

Nuclear Safety Harmonization in Europe

WENRA Approach

by

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Aiming to highlight

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- **WENRA**
- **Harmonization – what is it?**
- **Reactor Harmonisation Working Group project**
 - **Overview of comments and revision process**
 - **Overview of changes to Reference Levels**
 - **Ongoing work**
- **Conclusions**

Western European Nuclear Regulators Association



- **Nuclear safety was included in the EU enlargement criteria**
- **National safety approaches: common sources but independent development**
- **Western European Nuclear Regulators Association was established in February 1999**

WENRA Objectives

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- **Development of a common approach**
- **Networking**
- **Experience exchange**
- **Discussion of significant safety issues**

What is Meant by Harmonization?

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- **Neither uniformity nor loss of responsibility**
- **A prerequisite for avoiding work duplication**
- **Harmonization is to enable all involved to achieve the best standards more easily**

WENRA's harmonization concept

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“No substantial differences between countries from the safety point of view in generic, formally issued, national safety requirements, and in their resulting implementation on Nuclear Power Plants.”

Also

Independent of regulatory regime

Existing reactors only

RHWG Project -Terms of Reference

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- **Existing NPPs safety only**
 - **Not radiation or physical protection**
- **Cover deterministic, probabilistic, management, & safety culture aspects**
- **Focus on regulators' requirements of licensees**
 - **Not regulatory practices**

Identification of Safety Issues

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- **Five main safety areas – 18 Safety Issues**
(listed in the RHWG report)
 - **Safety Management – 4**
 - **Design – 3**
 - **Operation – 5**
 - **Safety Verification – 4**
 - **Emergency Preparedness – 2**

Project Timeline

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1999 WENRA's harmonization ideas developed

Pilot Project to devise a methodology

- **Reference Levels devised for 6 safety issues**
- **9 countries benchmarked**
- **2002 Results reported**

2003 Main project used Pilot Project experience

- **Number of safety issues increased to 18**
- **17 countries benchmarked**

2005 November WENRA RHWG report finalised

Project Timeline -contd

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2006 February WENRA Seminar in Brussels - stakeholders asked for comments

2006 June - September Review of comments submitted by stakeholders

- RHWG agreement on modified Reference Levels
- RHWG a proposal for revised Reference Levels submitted to WENRA

