



Design and Construction Code for mechanical equipments of innovative nuclear installations	
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Secretariat : AFNOR	2011-02-16

**Design and Construction Code for mechanical equipments of innovative nuclear installations
CEN WS MRx –**

Chairperson : Mr. Didier Lelièvre, Afcen
Secretariat : Mr. Jocelyn Loumeto, AFNOR

TITLE : Business plan of the CEN/WS 64/Version 2-4 approved during the Kick off meeting on 2011-02-03

SUBJECT : Business plan

SOURCE : CEN/WS 64 Secretariat

ACTION :

- for information**
- for approval at the next meeting**
- any other action**

COMMENTS :

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Business Plan Proposal for a CEN Workshop
Design and Construction Code
for mechanical equipments of innovative nuclear installations
(European Sustainable Nuclear Industrial Initiative)
- CEN WS MRx -

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Status of this Business Plan

Business Plan proposal for a CEN Workshop

1. Background to the CEN Workshop

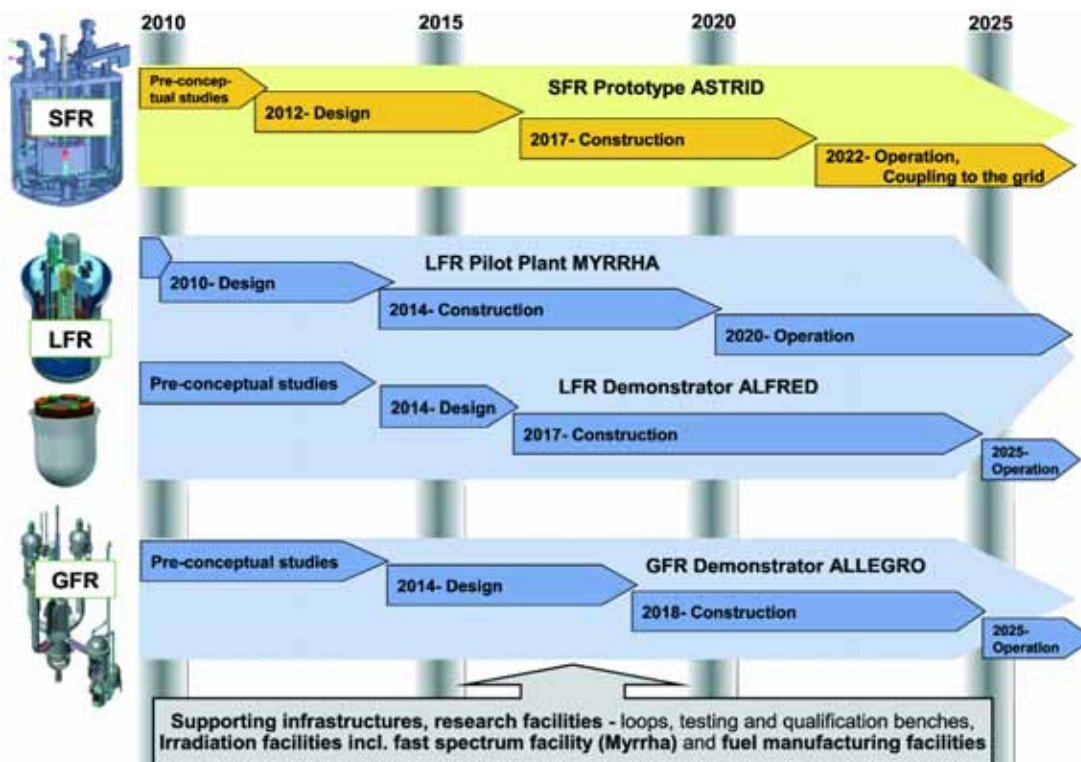
On 22 November 2007, the European Commission published its Strategic Energy Technology (SET) Plan, "*Towards a Low Carbon Future*". This document recognises the Europe needs to act now, together, to deliver sustainable, secure and competitive energy. The inter-related challenges of climate change, security of energy supply and competitiveness are multifaceted and require a coordinated response.

In the SET-Plan the European Industrial Initiatives (EII) constitute key elements with the aims to strengthen industrial energy research and innovation and to mobilise the necessary critical mass of activities and actors. in order to accelerate deployment of new technologies.

With these objectives the creation of European Technology Platforms has brought together stakeholders to define common research agendas and deployment strategies. For the nuclear energy, that this is the Sustainable Nuclear Energy Technology Platform (SNETP).

