Changes in the Transport of Fissile Material Resulting from the Latest Proposed Revision of the IAEA Transport Regulations

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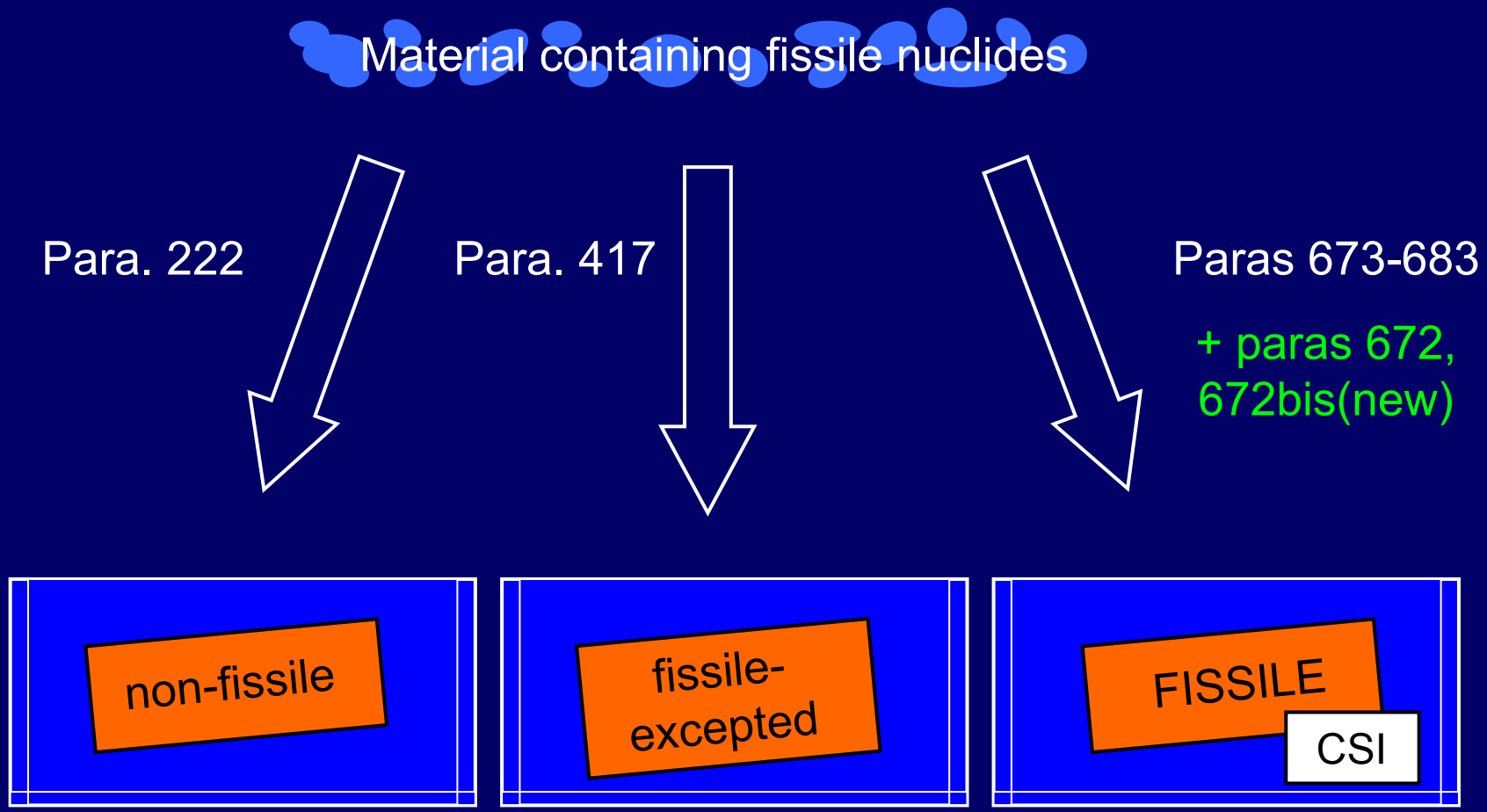
Introduction

Currently the IAEA is reviewing and revising the Regulations for the Safe Transport of Radioactive Material (TS-R-1).

A draft of the new revision has been published by IAEA for commenting by the member states.

