

No. CH/AERB/KKNPP-5&6/2021/27

May 12, 2021

PERMISSION FOR FIRST POUR OF CONCRETE OF KKNPP Units 5&6

References

1. Application for seeking AERB consent for First Pour of Concrete (FPC) for KKNPP Units 5&6 submitted vide No. NPCIL/ED(Engg-LWR)/KK-5&6/2019/M/51, dated 04.04.2019
2. Safety Review Plan for First Pour of Concrete of KKNPP-5&6, No. AERB/NPSD /LRB/CN/SR/233014/2019/00293, dated 30.04.2019

Consent No.	KKNPP-5&6/CN/FPC/0/12052021
Stage of Consent	First Pour of Concrete (FPC) of KKNPP-5&6
Applicant	Project Director, KKNPP-5&6 (Application – Ref.1)
Brief description of Nuclear Power Project	<p>Name: Kudankulam Nuclear Power Plant Units 5&6</p> <p>Type: 1000 MWe Pressurised Water Reactor (PWR) based Nuclear Power Plant</p> <p>Site: Existing site with KKNPP-1&2 operating and KKNPP-3&4 under construction</p> <p>Location: Kudankulam, Radhapuram Taluk, District: Tirunelveli, Tamil Nadu-627106</p> <p>Present Status: Excavation of main plant area has been completed. Site activities pertaining to confirmatory Geotechnical investigation, consolidation grouting and laying of levelling course have been completed. Site Organisation has been established. Construction power and water supply are available at site. Currently, preparation towards FPC and related activities is in progress.</p>
Basis of issuing the Consent	Regulatory requirements as per AERB Codes/Guides, AERB/SC/G (Regulation of Nuclear & radiation facilities), AERB/NPP-LWR/SC/D (Design of Light Water Reactor based Nuclear Power Plants) and necessary submissions as per AERB/NPP&RR/SG/G-1 (consenting process for NPP).

परमाणु ऊर्जा नियामक परिषद
Atomic Energy Regulatory Board

	<p>Satisfactory compliance to the Safety Review Plan for First Pour of Concrete of KKNPP-5&6 (Ref.2).</p> <p>Safety review in AERB followed by multi-tier safety reviews, viz.: 1st tier review by the Project Design safety Committee (PDSC-LWR), 2nd tier review by the Advisory Committee for Project Safety Review (ACPSR-NPP), and final 3rd tier review by the Board of AERB in its Meeting #133. Salient details of regulatory processes, compliance to regulatory requirements and review carried out towards the grant of Consent are briefly given in Annexure-1.</p>
Responsibility of Safety	<p>The Prime responsibility for safety of the facility or activity lies with the Consentee. It is the responsibility of Consentee to comply with safety requirements as specified in Regulations.</p>
Other Statutory requirements	<p>Consentee shall ensure that all other applicable statutory clearances are obtained and valid for present stage of Consent, i.e. FPC of KKNPP-5&6.</p>
AERB Stipulations and Conditions	<p>AERB Stipulations and conditions for FPC to enable effective regulatory control are appended as Annexure-2.</p>

Based on satisfactory review as brought out above, Permission is hereby granted for First Pour of Concrete of KKNPP Units 5&6, subject to satisfactory compliance to the Stipulations and Conditions, as brought out in Annexure-2. The Permission will be subject to re-review for any non-compliance to the Stipulations and Conditions.

This Permission is valid till 30st April 2026. The first pour of concrete related construction works shall be completed within the validity period, else extension shall be sought with justification.

This Permission shall be suspended or cancelled, if any declaration made or information given in the application is found to be false or if any undertaking given in the application is not complied with.


12-05-2021
(G. Nageswara Rao)

Encl.: Annexures-1 & 2

Chairman & Managing Director
Nuclear Power Corporation of India Limited
Nabhikiya Urja Bhavan (NUB)
Anushakti Nagar, Mumbai – 400 094.

परमाणु ऊर्जा नियामक परिषद
Atomic Energy Regulatory Board

Copy to:

AERB

Executive Director

Director, NFRG

Head, NPSD

Head, LWR&FCF-PS, NPSD

Head, S&SES, NPSD

NPCIL

Director (T-LWR)

Director (P-LWR)

Director (O)

AERB Committees

Chairman & Member Secretary, ACPSR-NPP

Chairman & Member Secretaries, PDSC-LWR

Chairman & Member Secretary, CRSA

KKNPP-5&6 Site

Project Director

Chief Construction Engineer

**Safety Review for
First Pour of Concrete (FPC) Permission for
Kudankulam Nuclear Power Plant Units 5&6**

1.0 INTRODUCTION

Kudankulam Nuclear Power Project Units 5&6 (KKNPP-5&6) is a twin unit 1000 MWe PWR based Nuclear Power plant at Kudankulam (Tamilnadu) and is similar in design to the 1000 MWe PWR plants KKNPP-1&2 (Operational at the same site) and KKNPP-3&4 (under construction at the same site), except for certain design differences due to implementation of new fuel TVS-2M, improvements based on feedback from earlier NPPs and site specific changes mainly w.r.t layout and civil engineering aspects.

