



Consenting Process for NPPs

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Atomic Energy Regulatory Board



National Conference on Regulatory Interface
28 November 2017



2

Regulatory framework

- Statutory provisions of **Atomic Energy Act 1962** and the rules framed thereunder, empowers AERB to lay down safety standard & frame rules/ regulations w.r.t. regulatory & safety requirements for use of Atomic Energy in India.

Statutory provisions



Regulations



Safety Codes

Safety Guides

Safety Manuals



3

Regulatory Basis

- Atomic Energy Act (1962)
 - Rules: (eg. Radiation Protection Rules 2004)
- **AERB/SC/G**: Regulation of Nuclear & Radiation Facilities
- **AERB/SG/G-1**: Consenting process for Nuclear power plants and Research reactors.

Safety regulation to ensure that the nuclear facilities are built and operated in a safe manner and they do not cause unacceptable radiological risk and/or toxic chemical exposure to plant & site personnel, the public and the environment.



EVOLUTION OF CONSENTING PROCESS

- ❑ **Research Reactors** – Safety assessment involved direct discussion and immediate implementation of the decisions taken
- ❑ **TAPS-1&2:** Committee to review Reactor Physics Experiment
DAE-SRC was constituted in 1972 to offer advice to DAE on safety matters related to commissioning and operation of RAPS-1
- ❑ **RAPS-MAPS:** Safety Committee reporting to Secretary, DAE.
Commissioning & Operation

1983 => AERB

- ❑ **NAPS:** Narora Design Safety Committee, complete design safety review (Authorization given for Commissioning stages)
- ❑ **KGS-1&2/RAPP-3&4:** Authorization given for all identified stages
- ❑ **TAPS-3&4**
- ❑ **KGS-3&4 RAPP-5&6, onwards** – [as per AERB/SG/G-1]



Consenting Process

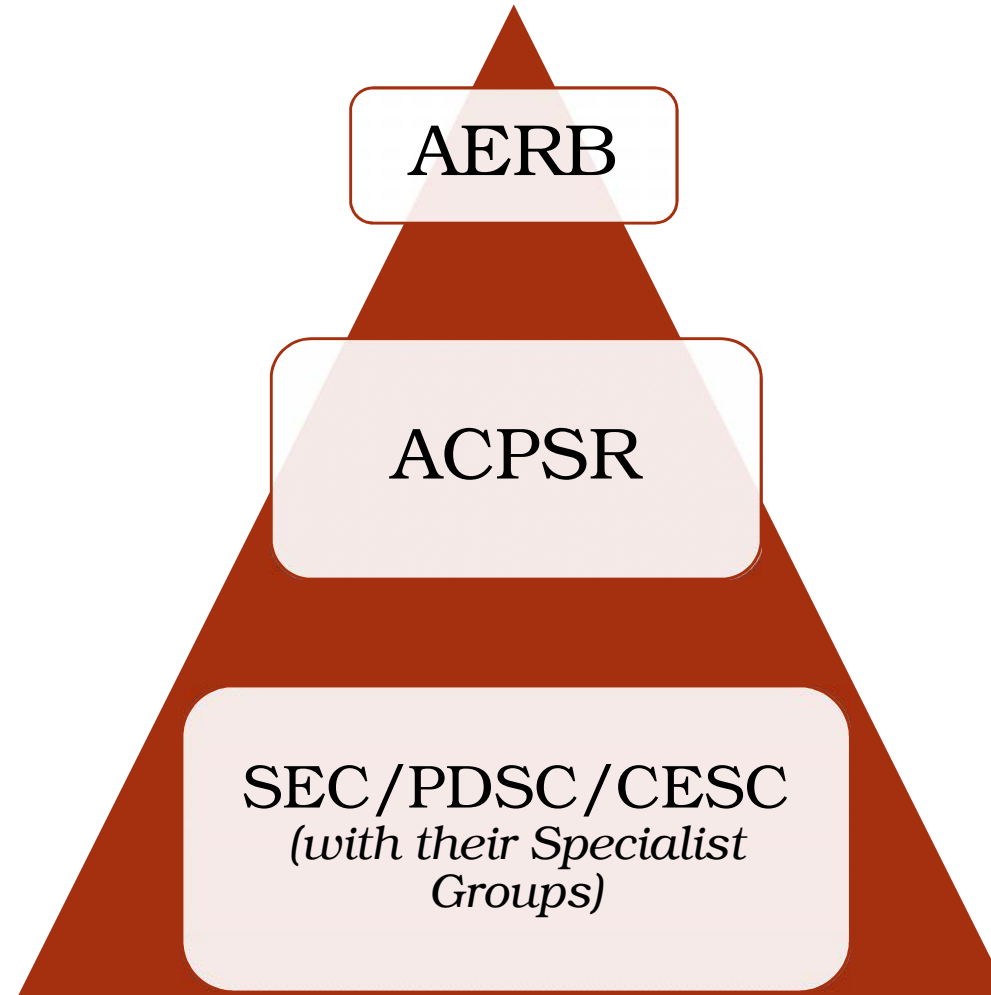
- Consent is a document:
 - To allow a specified activity or set of activities dealing with siting, construction, commissioning, operation or decommissioning of NPPs.
 - Establish requirements and conditions governing the performance of these activities.
- **Consenting process:** Continuing assessment/ oversight covering all stages.
- Consenting **stages** for NPPs:
 - (a) Siting
 - (b) Construction
 - (c) Commissioning
 - (d) Operation
 - (e) Decommissioning