In this revision process important changes have been made to the classification and transport requirements for fissile material.

Changes in the definition and classification of fissile material



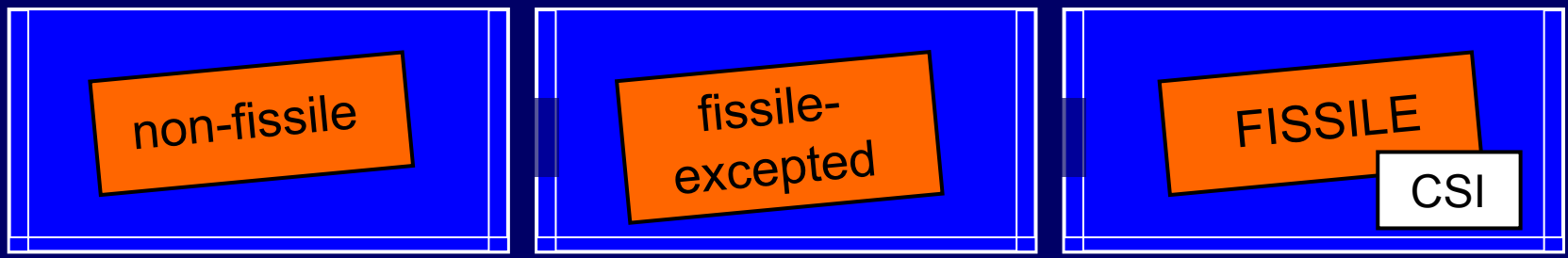
Changes in the definition and classification of fissile material

Material containing fissile nuclides

natural and depleted uranium, unirradiated or irradiated in thermal reactors

- limited to packages containing no other fissile nuclides

+ material in packages containing ≤ 0.25g of fissile nuclides



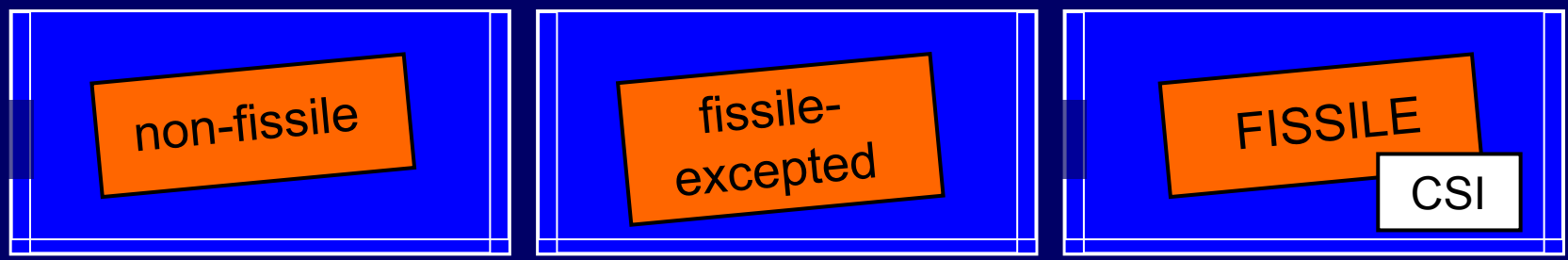
Changes in the definition and classification of fissile material

Material containing fissile nuclides

uranium enriched to ≤ 1%

uranyl nitrate enriched to max. 2%

…



Changes in the definition and classification of fissile material

Material containing fissile nuclides

- 15g fissile nuclides
- fiss. nucl. /H < 5%
- 5g fiss. nucl. / 10 L
- 1kg Pu with ≤ 20% Pu_{fiss}