Following Regulatory Consents have been issued for KKNPP-5&6 till date:

Regulatory Consents	Date of Issue
SITING STAGE	
Siting Consent for KKNPP-3 to 6	February 09, 2011
CONSTRUCTION STAGE	
Site Excavation Consent for KKNPP-5&6	November 14, 2018

NPCIL submitted an application (Ref.1) for the First Pour of Concrete (FPC) of KKNPP-5&6. The application was reviewed and additional submissions were identified while drawing out the safety review plan for KKNPP-5&6 (Ref.2) in line with the AERB Safety Guide on 'Consenting Process for Nuclear Power Plants and Research Reactors' AERB/NPP&RR/SG/G-1. NPCIL, over a period, progressively made the identified submissions as per safety review plan till March, 2021. The reviews were carried out in accordance with the NPSD's General Review Plan and the Safety Review Plan for FPC of KKNPP-5&6.

The application was reviewed by the AERB staff, Review Groups and the Safety Review Committees (PDSC-LWR & ACPSR-NPP). Review of nuclear security aspects was carried out by AERB Committee for Review of Security Aspects (CRSA). Thereafter, final review was carried out by the Board of AERB in its Meeting # 133 held on 29th April 2021.



परमाणु ऊर्जा नियामक परिषद Atomic Energy Regulatory Board

Compliance to the requirements of regulatory codes/guides as relevant to FPC stage was ensured during the review. The stipulations / recommendations of earlier consents were also followed up for compliance & resolution.

Based on the satisfactory review of Nuclear & Radiological Safety, Industrial & Fire Safety and Civil Engineering aspects as required for the current stage of KKNPP-5&6, it was decided to grant Permission for First Pour of Concrete of KKNPP-5&6, subject to compliance with the review recommendations and the progressive resolution of the Regulatory Hold Points identified for various sub-stages within the FPC Permission.

2.0 KKNPP-5&6 Compliance to AERB/NPP&RR/SG/G-1 Regulatory Requirements w.r.t. FPC

- 2.1 **Confirmatory Geotechnical Investigations:** The outcome of detailed geotechnical investigations and foundation parameters submitted as part of PSAR S-2 on Site Characteristics were reviewed during excavation clearance. Subsequent to excavation, the confirmatory geotechnical investigation reports and geological mapping of excavated pit have been submitted and review completed. The investigations also confirmed compatibility of the KKNPP-5&6 geotechnical strata (post consolidation grouting) with that adopted towards derivation of Design Basis Ground Motion parameters.
- 2.2 **Preliminary Safety Analysis Report (PSAR):** All PSAR Chapters as required for FPC stage have been submitted by NPCIL. PSAR Chapters 1, 2 & 3 were earlier reviewed at the time of Excavation Consent. PSAR Chapters relevant for the FPC stage were reviewed with focus on design differences w.r.t. KKNPP-3&4.
- 2.3 **Status of pending issues based on earlier stage reviews:** NPCIL submitted response to the stipulations / recommendations of earlier consents of KKNPP-5&6 (Siting & Excavation) which were taken cognizance of during the safety review.
- 2.4 **QA Manuals for Design & Construction:** Overall QA manual, QA manual for Design and QA manual for construction for KKNPP 5&6 are same as that of KKNPP-3&4. These manuals were reviewed satisfactorily at the time of FPC of KKNPP-3&4. NPCIL committed that manpower in QA group will be augmented as the construction progresses.
- 2.5 **Civil Engineering submissions:** Design Basis Reports (DBRs) on surface drainage, Report on Concrete Mix Design (with 40mm aggregate), Construction Methodology Document, Contractor QA Document etc. were submitted and satisfactory review of the same was completed.
- 2.6 **Construction Labour Colony:** The Construction Labour Colony has been established at Kudankulam.



