IS THERE A NEED FOR New Uranium Mines in the U.S.

In the fall of 2006, *Voices of the Earth* featured an article discussing the need for new uranium mines *(www.sric.org/voices/2006/v7n3/Need_Greed.html)*. At that time, we concluded that there were enough available, or easily recoverable, uranium resources to meet the needs of the nuclear industry for 50 years. The rise of the spot market price was identified as a "mine the investors" market bubble that arose to "fill" an imaginary shortage, rather than to meet a real need. Since then, uranium spot prices rose to historic highs in 2007, leading to a rush of new uranium claims by mining companies and investment in hundreds of uranium companies both large and small. To assess whether this combination of enormous global reserves and inflated spot market prices would remain in place a few years down the line, we decided to reanalyze the need for new uranium mines.

In the summer of 2007, the uranium spot price rose to a historic high of $137/pound. But since then it has fallen to $53/pound at the end of 2008 (near the spot market price seen in the fall of 2006). Even as the uranium spot market price in 2008 dropped to less than 40% of the historic peak price spot market of $137, the estimate of unmined but "Identified Uranium Resources" (IUR, the term used by the International Atomic Energy Agency (IAEA) to describe the degree of confidence in the specific amount uranium in a deposit) available around the world continued to rise. Global estimates of IUR soared to more than 5.4 million tons — enough to supply more than 100 years of uranium demand at either current or projected consumption rates, according to international nuclear industry calculations. In addition, the vast majority of identified resources in the leading uranium producing countries of Australia, Canada, and Kazakhstan can be produced at much lower cost than those in the U.S.

The availability of low-cost uranium resources in other countries, at and near existing mines and mills, means that potential U.S. producers face a market in which their uranium resources will cost significantly more to produce than those of their competitors around the world. Moreover, the cost of production for all U.S. uranium resources, as estimated by the World Nuclear Association (WNA) and the Nuclear Energy Agency (NEA), is above current uranium spot prices — February 16, 2009 — $47 per pound *(www.uxc.com)*. Uranium producers in the U.S. also face the challenges of raising development funds during the current global financial crisis, especially given the rapidly increasing costs for the construction of nuclear power stations, which can compete for the same capital.

Despite these widely published market conditions, as of Febuary 16, 2009, the U.S. Nuclear Regulatory Commission (NRC) continues to identify 28 uranium license applications expected to be submitted during the 2009–2011 time period. *(www.nrc.gov/info-finder/materials/uranium/2008-ur-projects-list-public.pdf)*. Of those projects, only two applications are identified as "complete" and subject to formal public and agency review, five others are identified as "received" (one of which is identified as "re-submitted"), and 21 are informal "Letter of Notices of Intent." Such Letters have no official status and do not represent a specific commitment of the resources necessary to complete a license application. The Letters have been submitted in response to NRC requests so that the Commission can determine whether it has sufficient licensing staff to process anticipated applications.

NRC's uranium recovery application list fails to identify the projected uranium recovery tonnage for any sites listed, nor does it include all projected U.S. uranium production sites. Missing are projects in the "Agreement States" of Colorado, Utah or Texas — states where the NRC has agreed to allow state licensing.

