

Site Evaluation of Nuclear Power Plants

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National Safety Requirements & Regulation

REGULATORY AUTHORITY

A
E
R
B

- Atomic Energy Act, 1962
- Atomic Energy (Radiation Protection) Rules 2004;
- Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987;
- Atomic Energy (Control of Irradiation of Food) Rules, 1996;
- Atomic Energy (Working of the Mines, Minerals and Handling of Prescribed Substances) Rules, 1984; and
- Atomic Energy (Factories) Rules, 1996.
- Regulatory Standards & Codes

MoEF

- Environment Protection Act, 1986
- Environmental Protection (Amendment) Rules, 1987

PCB

- The Water (Prevention & Control of Pollution) Act, 1974
- The Air (Prevention & Control of Pollution) Act, 1981
- The Water (Prevention & Control of Pollution) Cess Act, 1977
- The Hazardous Waste (Management & Handling), Rules 1989

SEB

- Indian Electricity Act 2003
- Indian Electricity Rules 1956

SBI

- Indian Boilers Act 1923

DoE

- Indian Explosive Act 1884
- Indian Explosive Rule 1983

MHA

- Disaster Management Act 2005

Legend

AERB: Atomic Energy Regulatory Board
MoEF: Ministry of Environment and Forest
PCB: Pollution Control Board
SEB: State Electricity Board
DoE: Directorate of Explosive
SBI: State Boiler Inspectorate
MHA: Ministry of Home Affairs

Introduction

- Siting process involves two major sub-stages,
 - Selection
 - Evaluation
- Sites in India are selected by a committee of DAE, Govt. of India, in consultation with State Governments.
- Utility applies to AERB for siting consent of a selected site along with a **site evaluation report**.
- AERB review at siting stage is focused on feasibility of engineering solutions against external events, foundation stability and implementability of emergency measures.
- Design basis for external events reviewed in detail during review towards construction consent.

Introduction

SITE SURVEY STAGE:
Identification of potential regions, potential sites and candidate sites through screening and comparison.

SITE SELECTION STAGE:
Evaluation aiming at selecting the final site through the ranking of candidate sites.

Site Selection

SITE ASSESSMENT STAGE
Confirmation of acceptability and complete site characterization: Derivation of site related design basis.

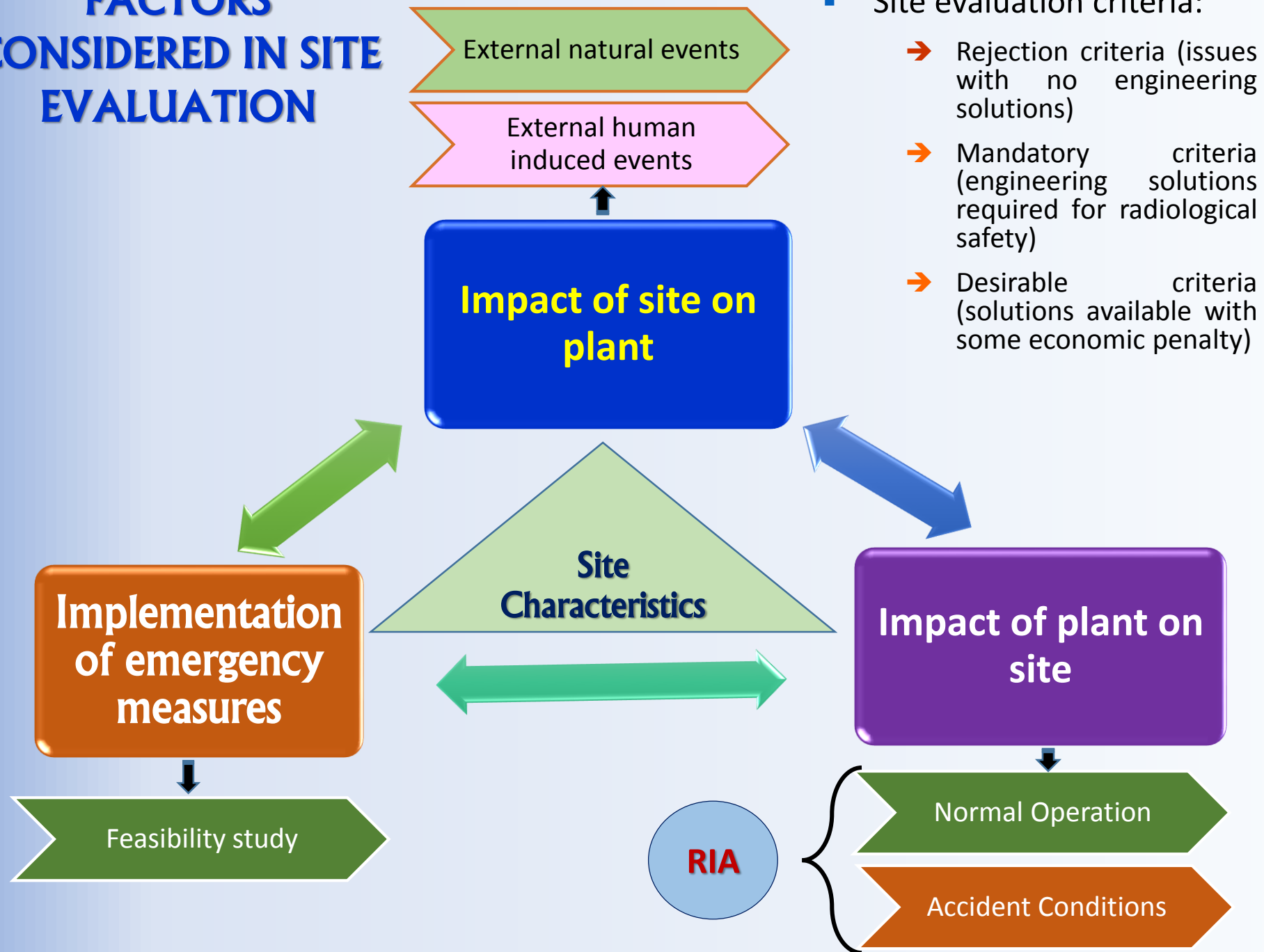
PRE-OPERATIONAL STAGE:
Confirmatory and monitoring work.

