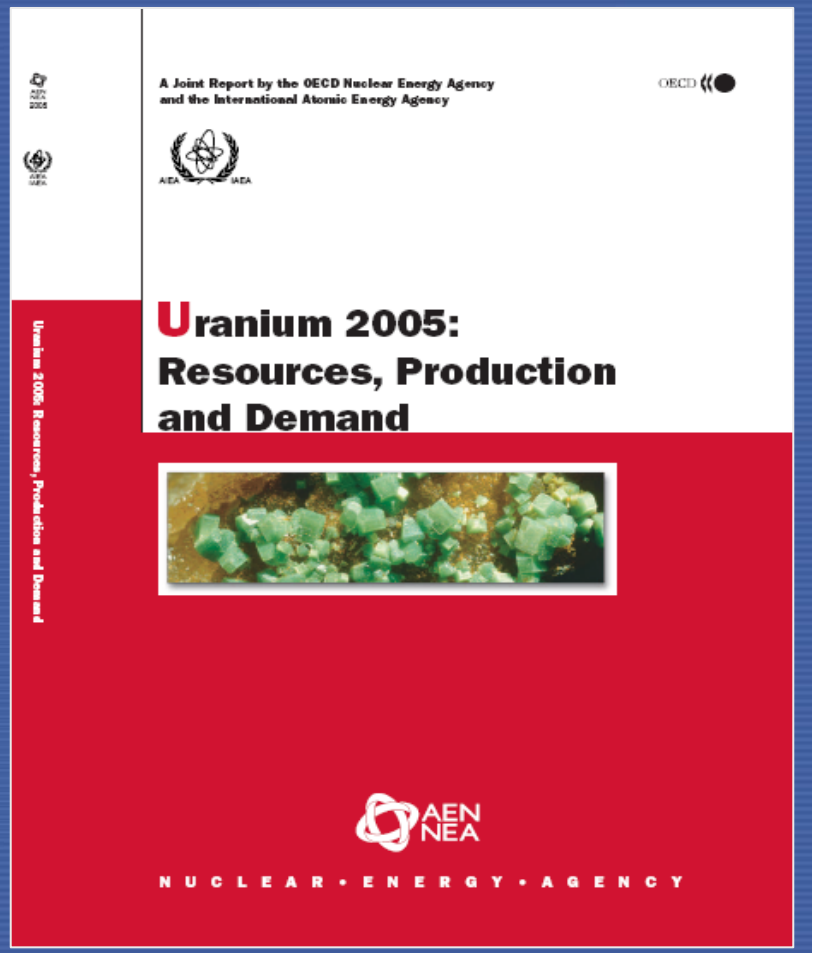
OECD/NEA – IAEA
Uranium Group Activities



Robert Vance, NEA Secretariat
Jan Slezak, IAEA Secretariat

UNECE Ad Hoc Group of Experts on Harmonization of
Fossil Energy and Mineral Resources Terminology
Fifth Session, 15-16 April 2008, Geneva

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URANIUM GROUP HISTORY

- Formed in the early 1960s - OECD, European Nuclear Energy Agency
- 1991: former Eastern Block countries join
- 1996: IAEA member states join; reorganized as the Joint NEA-IAEA Uranium Group
- Principal product: *Red Book*
  Uranium: Resources, Production, Demand

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OECD/NEA – IAEA Uranium Group Activities

RECENT ACTIVITIES

- 1999: Environmental Activities in Uranium Mining and Milling
- 2002: Environmental Remediation of World Uranium Production Facilities
- Terms of Reference
- Ongoing: Red Book On-line, United Nations Framework Classification (UNFC) for energy resources
- Process: 3 meetings every two years; one meeting hosted by U producing country (2004 Czech Republic; 2006 Kazakhstan; 2008 Australia)