The SNETP has set up a Task Force comprising research organisations and interested industrial partners to define the European Sustainable Nuclear Industrial Initiative (ESNII).

The ESNII's Task Force has prioritised the fast neutron systems and is proposing to develop a three tracks programme following the scheme below¹:



Considering the choice already made in France and in Belgium to build the mechanical components for ASTRID and MYRRHA on the RCC-MRx² basis, the ESNII Task Force recommended, at its March 2010

¹ SFR: Sodium cooled Fast Reactor; LFR: Lead cooled Fast Reactor; GFR: Gas cooled Fast Reactor

meeting, to bring together all the relevant stakeholders in a CEN Workshop in order to develop, on the RCC-MRx basis, the European code for the design and fabrication of mechanical equipments for ESNII innovative nuclear installations.

1.1 The market environment

Codes for design and construction of nuclear components for current Light Water reactors such as ASME³ section III, Div.1 or Afcen RCC-M, are not adequate for innovative reactors for which geometries, materials, structure environment, loadings and in service conditions are different.

As regards high temperature reactors,

- USA & South Africa are using ASME Section III (Subsection NH and code cases), but, ASME set up in 2009) three new divisions in section III dedicated to high temperature reactors (PBMR, ITER, GRC⁴ and LMR⁵).
- Japan had built the Monju reactor with a domestic Structural Design Guide not available in European languages; as well Russia is building BN 800 with domestic rules unavailable for non-Russian speaking.
- ESS : European Sapllation Source
- The RCC-MR had been set up to capitalise the experience feedback gained in design and construction of Super-Phenix by Germany, France and the UK. In the 90's, it was developed, with the support of the EC, by European countries (France, Italy, UK and Germany) in the framework of EFR (European Fast breeder Reactor) project. It capitalized the experience of French SFR operation and the Phenix refurbishing (1997-2003). The RCC-MR has been chosen by India to built PFBR and selected by ITER for the TOKOMAK Vacuum Vessel.

RCC-MRx is a suitable code for European high temperature and research reactors. It results from merging between RCC-MR and specific rules developed by CEA for the design and construction of the RJH research reactor.

1.2 Existing standards and standard related activities and documents

1.2.1 Standards for design and fabrication in the nuclear industry

Engineering industry standards constitute the basis of the design and construction rules for nuclear reactor components, the aims of the code being to put together these standards, to complement them when it is necessary and to fix the options in order to optimize the equipments quality.

Afcen codes refer mainly to EN standards, but international or US standards can be quoted when EN standards are not available, as shown in the following table:

Standards quoted in the RCC-MRx	Material procurement	Testing NDE	Welding	Fabrication	Design	General	Total
NF	2	7	2	8	9	0	28
EN	33	30	20	8	17	0	108

² The code of design And construction rules for mechanical components of innovative nuclear installations, developed and edited by Afcen, *Association Française pour les règles de Conception, de construction et de surveillance en exploitation des matériels des Chaudières Electro Nucléaires*, the french society for the rules governing the design, construction and operating supervision of the equipment items for electro nuclear boilers.

³ ASME: American Society of Mechanical Engineers

⁴ GRC: Gas cooled reactors

⁵ LMR: Liquid metal reactor

Standards quoted in the RCC-MRx	Material procurement	Testing NDE	Welding	Fabrication	Design	General	Total
EN ISO	4	14	17	7	4	3	49
European standards	39	51	39	23	30	3	185
ISO	0	3	0	5	2	0	10
IAEA	0	0	0	0	0	2	2
International standards	0	3	0	5	2	2	12
ASME	0	0	0	0	7	0	7
ASTM ⁶	5	8	0	0	0	0	13
AWS ⁷	0	0	12	0	0	0	12
US standards	5	8	12	0	7	0	32
Total	44	62	51	28	39	5	229

1.2.2 International nuclear standards activities

There are currently no European standardization activities in CEN concerning nuclear energy, although in CENELEC, TC 45AX, "Instrumentation and control of nuclear facilities" and TC 45B, "Radiation protection instrumentation" are mirror groups of IEC TC45.

At international level, ISO TC85 covers the nuclear energy field with a long-term objective⁸ "to produce new sets of standards in parallel with the international development of new technologies for future reactors", bearing in mind that "future reactor technology will have to manage higher temperatures and higher neutronic irradiation. This will need the development of new materials. The standardization of these new materials might be a focus point of ISO/TC 85." When available, such standards could become RCC-MRx references.