As and if required, Regulatory Body may Combine two/ more stages of activity in a single consent, or Break up the stages into sub-stages



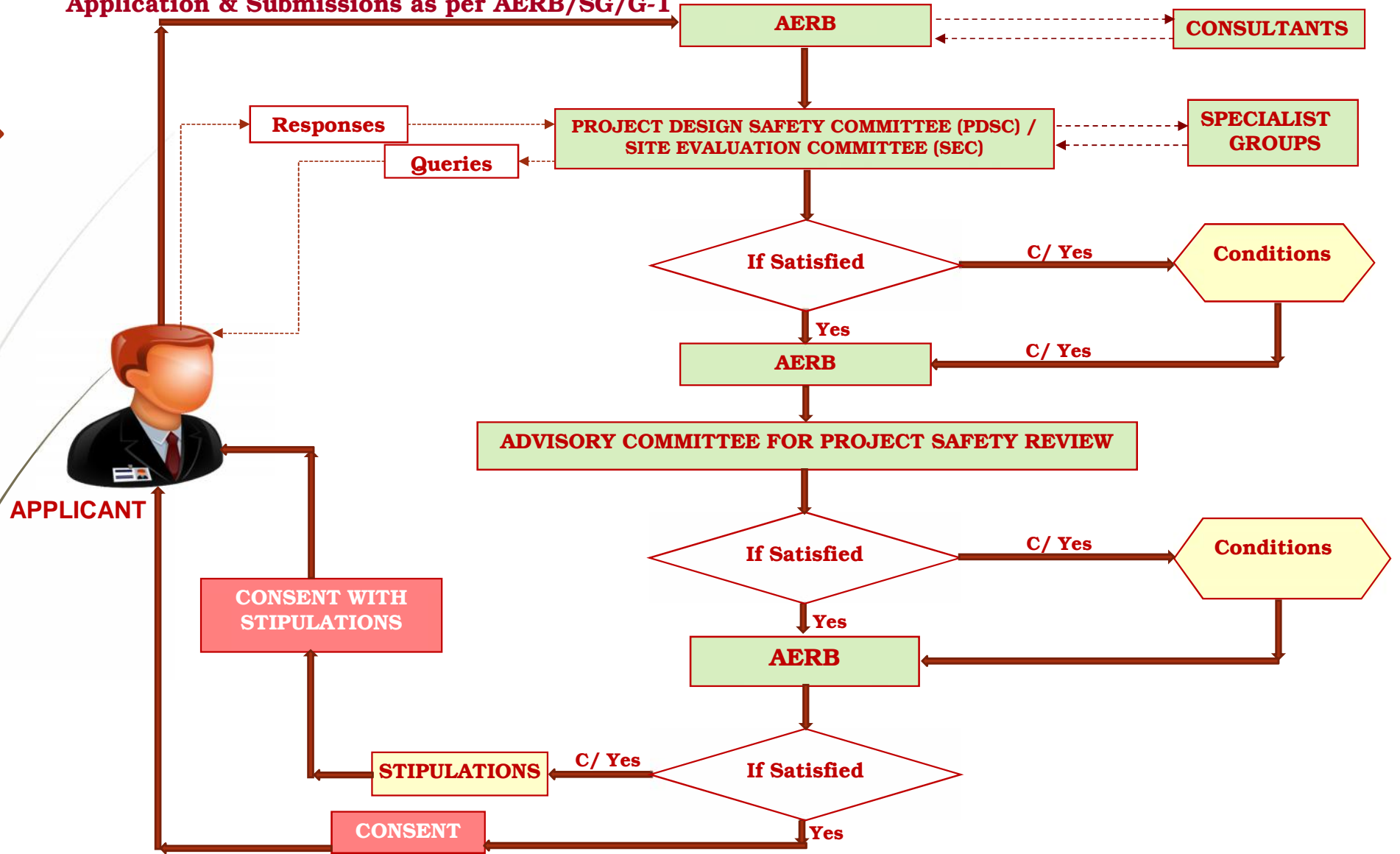
6

Three-tier Review Process [Projects]





Application & Submissions as per AERB/SG/G-1





8

Siting

Major aspects included in Assessment