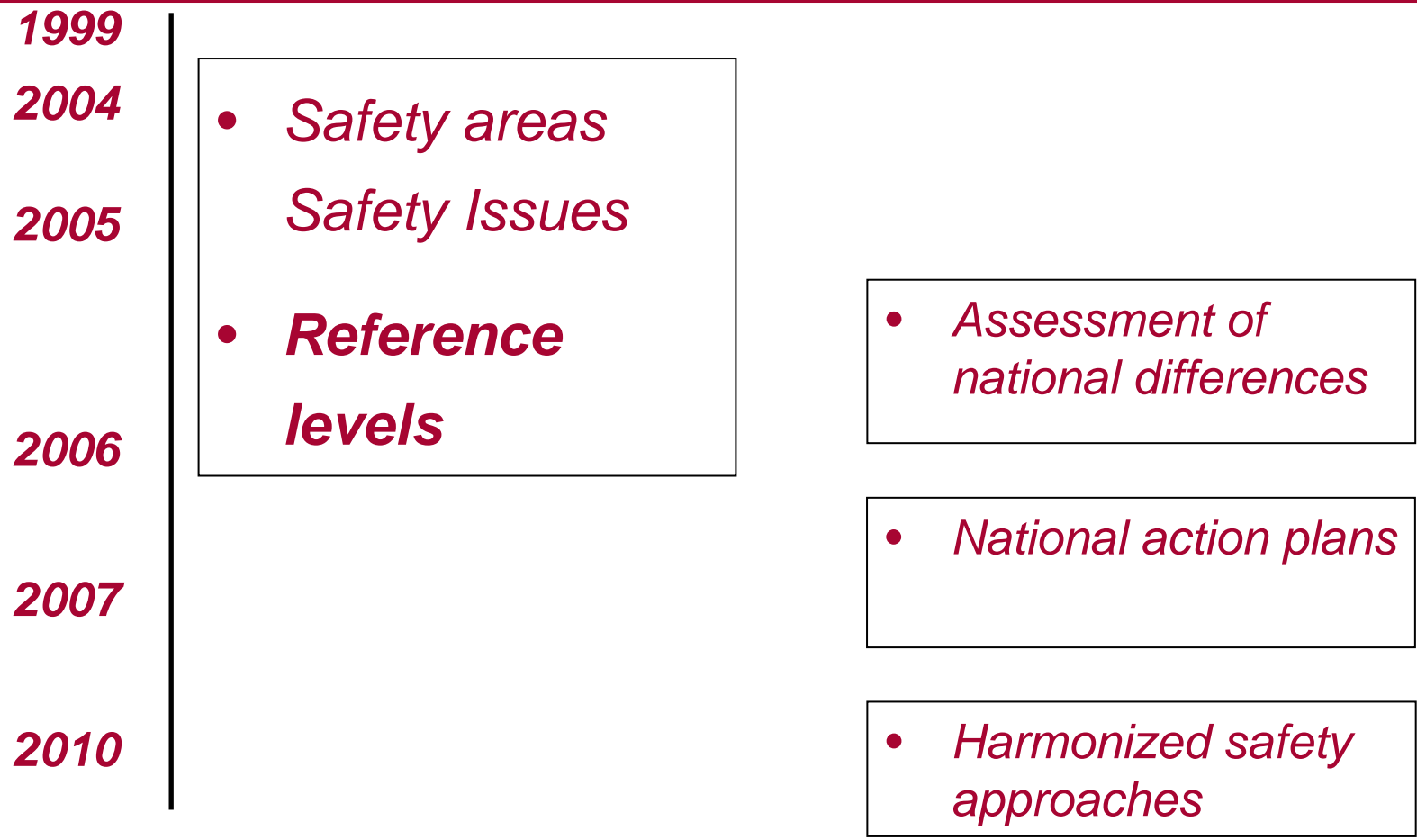
2006 October - December RHWG proposal reviewed by WENRA members

2007 January WENRA agreed the revised set of Reference Levels

WENRA Reactor Safety Reference Levels January 2007 published on www.wenra.org

National Action Plans for harmonization by 2010

Steps towards harmonization



Development into Reference Levels

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- **‘Reference Levels’ developed for Safety Issues**
 - **High-level requirements**
 - **Judgements of best practice**
 - **Useful for judging harmonization**
 - **Number per issue is not significant**
 - **IAEA Safety Standards used**
 - **Plus RHWG members’ high level of experience**

