

Uranium Resource Adequacy to Fuel LWR Nuclear Plants in 21st Century

by

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Introductory Background

- 441 NPs, total capacity 368 GWe now (3/2006)
- One GWe LWR uses 25-30 MMlb U3O8 over 60 years
- Resources at world's second largest mine, Cigar Lake, are 349 MMlb U3O8 (good for 12-14 LWRs)
- 1,000 GWe by 2050 (2003 MIT) would consume 13Blb U3O8 (2005-2050) and need 13 Blb for next 30 years
- NEA Redbook reports 12 Blb as discovered resources
- Only 31% of RB resources are discovered, 69% are not
- RB does not account for fact that not all resources can be mined, e.g. Jabiluka, etc.
- Australia does not report undiscovered resources



Major Uranium Resource Classifications

	Known Conventional Resources		Undiscovered Conventional Resources		
NEA/IAEA	Reasonably Assured (RAR)		Inferred Resources (IR)	Prognosticated Resources (PR)	Speculative Resources (SR)
Australia	Demonstrated		Inferred	Undiscovered	
	Measured	Indicated			
Canada (NRCan)	Measured	Indicated	Inferred	Prognosticated	Speculative
United States (DOE)	Reasonably Assured		Estimated Additional		Speculative



2003 Redbook World Uranium Resources With 2005 Updated Totals on 6/1/2006

Forward Cost	REASONABLY ASSURED RESOURCES (RAR)	INFERRED RESOURCES (IR)	PROGNOSTICATED RESOURCES (PR)	SPECULATIVE RESOURCES (SR)				
\$50 or less	1.8	0.9	20	19.6				
\$30 or less	1.9	0.7	3.8					
\$15 or less	4.5	21						
	Known (Discovered)		Unknown (Undiscovered)					
TOTALS:	8.2	(8.6)	3.7	(3.8)	5.8	(6.6)	19.6	(11.8)
CUMULATIVE TOTALS:	8.2	(8.6)	11.9	(12.4)	17.7	(19.0)	37.3	(30.8)*

