国家核安全局
National Nuclear Safety Administration

GC 59 Senior Regulators' meeting
17 September 2015
Renewal of Operating Licence for NPPs
- State of art in P.R.China

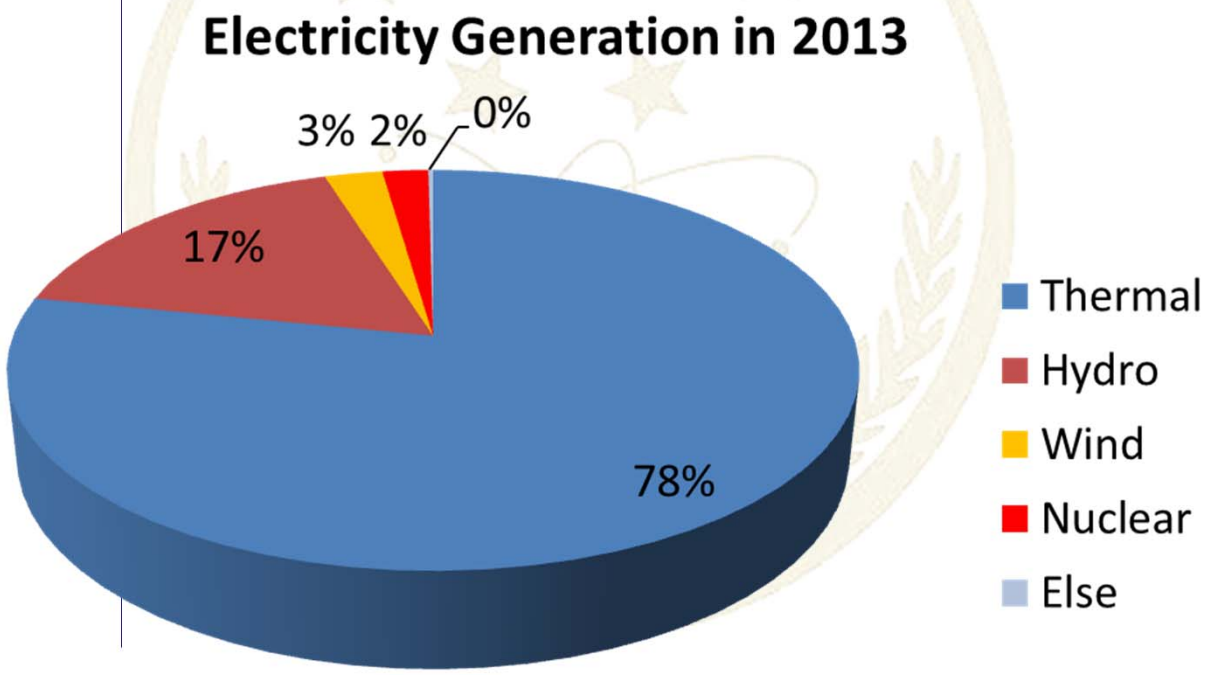
National Nuclear Safety Administration

P.R.China

1. Development of NPPs
2. Licencing requirements
3. Challenge of Operating Licence expiration and approaches
4. International Practices
5. Technical Policy on Operating Licence renewal