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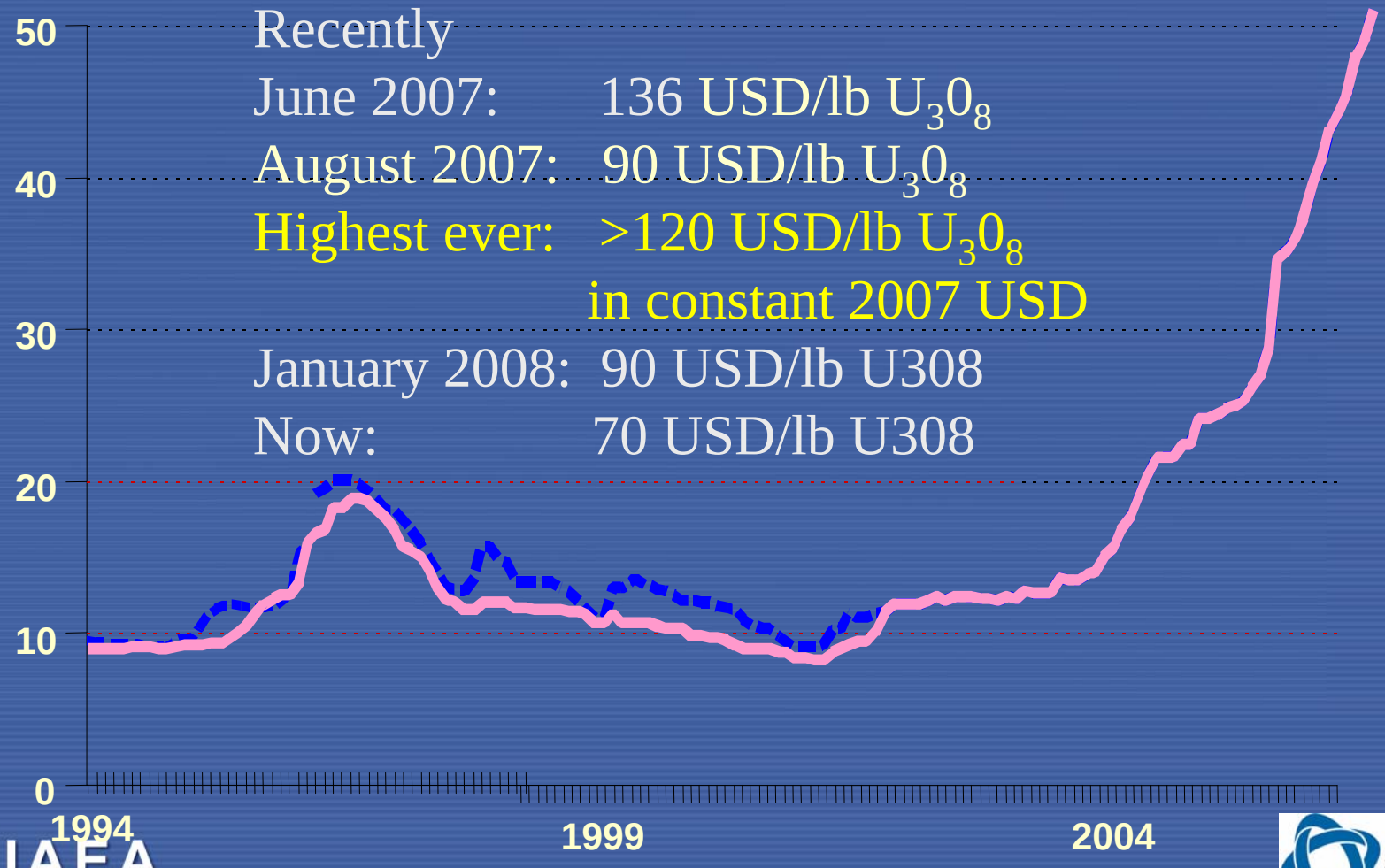
URANIUM SPOT PRICE (USD/lb U_3O_8)



