Task on Advanced Reactor Experimental Facilities (TAREF)

CSNI-PRG

TAREF Objectives

Several CSNI member countries are interested in advanced reactor technology.

CSNI has successfully coordinated several international research programs.

CSNI should initiate an activity to support advanced reactor technology.

➡ Task on Advanced Reactor Experimental Facilities (TAREF)

The purpose of TAREF is to identify and prioritize research needs for advanced reactors, specifically Gas Cooled and Sodium Fast Reactors.

Participating Countries

Group composition:

- Canada
- China
- Czech Rep.
- Finland
- France
- Germany
- Hungary
- Italy
- Japan
- Korea
- USA

- Includes regulators, TSO, R&D centres (universities), industry
- Totally 20 experts in Gas Cooled Reactor and Sodium Fast Reactors

TAREF

First Meeting at OECD HQ, on 3-5 November 2008

Second Meeting, same place, on 2-4 March 2009

Substantial amount of work done by all members between the meetings and after the last meeting

Group leaders were elected:

- For Gas Cooled Reactors USNRC, USA
  Dr. Jennifer Uhle
- For Sodium Fast Reactors IRSN, France
  Ms. Joelle Papin

TAREF

Agenda of first meeting, main points:

- General
  - Discussion and approval of Terms of Reference
  - Overall scope and intended schedule, group output, content of final report
  - Working plans for group meetings to complete work scope
- Gas Cooled Reactors (GCR)
  - Overview of safety research in TAREF countries
  - Overview of Phenomena Identification and Ranking Table (PIRT)
  - Overview of questionnaire results
  - Facilities for resolution of safety issues, approach to set priority
- Sodium Fast Reactors (SFR)
  - Overview of safety research in TAREF countries
  - Overview of questionnaire results
  - Definition of safety issues, SFEAR approach
  - Facilities for resolution of safety issues, approach to set priority

TAREF
Outcome and actions from first meeting

Report structure (one report for GCR and one for SFR)

I. EXECUTIVE SUMMARY

II. INTRODUCTION

III. OVERVIEW OF GCR DESIGNS (or SFR DESIGNS)

IV. TECHNICAL ISSUES AND ASSOCIATED FACILITIES

- Technical Areas
- Issues pertaining each Technical Area
- Facilities and issues that can be studied at each facility

IV. CONCLUSIONS AND RECOMMENDATION

TAREF
Task allocation for GCR report

I. INTRODUCTION

- JAEA and GRS, support from Secretariat, by 15 January 2009

II. OVERVIEW OF GCR DESIGNS

- Focus on HTR/VHTR (pebble bed and prismatic design) and GFR
- HTR description available
- CEA to describe gas cooled fast reactor, by 15 January 2009

III. TECHNICAL ISSUES AND ASSOCIATED FACILITIES

Technical Areas →Issues in Technical Area →Facilities vs. Issues

USNRC provides main input on Areas & Issues, by 31 December 2008
based on PIRT (high importance, low to medium knowledge)

Members provide facility description and link to issues, by 31 Jan. 2009

TAREF
Next steps for GCR report

III. TECHNICAL ISSUES AND ASSOCIATED FACILITIES (continued)

Technical Areas:

- Accident analysis and thermal fluids (including neutronics)
- Fission product transport
- High temperature materials (metallic)
- Graphite and Ceramics
- Fuel

Issue → Facility → Capability → Availability

IV. CONCLUSIONS AND RECOMMENDATIONS (at next meeting to be held March 2-4, 2009)

V. Aim: complete the GCR report by June 2009 and the SFR report one year later

TAREF

Agenda of second meeting, main points:

- Gas Cooled Reactors (GCR)
- Status of Chapter 1&2: Introduction & Overview of GCR designs
- Status of Chapter 3: Technical issues and associated facilities
  - ✓ Descriptions of the Technical Areas
  - ✓ Descriptions of the issues pertaining each Technical Area
  - ✓ Facilities vs. issues
- Priority setting, main recommendations for CSNI
- Members' ideas/ suggestions for international undertakings
- Next steps to finalise the report