Relation with IAEA Safety Standards

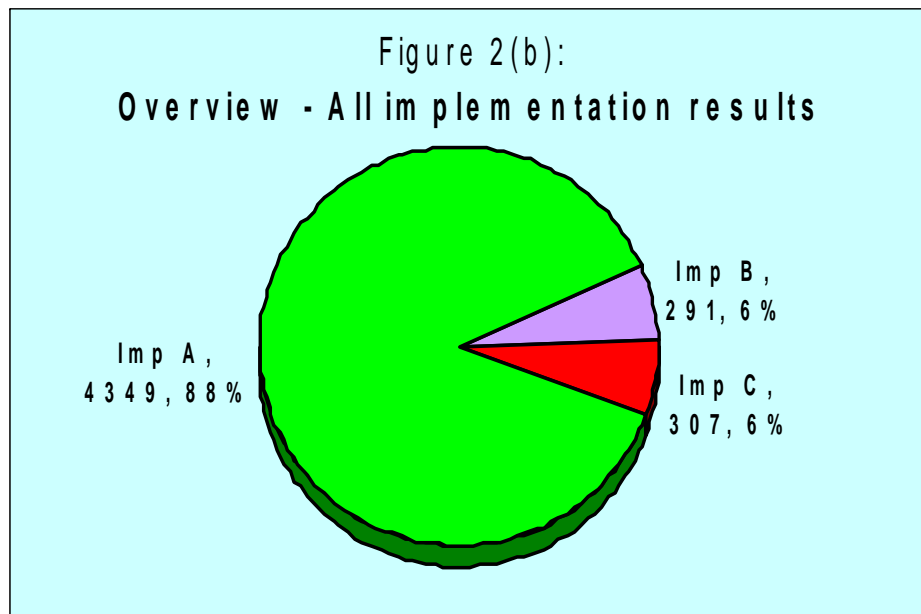
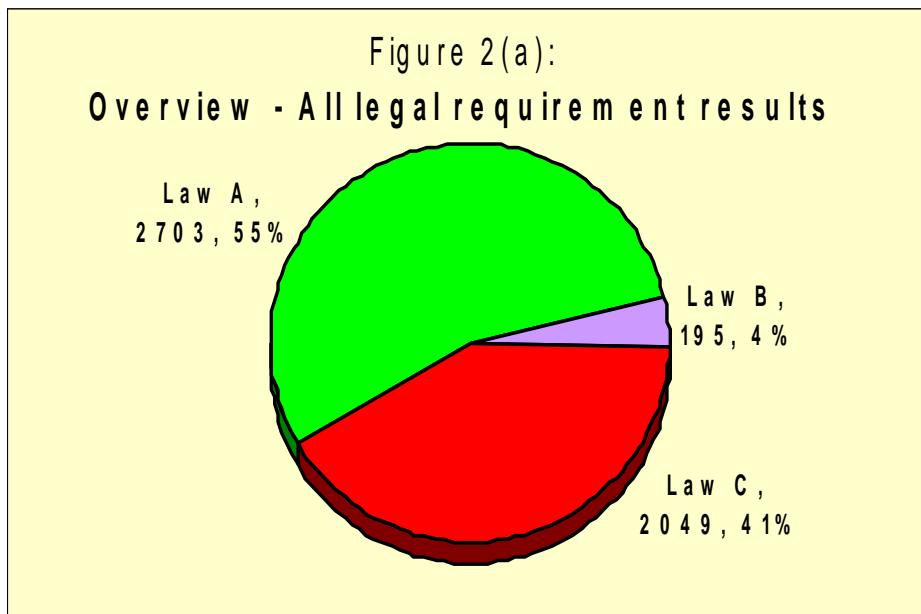


Safety Area	Safety Issue	IAEA References
Safety Management	A Safety Policy	NS-R-2, NS-G-2.4
	B Operating Organisation	NS-R-2, NS-G-2.4
	C Quality Management	50-C-Q; 50-C-Q1; 50-C-Q2; 50-SG-Q3; 50-SG-Q5; 50-SG-Q6; 50-SG-Q13 DS 338
	D Training and Authorisation of NPP Staff (jobs with safety importance)	NS-R-2, NS-G-2.8, NS-G-2.4
Design	E Design Basis Envelope for Existing Reactors	NS-R-1, NS-G-1.2
	F Design Extension of Existing Reactors	
	G Safety Classification of Structures, Systems and Components	
Operation	H Operational Limits and Conditions	NS-R-2, NS-G-2.2
	I Ageing Management	NS-R-1, NS-G-1.2, NS-G-2.4, NS-G-2.6
	J System for Investigation of Events and Operational Experience Feedback	NS-R-2, NS-G-2.4, DS 288 (now NS-G-2.11), SS-110
	K Maintenance, In-service Inspection and Functional Testing	NS-R-2, NS-G-2.6, NS-G-1.2
	LM Emergency Operating Procedures and Severe Accident Management Guidelines	NS-R-1, NS-R-2, NS-G-1.2, NS-G-2.2, NS-G-1.10, GS-G-4.1, NS-G-2.10, NS-G-2.8, SS-50-SG-Q13, SS-110
Safety Verification	N Contents and Updating of Safety Analysis Report (SAR)	GS-G-4.1, NS-R-2
	O Probabilistic Safety Analysis (PSA)	NS-R-1, NS-G-1.2, NS-G-2.6
	P Periodic Safety Review (PSR)	NS-R-2, NS-G-2.10
	Q Plant Modifications	NS-R-2, NS-G-2.3
Emergency Preparedness	R On-site Emergency Preparedness	GS-R-2, NS-R-2
	S Fire protection against Internal Fires	NS-R-1, NS-R-2, NS-G-1.2, NS-G-1.7, NS-G-2.1