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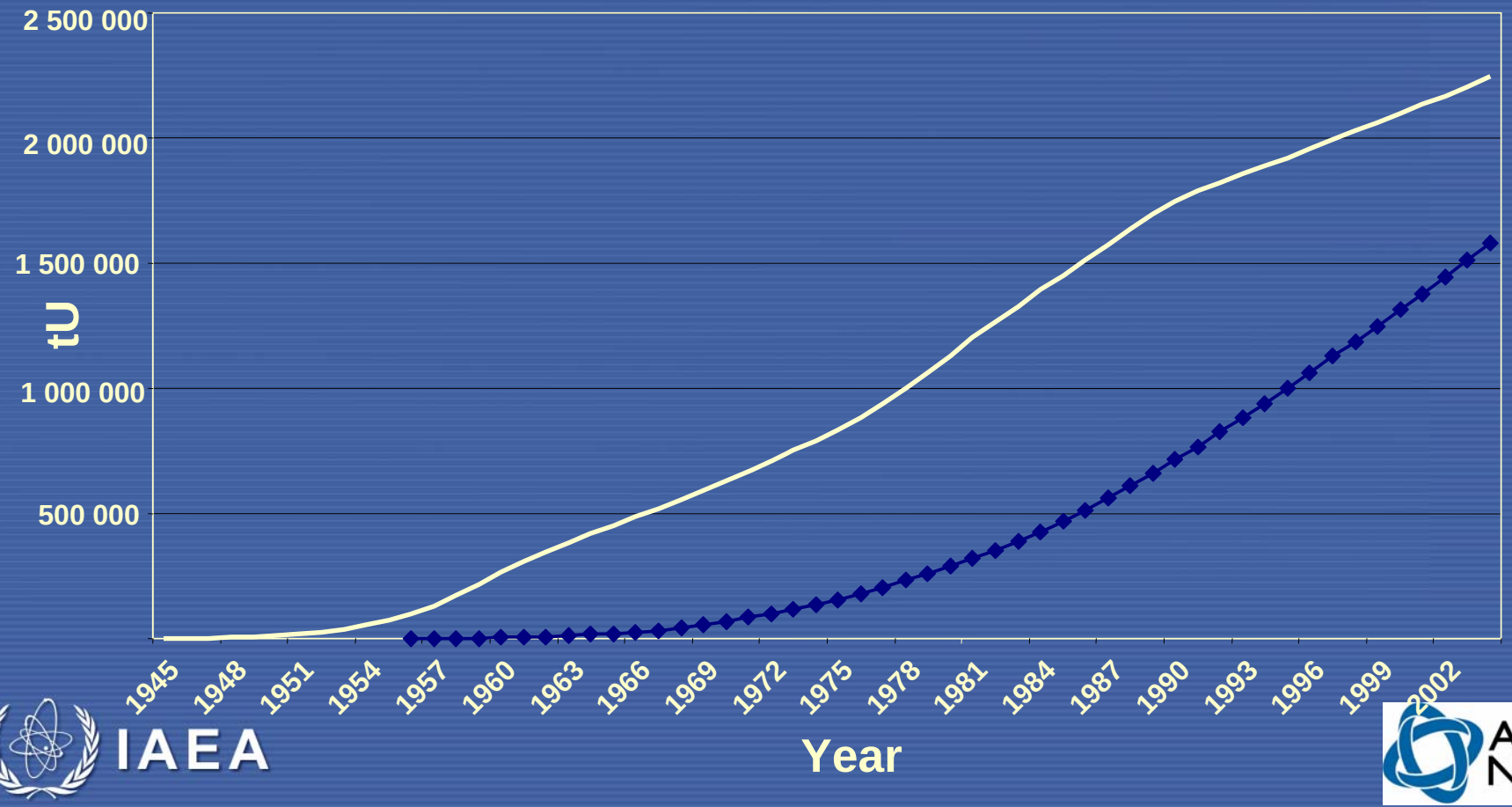
Cumulative Production -- World Requirements



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RED BOOK 2005 - 21st Edition

Data – Questionnaire Responses

- exploration,
- resource estimates,
- production,
- short-term production capability,
- installed capacity - U requirements.

