

Mandate (1/2)

The following items may be included in the programme of work:

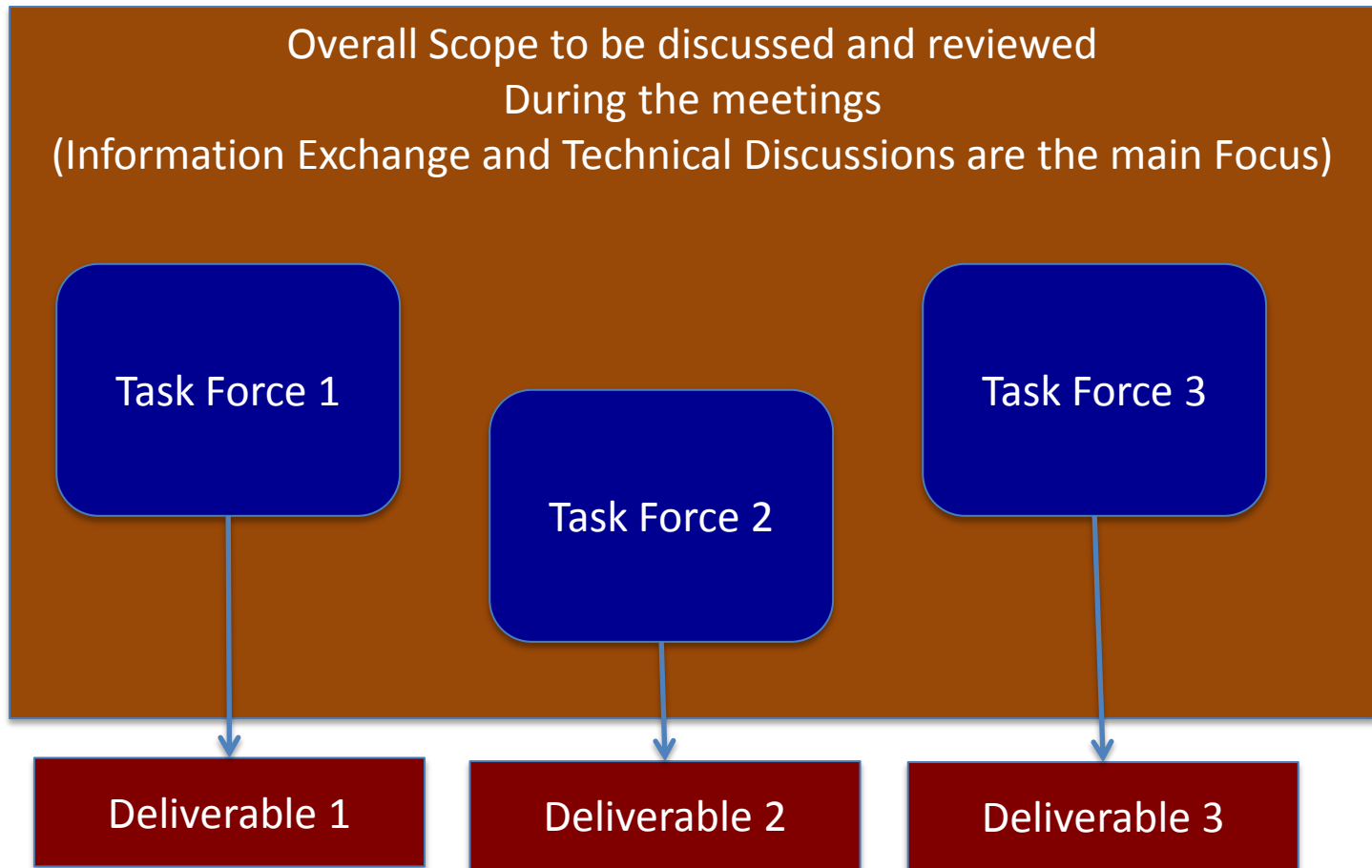
- Data and characteristics of candidate materials, including:
 - Advanced claddings: coated Zr-based alloys, SiC/SiC ceramic composites, advanced steels, refractory metals (e.g. molybdenum), etc.;
 - Advanced Fuels: doped UO_2 for enhanced thermo-mechanical properties, high density fuels such as U-silicide and U-nitride, dispersion fuels with coated particles, etc.;
 - Non-fuel core components such as fuel channels, control rods and blades, and fuel assembly hardware;
- Issues related to the modelling of the advanced materials (fuel/cladding behaviour in normal and transient conditions, including DBA and BDBA, etc.);
- A review of the needs related to an experimental validation of the most promising materials: available facilities, opportunities of joint experiments (including out-of-pile and in-pile experiments), identification of gaps, etc.
- The establishment of appropriate metrics to help prioritise between the ATF candidates;
- The definition and evaluation of reference scenarios to evaluate the effectiveness of ATF candidates;

Mandate (2/2)

It is anticipated that the Expert Group may organise the programme of work through activities carried out by individual Task Forces dedicated to specific technical issues such as:

- Identification and evaluation of candidate materials;
- Development of fundamental properties for the candidate materials;
- Evaluation of metrics for ATF;
- Development of modelling and simulation methods, identification of accident scenarios;
- Experimental needs and facilities.

Organization/Implementation



Roughly 2 year scope for task forces and deliverables

Possible Task Force/Deliverable Structure

- Metric Report – International Version
- Reference scenario development for evaluation
- Parametric studies on materials behavior under the evaluation scenario
 - Evaluation of different materials of interest
 - Impact on enrichment and fuel forms
- Fuel matrix concepts evaluation under the reference scenario
- Data on oxidation kinetics of various cladding materials
- SiC applications on in-core materials (cladding, channels, control blades)
 - Available data for the desired applications
 - Data gaps
- Technology Readiness Levels definition and evaluation of different concepts
 - Testing needs
 - Modeling needs
- Assessment of severe accident codes with respect to modeling the new fuel/cladding concepts
- Benchmark of proposed concepts against U-Zy system under normal operations

Task Forces

Task Force 1 Systems Assessment

- Metrics
 - Economics
 - Fuel cycle (SNF, ...)
 - Operations
 - DBAs
 - BDBAs
 - Etc..
- TRL definition
- Illustrative Scenario (to feed TF1 and TF2)
- Parametric studies
- Systems Codes

Deliverables

- Definition of the illustrative scenarios and first parametric studies
- Status report + Recommendations and priorities

Task Force 2 Cladding/Core Materials

- Properties
- Evaluation under normal operations (incl. fretting)
- Evaluation under illustrative scenario
- PCI
- Testing needs – data gaps (to be linked to RTFDB)
- Modeling needs – modeling gaps
- Experimental infrastructure

Deliverables

- Status report + Recommendations and priorities

Task Force 3 Fuel Concepts

- Properties
- Evaluation under normal operations (incl. fretting)
- Evaluation under illustrative scenario
- PCI
- Testing needs – data gaps (to be linked to RTFDB)
- Modeling needs – modeling gaps
- Recommendations on priorities

Deliverables

- Status report + Recommendations and priorities