols R., Alta Mesa, White Mesa	Palangana, Goliad
Non-US Production	<b>26,458</b>	<b>12,341</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
US Production	1,800	117	727	0	468	13
Planned 2016 US Production	1,100	0	700	300	950	~0
US Status	Not developing new US well fields	Not developing new US well fields	Continues to operate	Ramping up production	Operates Conventional Mill as Needed	Reducing Production

<sup>10</sup> 18 May 2016 interview published online by Rosatom

Those companies that obtained term contracts at other than market prices and those that do not have lower cost non-US production are the companies that continue to produce in the US. Companies that gambled and continue to gamble on high market prices returning have been forced to reduce production. These companies chose to not sign term contracts where prices were high and to wait on the hoped for substantially higher market prices to contract. ***The lack of contracting was not because opportunities did not exist. Peninsula Energy the parent of Strata Energy signed 4 contracts from 2011 through 2016 for a total of 8.2 million pounds at an average price of over \$54 per pound<sup>11</sup>.*** Three of these contracts for 7.2 million pounds were signed in the period from December 2014 through 2016. Other US suppliers have also entered into the higher defined price contracts during the period of the DOE transfers. UR Energy reports<sup>12</sup> contracts with deliveries from 2016 through 2021 with average prices of \$49.81 per pound. Energy Fuels reported sales of 1.1 million pounds in 2015 at an average price of \$56 per pound<sup>13</sup>. Clearly contracts for relatively high prices were available and these contracts were available at premium prices. Had those US producers chosen not gamble they would have been insulated from today's lower market prices.

In addition those companies with lower cost foreign properties have chosen to move their production from the US to other countries. ***US production has not fallen due to DOE transfers but due to the decisions made by producers to expand their lower-cost assets in Canada and Kazakhstan.*** Other US Producers have managed to expand their annual production with the proper contracting strategy with buyers willing to support higher-priced contracts within a diversification of supply portfolio justification.

FBP is pleased to submit our comments on the summary of information DOE published in the Federal Register September 19, 2016.

Respectfully submitted,

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<sup>11</sup> <http://www.pel.net.au/images/peninsul---aucaevieth.pdf>

<sup>12</sup>

<http://static1.1.sqspcdn.com/static/f/503515/27226013/1472848980097/20160901+September+Presentation+Final.pdf?toKen=tja1pAo7SyGGtwJd8NSY9v6ZhdY%3D>

<sup>13</sup> <http://www.energyfuels.com/investors/presentation/>

# ATTACHMENT

## 2015 Domestic Uranium Production Report

May 2016

EIA Domestic Uranium Production Reports (Million \$)							Yearly Production (Thousands)
Year	Drilling	Production	Land	Exploration	Reclamation	Totals	
2006	\$ 40.1	\$ 65.9	\$ 41.0	\$ 23.3	\$ 50.9	\$ 221.2	4,106
2007	\$ 67.5	\$ 90.4	\$ 77.7	\$ 50.3	\$ 50.2	\$ 336.2	4,534
2008	\$ 81.9	\$ 221.2	\$ 65.2	\$ 50.2	\$ 49.1	\$ 467.6	3,902
2009	\$ 35.4	\$ 141.0	\$ 17.3	\$ 24.2	\$ 62.4	\$ 280.5	3,708
2010	\$ 44.6	\$ 133.3	\$ 20.2	\$ 34.5	\$ 44.7	\$ 277.3	4,228
2011	\$ 53.6	\$ 168.8	\$ 19.6	\$ 43.5	\$ 33.7	\$ 319.2	3,991
2012	\$ 66.6	\$ 186.9	\$ 16.8	\$ 33.3	\$ 49.3	\$ 352.9	4,146
2013	\$ 49.9	\$ 168.2	\$ 14.6	\$ 21.6	\$ 54.4	\$ 308.7	4,659
2014	\$ 28.2	\$ 137.6	\$ 11.6	\$ 10.7	\$ 51.7	\$ 239.7	4,891
2015	\$ 28.7	\$ 118.5	\$ 12.1	\$ 4.7	\$ 59.4	\$ 223.5	3,343
EIA Domestic Uranium Production Reports (\$/Lb.)							
Year	Drilling	Production	Land	Exploration	Reclamation	Totals	
2006	\$ 9.77	\$ 16.05	\$ 9.99	\$ 5.67	\$ 12.40	\$ 53.87	
2007	\$ 14.89	\$ 19.94	\$ 17.14	\$ 11.09	\$ 11.07	\$ 74.15	
2008	\$ 20.99	\$ 56.69	\$ 16.71	\$ 12.87	\$ 12.58	\$ 119.84	
2009	\$ 9.55	\$ 38.03	\$ 4.67	\$ 6.53	\$ 16.83	\$ 75.65	
2010	\$ 10.55	\$ 31.53	\$ 4.78	\$ 8.16	\$ 10.57	\$ 65.59	
2011	\$ 13.43	\$ 42.30	\$ 4.91	\$ 10.90	\$ 8.44	\$ 79.98	
2012	\$ 16.06	\$ 45.08	\$ 4.05	\$ 8.03	\$ 11.89	\$ 85.12	
2013	\$ 10.71	\$ 36.10	\$ 3.13	\$ 4.64	\$ 11.68	\$ 66.26	
2014	\$ 5.77	\$ 28.13	\$ 2.37	\$ 2.19	\$ 10.57	\$ 49.01	
2015	\$ 8.59	\$ 35.45	\$ 3.62	\$ 1.41	\$ 17.77	\$ 66.86	
<b>NOTE: Table 8. US Uranium Expenditures divided by Table 3. US Uranium Concentrate Production</b>							