2. Workshop Proposers and Workshop Registered Participants

2.1 Workshop Proposers

The proposers of this Workshop are:

- Afcen and Afcen members,
- Stakeholders of SNETP task force for ESNII,

The full list of the Workshop Proposers is provided at Annex A.

2.2 Workshop Registered Participants

The CEN Workshop on Design and Construction Codes is built-up to meet the needs of ESNII projects (namely, ASTRID, MYRRHA, ALFRED and ALLEGRO,), European Union projects (JHR⁹ reactor, ITER¹⁰ vacuum vessel, TBM for ITER ...) and other European projects like ESS. Consequently, the managers of all these projects will be invited to join the Workshop.

Any other organisations among nuclear development stakeholders that agree with the objectives of the Sustainable Nuclear Energy – Technology Platform (SNE-TP) and ESNII and wishing to take an active part in this Workshop will be welcome. Registered participants shall accept the Business Plan and the requirements of section 6 below and pay their contribution to the Workshop fees.

⁶ ASTM: American Society for Testing and Materials

⁷ AWS: American Welding Society

⁸ ISO/TC 85 Business Plan, Date: 01/09/2008 ref: ISO/TC 85 N 1031

⁹ JHR: Jules Horowitz research Reactor

The registered participants will be listed in Annex A once the Workshop is established.

3. Workshop objectives

The proposed CEN Workshop will allow the Workshop members to consider the RCC-MRx 2010 and to propose modifications to be included in the RCC-MRx 2012 edition to meet the needs of MYRRHA and ASTRID projects and to prepare the design and construction of ALFRED and ALLEGRO, as well as other projects like ESS

This will contribute to share a common European approach on structural integrity for innovative nuclear installations components by:

- rationalising pre-normative R&D activities in Europe and capitalizing European R&D results into an European Framework,
- capitalising European and international feedback of experience gained in the design and construction of innovative nuclear systems (ITER, PFBR (India), etc....)
- meeting the WENRA¹¹ objectives to develop a common European approach for innovative nuclear prototypes in the field of structural integrity,
- reinforcing the links between European mechanical engineering standards and the nuclear industry.

4. Workshop programme

The working language will be English, and the final CEN Workshop Agreement (CWA) will be published in English.

Afcen will make available, free of charge, to the Workshop members the current issue of the English RCC-MRx file for consideration and drawing up modification proposals.

The RCC-MRx is an input of Afcen to the Workshop activities. It will remain the property of Afcen after integration of the modifications proposed by the CEN Workshop.

ESNII project needs and linked modification proposals related to section 2 (additional requirements and special instructions) and section 3 (set of applicable rules) of the RCC-MRx are to be identified by the Workshop members and submitted to the Workshop. The Workshop will work in three steps:

- Modification files¹² proposed by the Workshop participants will be sorted into:
 - short-term modifications for which data and justifications are available and do not need pre-normative R&D. They could be linked with the RCC-MRx acceptability for specific projects
 - medium-term modifications for which modification review needs some pre-normative R&D activities and should be delayed to a future Workshop agreement....
 - long-term modifications which need to acquire further R&D results before review....The modification files sorting will be concluded by a report.
- Preparation of Modification review files for each short-term modification which should be completed in time for the RCC-MRx 2012 edition.

¹¹ The Western European Nuclear Regulators Association

¹² Modification files should contain:

- The reasons for the proposal
- The justification criteria of the modification
- The modification's repercussion on the component design and faisability
- A proposal for modified texts

- Review of public comments on the final Workshop Agreement draft, placed on the web for a minimum of 60 days after the Workshop Plenary approval

After the Workshop Plenary endorsement, the modification review files will be transmitted to Afcen which, acting as maintenance organization, is in charge to update the RCC-MRx and to issue the next edition according to its own procedure.