Grand totals



Figure numbers as in RHWG report

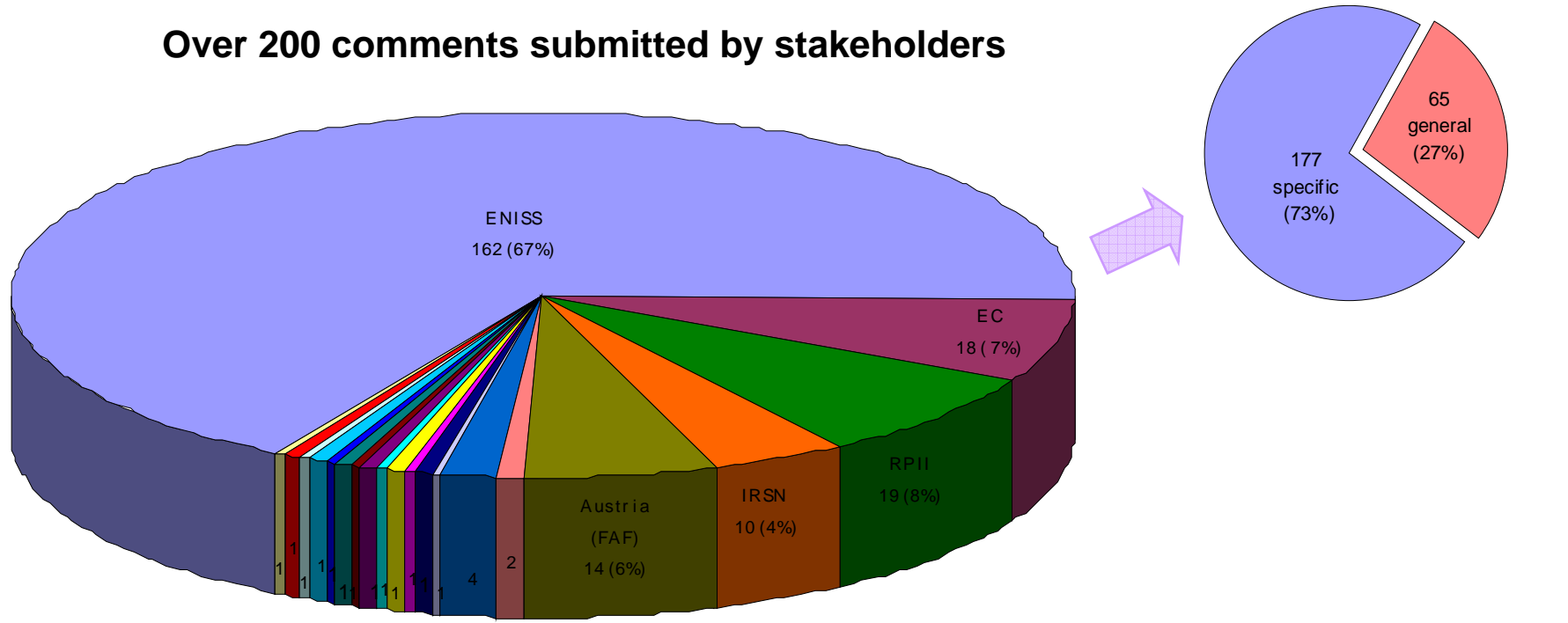


- Code A – Already harmonized
- Code B – Justifiable difference
- Code C – Needs harmonizing

Comments received



Over 200 comments submitted by stakeholders



- ENISS
- IRSN
- GPR (Groupe Permanent Reacteur)
- EDF
- E.ON Kernkraft GmbH
- Slovenske Elektrarne
- Teollisuuden Voima Oy
- EC (European Commission)
- Austria (FAF - Forum für Atomfragen)
- RA (Risque Attitude)
- Electrabel
- Fortum Nuclear Services
- Swisnuclear
- Vattenfall Europe Nuclear GmbH
- RPII (Radiological Protection Institute of Ireland)
- SKI
- AREVA
- EnBW Kraftwerke AG
- RWE Power AG
- Tractebel

Revision process

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All the comments have been thoroughly analysed by RHWG.