Responses from 43 Countries

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URANIUM RESOURCES 2005

Generally increased from 2003

- Total Identified (RAR and Inferred)
  - 3 804 000 tU (<USD80/kg U)
  - 4 743 000 tU (<USD130/kg U)
- Low-cost (<USD40/kg U) RAR
  - 13% increase from 2003
- Total Undiscovered (Prognosticated and Speculative; <USD130/kg U)
  - 10 000 000 tU

- 2007- Total Identified (RAR and Inferred) : 5.45 mil. tU (<USD130/kg U)

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Uranium Supply

Reactor/Fuel cycle	Years of 2004 world nuclear electricity generation with identified resources	Years of 2004 world nuclear electricity generation with total conventional resources	Years of 2004 world nuclear electricity generation with total conventional resources and phosphates
Current technology (water cooled reactors and once-through fuel cycle)	85	270	675
Future technology (fast breeder reactors with 'closed cycle' and multiple recycling)	>2 500	>8 000	~20 000

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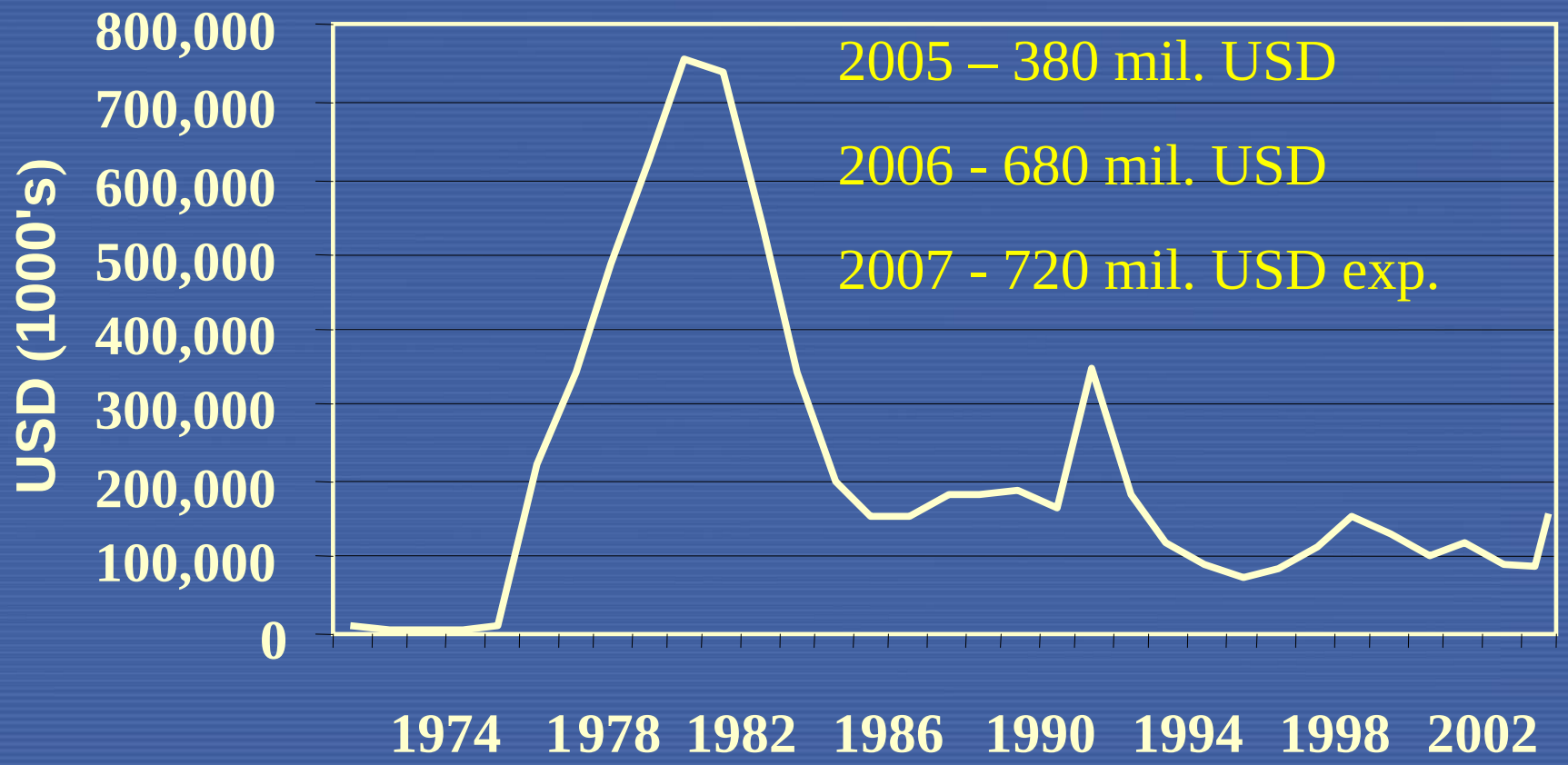
EXPLORATION EXPENDITURES