- Impact of natural/ human induced external events on facility
- Radiological impact of facility on public & environment
- Feasibility of effective implementation of emergency management plans in public domain

Submissions Reviewed

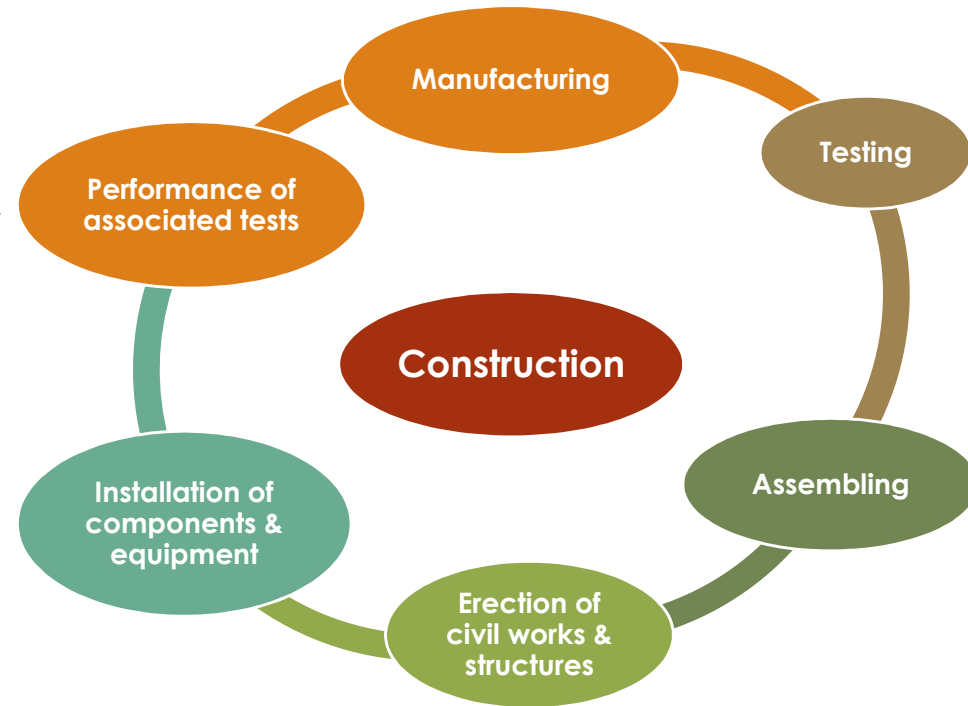
- Site Evaluation Report
- Design Basis Information