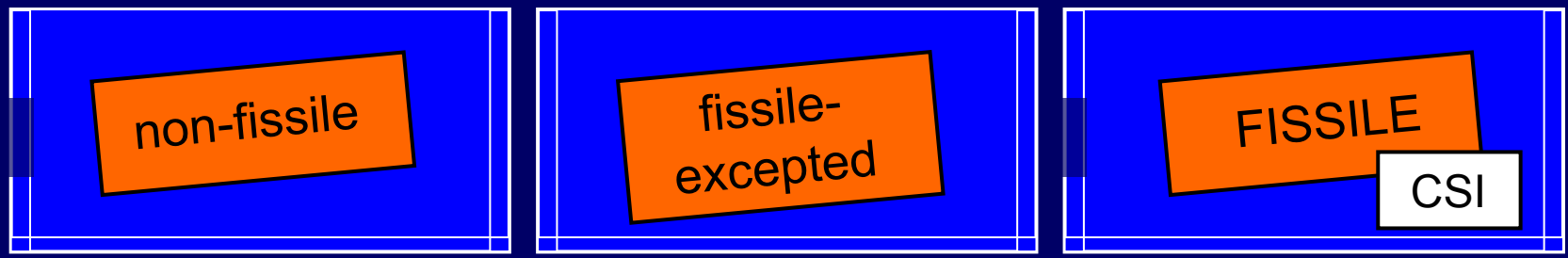
consignment limit

+ 3.5g U-235 at ≤ 5% enr.
+ 2g U-235 at > 5% enr.
+ 0.5g fissile nuclides

+ 45g fissile nuclides per conveyance, exclusive use

+ multilat. approved materials

consig. limit



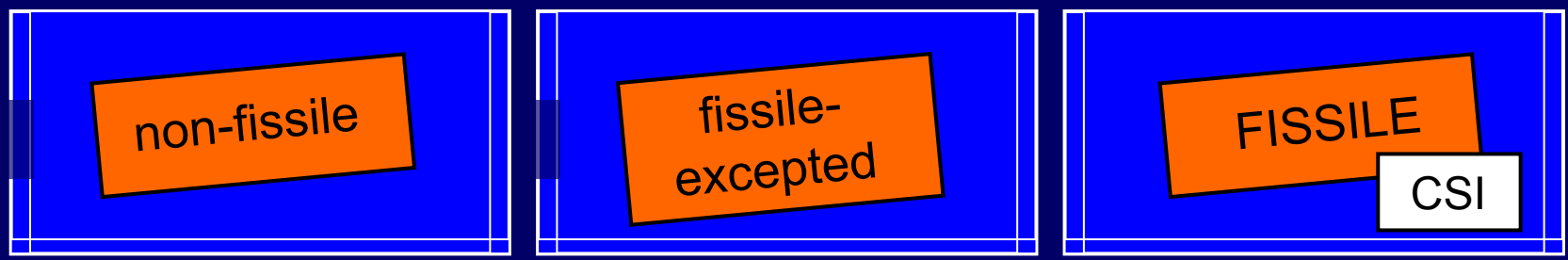
Changes in the definition and classification of fissile material

Material containing fissile nuclides

multilaterally approved package designs

+ general package designs not requiring competent authority approval

+ 1kg Pu with ≤ 20% Pu_{fiss}



How to continue transport of fissile material?

For the transport of material containing fissile nuclides including the category of fissile excepted packages according to the draft of the new regulations

→ all of the various possibilities in the paras 222, 417, 672 and 673-683 of the draft should be considered.

How to continue transport of fissile material?

Example:

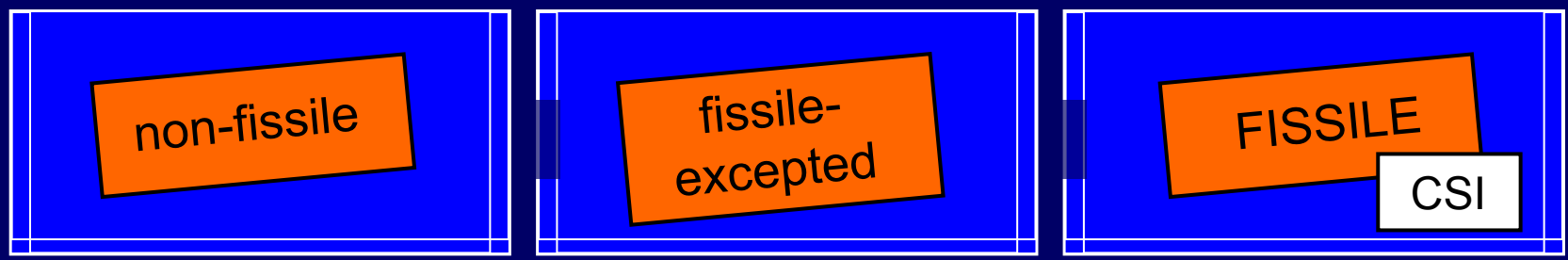
A package is currently transported as fissile excepted applying para. 417 (a)(i) of TS-R-1: max. 15g of fissile nuclides per package, smallest external dimension of each package not less than 10 cm, limitations on beryllium and deuterium, consignment limit for fissile nuclides

It is further assumed, that the package does not meet any other provisions of the current regulation for being classified as non-fissile or fissile excepted.