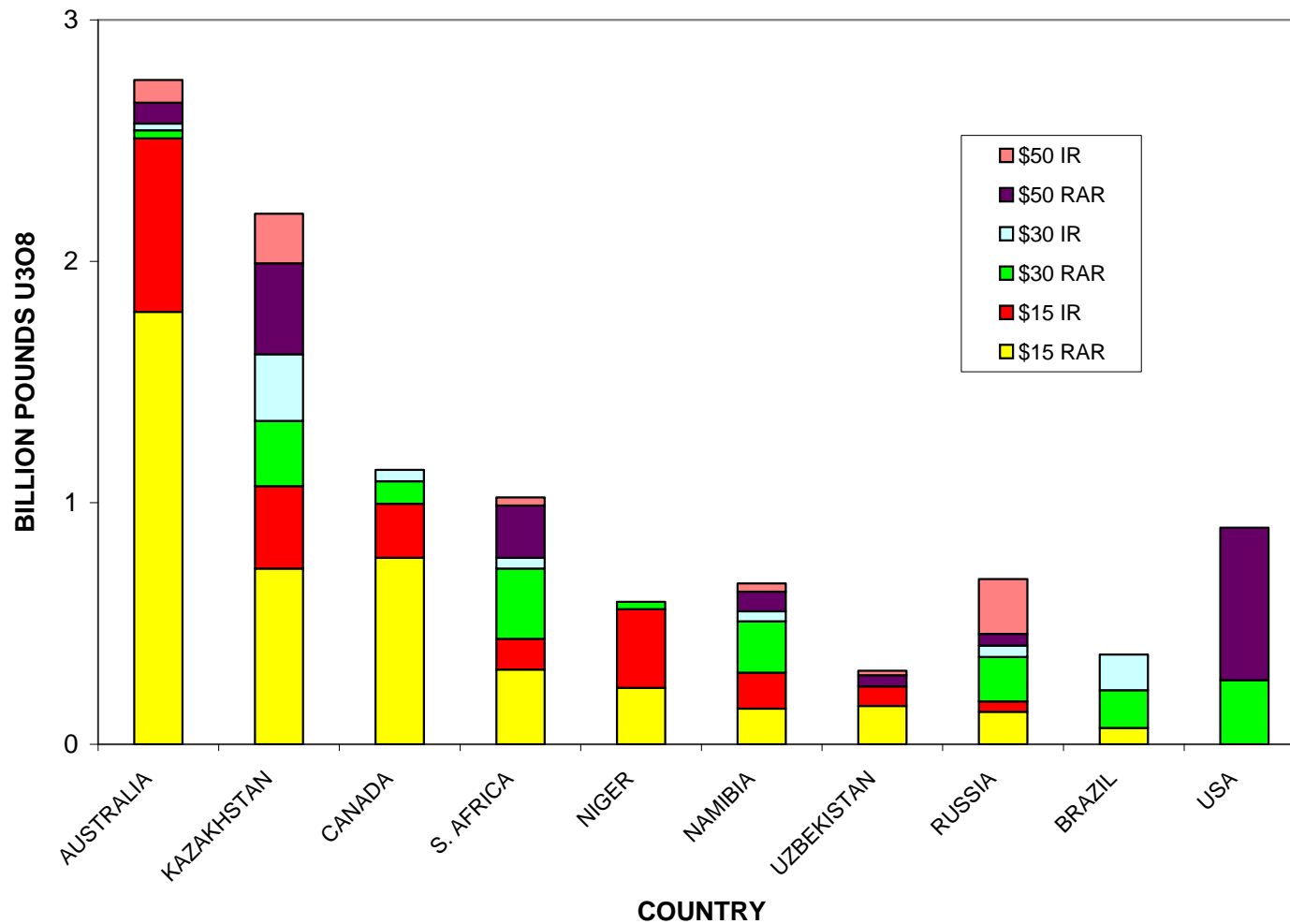
DECREASING ECONOMIC ATTRACTIVENESS ↑

← DECREASING CONFIDENCE IN ESTIMATES →

* Plus 7.7 SR with no cost assignment (would increase total to 38.5 B Pounds)



World Known Uranium Resources (Based on 2003 RB Data)



Near Term Outlook

- Discovery to production lead times range from 6 to 30 years; must add grassroots exploration program time; total time dictates that we must plan many years ahead
- Recent resources (?); much of the Kazakh resources discoveries and their data go back to the Soviet era
- Colin Macdonald, Cameco, in 2001, predicted that based on history for the Athabasca Basin, U production may peak near or before 2020 (c.f. Hubberts oil peak in 1971)
- Projected production and AMU should provide adequacy through about 2017, assuming WNA Reference Case world requirements
- We need to hustle (with \$) to expand world resource base