The review process focused on the comments made on specific Reference Levels.

Changes agreed by RHWG aimed at better clarifying the intent of the Reference Levels, to ensure their consistent interpretation.

Revision process

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Revised Reference Levels and justification for proposed changes were submitted to WENRA for review and approval.

Comments by WENRA members after review, lead to a new RHWG proposal submitted to WENRA in December 2006.

In January the revised set of Reference Levels, agreed by all WENRA members, was published on the WENRA website.

Restructuring of E and F



Verification and Improvement of the Design

1. Selection of design basis events and hazards
2. Demonstration of reasonable conservatism and safety margins of the design basis
3. Definition and application of technical acceptance criteria
4. Accidents beyond design basis
5. Instrumentation and hardware provisions for the management of severe accident conditions
6. Improvement of the design

Design Basis Envelope for Existing Reactors

1. Objective
2. Scope
3. Safety strategy
4. Safety functions
5. General design basis
6. Design of safety functions
7. Instrumentation and control systems

E Design Basis Envelope for Existing Reactors

1. Objective
 2. Safety strategy
 3. Safety functions
 4. Establishment of the design basis
 5. Set of design basis events
 7. Definition and application of technical acceptance criteria
 8. Demonstration of reasonable conservatism and safety margins
 9. Design of safety functions
 10. Instrumentation and control systems
 11. Review of the design basis
- Appendix (with list of events)

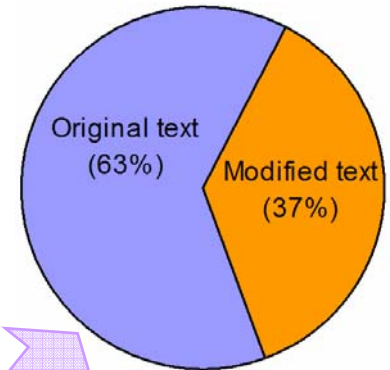
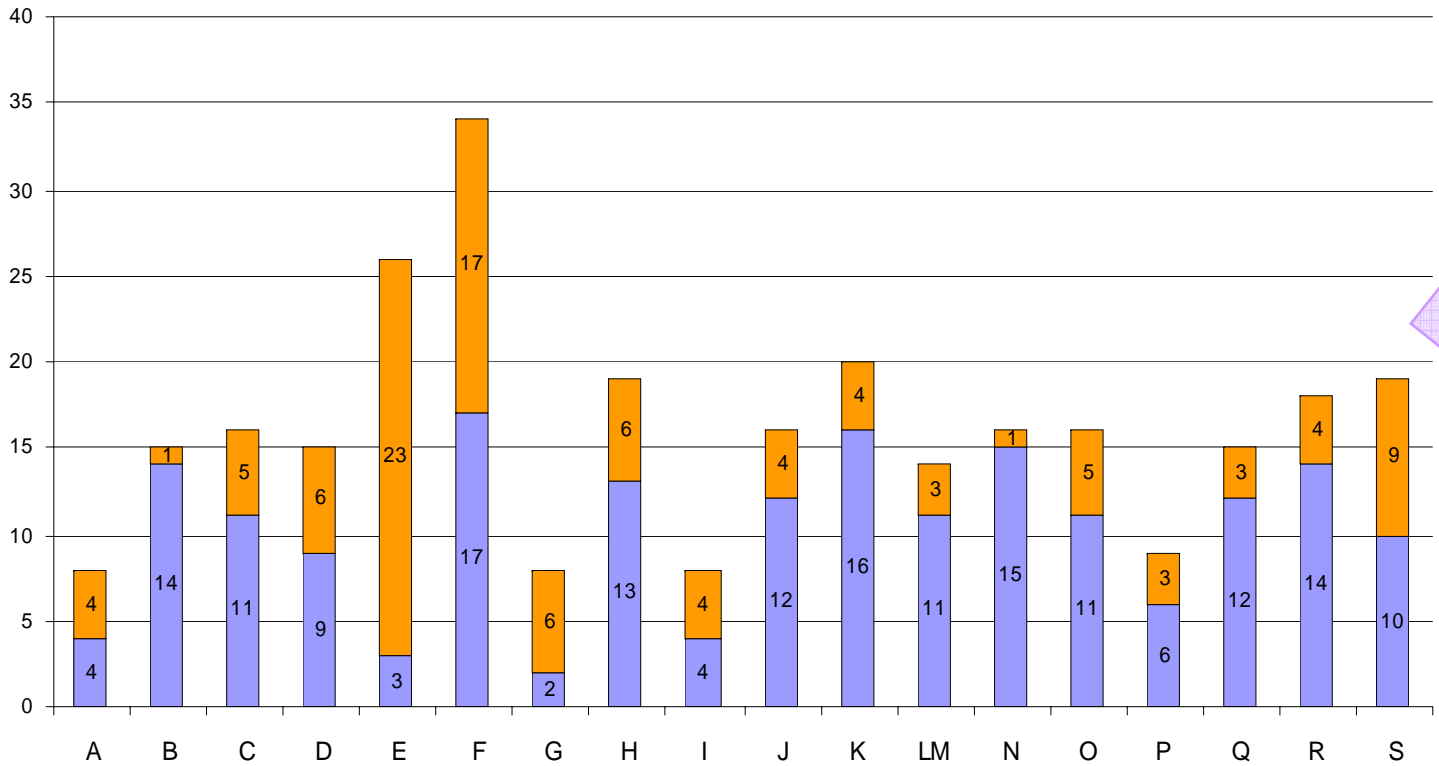
F Design Extension of Existing Reactors

