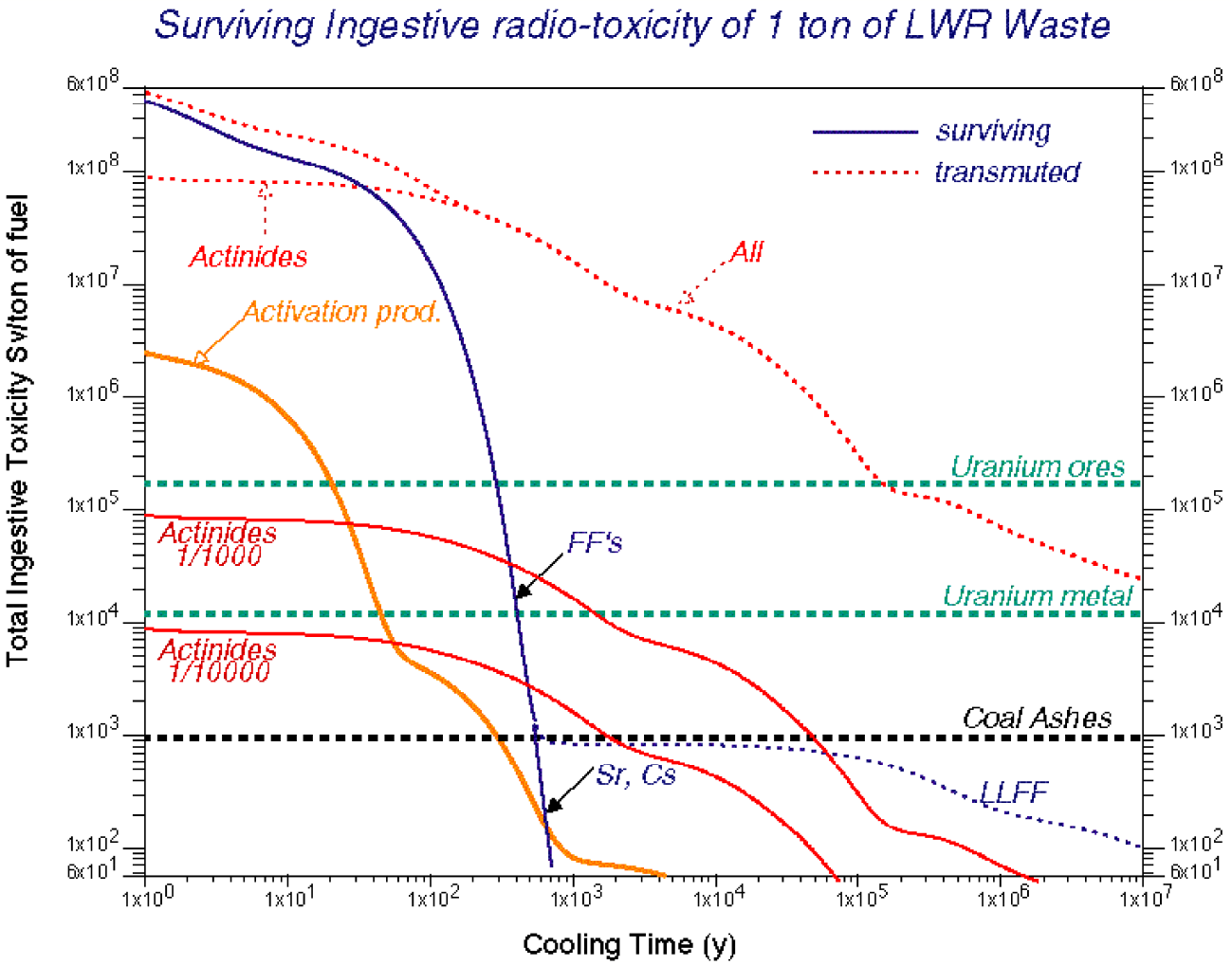
Waste Management, 3/4

- Option: Partitioning and Transmutation (P&T) before geological storage

Waste Management, 4/4

- Actinides incinerated (i.e., fissioned) in fast neutron spectrum systems
- Hybrid systems (sub-critical core driven by external neutron source, like spallation source (for ADS), or 14 MeV fusion neutron source)
- Transmutation of long-lived fission products (^{129}I, ^{99}Tc, ^{135}Cs) using leakage neutrons in ADS or resonance capture processes (adiabatic resonance crossing)

Transmutation Before Storage



Source: Y. Kadi, CERN (pers. comm.)

The Energy Amplifier Concept, 1/4

✍*Method:* A high energy proton beam interacts in a molten lead (Pb-Bi) swimming pool. Neutrons are produced by the so-called spallation process. Lead is "transparent" to neutrons. Single phase coolant, b.p. ˜ 2000 °C

✍*TRU:* They are introduced, after separation, in the form of classic, well tested "fuel rods". *Fast neutrons,* both from spallation and fission, drift to the TRU rods and fission them efficiently. A substantial amount of net power is produced (up to ˜ 1/3 of LWR), to pay for the operation.

✍*LLFF:* Neutrons leaking from the periphery of the core are used to transmute also LLFF (Tc^{99}, I^{129} ....)

✍*Safety:* The sub-criticality (k ~ 0.95?0.98) condition is guaranteed at all times.