OPERATIONAL STAGE:
Confirmatory, monitoring and re-evaluation as per periodic safety reviews.

DECOMMISSIONING:
Monitoring and evaluation of hazards taking into account modifications in plant configuration.

Site Evaluation

FACTORS CONSIDERED IN SITE EVALUATION



Rejection Criteria <i>(No engineering measures)</i>	Mandatory Criteria <i>(Engineering measures possible)</i>
Seismic Zone : V	Implementability of EPP
Active Capable Fault within 5 km	
Exclusion zone of at least 1.0 km radius	
Soil Liquefaction, Surface Collapse, Subsidence	
Screening Distance Values (SDV)	
RIA – Dose Criteria ⇔ EZ boundary	
Availability of UHS	
	Hazard assessment of Natural phenomena
	Hazard assessment of Human induced phenomena

Types of sites

Recent applications for Siting Consent received / approved / in process:

- KAPP-3&4
- RAPP-7&8
- KKNPP-3 to 6
- JNPP – 1 to 6
- GHAVP-1 to 4
- CMPAPP

Road map planned during revision of AERB guide, SG/G-1

Sites can be categorized into following types for optimization of review time:

Existing sites	New sites
Repeat design	Repeat design
New design	New design

Existing sites (siting consent within 10 years)

Repeat design

(Limited scope of review)

- Information on site related parameters available & approved
 - Needs data updating
 - Should capture major events, if any and implications
- Site specific geotechnical investigations
- Dose apportionment and dose reserve
- EPP to be revised taking into account existing facilities

New design

(Detailed review to focus on design / plant specific aspects)

- RIA, Dose apportionment and dose reserve – most important
- EPP taking into account plant specific inputs
- Information on site related parameters already available & approved
 - Needs data updating
 - Should capture major events, if any and implications
- Site specific geotechnical investigations required

Existing site to be considered for re-evaluation, if time since last issued Siting consent is more than 10 years

New sites

Repeat design

Detailed review to focus on site specific aspects:

- Information on site related parameters:
 - Geology
 - Seismology
 - Hydrology
 - Meteorology
 - Demography
 - Geotechnical investigations
- RIA, Dose apportionment and dose reserve – with regard to site specific input parameters
- Implementability aspect of EPP

New design

Detailed review of all aspects:

- Effect of site on plant
- Effect of plant on site
- Implementability aspect of EPP

Road map ...

- Introduce Scope for early review :
 - Design review (without specific site details, envelop site parameters)
 - Site review (without specific design details, envelop parameters)

Some areas for deliberations

- Implementability of EPP : role of external agency
 - Before start of operation, offsite EPP is prepared by Dist. Authorities and approved. However during site evaluation stage, inputs from them are not taken while evaluating 'implementability' of EPP around site.
- Lead time for investigations/data collection
 - NSDF : hydrogeological studies vs siting time line (dose at EZ boundary includes all routes)
 - Participation of external expert agencies and time schedule (in particular : Seismic, geotech)
 - Instrumentation- MEQ : Regional, Met. Data : local
 - Can investigations covering site evaluation requirements be initiated during site selection stage?
- Detailed methodology for RIA : DEC conditions ↔ AERB-TF RIA work
- 'Adequacy' of content in the submission

THANK YOU