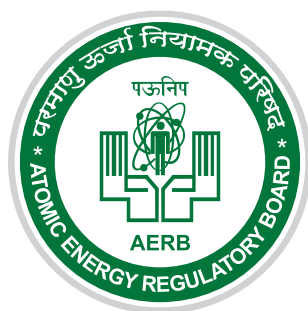


# CHAPTER - 03

## REGULATORY INSPECTIONS



## REGULATORY INSPECTIONS

Regulatory Inspections (RI) is one of the key processes of AERB through which it ensures that the activities performed by the Licensee during all the phases (viz. siting, design, construction, commissioning, operation, decommissioning, and release from regulatory control) of the life cycle of Nuclear and Radiation Facilities are executed in compliance with the conditions of the Licence and relevant safety requirements.

### 3.0 Regulatory Inspection Programme

A comprehensive RI programme is developed and implemented every year, which provides assurance that licenced activities are conducted in accordance with regulatory requirements and in conformity with safety and security objectives. The programme is prepared following graded approach. The frequency, scope and rigour of inspections depend on the hazard potential of the facility and the consenting stage of the facility. Inputs from previous inspection findings and safety reviews are also considered during the programme development. Adequate provisions for special inspections and reactive inspections (e.g., safety significant events) are incorporated in the programme to take care of unforeseen situations.

Inspections are carried out periodically as well as in special circumstances. Generally, the inspections are carried out with prior announcement. AERB also carries out special unannounced inspections with specific objectives. AERB prepares a consolidated plan while applying a graded approach, for inspection of nuclear and radiation facilities considering the following:

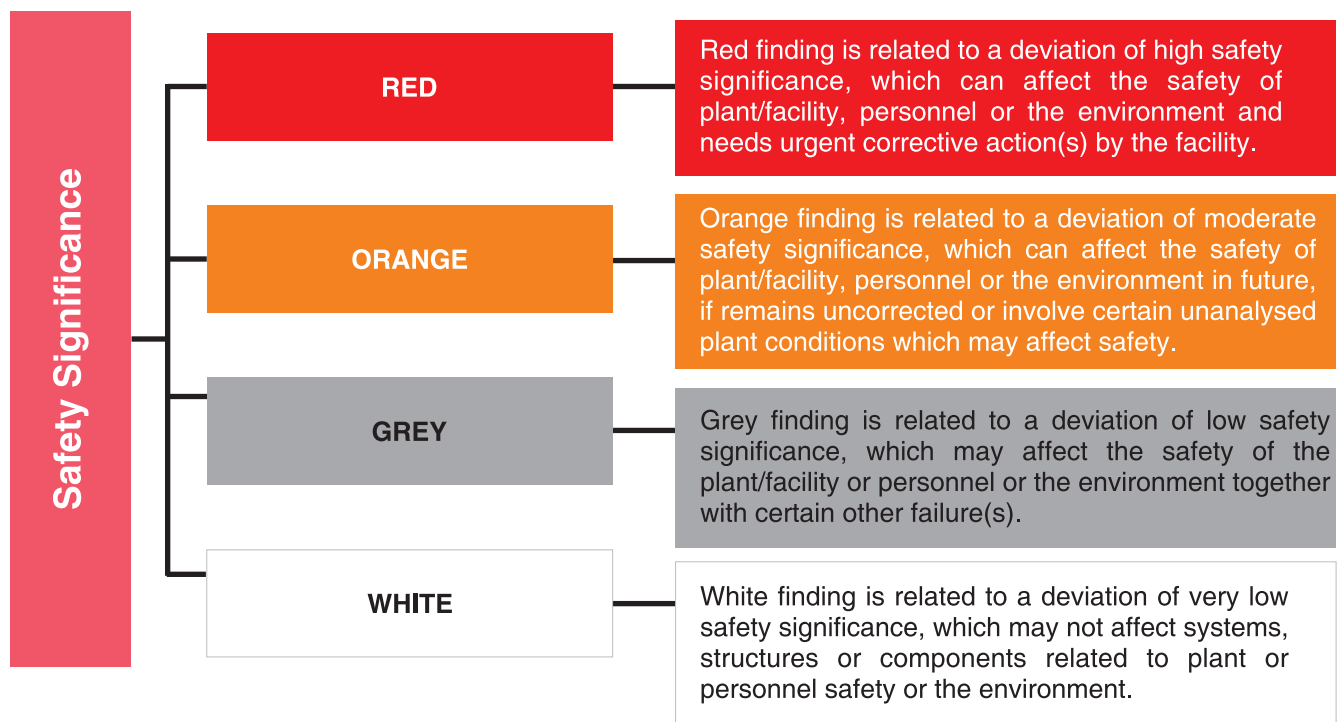
- (i) Probable degree and nature of the hazard associated with the facility or activity
- (ii) Outcome of safety review
- (iii) Progress of activities at the facility
- (iv) Experience of previous inspections
- (v) Available resources, and
- (vi) Guidelines provided in regulatory and IMS documents.

