

Mandate of the
Working Party on Scientific Issues of the Fuel Cycle (WPFC)

Chair:	Nathalie Chauvin, France
Members:	All NEA member countries
Participation in the work:	European Commission (under the NEA Statute), International Atomic Energy Agency (by agreement)
Date of creation:	June 2004
Date of expiration:	June 2020

Mandate:

- Approved at the 15th meeting of the Nuclear Science Committee in June 2004 [NEA/SEN/NSC(2004)3]
- Extended mandate at the 21st meeting of the Nuclear Science Committee in June 2010 [NEA/SEN/NSC(2010)3]
- Extended mandate as a part of WPFC activities at the 23rd meeting of the Nuclear Science Committee in June 2012 [NEA/SEN/NSC(2012)3]
- Revised mandate at the 24th meeting of the NEA Nuclear Science Committee in June 2013 [NEA/SEN/NSC(2013)2]
- Extended at the 25th meeting of the Nuclear Science Committee in June 2014 [NEA/SEN/NSC(2014)2]
- Extended at the 28th meeting of the Nuclear Science Committee in June 2017 [NEA/SEN/NSC(2017)2]

Scope

Under the guidance of the Nuclear Science Committee, the Working Party will deal with scientific issues in various existing and advanced nuclear fuel cycles, including fuel cycle scenarios, physics, separation chemistry and flowsheets, waste forms, fuels and materials, and coolants.

Objective

To provide member countries with up-to-date information on and develop consensus regarding:

- Fuel cycle scenarios:
 - Assessment of advanced fuel cycles scenarios, including resource utilisation, waste management and transition phases.
 - Fuel cycle tools and databases and evaluation of associated uncertainties.

- Recycling technologies:
 - Keep updated information on separation technologies, including advanced aqueous and pyrochemical processing issues for different fuel cycle scenarios.

- Evaluation of advanced processing concepts, including design bases for future reprocessing plants, and review of current robotics used for spent fuel reprocessing.
- Improvement of waste management in advanced fuel cycles: reduction, recycle and reuse.
 - Fuels:
 - Keep updated information on fuels development for implementing in advanced systems and associated fuel cycles.
 - Evaluation of innovative fuels, including fabrication processes, characterisation, behaviour, property measurement, performance and qualification.
 - Materials:
 - Identification of advanced materials to meet systems requirements for advanced systems.
 - Assess current status and future needs for qualification of reference structural materials.
 - Identification and elaboration of areas where experimental protocols and standards are needed.
 - Identify existing databases.
 - Liquid metal and coolant technologies:
 - Assessment of the environmental effects relevant for construction standards based on a fundamental understanding of materials behaviour
 - Answer key technical issues to address radiological impact, operation, handling, maintenance and inspection as relevant for licensing.
 - Technology and components of accelerator-driven systems (workshop):
 - Accelerator and neutron source.
 - Subcritical system design and relationship to nuclear fuel cycles.

Links

Liaise closely with other relevant NSC working parties and NEA standing technical committees, especially the Nuclear Development Committee (NDC) and the Radioactive Waste Management Committee (RWMC), to ensure the respective work programmes are complementary and to provide advice and support where required, undertaking joint work where appropriate. Particularly close working relationships will be maintained with the Working Party on Scientific Issues of Reactor Systems (WPRS) and the Working Party on Multi-scale Modelling of Fuels and Structural Materials for Nuclear Systems (WPMM), as well as with the Generation IV International Forum (GIF). The Working Party will also work in co-operation with other international organisations (EU, IAEA).

Deliverables

- Report on study of the management of transuranics.
- Benchmark on dose rate calculations for irradiated UOX and MOX spent fuel assemblies.
- Report on potential options for treatment and conditioning of fuel debris and corium.
- Report on treatment of volatile fission products.
- Review of international R&D facilities opened to international co-operation for advanced fuel cycles.
- International review on recycle and reuse of components from spent fuel.
- Report on grand challenges for adoption of innovative materials in modern reactor applications. *1) Ion Irradiation.*

- Review of users facilities for R&D for advanced materials testing.
- Benchmark study on fuel performance codes and experiments.
- Preliminary recommendations on fuel properties.
- Report on data management.
- Report on the effects on environment conditions on material behaviour.
- Report on the chemistry of coolant and cover gas issues.
- Benchmark on thermal-hydraulic loop models for Lead-Alloy Cooled Advanced Nuclear Energy Systems – Phase II.
- Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation (IEMPT).
- Workshop on Structural Materials for Innovative Nuclear Systems (SMINS).
- Workshop on Technology and Components of Accelerator Driven Systems (TCADS).