1 Development of NPPs

- Unbalanced energy supply structure

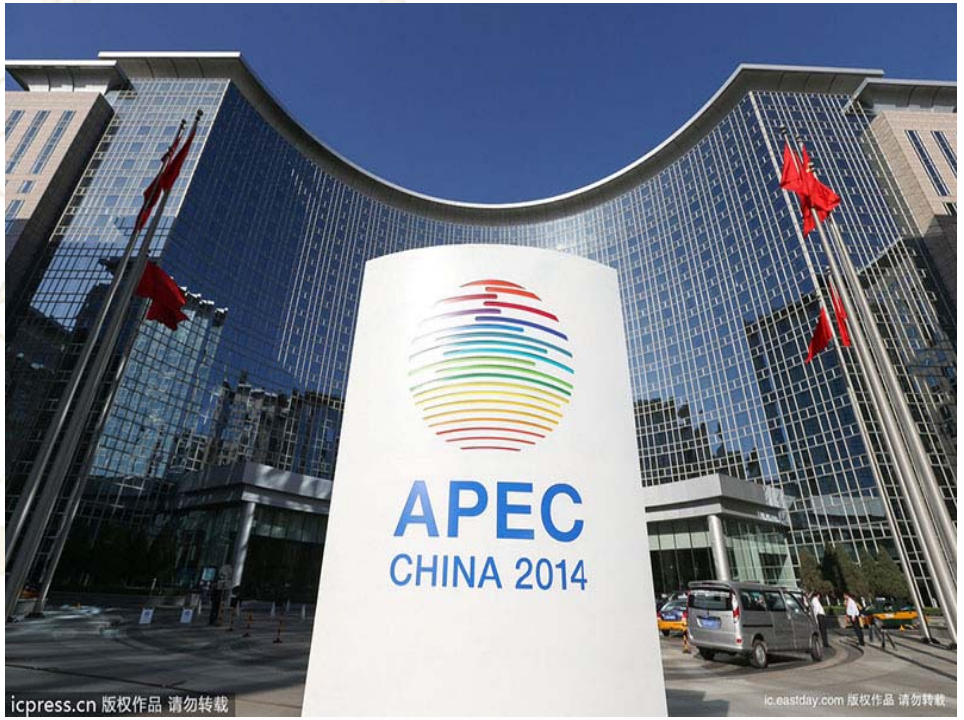


1 Development of NPPs

- Environment Pollutions: important contribution from coal burning power plants

1 Development of NPPs

- Environment Protection: an important solution by NPPs

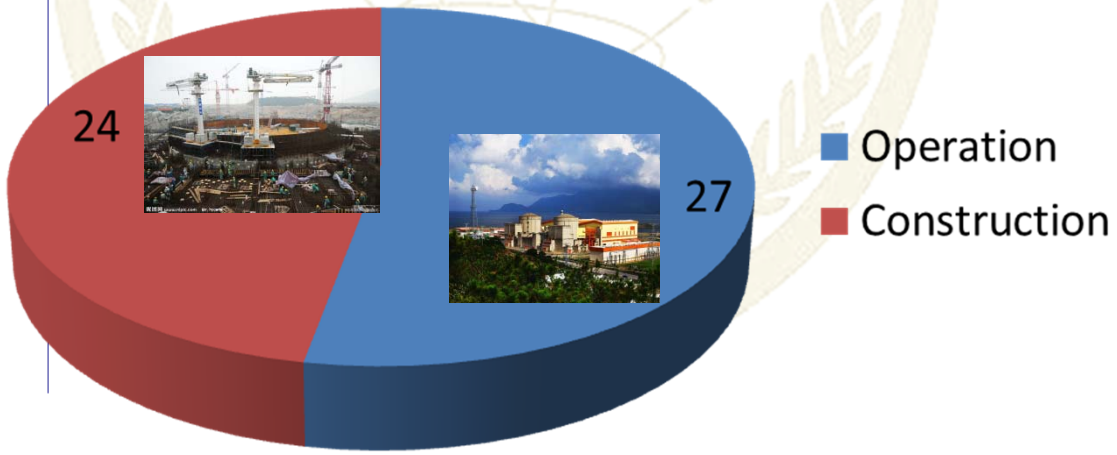


1 Development of NPPs

- Nuclear Power Units in Operation: 27

  Nuclear Power Units under Construction: 25

  Total capacity of nuclear power: 23570 MWe



1 Development of NPPs

- More than 20 years nuclear power operation experience with a safe record benefiting from:
  Insisting on Safety First, Quality First principle,
  Adopting Defense in Depth strategy
  Promoting Safety Culture
  Adopting high safety standard
  Enhancing nuclear safety supervision

2 Licencing requirements

- NNSA is authorized to conduct a unified and independent nuclear safety supervision over the national nuclear facilities.
- Licensing system is adopted for nuclear facilities in China. NNSA is responsible for issuing the safety licences, including construction and operation licences of nuclear power plants.
- According to the Safety Regulations, the validity of operation licence of NPP is its design life normally, or decided by NNSA in exceptional case.

3 Challenges of Operating Licence expiration and approaches

- Challenges:
  - The design life of Qinshan-1 is 30 years, and the expiration date of Operating Licence is in December, 2021.
  - The design life of Daya Bay reactors are 40 years and the operational time has been over 20 years by now.
  - The reactors will continue to face the problem of operating licence expiration.
  - PSRs performed in China shows enough time must be allocated in advance to both utility and regulatory body for safety reviews.

