



International and Domestic Licensing of Packages

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NRC SFST Regulatory Conference
November 3, 2011



Inconsistency among Competent Authorities



- ▶ **Some significant regulatory requirements vary between countries**
- ▶ **Even when regulatory requirements are essentially the same, different regulators may have different expectations about methodology**
- ▶ **As a result, validation of foreign packages can require redundant engineering and analysis**
- ▶ **Examples**
 - ◆ **Type B Package Tie-Downs**
 - ◆ **Nuclear Analysis**

Type B Package Tie-Downs



- ▶ **European regulatory requirements are based on the guidance in TS-G-1.1 Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material**
- ▶ **US regulatory requirements are found in Title 10, US Code of Federal Regulations**



Disagreement between the requirements frequently results in redundant analyses and sometimes redesign and new fabrication

IAEA Acceleration Factors for Package Retention System Design



Mode	Acceleration Factors		
	Longitudinal	Lateral	Vertical
Road	2g	1g	2g up, 3g down
Rail	5g	2g	2g up, 2g down
Sea/water	2g	2g	2g up, 2g down
Air	1.5g (9g forward)	1.5g	2g up, 6g down

TS-G-1.1 Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material , Appendix IV, Table IV.1

“ Any tie-down attachments on the package shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the package to meet the requirements of these Regulations. [TS-R-1 2009 Paragraph 636]

USA Lifting and Tie-down Standards for All Packages



Mode	Acceleration Factors		
	Longitudinal	Lateral	Vertical
All	10g	5g	2g

Title 10, US Code of Federal Regulations, Part 71.45

“ *Each tie-down device that is a structural part of a package must be designed so that failure of the device under excessive load would not impair the ability of the package to meet other requirements of this part.* [10 CFR 71.45(b)(3)]

Nuclear Analysis



- ▶ **Different regulators recognize and prefer different codes**
- ▶ **Criticality**
 - ◆ NRC has routinely approved applications that incorporate analysis using computer codes like SCALE/KENO, MCNP and MONK (British)
 - ◆ French applications are often based on codes like TRIPOLI and MORET
- ▶ **Shielding**
 - ◆ NRC has routinely approved applications that incorporate analysis using computer codes like SCALE/MAVRIC and MCNP; although DOORS is acceptable
 - ◆ French applications are often based on codes like MERCURE V, TRIPOLI and MORET



Redundant analyses are frequently required in order to validate foreign packages

Conclusions



- ▶ Differences in regulatory requirements lead to redesign and possibly new fabrication
- ▶ Different regulator' expectations about methodology and approach lead to redundant analyses



Unnecessary cost and schedule burden is imposed on industry