5. Workshop process

The process diagram to produce the CEN Workshop Agreement can be schematized as follows:

Steps	Actors	Requesters	WS Secretariat	WS 64	WGs
1	Proposal of Modification files.				
2	Recording of the Modification Request, Dispatching to WS and WGs, database updating.				
3	Sorting of the Modifications Requests into "short-term", "medium-term" and " long-term"				
	Endorsement of the Sorting report by the Workshop Plenary				
4	Preparing Modification reviewfiles for the short-term modifications by the Working Groups				
5	Endorsement of the modification reviewfiles proposed by the Workshop Plenary				
6	Registration of the endorsed modification reviewfiles in the database.				
7	Modification reviewFiles Compendium diffusion to CCMC for public enquiry				
8	Public comments review				
9	Transmission of the final CWA draft to CCMC for publication				

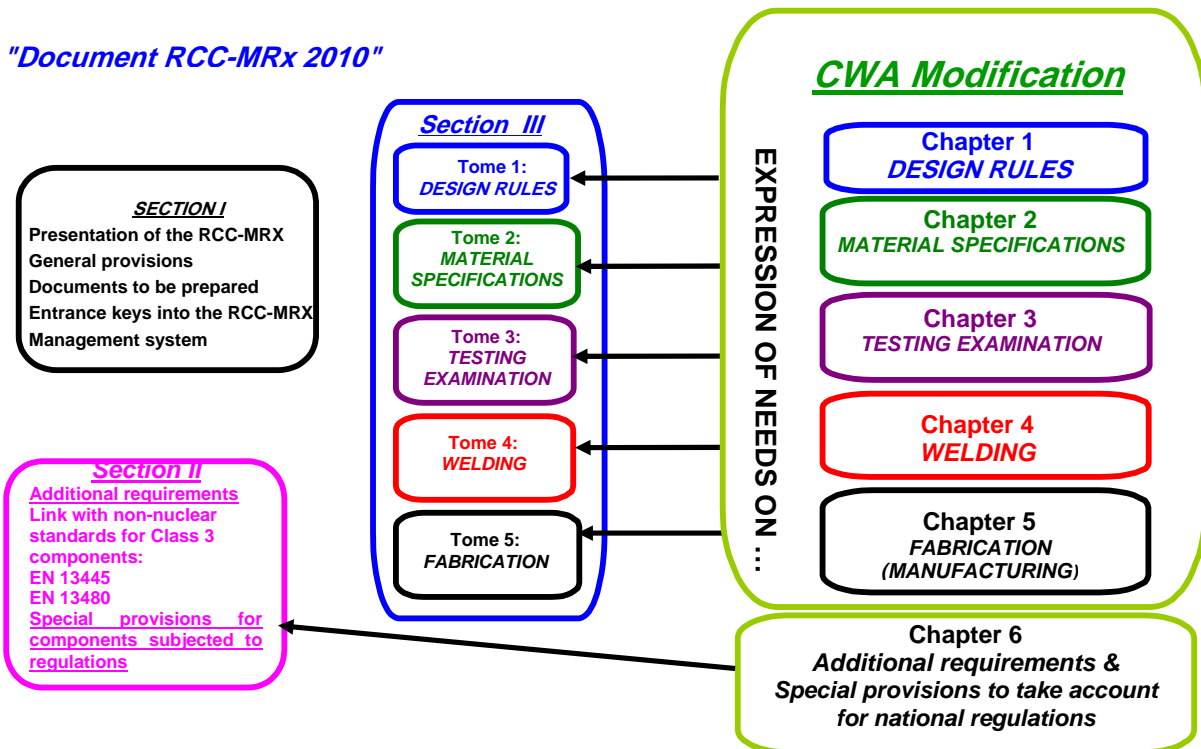
6. Exploitation rights and confidentiality rights

The exploitation rights in the CWA will be transferred to CEN in accordance with the general CEN policy. Afcen will retain the exploitation rights in the original and modified RCC-MRx, subject to the an agreement by CEN-CENELEC SD-COMPOL Committee. Information provided by Workshop participants during the Workshop's activities may be required to be treated on a confidential basis; in which case, the participants may be asked to sign a non-disclosure agreement.