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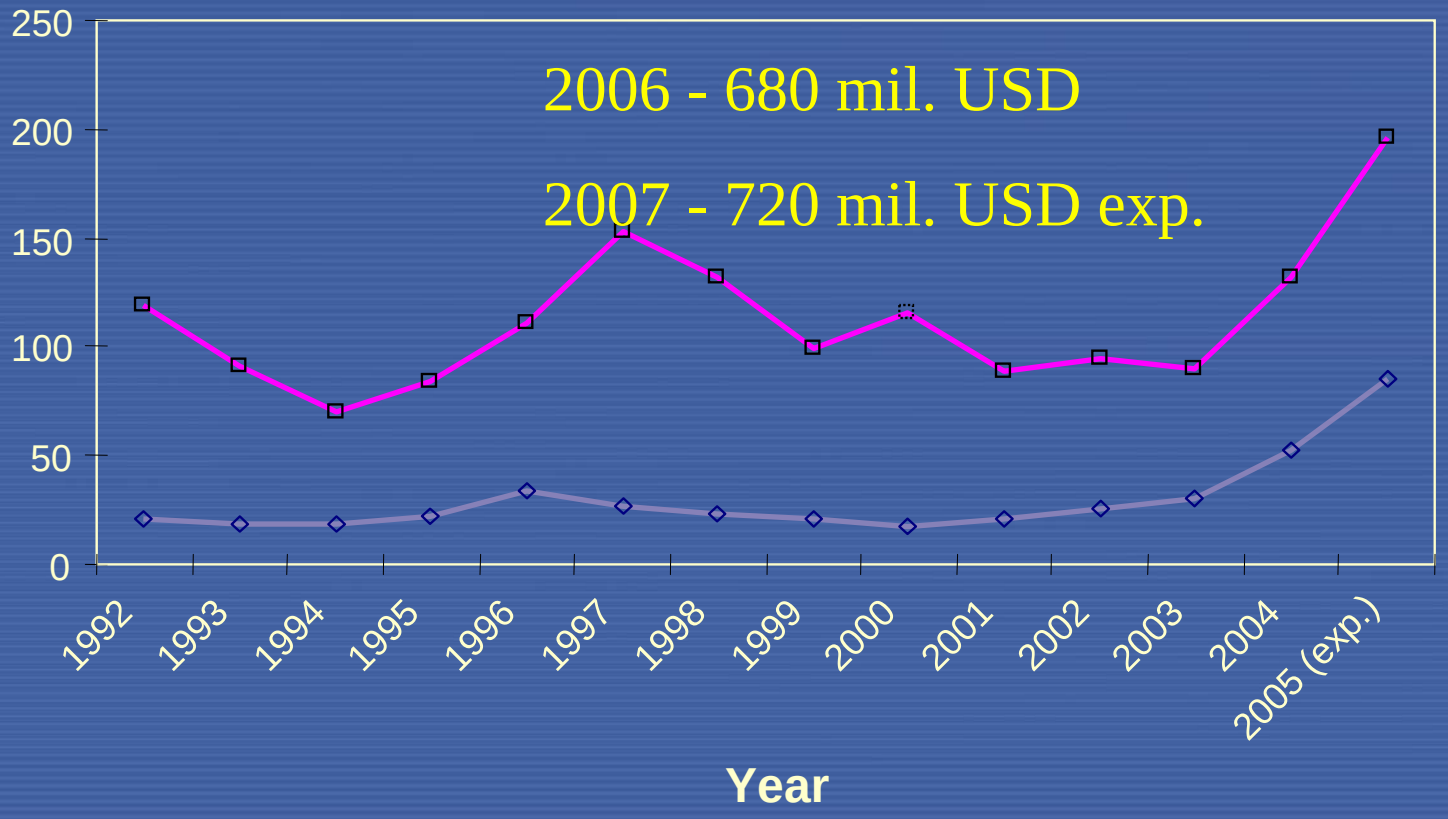
Exploration Expenditures - Price (1992-2005)