How to continue transport of fissile material - example

Classification options according to the draft of the new revision of TS-R-1 for packages currently meeting para. 417 (a)(i) of TS-R-1

max. 0.25g of fissile nuclides per package



How to continue transport of fissile material - example

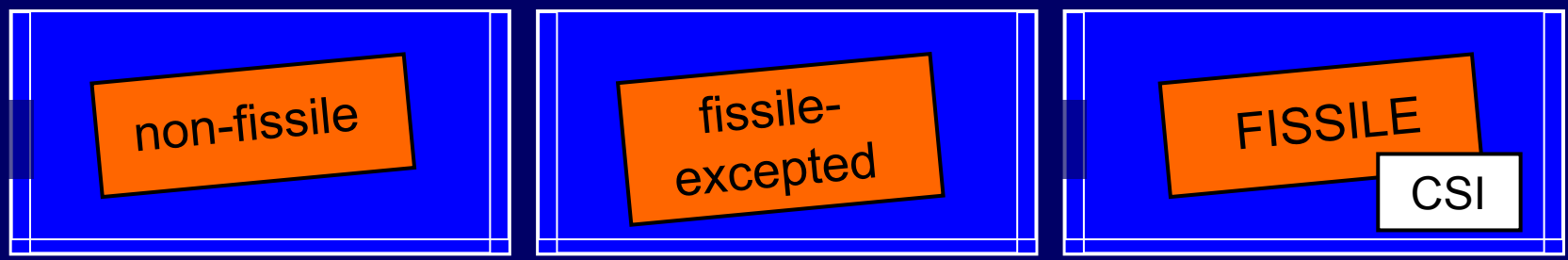
Classification options according to the draft of the new revision of TS-R-1 for packages currently meeting para. 417 (a)(i) of TS-R-1

consignment limit

- 3.5g U-235 at ≤ 5% enr.
- 2g U-235 at > 5% enr.
- 0.5g fissile nuclides

45g fissile nuclides per conveyance, exclusive use

multilaterally approved materials, requirements in para. 605bis of the draft



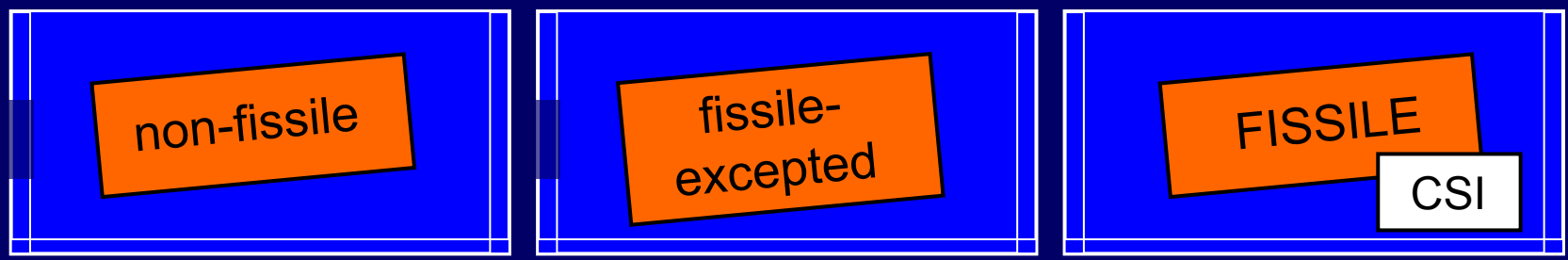
How to continue transport of fissile material - example

