International Atomic Energy Agency

Harmonization of Energy Reserves / Resources Terminology

Uranium

Geneva 30-31 October 2003

Harmonization of Energy Reserves / Resources Terminology

- # Why the UNFC ?

  - ## Harmonize Reserves / Resources classification systems between all energy commodities (Coal, gas, petroleum, Uranium)

  - ## But also within the Uranium world.

Harmonization of Energy Reserves / Resources Terminology

- ## Uranium classification based:

  - ### Geology

  - ### Economy (Uranium price)

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- # Geology
  - ## 4 categories:

    - ### Reasonably Assured (RAR)
    - ### Estimated Additional I (EAR-I)
    - ### Estimated Additional II (EAR-II)
    - ### Speculative (SR)

    - ### RAR + EAR-II : Known Resources
    - ### EAR-II + SR   : Undiscovered Resources

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- ## **Economy**

  - ### < US$ 40 / kgU   (Economic. Actual spot price: US $ 32 / kgU)

  - ### US $ 40-80 / kg U (Sub-economic)

  - ### US$ 80-130 / kgU

- # Feasibility axis

  - ## Not used, but implied by some major mining Companies.

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- **Approximative correlations of terms used in major resources classification Systems**

Known Resources	Undiscovered Resources

- **NEA/IAEA**

Reasonably Assured	Estimated Additional I	Estimated Additional II	Speculative

- **Australia**

Measured	Indicated	Inferred	Undiscovered

- **Canada**

Measured	Indicated	Inferred	Prognosticated	Speculative

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- **Approximative correlations of terms used in major resources classification systems** (continued)

Known Resources	Undiscovered Resources

- **US DOE**

Reasonably assured	Estimated Additional	Speculative

- **Russian Federation, Kazakhstan, Ukraine, Uzbekistan**

A+B	C1	C2	P1	P2	P3

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- **IAEA/NEA classification , and country classifications in most countries, very close to UNFC.**

- **UNFC already used in some countries: Hungary, Ukraine, Russian Federation.**

- **Problems to be solved:**
  - **Definitions**
  - **Some countries do not report resources according to IAEA/NEA system (USA)**

Harmonization of Energy Reserves / Resources Terminology

- **How can the UNFC be presented in the Red Book:**

  Simplified Presentation

Known Resources	Undiscovered Resources

- **IAEA/NEA**

RAR	EAR-I	EAR-II	SR

- **UNFC**

EF1	EF2	EF3	EF4

Harmonization of Energy Reserves / Resources Terminology

- **How could the UNFC be presented in the Red Book:**

  Extended Presentation

Known Resources	Undiscovered Resources

- **IAEA/NEA**

RAR	EAR-I	EAR-II	SR

- **UNFC**

<40$/kgU	111	121,122	Usually not Relevant	
40-80$/kgU	211	221,222		
80-130 $/kgU	311,321	322		
> 130$/kgU	331	332	333	334

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- ## What could be the next steps:
  - ### Uranium resources classification and evaluations (mainly undiscovered resources) have to be updated.(<u>Evaluation methodology</u> and reporting system).

  - ### Case studies on deposits evaluations using and comparing two classification systems (Country + UNFC)