***The frequency, scope and rigour of regulatory inspections depend on the hazard potential of the facility and the consenting stage of the facility.***

The inspection findings made during the regulatory inspections are broadly categorised adopting a graded approach for follow up of their review and resolution. The facility is required to submit an action taken report on the deficiencies brought out during the inspection within a specified timeframe.

### 3.1 Graded Approach in Determining Safety Significance of Deviations

AERB follows graded approach in determining the safety significance of the deviations observed during the regulatory inspections of nuclear and radiation facilities. The reported deviations are categorised as White, Grey, Orange and Red findings, in the increasing order of safety significance, as described here:



AERB follows-up the implementation of all the actions for resolution of the reported deviations. Orange and Red findings are reviewed for appropriate followup or enforcement actions. The closure of the Grey, Orange and Red findings of nuclear and industrial facilities are considered by AERB after review and acceptance of the corrective actions. Resolution of White findings, by the Licensee is checked by AERB inspectors on sample basis during subsequent inspections.

Facilities have to submit the action taken report for all types of inspection findings for review and consideration by AERB for closure.

AERB may also initiate enforcement action, if in its opinion, the licensee has violated the conditions of the licence wilfully or otherwise or misinformed or did not disclose the information having bearing on safety, after specifying the reasons for such action. The RI team can also initiate enforcement actions on the spot, if necessary, in case of serious non-conformances.

The enforcement actions may include one or more of the following:

- (i) A written directive for satisfactory rectification of the deficiency or deviation observed during inspection;
- (ii) Written directive to applicant/licencee for improvement within a reasonable timeframe;
- (iii) Orders to curtail or stop the activity;
- (iv) Modification, suspension or revocation of licence/consent; and
- (v) Initiation of legal proceedings under provisions of The Atomic Energy Act, 1962.

### 3.2 Regulatory Inspections of Nuclear, Industrial & Radiation Facilities

AERB carries out regulatory inspections of the nuclear, industrial and radiation facilities to ensure compliance with the AERB safety requirements and stipulations. In nuclear and industrial facilities, the emphasis is given to aspects related to project management, safety culture, civil construction,



quality assurance, equipment storage & preservation, fabrication & erection of major safety related components, documentation, commissioning & operation activities, occupational health & safety, fire safety, nuclear security, radiological monitoring and emergency preparedness.

Additional inspections are conducted to gather information after important events, or to observe specific activities.

AERB has posted onsite observers at four NPP sites [Rawatbhata, Kalpakkam, Kakrapar and Kudankulam]. They observe activities at the operating as well as under construction plants at these sites and submit report to AERB Headquarter (HQ) on daily basis, which provides important inputs for safety review and inspections. This has led to establishment of continuous regulatory presence at these sites, covering twelve operating, two under commissioning, and seven under construction NPPs. At other NPP sites, AERB conducts unannounced inspections, apart from baseline announced inspections.

In case of radiation facilities, the inspection plan envisages prioritization of inspection of the facilities having reported cases of radiation exposures exceeding the prescribed dose limits, and the facilities having safety issues identified from safety review/inspections e.g. periodic safety reports are not received, disused radioactive sources pending for disposal, moderate safety significance (Orange category) inspection findings during previous inspection etc.

The regulatory inspections are carried out by AERB HQ located at Mumbai and its regional regulatory centres viz.; Eastern Regional Regulatory Centre (ERRC), Kolkata, Northern Regional Regulatory Centre (NRRRC), New Delhi and Southern Regional

Regulatory Centre (SRRC), Chennai.

The information on RIs conducted at various nuclear, industrial and radiation facilities during the year is given in the following sections:

### 3.2.1 Regulatory Inspections of Nuclear Facilities and Industrial Facilities

During the year, 124 regulatory inspections of nuclear facilities were conducted which included routine inspection and special inspections to observe any specific activity or for specific issues identified during licensing, safety review or regulatory inspection processes, and reactive inspections in response to significant events.

