TOPICAL ISSUE 4:

LONG TERM OPERATIONS - MAINTAINING SAFETY MARGINS WHILE EXTENDING PLANT LIFETIMES

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INTERNATIONAL CONFERENCE ON TOPICAL ISSUES IN NUCLEAR INSTALLATIONS SAFETY

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International Atomic Energy Agency

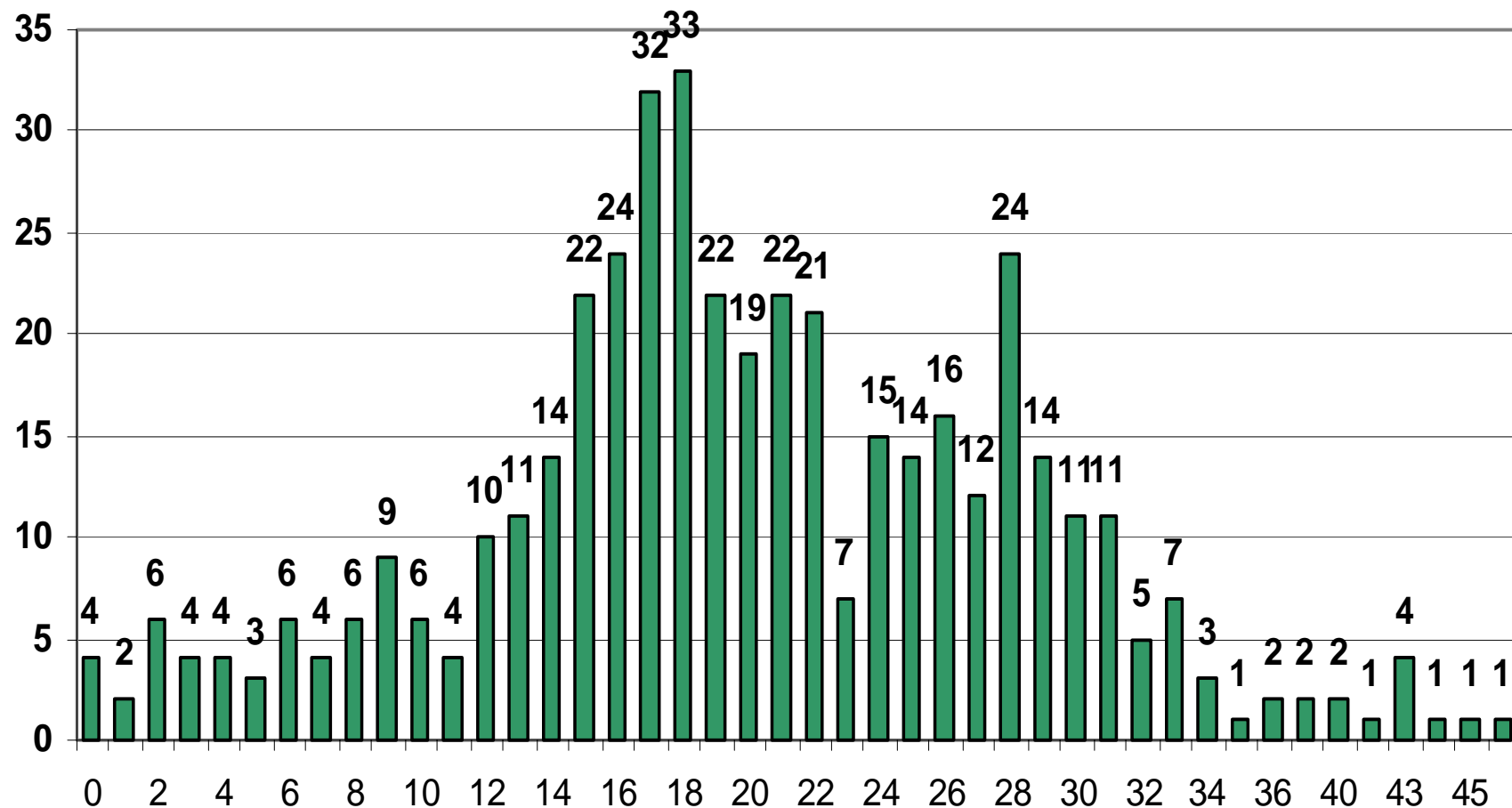- **Contributors:**
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- background
- status
- priorities for future work
- areas for future IAEA activities
- open questions

Plants by age, December 2003

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Long Term Operation (LTO)

- operation beyond an established timeframe
  - term to accommodate various approaches
  - initially assumed time of operation – 30 to 40 years (mostly legal, economic considerations)
  - design lifetime/life extension
- status in Member States
  - routine implementation (USA, U.K., Russian Federation) vs. initial considerations

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Decisions on LTO

- plant design
- actual condition of plant equipment
- equipment qualification
- ageing
- safety assessment
- safety performance
- maintenance, surveillance
- plant modifications, configuration management
- design basis information availability
- spent fuel and waste management
- decommissioning, etc.