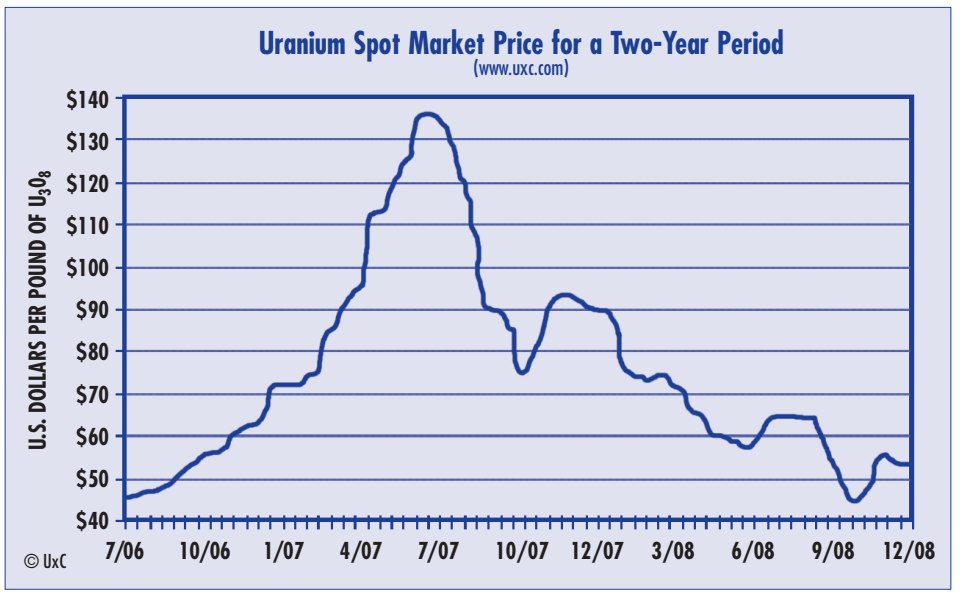
The combination of the current market trends, including rising resource estimates, and falling spot market prices, is a strong indicator that the "new uranium boom" touted in the Southwestern U.S. (including New Mexico) will remain a "pipe dream." It is more an intensive marketing campaign, rather than a realistic or likely investment and construction scenario.

The current uncertainty about new U.S. uranium development projects is reflected in the changing plans by Canada-based Energy Fuels. In 2007, the company announced plans for the Pinon Ridge Mill, which would be the first new uranium mill in the Southwest. Energy Fuels filed an application for a Special Use Permit from Montrose County, CO in July 2008, but it has not filed an application for a uranium recovery mill license with the State of Colorado. In December 2008, only three months after receiving its permit to operate the Whirlwind mine near Gateway, Colorado (on the border with Utah), the company decided to put the mine on stand-by status. This indefinite delay in mine operation happened before any uranium was produced. The delay will mean that a significant source of ore to either generate income for the company or feed the new mill will not exist. The lack of income and ore may significantly delay the mill application and licensing process. As of February 2009, Energy Fuels' web site states that it plans to file its mill license application by the end of 2009 and commence construction in the middle of 2011. In its July 2007 release announcing the mill, the company projected that the mill license application would be filed by July 2008 and the mill would commence operations in 2010.

URANIUM SPOT MARKET PRICES RISE AND FALL

Uranium spot market prices — an estimate of an open-market, rather than long-term uranium sales price — are reported by two commercial sources: Ux Consulting (UxC) and Tradetech. The February 6, 2009 uranium spot market price posted at Tradetech matched the February 9, 2009 uranium spot market price posted at UxC at $47/pound. The uranium spot market price for both firms peaked briefly at $137/pound in late June 2007.

The chart below of the two-year history of uranium spot market prices shows the "roller coaster" pattern of recent market changes. The steep climb of the uranium spot market price from the $100/pound range in the April 2007 up to the $137/pound range in June 2007, was very quickly followed by a return to $100/pound by August 2007, and a steeper fall to $75/pound by October 2007. The past year has seen spot market prices decline further, deteriorating towards the December 2008 price of $53/pound.



The marketing hype associated with a "uranium boom" increased in intensity in 2006 and 2007 as the price shot above $50/pound. Such talk has quieted as prices dropped from peak values.

ESTIMATES OF IDENTIFIED URANIUM RESOURCES AROUND THE WORLD GROW

Country-by-country uranium resource estimates have been reported by the IAEA and the Organization for Economic Cooperation and Development (OECD) — Nuclear Energy Agency (NEA) for more than forty years. The most recent report is the Uranium 2008: Resource, Production and Demand (also called the *Uranium Red Book 2008*), which provides data from 2007.

IUR from that *Uranium Red Book* have been compared with estimates from the two previous editions — providing data for 2003 and 2005 — on the following table for most leading uranium resource countries.