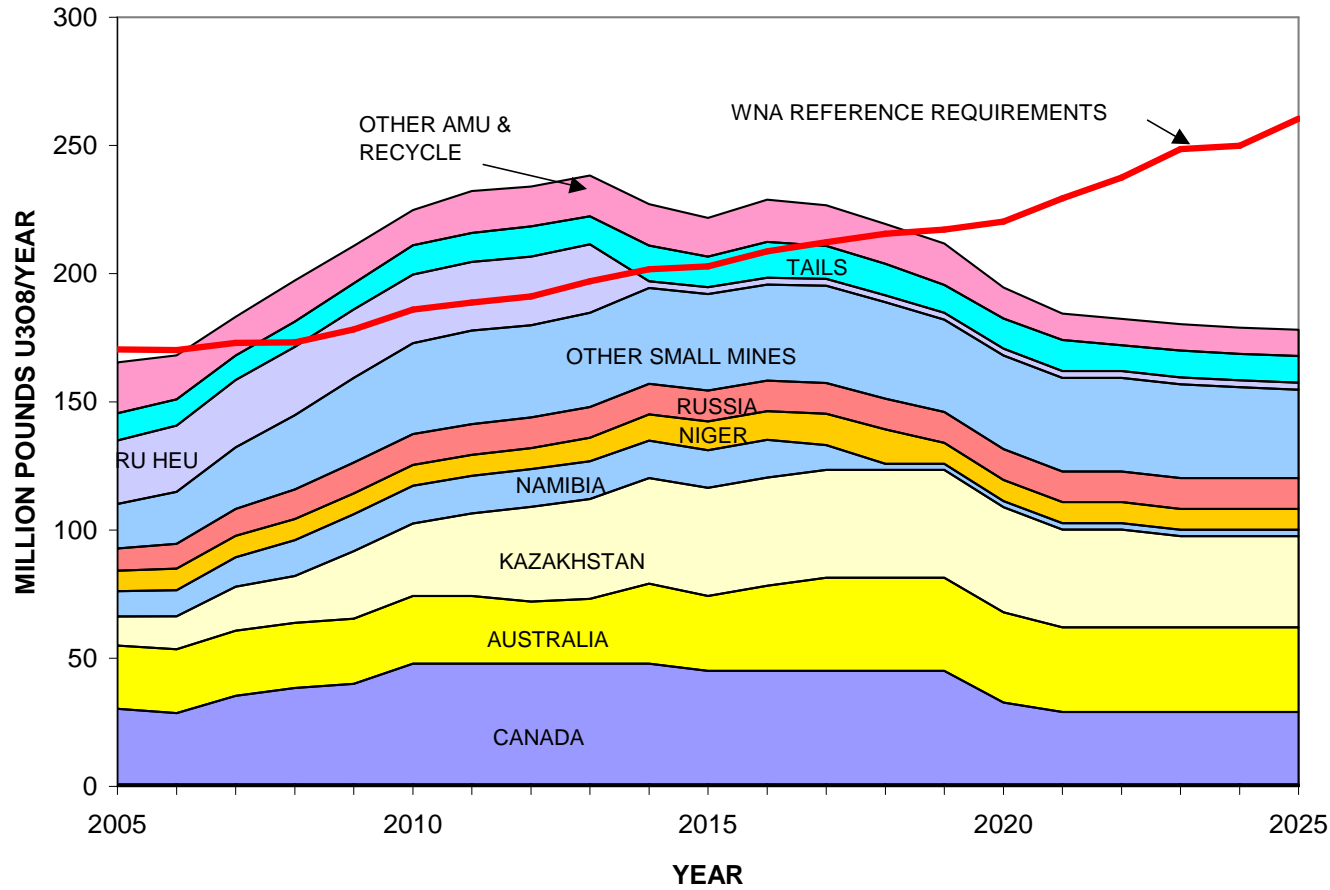
Typical Discovery to Production Times

TIME FROM DEPOSIT DISCOVERY TO PRODUCTION

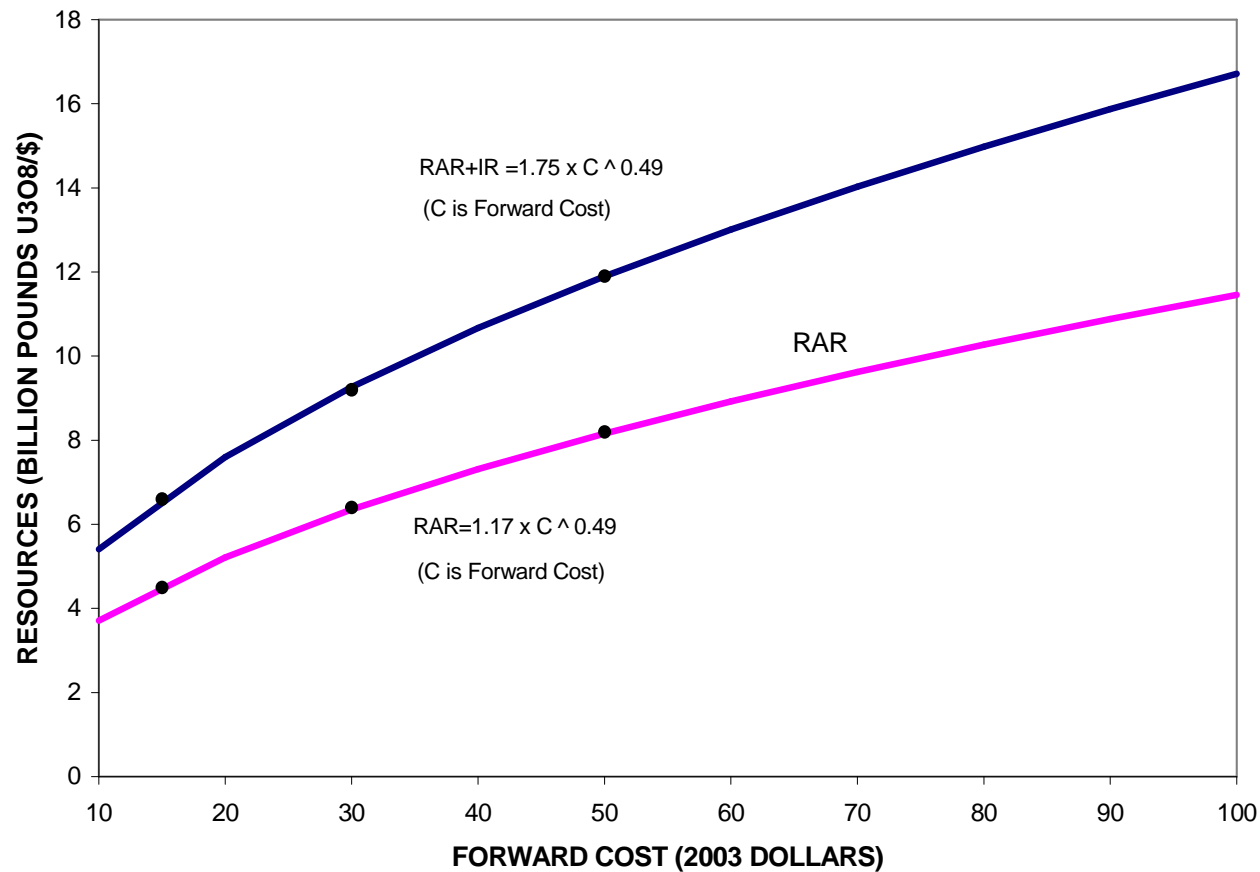
COUNTRY	CENTER	DISC.	PROD.	YEARS
Canada	Cluff Lake	1967	1981	14
	Rabbit Lake	1968	1975	7
	Key Lake	1975	1981	6
	McArthur River	1988	1999	11
	McClellan Lake	1980	1999	19
	Cigar Lake	1981	2007	26
Australia	Nabarlek	1970	1979	9
	Ranger	1969	1981	12
	Olympic Dam	1975	1988	13
Namibia	Rossing	1966	1976	10
Niger	Arlit	1965	1971	6



