

Session description

Session 1: MOX Fuel Fabrication – Design, Industrial Experience and associated Criticality-Safety issues

The purpose of this session is to familiarise the audience with the MOX fuel fabrication process and to present an industrial perspective in terms of feedback from existing facilities and challenges associated with new projects. The second part of the session will focus on criticality safety issues that are encountered at various phases of the MOX fabrication process and highlight areas in which the process could be better optimised if criticality safety margins were better known.

Session 2: Experimental Data Needs

The OECD/NEA Expert Group on Experimental Needs for Criticality-Safety has highlighted MOX fuel manufacturing, as an area in which there is a specific need for additional experimental data for validation purposes.

The purpose of this session is to establish the technical basis for the stated need. A link should be established between specific applications within the MOX fuel cycle and the lack of data to validate codes and cross section libraries that are used to establish the criticality safety basis for the application.

Session 3: Proposed Programs and Presentation of Experimental Facilities

The need, highlighted by the OECD/NEA Expert Group, focuses on the following parameters:

Reactor-grade plutonium

PuO₂ content: 30 % (Primary blend)
12.5 % - 5% (final blend)

Powder density: 4.6 g/cm³ and 5.5 g/cm³

Water content: 1 or 3% (normal conditions) - 5 % (abnormal conditions)

Uranium enrichment: ²³⁵U wt.% 0.5-1.5 %
Plutonium composition: ²⁴⁰Pu wt.% ≥ 17 %

Weapon-grade plutonium

PuO₂ content: 22 % (primary blend)
6.5 % (final blend)

Powder density: 5.5 g/cm³

Water content: 1% - 5%

Uranium enrichment: ^{235}U wt.% 0.5-1.5 %

Plutonium composition ^{240}Pu wt.% ~ 4 %

For these fissile media, the neutron energy spectrum varies between fast and intermediate energies. (Note, additional needs may be identified during the course of the Workshop that could extend or further constrain these parameters.)

The purpose of this session is to identify facilities at which the needed MOX experiments can be performed and to identify the strengths and weaknesses (lack of sufficient fuel and / or equipment, challenges faced to gain regulatory approval, etc.) of each facility. Other resources that can be used to address areas of weakness at candidate experimental facilities should also be identified. Presentations should focus only on the ability to contribute to filling the stated need and should not address other capabilities. Preliminary design of proposed experiments should clearly demonstrate that they meet the specific need (i.e., comparisons of spectra data, neutron balance data, sensitivity data, etc.)

Session 4: Panel Discussion – Prospects for International Co-operative Program

The purpose of the panel discussion is to discuss in an open forum, the information provided in the previous sessions and to reach a consensus among the panellists on the following three questions:

- (1) Is there a real need for additional MOX experiments?
- (2) Which proposal or combination of proposals seems to best fill the need?
- (3) What are the prospects for an International Co-operative Program?