Classification options according to the draft of the new revision of TS-R-1 for packages currently meeting para. 417 (a)(i) of TS-R-1

general package designs

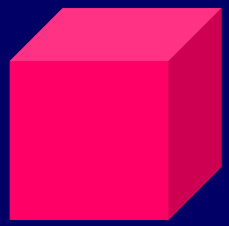
- no excepted package,
- limitations on deuterium, beryllium and carbon,
- applying a CSI,
- not requiring competent authority approval

multilaterally approved package designs



How to continue transport of fissile material - example

Examples for general package designs:

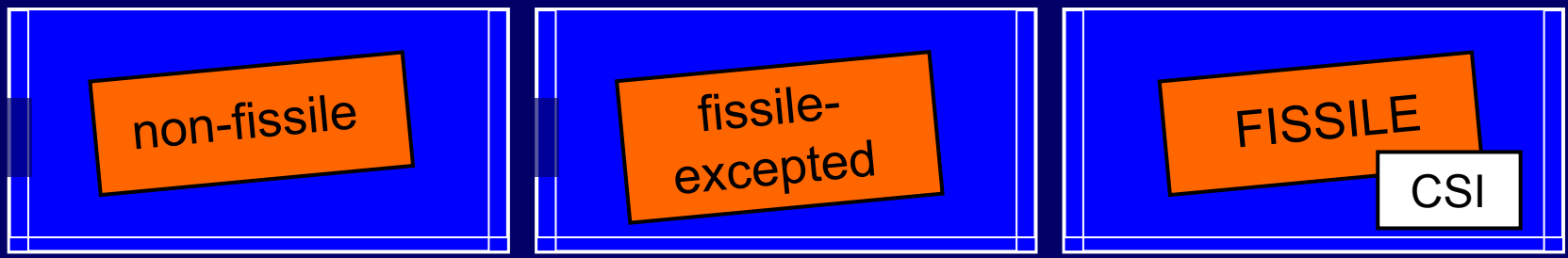


up to 40g of U-235 at 5% enrichment

≤ 20g of material with a hydrogen density greater than water in the package

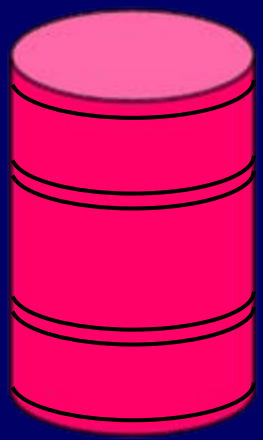
no excepted package

with CSI=10



How to continue transport of fissile material - example

Examples for general package designs:

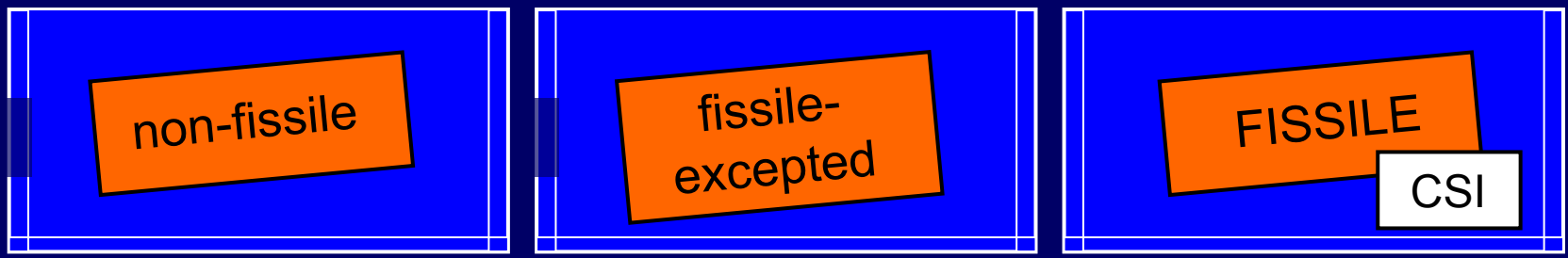


up to 100g of U-235 at 5% enrichment

≤ 20g of material with a hydrogen density greater than water in the package

min. 30x30x30cm³, stable under normal conditions of transport

with CSI=10



Conclusions

The draft of the new revision of the IAEA transport regulations provides a new graded approach to the classification and transport of material containing fissile nuclides.

For every transport need concerning material containing fissile nuclides including the category of fissile excepted packages the appropriate way of classification and transport should be sought, taking into account the various possibilities.