3 Challenge of Operating Licence expiration and approaches

- **Approaches**:
  - Lack of relative experience of analysis and practices
  - NNSA has carried out extensive investigations and studies. Participants came from the design institutes, utilities, universities, technical supports…
  - It is decided to establish a Technical Policy (TP) based on IAEA safety standards and international practices for licence renewal of NNPs to provide guidance for licence renewal application.
  - When the requirements of the TP have been completed and verified by the practices, they will be combined into the safety standards.

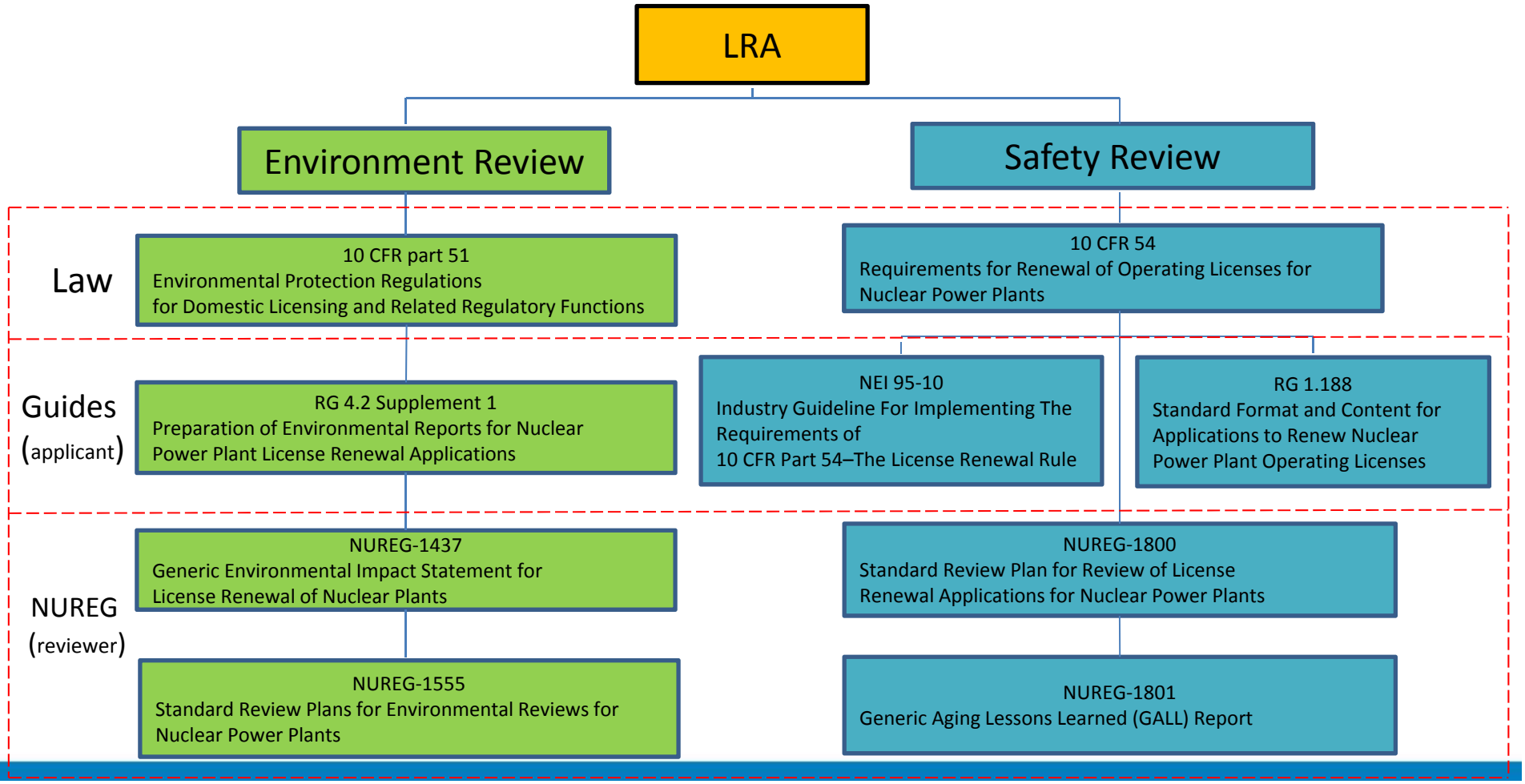
4 International Practices

- IAEA: Long Term Operation(LTO)
  - 1990s: Launching research on ageing management.
  - 2006: Technical Reports Series No.448，Plant Life Management for Long Term Operation of Light Water Reactors
  - 2007: IAEA-EBP-SALTO, Safety Aspects of Long Term Operation of Water Moderated Reactors provides suggestions on the scope and contents of LTO.
  - 2008: Safety Reports Series No.57，Safe Long Term Operation of Nuclear Power Plants provides the methods and procedures for the application of LTO.
  - 2011: SSR-2/2，Safety of Nuclear Power Plants: Commissioning and Operation, Requirement 16: LTO plan.
  - LTO approaches: PSR+Ageing management review

4 International Practices

- USA: Licenses Renewal Application(LRA)
  - 1991: 10 CFR 54，Requirements for Renewal of Operating Licenses for Nuclear Power Plants (revised in 1995).
  - Up to Jun 2014,LRAs have been approved by NRC for 73 units, 19 units in review, 7 units in plan.
  - LRA approaches: Passive SSCs safety review required by 10 CFR 54+Environment review required by 10 CFR 51.

■ USA: Licenses Renewal Application(LRA)



4 International Practices

- France: PSR
  - 1963: Décret n° 63-1228 du 11 décembre 1963 relatif aux installations nucléaires/ 2006: transparency law require PSR every 10 years to decide whether the unit is allowed to continue operation.
  - Routine activities of operation and maintenance (ISI, Performance enhance…) to ensure the operation capacity and unit availability
  - Lifetime program for safety important equipment to control ageing effects.
  - Ageing evaluation on SSCs by PSR every 10 years.
  - Exceptional Maintenance Program (operational and anticipation) to deal with the generic problems and degradation.
  - PSR approaches: PSR+Ageing management review+Exceptional Maintenance Program

5 Technical Policy on Operating Licence renewal

- Background
  - Design life, real life, validate of licence
  - International practices
