

MDEP Activities and Accomplishments on Design Specific Working Groups

**2nd CNRA International Workshop on “New Reactor Siting,
Licensing and Construction Experience”**

Atlanta, Georgia, USA

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■ EPR Working Group

Members- RB from:

Canada, China, Finland, France,
India, U.K., U.S.

■ AP1000 Working Group

Members-RB from: U.S., China,
Canada, U.K.

Accomplishments

- Developed Common Positions (EPR Digital I&C design, AP1000 squib valves)
- Shared issues identified, questions to applicant, and drafts of evaluations
- Identified differences among various country designs
- Identified additional questions for applicants based on MDEP interactions



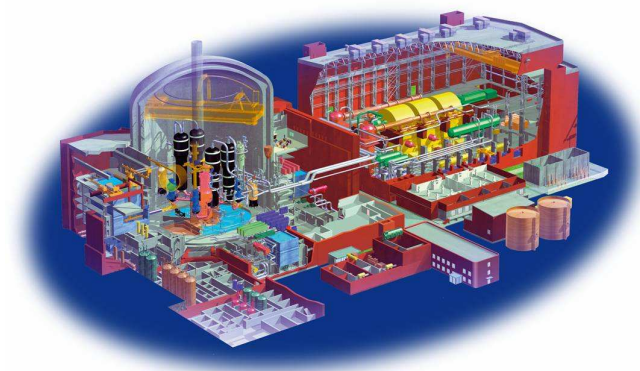
- ✘ There is no obligation for any regulatory body to follow them.
- ✘ If a regulatory body chooses to adopt a Common Position, it is through that country's normal processes.
- ✘ The responsibility for regulatory decisions continues to be with the national regulator.

AP1000 WG

- Accomplishments
 - Common positions developed
 - Squib valve qualification, testing, maintenance CP developed
 - Guidelines for novel construction drafted
 - Sharing of pre-lease version of safety evaluation
 - Design review documents stored in MDEP library
 - Working relationship with counterparts facilitates communications
- Next steps
 - Increased cooperation planned to aid CNSC to complete phase 2 licensing review of the AP1000
 - Share actions on Fukushima regulation
 - Gain knowledge on construction challenges for feedback into design

EPR Working Group - Goals

- Goal of the MDEP EPRWG is to share information and experience on design reviews and construction oversight in order to
 - leverage the technical evaluations completed by each of the participating regulators
 - leverage the resources and knowledge of the national regulatory authorities
 - develop consistency between regulators and/or to understand differences
 - develop joint assessment on specific subjects
 - make safety assessments more robust and increase the safety level of EPR



EPR Working Group - General

- Members of EPR WG are regulators from:
 - Canada,
 - China,
 - Finland (chair),
 - France (co-chair),
 - India,
 - United Kingdom,
 - United States
- Countries where EPR is being licensed or constructed
- Group has been meeting regularly since early 2008

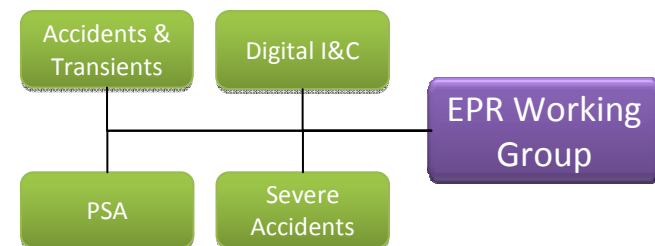


EPR Working Group - Activities

- General meetings on the status of each EPR project
 - discussions on the status of design review, construction
 - goal to identify new items for in depth discussions in the group
- Specific task groups for
 - instrumentation and control, covering also electrical issues
 - probabilistic safety assessment
 - accidents and transients
 - severe accidents
- Issue specific meetings, teleconferences/net meetings and email exchanges on specific topics
 - Internal hazards, radiation protection, human factors, grouted tendons, technical specifications, spent fuel cask loading, commissioning
- Implications on EPR design enhancements of Fukushima accident considered by EPRWG and TESSG