2005 – 380 mil. USD

2006 - 680 mil. USD

2007 - 720 mil. USD exp.



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Mine Openings / Expansions Expected

2005
Russia (Khiagda, 1 000 tU/yr)
2006
Niger (Ebba, 2 000 tU/yr)
Namibia (Langer Heinrich, 1 000 tU/yr) – 2007-8
Kazakhstan (JV KATCO – Tortkuduk, 1 000 tU/yr)
2007
Canada (Cigar Lake, 6 900 tU/yr) – delayed to 2010
Kazakhstan (JV Kendala - Central Mynkuduk, 2 000 tU/yr)
2008
Kazakhstan (LLP Kyzylkum - Kharasan-1, 1 000 tU/yr)
Kazakhstan (Southern Inkai, 1 000 tU/yr)
2010
Canada (Midwest, 2 300 tU/yr)
Australia (Proposed Olympic Dam expansion, 12 720 tU/yr)

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MINE DEVELOPMENT TIME

Country	Deposit/Mine	Exploration begins	Discovery of deposit	Beginning of production
Australia	Ranger	1968	1969	1981
	Olympic Dam	early-1970's	1976	1988
	Beverley	1968	1970	2000
Brazil	Lagoa Real	1974	1976	2000
Canada	Cigar Lake	1969	1981	2007
	Key Lake	1968	Gaertner: 1975 Deilmann: 1976	Gaertner: 1983 Deilmann: 1989
	McArthur River	1981	1988	1999
	McClean Lake	1974	1979	1999
Kazakhstan	Inkay	1976	1979	2001
	Kanzhugan	1972	1974	1982
	Mynkuduk	1973	1975	1987
Niger	Akouta	1956	1972	1978
	Arlit	1956	1965	1970

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CONCLUSIONS

- **Large low-cost resource base**
- **Long development times**
- **Uranium investment now with increased prices**
- **Exploration surge likely to lead to new discoveries**

OECD/NEA – IAEA Uranium Group Activities

RESOURCE CLASSIFICATION

	Identified Resources			Undiscovered Resources	
Australia	Demonstrated		Inferred	Undiscovered	
	Measured	Indicated			
Canada	Measured	Indicated	Inferred	Prognos-ticated	Speculative
Russian Federation, Kazakhstan, Ukraine, Uzbekistan	A + B	C 1	C 2	P1	P2 / P3
UNFC	G1		G1 + G2	G3	G4

UNFC correlation with NEA/IAEA and national classification systems is still under consideration.