The details of special and reactive inspections conducted in 2022 are as follows

- A Reactive remote RI of RAPS-6 was conducted by a team consisting of officials from AERB-HQ and site observers at Rawatbhata Site during January 3-4, 2022 to verify aspects related to tripping of RAPS-6 on PHT pressure very low (73 kg/cm<sup>2</sup>) on December 28, 2021 after all control rods moved in on sensing RRS input failure.
- A Special on-site RI of Tummalapalle Mill, UCIL and tailings pond was conducted during March 7-8, 2022 to check the radioactive and other toxic pollution in surrounding areas of the tailing pond site of the Milling area based on inputs from Safety Review Division.
- A Reactive RI of HWP-Thal was carried out on February 24, 2022 to investigate the significant event of bursting of oil drain header during periodic draining of oil separator/oil absorber pertaining to synthesis gas compressor (20k41B).
- A Reactive RI of RAPS-4 was carried out on April 12, 2022 to investigate the event of external leak from weldolet of 20 NB line connection (for 3341-



MV-1 cavity drain line and autoclave circuit) to ECCS supply header (200 NB) and subsequent corrective action taken.

- A Special RI of HWP-Thal was conducted on April 22, 2022 to assess the preparedness of the plant for restart after restoration of oil draining system of synthesis gas compressor (20K41B).
- A Reactive inspection of TAPS-1&2 was conducted on May 20, 2022 in view of the fatal accident involving fall of a worker from terrace of Rad waste building.
- A Special RI of TAPS-3&4 was conducted during May 25-27, 2022 to check the aspect related to Human and Organizational Factors (HOFs).
- A Special RI of Metallurgical Products India (Pvt.) Ltd (MPIL)-Taloja was conducted on May 26, 2022 to check the safety aspects related to storage of radioactive leach residue and radiological safety aspects.
- A series of Special RIs of KAPP-3&4 were being undertaken in view of the modifications being implemented to address the issue of high temperatures in reactor building areas. Towards this, three special RI of KAPP 3&4 were conducted during May 11-13, 2022, June 15-17 and June 20-22, 2022 to check aspects related to structural steel beam and other related modifications.
- A Special RI of KAPP-3&4 was conducted during July 17-19, 2022 to also check the KAPP-3 start-up activities (first reactor criticality after long unit outage) for trial run of KAPP-3 up to 50% FP for validating the modifications.
- A Special RI of HWP-Baroda was carried out

during June 30-July 01, 2022 to verify the outcome of commissioning trials and assess preparedness of the plant for initiation of operation of the prototype 24kA Sodium Cell.

- A Special RI of NFC-Hyderabad was carried out during July 5-6, 2022 to check the aspects related to plant modifications, as a part of review of application for renewal of licence.
- A Reactive RI of UCIL-Jaduguda mill was carried out on August 05, 2022 to investigate the fatal accident of contract labour and serious injury during cleaning activity of strong flocculent solution preparation tank at Chemical House.
- A Special RI of PFBR was carried out during September 26-28, 2022 to observe the integrated leak rate test (ILRT) and Superimposition test of reactor containment building.
- A Special RI of RAPP-7&8 was carried out during September 27-30, 2022 to check the preparedness for Proof test and ILRT of RAPP-7 RB.
- Special RI of RAPP-7&8 was carried out during October 2022 for observing the ILRT and structural integrity test (SIT) of RAPP-7.
- A Special RI of RAPS-1&2 was conducted during December 20-23 to cover EMBHR and BSD activities of RAPS-2.

The number of inspections conducted in each of Nuclear Facilities (under construction & commissioning), Operating NPP and Industrial & Fuel Cycle Facilities are given in Table 3.1, 3.2 and 3.3 respectively.

**Table 3.1: RIs of NFs (Under Construction and Commissioning)**

Project(s)	No. of Inspections	Project(s)	No. of Inspections
KKNPP-5&6	2*	DFRP	1
KKNPP-3&4	2	NFC-Kota	1
KAPP-3&4	7#	KAIGA-5&6	1
RAPP-7&8	5#	GHAVP	2
PFBR	5	OESC Kalpakkam	1
Total Inspections		27	