7. Workshop Agreement contents

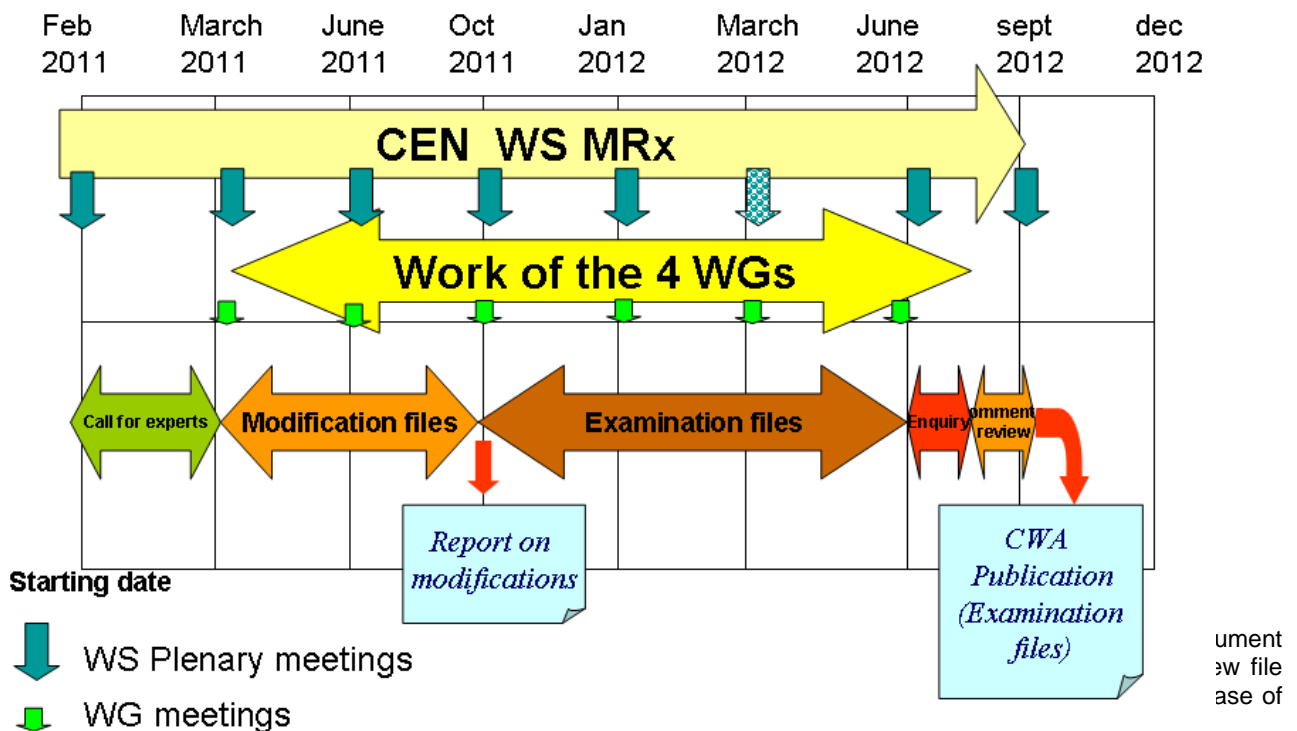
The final draft CEN Workshop Agreement should contain the complete set of modification review files of the modifications to be included in the next issue of the RCC-MRx section 2 and RCC-MRx section 3.

The CEN Workshop Agreement is proposed to be organized in 6 chapters, following the diagram below:



8. Workshop timetable

In addition to the Kick-off meeting, three Plenary meetings are proposed: a meeting to endorse the modification list (provisionally November 2011), a meeting to endorse the CWA draft and the final meeting, to approve the final CWA after review of the external comments. Two Intermediate meetings could be held if needed to facilitate the work progress in the working groups. The Workshop time table is summarized on the schema below:



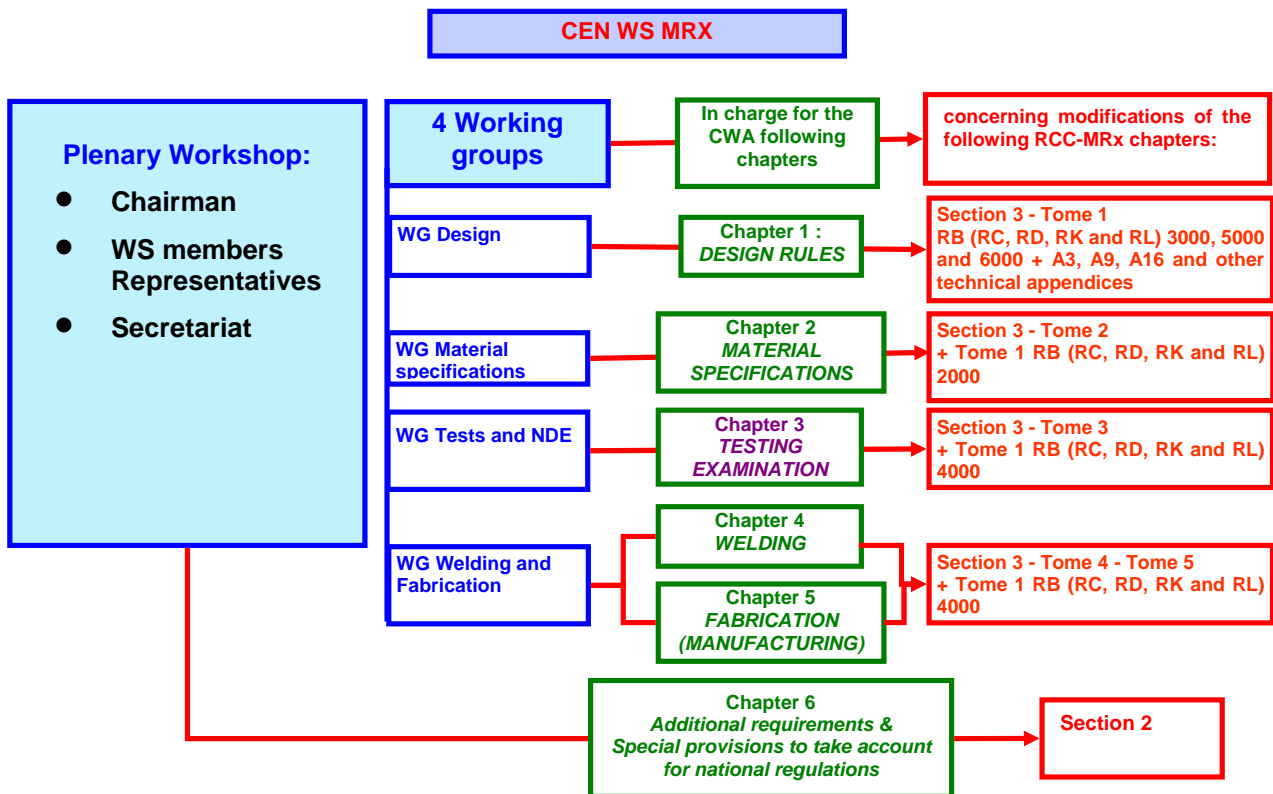
9. Workshop organization

9.1 Workshop general organization:

The Work will be shared between four Working Groups:

- WG 1 in charge of Chapter 1: Design rules
- WG 2 in charge of Chapter 2: Materials specifications
- WG 3 in charge of Chapter 3: Tests and non-destructive examinations
- WG 4 in charge of Chapter 4: Welding
and Chapter 5: Fabrication (Manufacturing)

The Plenary will be responsible for the Chapter 6 related to additional requirements and specificities related to national regulations following the schema below:



9.2 Workshop Chairman

Afcen proposed the Workshop Chair to the approval of the Kick-Off meeting

The responsibilities of the Workshop Chairman will be:

- To preside at Workshop Plenary meetings.
- To ensure that the Workshop delivers in line with its Business Plan.
- To manage the consensus building process
- To interface with the CCMC¹³ regarding strategic directions, problems arising, external relationships,
- To work with the Workshop Secretariat on general management issues

9.3 The Workshop Secretariat

AFNOR, the French member of CEN (proposed by Afcen) is nominated as Secretariat, and endorsed during the Kick-Off meeting.

The CCMC organised the Kick-Off meeting in collaboration with the Chair and the Secretariat.

- to organize the agenda of the Kick-Off meeting in liaison with sponsors. The costs of the Kick-Off meeting will be borne by CCMC if the meeting is held in its premises, and otherwise by the proposed Secretariat in relation with the sponsors
- CCMC registered attendance at the Kick-Off meeting and expressions of interest in membership for non-attendees

¹³ CCMC: CEN-CENELEC Management Centre

Duties related to the operation of the Secretariat:

KICK OFF MEETING

Coordination with CCMC, Chairperson, WG members.

Presentation of the BP, assistance for its validation at the Kick-off meeting

Operational assistance to WG conveners

Updating of the business plan after the kick-off meeting

Attendance to meeting

Drawing up, sending and mailing of invitations, agenda, working documents

Drawing up, sending and mailing of meeting report, attendance list, action items, decisions summary, list of pending items, register of minority views, planning for future meetings.