Identified Uranium Resources by Country, *Uranium Red Books, 2004, 2006, and 2008*

COUNTRY	TONNES U 2003	WORLD PERCENT 2003	TONNES U 2005	PERCENT INCREASE 2003–2005	WORLD PERCENT 2005	TONNES U 2007	PERCENT INCREASE 2005–2007	WORLD PERCENT 2007
Australia	989,000	28%	1,143,000	16%	24%	1,243,000	9%	23%
Kazakhstan	622,000	18%	816,000	31%	17%	817,300	1.5%	15%
Canada	439,000	12%	444,000	1%	9%	423,000	- 5%	8%
South Africa	298,000	8%	341,000	16%	7%	435,000	28%	8%
Namibia	213,000	6%	282,000	33%	6%	275,000	- 2%	5%
Brazil	143,000	4%	279,000	97%	6%	278,000	0%	5%
Russian Federation	158,000	4%	172,000	9%	4%	545,000	216%	10%
USA	102,000	3%	342,000	235%	7%	339,000	- 1%	6%
Uzbekistan	93,000	3%	116,000	20%	2%	111,000	- 4%	2%
All Other Countries	480,000	14%	808,000	68%	18%	1,003,000	24%	18%
World total	**3,537,000**		**4,743,000**	**34%**		**5,469,000**	**13%**	

The table shows a rising trend for IUR for all countries, except Canada, since 2003. U.S. identified uranium resources are 6% of total global resources identified in 2007. From 2005 to 2007, U.S. estimates provided by the Department of Energy's Energy Information Administration remained almost unchanged, while global uranium resource estimates rose 13%. That increase represented more than 700,000 tonnes of uranium — more than twice the estimate of all identified resources in the U.S.

URANIUM DEMAND PROJECTED GROWTH SLOWS

Rates of uranium consumption and projected demand also are presented in IAEA, OECD/NEA and WNA publications. Presentations at the 2007 WNA Symposium *(www.world-nuclear.org/sym/subindex.htm)* featured projections that summarize uranium demand through 2030. The projections forecast uranium use in the 2005–2010 period at approximately 65,000 tons/year, all of which would be used at nuclear power stations, as a "reference," or mid-range uranium demand scenario. The 2007 reference scenario forecasts growth in uranium use through 2030, at which time uranium demand is projected to reach 110,000 tons/year, based on anticipated operation of a new fleet of "yet-to-be built" nuclear reactors.

Of the 65,000 tons/year of uranium to be used in the 2005–2010 period, 40,000 tons/year — about 60% — would come from operating uranium mines. The remaining 25,000 tons — about 40% — will come from re-use of previously mined uranium (i.e., "secondary sources"). Much of this uranium exists as highly-enriched, "weapons grade" uranium, while some is uranium enrichment tailings (i.e., "depleted uranium"), mixed-oxide fuels and other sources. Brief discussions of secondary sources of uranium are found at *www.sric.org/voices/2004/v5n4/uspotprice.html* and *www.sric.org/voices/2006/v7n3/Need_Greed.html*

The uranium demand "reference scenario" projects that by 2030, when 110,000 tons/year could be used, 95,000 tons — more than 85% — are anticipated to come from operating mines. That scenario assumes that only 15,000 tons — less than 15% — would come from secondary sources because, though large volumes exist, there are no specific plans for such sources to maintain their current contribution of approximately 40% of the uranium supply.

ESTIMATES OF IDENTIFIED URANIUM RESOURCES FAR EXCEED PROJECTED URANIUM DEMAND

Uranium resources far outweigh projected uranium demand for the foreseeable future. Based on the *Uranium Red Book 2008,* the WNA boasts that enough uranium can be produced from IUR at *existing production sites* for 100 years at current usage rates.

The projected ratio of IUR versus demand has risen steeply for the past five years because of significant growth in the tonnage of uranium resources during a period when projections of new nuclear reactors has remained relatively steady. In 2004, WNA Symposium presenters reported that, "the world's present measured resources of uranium [of] …3.5 million tonnes … [in 2003] are enough to last for some 50 years. This represents a higher level of assured resources than is normal for most minerals."