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RESOURCE CLASSIFICATION 2008

	Identified Resources			Undiscovered Resources	
Australia	Demonstrated		Inferred	Undiscovered	
	Measured	Indicated			
Canada	Measured	Indicated	Inferred	Prognos-ticated	Speculative
Russian Federation, Kazakhstan, Ukraine, Uzbekistan	A + B	C 1	C 2	P1	P2	P3
UNFC	222, 322		232, 323	334	334	

UNFC correlation with NEA/IAEA and national classification systems is still under consideration.

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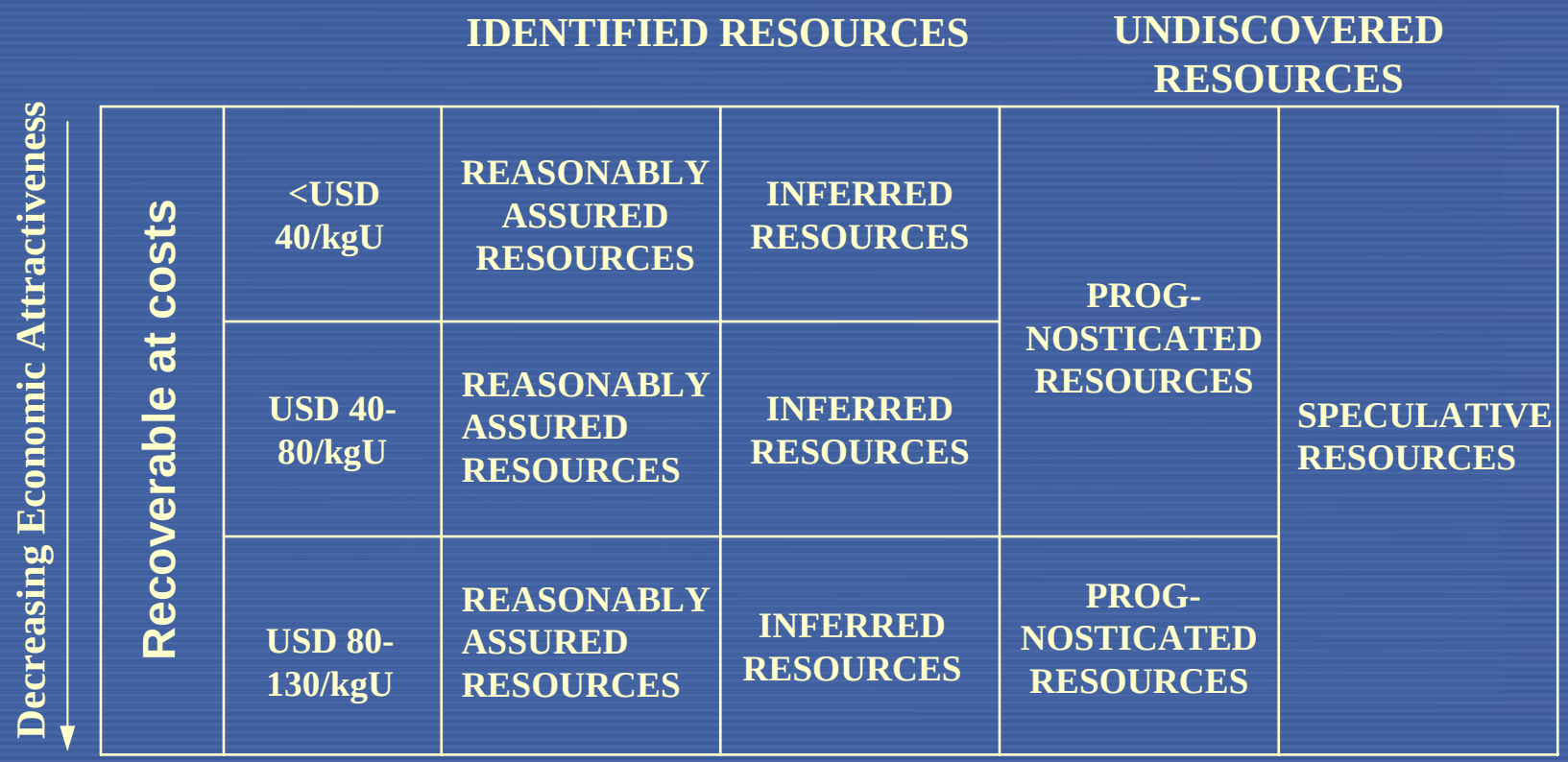
OECD/NEA – IAEA Uranium Group Activities