\*RI Including AFR construction activities

#RI including OESC construction activities at respective site

**Table 3.2: RIs of Operating Nuclear Facilities & NPCIL HQ**

Facilities	No. of Inspections	Facilities	No. of Inspections
Operating NPPs			
TAPS-1&2	5	NAPS-1&2	5
TAPS-3&4	5	NAPS Site*	1
TAPS Site*	1	KAPS-1&2	3
RAPS-1&2	4	KAPS Site *	1
RAPS-3&4	5	KGS-1&2	3
RAPS-5&6	4	KGS-3&4	3
RR Site*	1	-	-
KGS Site*	1	MAPS-1&2	3
KKNPP-1&2	4		
Kalpakkam Site*	1	KK Site*	1
NPCIL- HQ			1
IGCAR Facilities			
FBTR, KAMINI, IFSB	1	FRTG, RCL, RML	3
CORAL	1	-	-
Total Inspections			57

\* Inspection covering Nuclear Security Aspects

**Table 3.3: Regulatory Inspections of Industrial and Fuel Cycle Facilities and HWB HQ**

Facility	No. of Inspections	Facility	No. of Inspections
HWB-HQ	1	UCIL-Turamdih Mine	1
HWP-Kota	2	UCIL-Turamdih Mill	2
HWP-Thal	3	UCIL-Mohuldih Mine	1
HWP-Hazira	1	UCIL-Bagjata Mine	1
HWP-Manuguru	2	UCIL-Bhatin Mine	1
HWP- Manuguru*	1	UCIL-Narwapahar Mine	1
HWP-Baroda	1	UCIL-Banduhurang Mine	1
HWP-Talcher	1	UCIL- Tummalapalle Mine	1
HWP-Tuticorin	1	UCIL- Tummalapalle Mill	2
TDP- Chembur	0	IREL-Udyogamandal	2
NFC-Hyderabad	3	IREL-OSCOM	2
ZC- Pazhayakayal	1	IREL- Manavalakurichi	1
ECIL- Hyderabad	1	IREL- Chavara	1
ECIL- Tirupathi	0	KMML- Chavara	0
UCIL-Jaduguda Mill	3	MPIL - Taloja	1
UCIL-Jaduguda Mine			1
Total Inspections	40		
* Inspection Covering Nuclear Security Aspects			

### 3.2.2 Inspection of Headquarters (HQs) of NPCIL and HWB

As a further step towards enhancing the regulatory oversight of NPCIL-HQ, inspections of NPCIL HQ has been started on regular basis covering 2-3 directorates in each year from 2022. Accordingly, inspection of following directorates of NPCIL was carried out in December, 2022:

(i) Directorate of Quality Assurance

(ii) Directorate of Projects (PHWR)

(iii) Directorate of Operations (PHWR)

The Regulatory Inspection Programme was also extended to Heavy Water Board (HWB) HQ, Mumbai to check QA program implementation for the activities & functioning of HWB-HQ and compliance to the requirements identified in regulatory documents of AERB. The inspection of HWB-HQ was conducted in November, 2022.



### 3.3 Regulatory Oversight of QA Activities During Manufacturing of Safety Related Reactor Components

AERB has planned to augment the regulatory oversight of the licensee's QA activities during manufacturing of safety related components of NPPs at vendor premises in a phased manner. Towards this, AERB inspectors observed NPCIL activities during manufacturing of important safety related components of NPPs at the premises of the four vendors, viz., M/s Godrej, Mumbai, M/s L&T, Hazira, M/s Kay Bouvet, Satara and M/s BHEL, Tiruchirappalli. In addition, AERB inspectors also

observed the corporate QA audit conducted by NPCIL for its regional QA centre at Hazira.

### 3.4 Regulatory Inspection of Radiation Facilities

During the year, 912 regulatory inspections of radiation facilities were conducted which included routine inspection, special inspections for type approval and pre-commissioning tests, and unannounced inspections of specific radiation facilities.

The number of inspections conducted in different types of radiation facilities are given in Table 3.4

**Table 3.4: Regulatory Inspections of Radiation Facilities**

Radiation Facility	Type of Inspection			
	Announced/ Routine	Special	Surprise	Total
Calibration	4	-	-	4
Consumer Products and Scanning Facility	-	3	-	3
Diagnostic Radiology	204	36	12	252
Gamma Irradiation Chamber	25	2	-	27
Gamma Radiation Processing Facility	6	3	4	13
Industrial Radiography	266	3	-	269
Industrial/Research Accelerator Facility	1	4		5
Medical Cyclotron Facility	5	3	-	8
Nuclear Medicine	123	2	4	129
Nucleonic Gauge	3	-	1	4
Radiotherapy	155	16	10	181
Research	1	-	-	1
Sealed Sources	2	-	-	2
Well Logging	14	-	-	14
Total	809	72	31	912