In 2006, the WNA reported that, "between 2003 and 2005, WNA's global total of known recoverable uranium resources had increased by 34% to 4.7 million tonnes. The 1.2 million tonnes of additional uranium in unmined deposits identified between 2003 and 2005 is roughly equal to the total amount of uranium consumed by the nuclear weapons and reactor industry from its inception in the 1940s through 2005." The amount of IUR identified for 2005 would meet the projected demand for uranium from mines (primary sources) for 67 years.

Based on 2007 data, WNA and IAEA project that, including the additional 700,000 tonnes of uranium resources identified in the years 2005–2007, the 5.4 million tonnes of IUR is enough for more than 100 years of uranium demand at current usage rates of approximately 50,000 tonnes per year. The 2007 data show that uranium resources are sufficient for more than 75 years if demand were to increase to 70,000 tonnes per year.

Regardless of the accuracy of the long-term demand projections, WNA and IAEA have determined that no unmet uranium demand can be identified through the year 2020. Comparing uranium production capacity at existing operations with projected uranium demand, WNA analysts and the *Uranium Red Book 2008* forecast that demand through 2020 will be satisfied by supplies from existing uranium production sites at current uranium recovery rates and existing agreements to provide uranium from secondary sources.

WNA analysts determined that, "combining all primary and secondary uranium supply sources suggests that the nuclear fuel market should be more than adequately supplied in the period to 2020. Indeed, there are expected to be [uranium] supply surpluses in the period 2010–2015, assuming primary uranium production rises as anticipated. Lower uranium requirements than predicted in 2005 are also an important factor in this." This projection sharply contradicts the shrill marketing message from potential U.S. uranium producers seeking quick issuance of new uranium production site permits.

U.S. URANIUM RESOURCES ARE MORE EXPENSIVE TO MINE THAN THOSE IN OTHER COUNTRIES

Estimates of the cost of recovery for uranium around the world also have been compiled in *Uranium Red Books* for more than forty years. The following table shows the estimated cost of recovery for "reasonably assured" and "inferred uranium resources" for several leading uranium producing countries. Reasonably Assured Resources (RAR) have sufficient direct measurement to establish a high confidence in the estimates of grade and tonnage generally compatible with mining decision making. Inferred Resources (IR) have a lower degree of confidence than RAR and generally require further direct measurement prior to making a decision to mine. IUR (formerly called "Known Conventional Resources") are delineated by sufficient direct measurement to conduct pre-feasibility studies to assess future development options and include both RAR and IR.

The most recent estimate reports that the U.S. has ZERO uranium resources in the lowest cost-of-recovery category reported (less than $18/pound), while other nations listed have 642,000 tonnes. In the next highest cost of recovery category (less than $36/pound), the U.S. data shows an estimated 99,000 tonnes (less than 5%) of the world total of more than 2,300,000 tonnes.

Major Identified Uranium Resources by Country

In 1000s of Tonnes of Uranium, Countries with >100,000 Tonnes listed / Source: Uranium *Red Book 2008*, paes 17 and 20

COUNTRY	REASONABLY ASSURED RESOURCES	INFERRED RESOURCES (IR)	2005	2007	PERCENT CHANGE
Australia	<$60/lb		747	725	-22
		<$18/lb	343	487	+144
		<$36/lb	360	502	+142
		<$60/lb	396	518	+122
Canada	<$18/lb		287	270	-17
Kazakhstan	<$18/lb		279	236	-43
	<$36/lb		378	344	-34
	<$60/lb		514	378	-136
		<$18/lb	128	282	+153
		<$36/lb	228	407	+179
		<$60/lb	302	439	+137
Niger	<$18/lb		173	21	-152
	<$36/lb		180	44	-136
	<$60/lb		180	243	+63
		<$18/lb	0	13	+13
		<$36/lb	45	31	-14
		<$60/lb	45	31	-14
Russia	<$36/lb		58	48	-10
	<$60/lb		132	172	+40
		<$18/lb	22	36	+14
		<$36/lb	41	323	+282
		<$60/lb	41	373	+332
South Africa	<$18/lb		89	115	+26
	<$36/lb		177	206	+29
	<$60/lb		256	284	+28
		<$18/lb	55	120	+65
		<$36/lb	72	137	+65
		<$60/lb	85	151	+65
United States *(only 2003 data data reported in Uranium 2008)*	<$18/lb	0	0	0	
	<$36/lb	99 (2003)	99 (2003)		
	<$60/lb *(Only "RAR+Inferred" reported in Uranium 2008)*	339 (2003)	339 (2003)		

WHERE IS THE WORLD'S URANIUM MINING LIKELY TO OCCUR?