TAREF

Agenda of second meeting, main points:

- Sodium Fast Reactors (SFR)
- Recall of (provisional) Technical Areas: are changes needed?
- In-depth discussion of technical issues in each area (SFEAR approach)
- Way to finalise technical issues, tasks
- Discussion on facilities, relation to issues
- Priority setting
- Structure of Final Report, schedule
- Tasks allocation to produce the Final Report
- Next steps, tasks and schedule

TAREF

Outcome of second meeting, main points:

- Sodium Fast Reactors (SFR)
- Add Sodium risk to the Technical Areas (before was in SA)
- Pool-type and Loop-type design should be included
- Fuel: both ceramics and metallic fuel to be considered
- Discussion on safety issues to continue at next meeting
- Info on facility already received, link to issues and priority at next mtg
- Tasks allocation to produce the Final Report
- Next meeting on 29 September 2009, in Paris

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Outcome and actions from first meeting

SFR report, progress:

- Technical Areas *provisionally* identified:
  - Thermal-hydraulics
  - Fuel safety
  - Reactor physics
  - Severe accidents
  - Integrity of structures
- Define an initial list of issues for each area
  IRSN, CEA and JAEA to provide the list by 31 January 2009

TAREF Recommendations

TAREF GCR Summary, Highest Rated Facilities

	Accident & Thermal Fluids	Fission Product Transport	High Temperature Materials	Graphite and Ceramics	Fuel
Czech Republic		HTHL	HTHL	HTHL	
France	HEDYT ENIGMA	MERARG		HEDYT	PLINIUS
Germany	HELOKA A2	THAI	High Power Laser Lab		
Italy	HEFUS (avail?)				
Japan	HTTR	HTTR	HTTR		NSRR
USA		ATR	ORNL materials lab INL High Temp Test Lab	MIT Reactor HFIR	ACRR ATR MIT Reactor

TAREF Recommendations

- The Japanese HTTR is a unique resource: It is the only experimental HTGR facility available in the OECD countries context.
- It is a graphite moderated, helium cooled reactor that can reach temperature as high as 1600°C in some transient conditions.
- The HTTR experiments planned to study effects of RCCS performance reduction are highly relevant for HTR safety assessments.
- Actions should be taken to develop an international programme centred on the HTTR capabilities and focused on the safety issues identified in the present task.

TAREF Recommendations

- Develop a GCR safety programme on RCCS performance based at HTTR
- Assess feasibility of a FP and/or HT material separate effect programme in the Czech HTHL
- Promote GCR-related activities in GAMA (CAPS at this mtg), IAGE and WGFS
- CEA to keep the CSNI abreast of developments in the GFR area. In particular
- CSNI should be kept informed on long term plans and progress made for the GFR demonstration reactor (ALLEGRO)

TAREF GCR follow-up

HTTR Proposal covered by a JAEA presentation

Request to CSNI: Set up an experts meeting in September 2009, for a discussion and evaluation of the JAEA HTTR proposal, aiming to possibly start a joint project in spring 2010.

THANK YOU

TAREF

Steps to produce the GCR report:

• Terms Of Reference (TOR)	March 2008
• Questionnaire to members	March-June 2008
• Set up the TAREF group	Summer 2008
• Compilation of quest. answers	September 2008
1. First meeting	3-5 November 2008
• Revision of TOR by the group	At first meeting
• Working method & report structure	At first meeting
• Acquisition of facility data	Jan-February 2009
• Description of GCR safety issues	January 2009
• Rough GCR draft of first chapters	Jan-February 2009
2. Second meeting	2-4 March 2009
• Revision of GCR draft	At second meeting
• Definition of GCR priority & ranking	At second meeting
• GCR facilities, recommendations	At second meeting
• Completion of the draft report	After second meeting