Safe LTO

- demonstrate that the plant will continue to operate within its design basis
  - good knowledge of the current design basis
  - correct picture of the actual state of the plant
  - analyses needed to support LTO
  - feedback of operating experience
  - consideration of advances in science and technology
- starting point-comprehensive safety review
  - e.g. periodic safety reviews

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LTO activities

- Ageing management
  - programmatic guidelines
  - components specific guidelines
- Design basis documentation
  - important for older plants (documentation, modifications)
  - WWER operating countries (Guidelines)
- Configuration management
  - TECDOC
 - IRS: 25% events related to CM errors

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LTO activities cont'd

- Defence in depth preservation/evaluation
  - state-of-the-art tools to evaluate safety
  - use of deterministic and probabilistic methods
- Knowledge management (pilot-SKALTO)
- PLIM guidelines
- ISI improvement
  - qualification and risk informed ISI
- Life management databases
  - RPV
  - concrete containment, piping, SG-under development

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LTO activities cont'd

- Safety aspects of long term operation of water moderated reactors (**SALTO**)
  - integrate and focus on LTO
  - 2003-2006: EBP
  - participants:12 MS and EC
  - PSR Safety Guide index
  - 2007 onwards: regular programme

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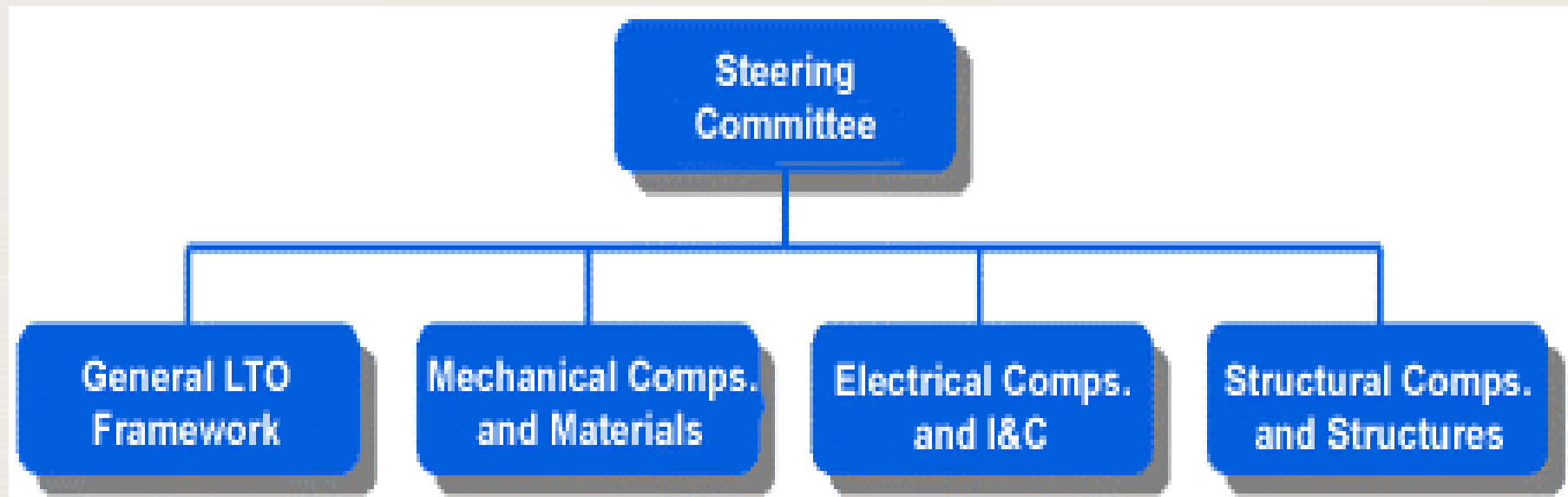
SALTO

LTO activities cont'd

- SALTO Outcome: **'Recommendations on the Scope and Content of Programmes for Safe LTO**'
  - what has to be done/optimal approach
  - indexed technical information
  - basis for a Safety Guide on LTO
  - reference for a new service

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Priorities for future work

- Integrating requirements, practices and approaches on LTO
- Required safety level and its evaluation
- Exchange and feedback of operational experience
- Knowledge management
- Succession planning
- Other issues (e.g. spent fuel and waste management, decommissioning)

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Future IAEA activities

- ## Safety Guide on LTO
  - based on the EBP SALTO outcome
  - complemented by technical documents, activities and safety evaluation tools
- ## LTO Safety Service
  - exchange of 'positive' experience
  - broad scope, integrating existing engineering services
  - complementing OSART

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Future IAEA activities cont'd

- Forum for exchange of experience
  - lessons learned form events
  - annual event
  - regulatory, operational and engineering issues (beyond LTO)
- Mechanisms to maintain the knowledge
  - technical issues
  - lessons learned from events
  - good practices

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- Is there a difference between normal operation and LTO?
- What is the adequate safety level required for LTO? How should it be judged?
- What should be assessed/monitored to ensure the required safety level is achieved? What would/could make LTO unacceptable?
- How do we improve exchange and feedback of experience to improve safety?
- What are the key future LTO related challenges?

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