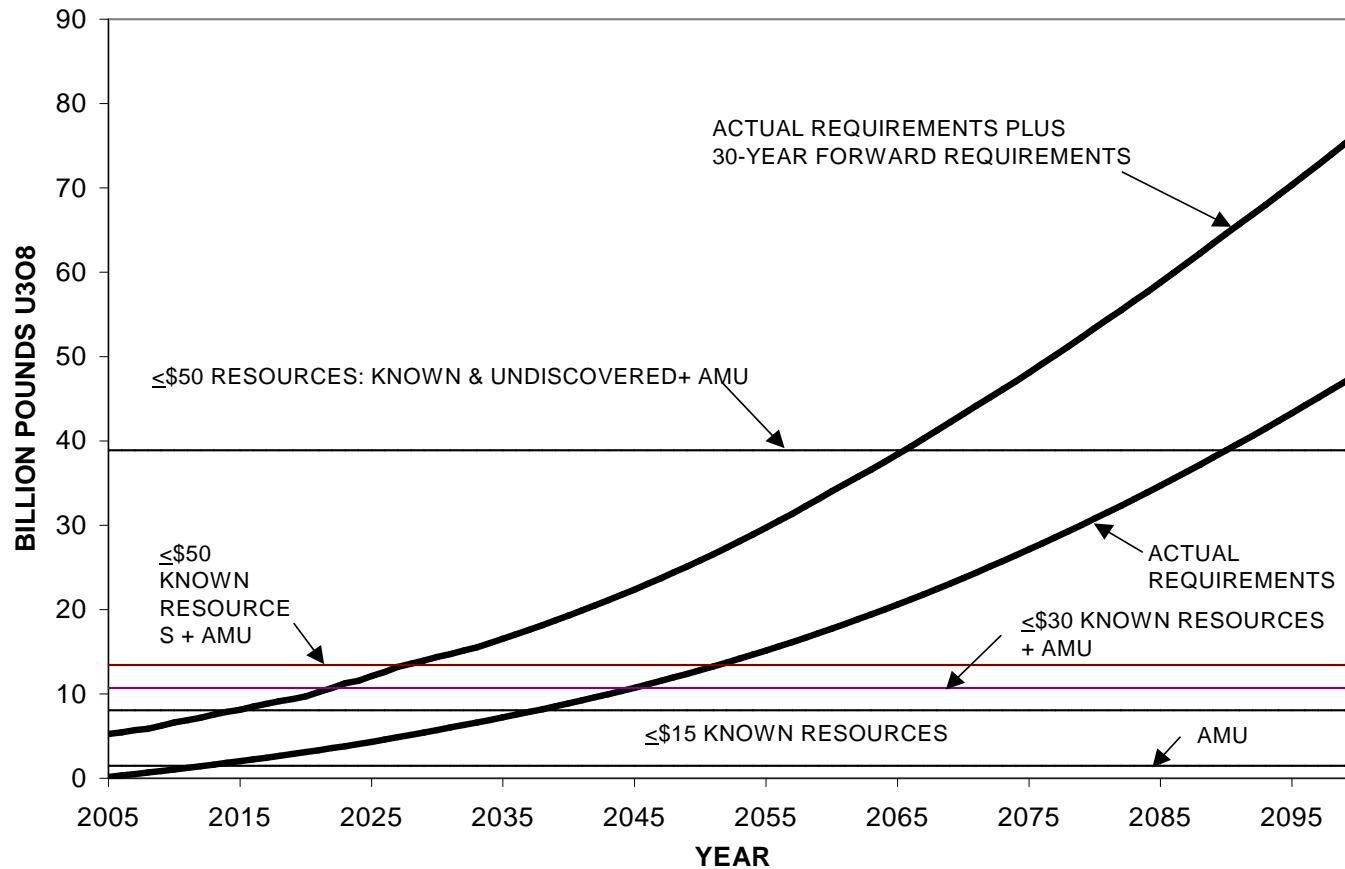
World Uranium Supply & Requirements



RAR & IR as a Function of Forward Cost (Based on 2003 RB Data)



RB Resources & NP Cumulative Requirements: Actual and Plus 30-Year Forward



Long Term Supply & Requirements

- My last graphic shows:
 - AMU from all Sources (U, HEU, Pu, UE Tails)
 - Identified Production Center Output
 - RB RAR & IR (Discounted & not Included in the Above)
 - RB Prognosticated Resources (Discounted)
 - Required Discoveries of 3 Billion Pounds (c.f. Olympic Dam)



AMU, Identified Production, RB Resources & Required Discoveries vs. Reference Requirements