Source: EDF

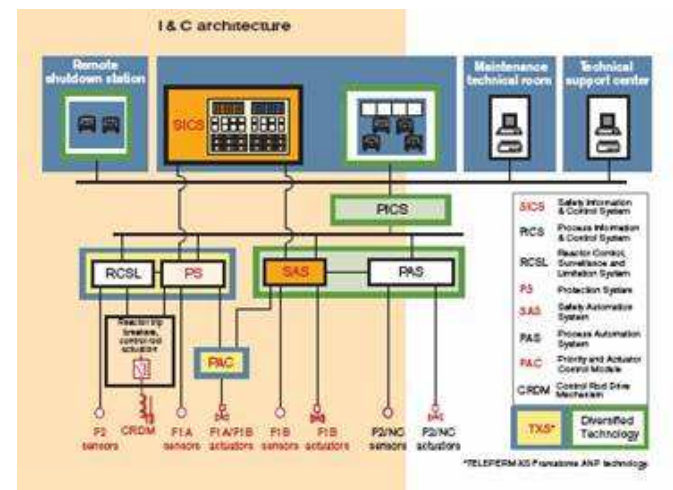


EPR Working Group - Fukushima follow up

- Continue discussions within the EPRWG about approaches being taken by regulators regarding Fukushima-related issues
 - Position on Fukushima related issues – Draft
- Items for technical experts subgroups
 - Arrangements for long lasting loss of electrical power (supplies and distribution systems)
 - Reliable and qualified instrumentation for dealing with severe accidents
 - Management of pressure in containment during severe accidents
 - Ensuring the long term cooling of spent fuel pool
 - Long term sub-criticality
- Discussions with AREVA/EDF, TVO, TNPJVC, NNB Genco, and UniStar about actions being taken to address lessons learnt from the Fukushima accident

EPR Working Group - Instrumentation and Control

- Common position published in 2010 highlighting areas where harmonization can be further achieved
 - Simplicity as design principle
 - Data communication independence
 - TELEPERM XS digital platform and software
 - Embedded digital systems
 - Back up systems for defence in depth and diversity
- Some of the common positions and experiences were input to the MDEP digital I&C ISWG discussions
- Program plan
 - Loss of electrical power robustness, arrangements for long lasting loss of electrical power
 - Technical report on EPR DI&C issues
 - Update DI&C Common Position



Source: Areva EPR Brochure March 2005

EPR Working Group - PSA

- Comparison of EPR PSAs
 - Main result and risk profiles
 - Causes for differences and their risk significance
 - Identification of potential issues
 - Sharing with the vendors
 - Comparison report under elaboration

- Co-operation with other subgroups
 - Modeling of I&C
 - Insights from level 2 analyses, severe accidents

- Work can be limited by the restrictions related to protection of proprietary information



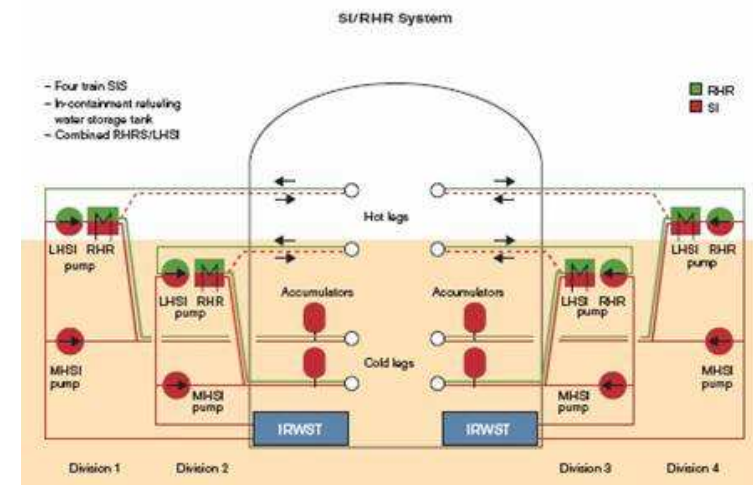
Source: Clipart



Source: Areva EPR Brochure March 2005

EPR Working Group - Accidents and Transients

- Activities ongoing within the following areas
 - Regulatory approaches and methodologies for accident analysis
 - Containment performance
 - Fuel and core design
 - Criticality safety
- Products in the process of being finalized
 - Technical report identifying the differences in regulatory criteria and approaches,
 - Containment circulation/mixing response evaluation
 - Mass and energy releases in containment
- Future topics related to Fukushima lessons learned: Long term sub-criticality

