

For Discussion at Panel-1

Feedback from Methodology Users on Rev.6 Report - MT

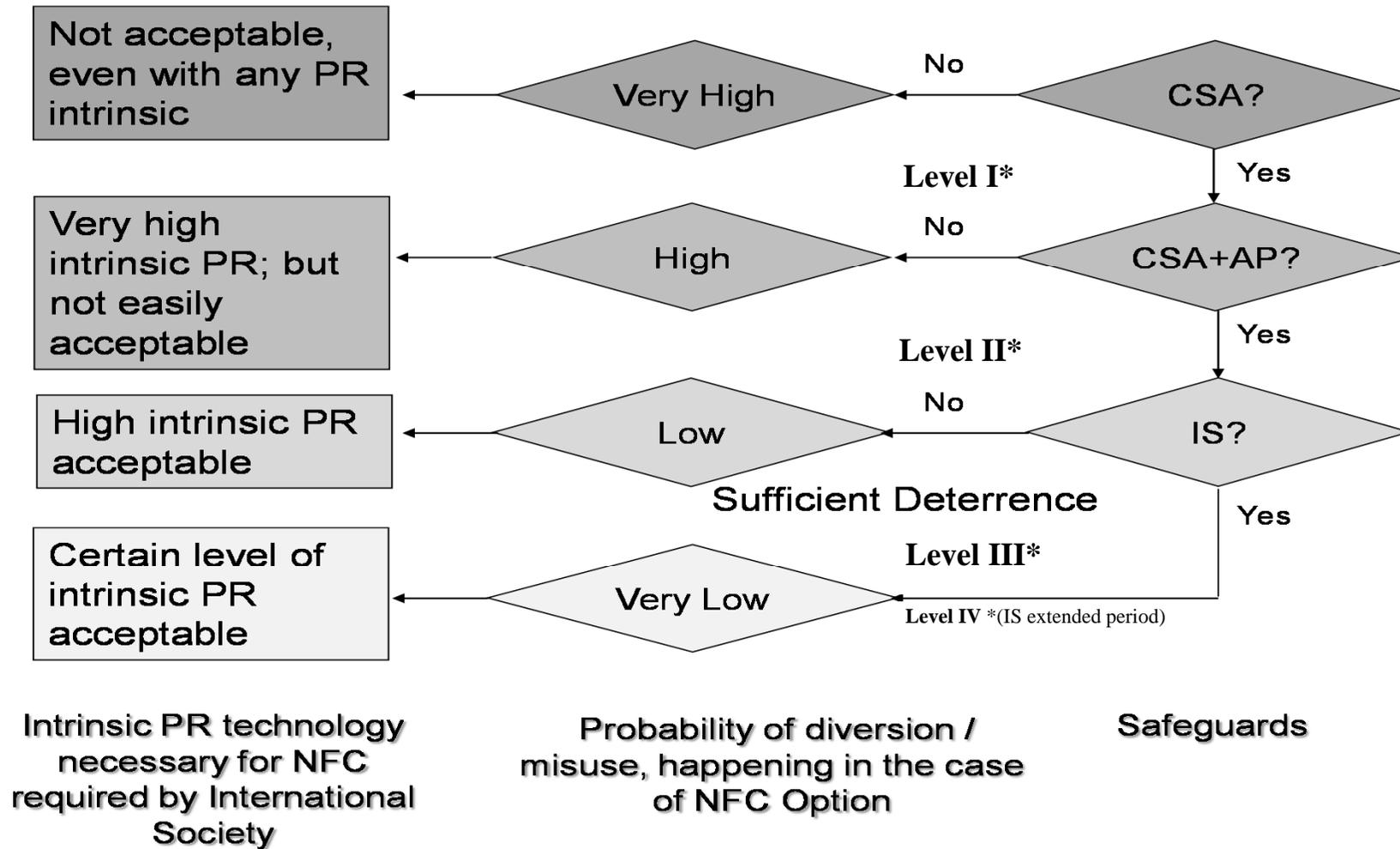
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MT Measure in PR&PP

- **Very low PR – HEU.**
- **Low PR – weapons-grade plutonium (WG-Pu).**
- **Medium PR – reactor-grade plutonium (RG-Pu).**
- **High PR – “deep-burn” plutonium (DB-Pu).**
- **Very high PR – LEU.**

- Reasonable, in general.
- However, those are categorized based on isotopic compositions. Other MT factors such as mixtures with other elements that enhance PR (e.g. ^{244}Cm) and/or chemical compounds can be taken into account.
- MT may not be independent of IAEA verification time.

Safeguards and Intrinsic PR Technologies



* Classification of Level I-IV was proposed by J. Carlson and R. Leslie: "Safeguards Intensity as a Function of Safeguards Status", the 46th INMM Annual Meeting, Phoenix, Texas, July 2005

Comparison of sample of MT metric ranges (discussed in Rev 6)

- It suggests possible correlativity of IAEA verification or conversion time and MT (e.g. grade of Pu)
- RG-Pu in un-irradiated MOX compounds
IAEA verification time for those
1 month  3 months for Integrated Safeguards
 Equivalent to lower grade of C (DB-Pu) (?)
- RG-Pu in irradiated compounds (SFs)
IAEA verification time for those
3 months  12 months for Integrated Safeguards
 Equivalent to Grade D (?)

Level of PR MT Measures

- Materials of LWR spent fuels (SF), MOX (LWR) SF, and Pu materials even containing 10% of ^{238}Pu are uniformly in accordance with grade C of US DOE Graded Safeguards (US DOE M 470.4-6).
- In this context, categorization of material-type PR measure based on USDOE table may also not be appropriate for the evaluation of MT PR.

	Attractive-ness Level	FOM
WEAPONS: Assembled weapons and test devices	A	
PURE PRODUCTS: Pits, major components, button ingots, recastable metal, directly convertible materials	B	> 2
HIGH-GRADE MATERIALS: Carbides, oxides, nitrates, solutions (≥ 25 g/L) fuel elements and assemblies; alloys and mixtures; UF ₄ or UF ₆ ($\geq 50\%$ enriched)	C	1-2
LOW-GRADE MATERIALS: Solutions (1 to 25 g/L), process residues requiring extensive reprocessing; moderately irradiated material; Pu-238 (except waste); UF ₄ or UF ₆ ($\geq 20\%$ < 50% enriched)	D	0-1
ALL OTHER MATERIALS: Highly irradiated forms, solutions (<1 g/L), uranium containing <20% U-235 or <10% U-233 (any form, any quantity)	E	< 0

Conclusion: Metric categorization may need further study.

Expert Elicitation

- Formal expert elicitation \Rightarrow judgment with less uncertainty is expected.
- For that, judgment standards are essential.
- Expert judgment still provide only grade or score against individual measures.
- **How should the overall evaluation be made?**