1. Objective
 2. Selection and analysis of Beyond Design Basis Events
 3. Instrumentation for the management of beyond design basis accident conditions
 4. Protection of the containment against beyond design basis accidents
- Appendix (with list of events)

Changes to Reference Levels



Status of Reference Levels by Issue
 (graphs show only the modifications to the text of the original RLs
 reshuffling of E and F is not reflected)



Safety Issue

■ modified RLs

■ original RLs

National action plans

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Preliminary action plans had been drawn up by WENRA countries based on the results of the benchmarking performed against the first version of the Reference Levels.

The revisiting of benchmarks is done on a self-assessment basis. The national action plans are under revision to take into account the current Reference Levels.

RHWG will establish a process for following up on action plans.

- **Commitment by the year of 2010 to improve and harmonize national regulatory systems , using as a minimum the reference levels.**
- **Revise reference levels when new knowledge and experience are available.**

Revision of Issue C

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Issue C (Quality Management System) is in process of updating to make the transition from requirements on QMS to requirements on Integrated Management System, taking into account the development of IAEA Safety Standards.

A new benchmark in this area to be performed this year.

Results of the harmonization study

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- **Large undertaking for WENRA countries**
 - **Very good network created through the project**
 - **All 17 countries have been benchmarked against all 18 Safety Issues**
- **Results showed good harmonization**
- **Validated results – effective methodology**
- **Countries can develop Action Plans from them & should be able to meet WENRA's 2010 target**

Conclusions

RHWG

- **Major project involving 17 countries and 18 issues.**
- **Set of agreed Reference Levels signed up to by all WENRA members.**
- **Significant amount of work was done to clarify issues linked to the interpretation of Reference Levels to ensure their common understanding by the end-users.**
- **The current version of the Reference Levels is ready to be used for further developing and implementing the national action plans to achieve the goal of harmonization of reactor safety in WENRA countries.**

- **Further information on www.WENRA.org**
- **Thank you for your attention**