  - Challenges faced
  - Necessity for the TP

5 Technical Policy on Operating Licence renewal

- Application and approval procedure
  - Application for licence renewal submitted with demonstration documents at least 5 years before the expiration
  - Normally 20 years extension will be approved by NNSA after safety review(If the real life is less than 20 years by evaluation, approving the real life).
  - After consulting the local government and other relevant governmental organizations, NNSA approves the LRA

5 Technical Policy on Operating Licence renewal

- Base line for licence renewal safety demonstration
  - Revised FSAR
  - Modifications implemented important to the safety
  - Any changes for the licensing basis during the review of application

5 Technical Policy on Operating Licence renewal

- Documents required to be supplied
  - **Safety Evaluation Report for the renewal of operating license for nuclear power plants**
    - SSCs conducting safety functions of reactivity control, residual heat removal, radioactivity confinement, operational release control, accident release limit.
    - Other SSCs whose failure may stop the above mentioned SSCs from conducting their safety functions.
    - Fire fighting design, fire detecting, fire fighting system.
    - Preventing and mitigating systems for accidents beyond design.
    - Modifications to the above mentioned SSCs.
    - SSCs ageing management list, including methods adopted
    - Time limited ageing analysis(TLAA) list.
    - Ageing management program, procedures and activities.

5 Technical Policy on Operating Licence renewal

- Documents required to be supplied
  - **Revised Environment Impact Report**
    - Evaluating the adequacy of the report, and the conformity to the current environment protection standards.
  - **Revised FSAR**
    - Description of ageing management program and activities, time limited ageing analysis(TLAA) in the extension period.
    - Requirements for ageing effects management in the extension period shall be included in Technical Specifications.

5 Technical Policy on Operating Licence renewal

- Codes and Standards
  - All the codes and standards listed in the revised FSAR are valid for LRA safety review, except the operating organization make some modification/supplement and approved by NNSA.
  - The codes and standards may be not enough for LRA safety review, so the licensee should adopt other codes and standards as supplement.
  - Licensee shall make evaluation on the applicability of the supplemented code and standards, and shall get the approval from NNSA

Thank you

for your attention !