The Uranium Red Book 2008 also identifies countries where uranium production is occurring or is projected to occur through the year 2030. This data, summarized in the table on page 9, show that world uranium production capacity at existing and committed sites forecast to be operating in 2015 also will meet world uranium demand in 2030 of 95,000 tonnes. The global boom in uranium production capacity is reflected in the 75% increase in forecasted "existing and committed" uranium production sites in the 2007 to 2015 period.

Very little of the future growth of uranium production is projected to come from the United States. Indeed U.S. production capacity is forecast to drop between 2015 and 2030, in contrast to several leading uranium resource countries. U.S. existing and committed uranium production is projected to grow less than 10%, from 2,900 to 3,100 tonnes per year, between 2007 and 2030. If that slow growth rate is realized, the global contribution of U.S. uranium production will fall from 8.5% in 2007, to less than 6% by 2015, and less than 5% by 2030.

While many uranium properties around New Mexico and other regions of the U.S are being actively marketed, the cost of uranium production at those sites is very high when compared to cost-of-recovery of uranium resources at or near existing mines around the world. Given the world capacity data, the companies have not explained how U.S production can compete with costs in other nations.

(Continued on page 9.)

IS THERE A NEED FOR New Uranium Mines in the U.S.? *Continued from page 5*

WHY IS THE NRC PREPARING FOR 28 APPLICATIONS?

The NRC has apparently not considered any of the world market conditions data in its projections of "expected" uranium production sites and encouragement of Letter of Notices of Intent. The agency's acceptance of such unsubstantiated notices also allows applicants to avoid having to demonstrate whether they have the $5–10 million investment necessary to produce a complete application. As a result, NRC has given credibility to firms that have not shown that they have adequate funding for the multi-year work plans necessary to complete an application, much less the financial resources to build and operate a mine or mill.

Giving further support to these unsubstantiated uranium development claims, the NRC has invested its staff time in a *Generic Environmental Impact Statement on Uranium Recovery by In-Situ Methods* (GEIS), which largely ignores the legacy of or potential problems with conventional mines and mills. NRC's GEIS program therefore avoids issues associated with the half of the "expected" applications that are described as for conventional or heap leach facilities. Most of the "expected" *in situ* proposals are renewal or expansion, rather than "new" project application. (For more information about the GEIS, see the accompanying article.)

NRC also fails to provide a nationwide view of "expected" uranium license applications by ignoring the projected applications in "agreement states." Failing to list facilities in Utah (home to the single U.S. operating uranium mill), Colorado, and Texas, NRC ignores a major segment of uranium licensing activity. That activity, while outside NRC's jurisdiction, is certainly part of the "expected" uranium licensing applications.

The NRC list of new uranium projects also will result in wasting taxpayers' money by bringing on too many staff and focusing on an inappropriately narrow portion of the industry. NRC also misinforms the public about the likelihood of so many applications.