परमाणु ऊर्जा नियामक परिषद
Atomic Energy Regulatory Board

- 2.7 **Emergency Preparedness Plan:** The revised Site EPP manual including the personnel involved in construction activities of KKNPP-3&4 and KKNPP-5&6 along with identification of the assembly areas was approved for use by SARCOP on September 19, 2018. Two additional Emergency Assembly Areas (EAAs) are identified within KKNPP-5&6. NPCIL informed that one of these will be established prior to FPC of KKNPP-5&6. The capacity of these assembly areas will be adequate for one year after FPC and subsequently NPCIL will progressively augment the capacity & locations of EAAs commensurate with manpower expected to be employed at site in different construction stages.
- 2.8 **Location and Approach / Exit Roads:** Details were covered in Site Evaluation Report and PSAR Chapters 1, 2 & 3 which were reviewed at the time of Excavation Consent.
- 2.9 **Industrial & Fire Safety:** NPCIL submissions related to I&FS of KKNPP-5&6 were reviewed w.r.t. requirements for the consenting stage of FPC, including compliances w.r.t safety and regulatory requirements specified in Atomic Energy (Factories) Rules, 1996, relevant AERB Safety Codes/Standards/ Guides and previous recommendations related to I&FS of KKNPP-1 to 4 as applicable to KKNPP-5&6. Certain observations were made which are covered as specific stipulations in Annexure-2.
- 2.10 **Nuclear Security:** NPCIL submissions towards compliance to the recommendations made during excavation clearance with respect to nuclear security aspects along with status of compliance to FPC requirements were reviewed in CRSA, AERB. Site is complying with recommendations made during excavation clearance. For FPC stage, site has complied with certain recommendations and has made commitment to comply with the rest of the recommendations, prior to appropriate stage of the project.
- 2.11 **Statutory Clearances -** Ministry of Environment & Forests and Climate Change (MoEF & CC) had issued Environmental Clearance for KKNPP-5&6 on December 31, 2009 with validity period of 5 years. Subsequently validity has been extended up-to December 31, 2020 by MOEF&CC. NPCIL informed that Application has been submitted to MoEF&CC for extension of validity.

----- 

AERB STIPULATIONS AND CONDITIONS FOR FIRST POUR OF CONCRETE OF KKNPP-5&6

1.0 Specific Stipulations within FPC Permission

- S.1. Detailed methodology for concrete pour of UJA building raft and the corresponding pour plan shall be reviewed and concurred by NPCIL-HQ before execution at site. NPCIL shall also devise a contingency plan before execution at site.
- S.2. NPCIL shall take up major pour of UJA raft only after ensuring availability of two dedicated batching plants for KKNPP-5&6 with third plant on standby along with readiness of other measures for successful completion of the comparatively large pour.
- S.3. NPCIL shall revise and submit the Seismic Analysis and Floor Response Spectra (FRS) of UKD building by modifying the alpha and beta parameters of Rayleigh damping so that damping would be less than 7% for all major frequencies and satisfactory review of the same to be completed and accepted by NPSD, AERB before start of construction of UKD raft.
- S.4. NPCIL shall reconfirm the design checks of UKD building with NPSD, AERB addressing the aspects related to revision of seismic analysis considering appropriate lower building frequencies and design checks using "released for construction" drawings before construction of UKD raft.
- S.5. NPCIL shall reconfirm the design check of UQZ tunnels using construction drawings of KKNPP-5&6 prior to commencement of construction of UQZ base slab.
- S.6. NPCIL shall submit design checks of identified locations of buildings [UJA (+0.0 to +43.0 m EL), UKC (+0.0 to 24.0 m EL and vent stack) and UKD (-4.9 to 17.9 m EL)] for satisfactory review by NPSD, AERB prior to commencement of construction at relevant elevation in these buildings.
- S.7. NPCIL shall submit the impact of Atmospheric Steam Discharge (BRU-A) valve relief loads on UJE building design on account of relocation of BRU-A valves for satisfactory review and acceptance by NPSD, AERB before start of construction of UJE building.
- S.8. Adequate flood/floatation prevention measures shall be adopted prior to and during construction of UQZ and UKZ tunnel of KKNPP-5&6.
- S.9. NPCIL shall include details of regulated backfilling and corresponding testing requirements to demonstrate the required strength of soil in the embedment portion of UZM building in relevant construction procedures. NPCIL shall submit confirmation on the same to NPSD, AERB prior to commencement of relevant construction activity.



2.0 General Stipulations

- 1 The Consentee shall not deviate from design as provided in safety analysis reports in any way that might affect safety, without prior approval of AERB.
- 2 The Consentee shall implement the Quality Assurance Program laid down as per requirements of the safety code on "Quality Assurance in Nuclear Power Plants" AERB/NPP/SC/QA (R1) and any other requirements stipulated by the Regulatory Body in this regard from time to time.
- 3 The Consentee shall appoint authorised persons who are qualified to perform the functions under the Consent.
- 4 The Consentee shall comply with Regulatory requirements related to radiation protection and emergency preparedness.
- 5 The Consentee shall adhere to Industrial & Fire Safety requirements including prompt reporting of industrial accidents or fatalities as per the Atomic Energy (Factories) Rules, 1996/AERB notifications. The accident/incident/event occurrences should be promptly reported to AERB as per provisions of Atomic Energy (Factories) Rules, 1996.
- 6 The Consentee shall make no changes to the programs & procedures, which have been approved by AERB, without prior intimation and review of AERB. Significant Event or Change shall be reported as per SECRC (Significant Event/Change Reporting Criteria).
- 7 The Consentee shall adhere to Nuclear Security related stipulations specified by AERB.
- 8 The Consentee shall obtain all applicable Statutory Clearances and ensure compliance to the Stipulations of the Statutory Clearances.
- 9 NPCIL shall ensure appropriate accountability for any safety lapses leading to fatal or serious industrial accidents in the works contract.