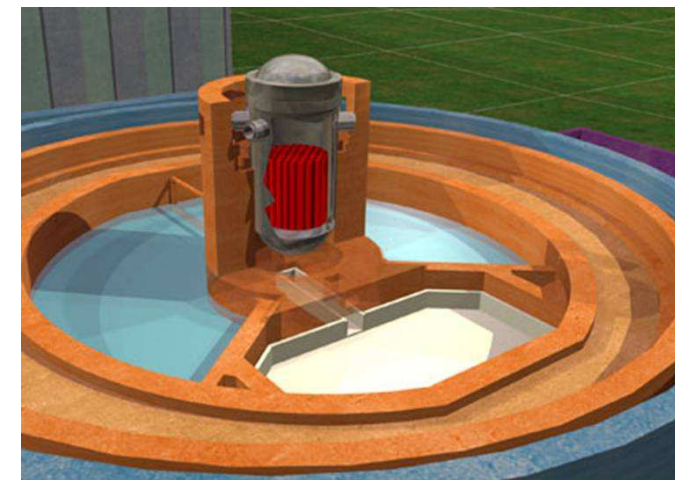
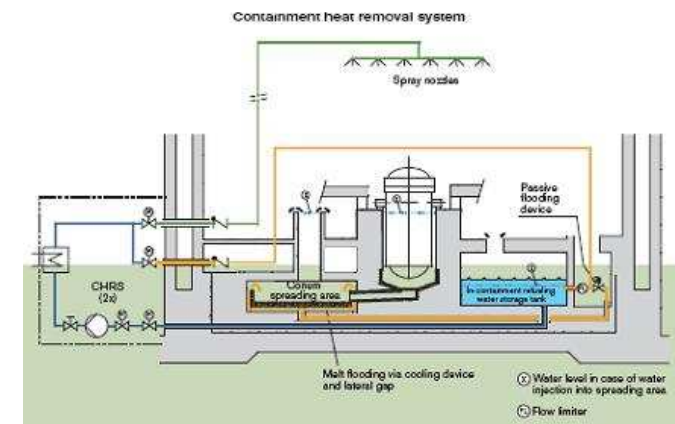


Source: Areva EPR Brochure March 2005

EPR Working Group - Severe Accidents

- Group has been working on
 - Hydrogen management in two room concept
 - Cooling functions and structures of the molten core
 - Scope of severe accident instrumentation
 - Operating strategies for severe accidents

- Future topics include
 - Technical report on design, arrangements and configuration of the CHRS (SAHRS) injection lines into the core catcher
 - Technical report on IRWST pH control
 - Technical report on Fukushima related issues: Management of pressure in containment during severe accidents.



Source: Areva EPR Brochure March 2005

EPR Working Group - Specific topics

- Meeting in May 2011 with EDF/AREVA and involved utilities on EPR design differences
- Two meetings with EDF/AREVA and involved utilities on safety enhancements following Fukushima accident
- Other topics discussed
 - Long term cooling of spent fuel pool (Fukushima related)
 - Radiation Protection
 - Grouted tendons
 - Operational safety issues, technical specifications
 - Human factors engineering
 - Spent fuel cask loading device
- Future topics of cooperation : commissioning tests phase

EPR Working Group - Accomplishments

- Sharing results of the design reviews
 - have resulted in identification of common safety concerns
 - have made national safety assessments more robust
 - have made it possible to understand differences e.g. in accident analyses methodologies
 - have helped participants to anticipate future issues
- Discussions on the design differences have resulted in
 - understanding of the differences in safety requirements
 - identification of harmonisation areas (e.g. safety classification) and design changes
- Networking the experts on different technical disciplines
 - easy to contact - ask questions, share information