9

Construction

➤ Single stage Regulatory Clearance / sub-stages



- Review of overall **design safety**, plant **layout**, Safety Classification & Seismic Categorization of SSCs, plant buildings/structures, Rx systems, electrical systems, I&C systems, common services system & waste disposal **systems**
- Submissions: PSAR, DBR, QA during Design & Construction, Construction schedule for the proposed NPP



10

Commissioning

Phase-A

- Pre-Commissioning activities
- Hot Conditioning
- Various tests with/ without Dummy fuel

Phase-B

- Fuel Loading
- Heavy water addition to PHT System
- Bulk heavy water addition to Moderator system
- FAC & LP physics experiments

Phase-C

- System performance tests [low/medium/full power]
- System performance at rated power

(Typical for PHWRs)

- Demonstration of Design capabilities, effectiveness, readiness of systems to take up commissioning - to the satisfaction of AERB
- Regulatory clearance required at each phase
 - AERB may add/modify intermediate phases



Commissioning

Submissions reviewed for the various Commissioning phases:

- CCC
- QAM for Commissioning
- Commissioning Procedures
- Commissioning Reports
- Training programme & adequacy of qualified manpower
- Radiation Protection Manual
- EPP & Report of an Off-site exercise
- Technical Specifications for operation
- Specific submissions for intermediate stages



Operation

- Allowing routine power operations up to rated power.
- Submissions at this stage include:
 - (a) FSAR [for as-built plant]
 - (b) Tech Specs, incorporating feedback from commissioning
 - (c) Conceptual Decommissioning Plan
 - (d) Certification on availability of as-built drawings for all systems
 - (e) Resolution of all pending issues
 - (f) System Transfer Document
- Review:
 - (a) Plant performance up to rated power
 - (b) QA of systems relevant to operation
 - (c) RPP and EPP



Operation

- ▶ Consent for regular operation at rated power, is issued for a **specified period**. Subsequently ARA & PSR.
 - **Renewal** of consent - before expiry
- ▶ Renewal of consent is based on PSR, with key elements:
 - (a) **NPP as a whole** continues to be capable of safe operation at authorised power levels, within the **operational limits** & **Tech Spec** conditions
 - (b) **Safety related SSCs** have not shown undue signs of **deterioration** & are capable of **reliably performing** intended design functions
 - (c) Plant is **safe** as judged by **current safety standards** & practices and adequate arrangements are in place to **maintain safety**
 - (d) NPP **management is alive** to safety related problems & a **system** has been established at the NPP
 - (e) NPP has **operated in a safe manner** & continued operation till the next **renewal** would not pose undue risks



Proposed Changes in consenting process

- Provision for review (optional) before formal application for Consent
 - Early Site Review
 - Review of site characteristics and corresponding design basis independent of Reactor design. Reviewed w.r.t to Plant Parameter Envelope (PPE). Review findings taken into account at the time of formal siting consent.
 - Early Design Review
 - Review of NPP design features and technology alongwith the applicable regulatory and safety requirements for licensability. Review findings utilised during the formal consenting process.
- **Admittance of Application:** Preliminary acceptance check of Application to verify completeness of information and submission before it is formally admitted.
- Construction sub-stage of Excavation is Eliminated



15

Proposed Changes in Consenting process

- Commissioning Stage
 - Single application for all sub-stages.
 - Regulatory Hold points
- Licence for Operation: for Design life or Limited period
- Release from Regulatory Control

- Scope of Review and Assessment based on NPP design
 - Repeat/New design
 - New/Existing site



Conclusion

Process ensures:

- Site is suitable from environmental considerations
- Plant design meets the regulatory requirements
- Safety Analysis has been carried out
- Design has appropriate ESFs
- Construction will meet quality requirements
- Commissioning test program to verify adequacy of all safety related features as per design intent
- Technical Specifications for Operation are consistent with SAR and Regulatory Requirements
- Training and Qualification of the Operating Personnel
- Meeting of Dose Criteria for Normal Operation, AAO, Accident Conditions
- Emergency Preparedness Plan exists
- Site and design of the facility meets Nuclear Security Objective



17

Thank You