SUPPORTING TO THE WORKSHOP AND WORKING GROUPS

Website + e-forum

Meeting places at CEN or AFNOR premises

Virtual meeting facilities at AFNOR premises

Coordination with Plenary Workshop Meetings

PLENARY WORKSHOP MEETINGS

Coordination with the Working Groups

Attendance to meetings

Drawing up, sending and mailing of invitations, agenda, working documents

Drawing up, sending and mailing of meeting report, attendance list, action items, decisions summary, list of pending items, register of minority views, planning for future meetings.

PROJECT MANAGEMENT

Project, decisions and actions follow-up, chasing action items of concerned members.

Updating of the programme of work, schedule, Business Plan....

Call for expert for WGs and WGs lists

Editing the CWA and rewriting prior to submission to CCMC for approval and publication

Coordination with CCMC (approval and publication and review)

9.4 Workshop Plenary and Working groups

The Workshop Plenary will:

- deal with modifications requirements related to Section II,
- coordinate the Working groups activities
- support the WS Chairperson in the efforts
- ensure that the Workshop delivers in line with its Business Plan.
- manage the consensus building process
- endorse the Working group reports presented by the Working Groups Conveners
- approve the modification sorting proposed by the Working Groups and presented by the Conveners,
- approve the Modification review files proposed by the Working Groups and presented by the Conveners,
- draw up and approves the Modification review files compendium to be transmitted to Afcen

The Workshop Plenary includes the Chairman and the Secretariat (according to above Schema) and the Working Group Conveners. It is proposed to limit the Workshop Plenary participation to one representative per registered participating organization.

The Working Group Conveners will be appointed during the Workshop kick-off meeting by the participants on the basis of nominations to be received.

Their responsibilities are:

- To convene the Working Group activities and to chair the Working Group meetings.

- To ensure that the Working Group delivers in line with its Business Plan.
- To manage the consensus building process
- To interface with the Workshop Chairperson regarding strategic directions, problems arising, external relationships, etc.

Working Group experts shall comprise representatives of the Workshop registered participants. However, experts coming from other organisations may be invited to join a Working Group meeting on invitation of the Convenor, and with the agreement of the WG experts.

Working groups shall be in charge of:

- Identifying the ESNII needs and of all potential modifications of the RCC-MRx in order to meet the identified needs;
- sorting the modification proposals into
 - short-term,
 - medium-term, which needs pre-normative activities,
 - long-term which need R&D programme developments before examination;
- assessing the short-term modification files;
- preparing modification review files for the short-term modifications.

10. Kick-Off meeting and working procedures

The objectives of the Kick-Off meeting are:

- To approve the business plan,
- To confirm the Secretariat of the CEN Workshop,
- To appoint the Workshop Chairman,
- To appoint the Working Groups Conveners,
- To approve the working procedures for the Workshop.

Draft working procedures will be provided in advance to the registered participants of the Kick-Off meeting. They should be harmonised with the Afcen procedures in order to make easier the integration of the modifications into the next edition of the RCC-MRx.

11. Resource requirements

Manpower:

- Each participating organization provides experts and contributors to the Workshop
- All costs relative to the WS activities will be borne by the participants

Other costs:

- Secretariat and CCMC
- Estimated costs: 120 k€ for 2 years
- Possible sponsoring by EC (unknown amount at present)
- Remaining costs shared equally between the participants for
- 2 payments called up at the beginning of each civil year:
 - lump sum of 5 k€ at the beginning of 2011
 - complementary funding for the remainder at the beginning of 2012.

12. Related activities, liaisons, etc.

- The CEN Workshop on Design and Construction Codes is built up to meet the needs of ESNII projects. It is proposed that, in order to harmonize the Workshop objectives with the ESNII view, the Workshop Chairman will report on the Workshop activities once a year to the SNETP Task Force for ESNII.
- Prenormative R&D supporting the design and construction code for innovative nuclear facilities is proposed by EERA through its joint program on Structural materials for Innovative Nuclear Systems, Subprogram 1: Support to Industrial Initiative (JRC-Petten). This subprogram corresponds to the MATTER Euratom project with which the Workshop will liaise.

- ISO/TC 184 SC4 liaison

ISO/TC 184 SC4 develops innovative standards for the computer representation of industrial data. Several of these standards in the ISO 10303 and ISO 15926 series will be valuable for the nuclear industry to use for the sharing and communication of data for design, construction and operation of the proposed new designs.

13. Contact points

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Annex A

Workshop proposers

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