RESOURCE CLASSIFICATION



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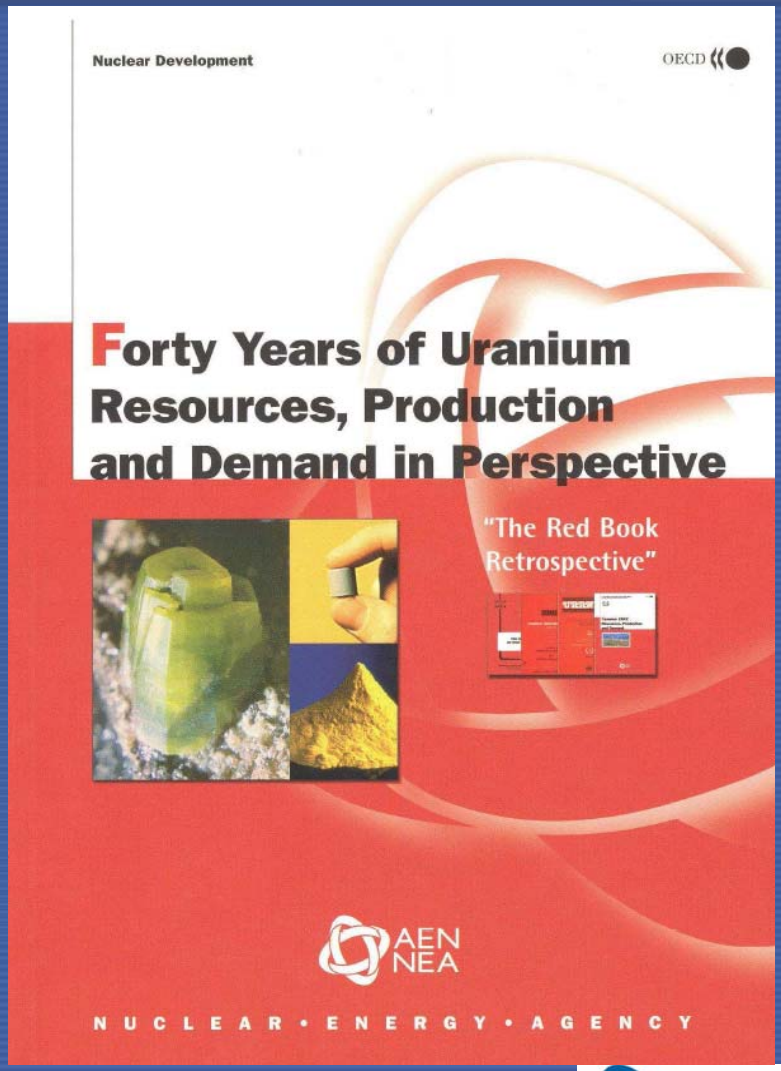
OECD/NEA – IAEA Uranium Group Activities

- Forty Years of Uranium Exploration, Resources, Production & Demand in Perspective

- **Newly planned similar:**
  RED BOOK Retrospective Country Reports



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OECD/NEA – IAEA Uranium Group Activities

- **A big event is planned on 22-26 June 2009**
- **An IAEA International Symposium on**

URANIUM PRODUCTION AND RAW MATERIALS FOR THE NUCLEAR FUEL CYCLE – SUPPLY AND DEMAND, ECONOMICS AND THE ENVIRONMENT AND ENERGY SECURITY (URAM 2009)

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Contacts

- **THANK YOU FOR YOUR ATTENTION**

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