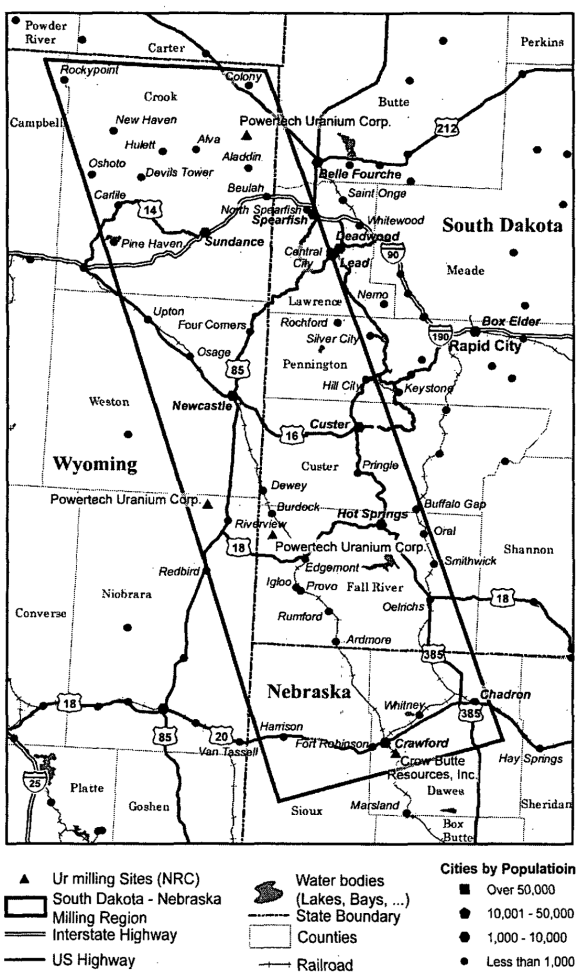
That distorted image may reflect the interests of the nuclear industry that wants to portray that there is an impending uranium development boom or an agency seeking to expand its budget in bad economic times. But the NRC fails to accurately inform the people concerned about the impact that uranium operations have on their communities and their local economies. NRC is pursuing a role as a provider of a licensing service, rather than being a protector of public health and natural resources, or even an accurate information source for the public.

The Energy Minerals Law Center in Durango, Colorado, commenting on behalf of a dozen community and environmental organizations in several Western states, said the GEIS itself is a de facto rule because of NRC's intention to "tier" site-specific licensing decisions to the GEIS. This creates an unpublished regulation that may further NRC's policy objectives, but is illegal under NEPA and the Council on Environmental Quality's NEPA-implementing regulations.

Not so coincidentally, the NRC staff told the Commission in December that it intends to propose groundwater protection rules for ISL recovery facilities by April 2009. The rules would address all elements of potential groundwater impacts from ISL operations, from pre-operational construction and monitoring requirements to groundwater restoration and corrective action mandates. The NRC staff said an objective of the proposed rules is to reduce or eliminate "dual regulation" of ISL operations with USEPA's Underground Injection Control program. The proposed ISL groundwater protection rulemaking would be done on a separate track from the GEIS, and the NRC staff has stated publicly that the two agency actions will have no connection.

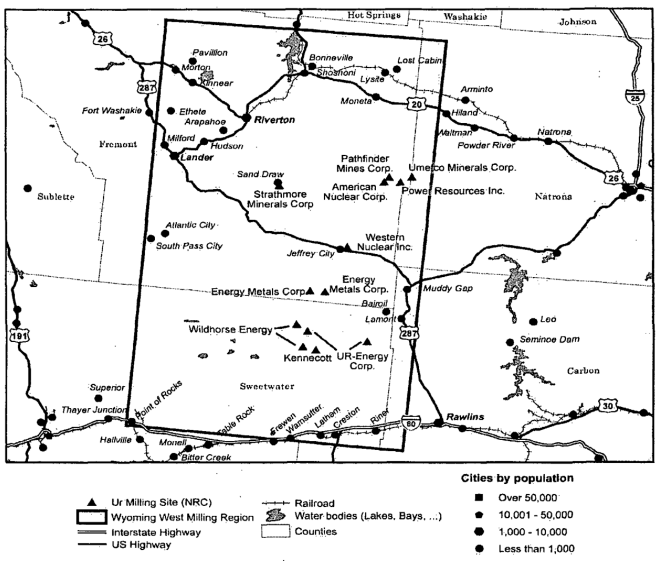
NRC plans to issue a final version of the GEIS in June 2009. The entire document can be viewed at *www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910.*

Nebraska / South Dakota / Wyoming Uranium Milling Region with Current and Potential ISL Milling Sites

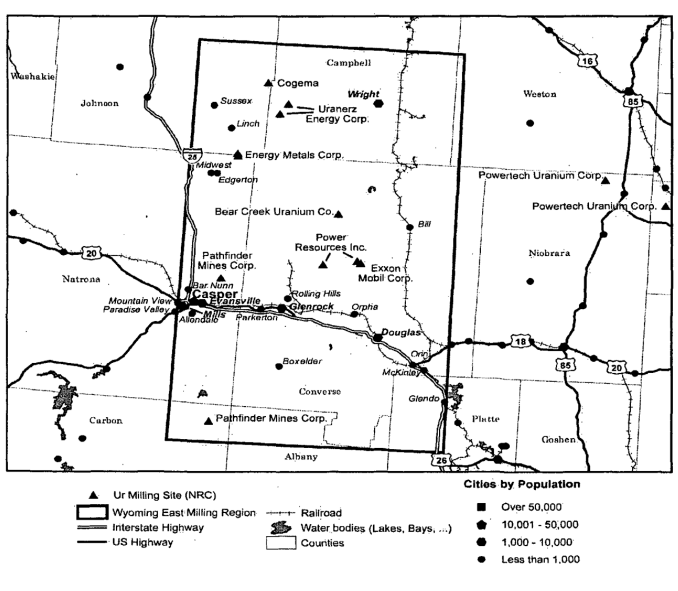


New Mexico Uranium Milling Region with Current and Potential ISL Milling Sites

Wyoming West Uranium Milling Region with Current and Potential ISL Milling Sites



Wyoming East Uranium Milling Region with Current and Potential ISL Milling Sites



World Uranium Production Capacity Projected to Year 2030

In Tonnes of U/year, from Reasonably Assured Reserves and Inferred Resources at Cost of <$36/lb) / Source: *Uranium Red Book* 2008, page 48

COUNTRY	2007		2015		2030	
STATUS OF URANIUM PRODUCITON CENTERS	EXISTING AND COMMITTED	EXISTING AND COMMITTED + PLANNED AND PROSPECTIVE	EXISTING AND COMMITTED	EXISTING AND COMMITTED + PLANNED AND PROSPECTIVE	EXISTING AND COMMITTED	EXISING AND COMMITTED + PLANNED AND PROSPECTIVE
Australia	9,400	9,400	10,200	19,000	5,500	17,700
Canada	14,990	14,990	17,730	19,270	17,730	19,270
China	940	1,040	1,200	1,200	1,200	1,200
Kazakhstan	7,000	7,000	22,000	22,000	20,000	23,000
Namibia	5,000	5,000	8,000	9,000	5,000	7,000
Niger	4,000	4,000	10,000	10,000	5,000	5,000
Russia	3,400	3,400	7,400	12,000	8,000	18,500
South Africa	2,000	2,000	4,800	6,320	4,860	6,320
Ukraine	1,000	1,000	2,000	2,000	3,700	3,700
USA	2,900	4,600	3,800	6,600	3,100	5,600
Uzbekistan	2,300	2,300	3,000	3,000	3,500	3,500
Total Listed Countries	**52,930**	**54,730**	**90,130**	**110,390**	**77,590**	**110,790**
Total Other Countries	**1,440**	**2,125**	**5,500**	**7,030**	**5,540**	**7,060**
Total Global Production & Projected Production	**54,370**	**56,855**	**95,630**	**117,420**	**83,130**	**117,850**

SOURCES OF INFORMATION

Energy Fuels: www.energyfuels.com
International Atomic Energy Agency (IAEA): www.iaea.org
Nuclear Regulatory Commission (NRC): www.nrc.gov
Organization for Economic Cooperation & Development (OECD) / Nuclear Energy Agency (NEA): www.nea.fr
Tradetech: www.tradetech.com
Uranium 2008 (Uranium Red Book 2008) is available for purchase and in a "read-only" format at: www.oecdbookshop.org/oecd/display.asp?sf1=identifiers&st1=9789264047662.
Ux Consulting: www.uxc.com
Wise Uranium Project: www.wise-uranium.org
World Nuclear Association (WNA): www.world-nuclear.org
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