

No. AERB/CH/KAPP-3&4/2020/25

July 17, 2020

**Permission for First Approach to Criticality and  
Low Power Reactor Physics Experiments of KAPP-3**

**References**

1. Application of Authorisation of KAPP Unit-3 for 1) Bulk addition of heavy water to Moderator System with minimum specified boron level in heavy water to prevent reactor criticality, (2) First Approach to Criticality (FAC), and (3) Low Power Reactor Physics tests and experiments; No. KAPP-3&4/SD/2020/S/55 dated May 11, 2020
2. Application incorporating the review comments towards Authorization of KAPP Unit-3 for 1) Bulk addition of heavy water to Moderator System with minimum specified boron level in heavy water to prevent reactor criticality, (2) First Approach to Criticality (FAC), and (3) Low Power Reactor Physics tests and experiments; No. KAPP-3&4/SD/2020/S/79 dated June 18, 2020
3. AERB Permission for Bulk addition of Heavy water to the Moderator system of KAPP-3; AERB/CH/KAPP-3&4/2020/24 dated July 07, 2020

<b>Consent No.</b>	KAPP-3/CM/FACLPE/0/17072020
<b>Stage of Consent</b>	First approach to Criticality and Low power Reactor Physics Experiments of KAPP-3
<b>Person authorized by CMD NPCIL for applying</b>	Shri M. Venkatachalam Station Director, KAPP-3&4
<b>Brief description of Nuclear Power Project</b>	<b>Name:</b> Kakrapar Atomic Power Project Unit 3&4 <b>Type:</b> 700 MWe Pressurized Heavy Water Reactor based Nuclear Power Plant <b>Location:</b> Anumala, Dist. Surat, Gujarat, Pin-394651 <b>Present Status:</b> At KAPP-3, Initial Fuel Loading has been completed. Addition of Heavy Water to the Moderator System and Primary Heat Transport System has been completed. At KAPP-4, Construction and Equipment erection is in progress
<b>Basis of issuing the Consent</b>	AERB regulatory requirements as per the AERB Codes and Guides, mainly AERB/SC/G (Regulation of Nuclear & Radiation Facilities), AERB/SG/O-4 (Commissioning of PHWR based NPPs) and AERB/NPP&RR/SG/G-1 (Consenting Process for NPPs and Research Reactors). Also satisfactory compliance to the Safety Review Plan for Commissioning of KAPP-3&4.

**परमाणु ऊर्जा नियामक परिषद**  
**Atomic Energy Regulatory Board**

<b>Safety Review</b>	After review by NPSD Review Groups and Working Groups/ Specialist Groups, safety review by the Project Design Safety Committee for Pressurized Heavy Water Reactors (PDSC-PHWR) and Advisory Committee for Project Safety Review of Nuclear Power Plants (ACPSR-NPP) was carried out towards Bulk addition of heavy water to the Moderator system, First approach to Criticality & Low power Reactor physics experiments of KAPP-3. After satisfactory reviews as above, final review was done by the Board of AERB. Reviews carried out towards the grant of Permission is briefly given in Annexure-1. The proposed activity of First approach to Criticality and Low power Reactor physics experiments can be carried out without undue risk to the workers, public or the environment.
<b>Responsibility of Safety</b>	The Prime responsibility for safety of the facility or activity lies with the Consentee. It is the responsibility of the Consentee to comply with safety requirements as specified in Regulations.
<b>Other Statutory requirements</b>	Consentee shall ensure that all other necessary Statutory Clearances are obtained and are valid for the present stage of Consent, i.e. First approach to Criticality and Low power Reactor physics experiments.
<b>AERB Stipulations and Conditions</b>	Refer Annexure-2

Based on the satisfactory Safety reviews as brought out above, Permission is hereby granted for the First approach to Criticality and Low power Reactor physics experiments of KAPP-3, subject to satisfactory compliance to the Stipulations and Conditions, as brought out in Annexure-2. The Consent will be subject to re-review for any non-compliance to the Stipulations and Conditions. This Consent is valid till October 30, 2020. The activity as per AERB/NPP&RR/SG/G-1 shall be completed within the validity period, else extension shall be sought with justification.

  
(G. Nageswara Rao) 17-7-2020

Encl.: Annexures-1 and 2

**Chairman & Managing Director**  
**Nuclear Power Corporation of India Limited**  
**NUB, Anushakti Nagar**  
**Mumbai – 400 094.**

**परमाणु ऊर्जा नियामक परिषद**  
**Atomic Energy Regulatory Board**

**Copy to:**

**AERB**

Chairman  
Executive Director  
Director, NFRG  
Director, NSARG  
Head, NPSD  
Head, DRI  
Head, OPSD  
Head, NSAD  
Head, DRPE  
Head, PHWR-PS

**NPCIL**

Director (T)  
Director (P)  
Director (O)

**AERB Committees**

Chairman & Member Secretaries, ACPSR-NPP  
Chairman & Member Secretaries, PDSC-PHWR  
Chairman & Member Secretary, CRSA  
Chairman & Member Secretaries, SCRP  
Chairman & Member Secretaries, SCCI&CS  
Chairman & Member Secretary, AERB-PSA-NF

**Kakrapar Site**

Site Director  
Station Director, KAPP-3&4  
Project Director, KAPP-3&4  
Chief Superintendent, KAPP-3&4

**SAFETY REVIEW FOR  
FIRST APPROACH TO CRITICALITY & LOW POWER REACTOR PHYSICS EXPERIMENTS**

**1.0 INTRODUCTION**

Kakrapar Atomic Power Project Unit-3&4 (KAPP-3&4) is a twin unit 700 MWe Pressurized Heavy Water Reactor (PHWR) based Nuclear Power Project (NPP), currently under construction/ commissioning. Following are the Regulatory Consents/ Clearances/ Permissions issued for KAPP-3&4 till date:

Regulatory Consents/ Clearances/ Permissions issued	Date of Issuance
Siting Consent	May 25, 2009
Clearance for Site Excavation	January 15, 2010
Clearance for First Pour of Concrete	November 20, 2010
Permission to proceed with construction activities beyond 91.7m EL	November 22, 2011
Clearance for Major Equipment Erection	May 26, 2014
Permission for Grouting End-Shields	September 29, 2014
Permission for Construction of ICW-OCW above 133mEL	June 09, 2015
Clearance for Hot Conditioning and associated Hot tests of KAPP-3	August 07, 2019
Clearance for Balance Light Water Commissioning Tests of KAPP-3	November 01, 2019
Permission for Light Water Draining from PHT System of KAPP-3	December 16, 2019
Permission for Draining of Light Water from Moderator System of KAPP-3	January 13, 2020
Provisional Authorization for Disposal/Transfer of Radioactive Waste	January 27, 2020
Clearance for Initial Fuel Loading of KAPP-3	February 28, 2020
Clearance for Addition of 65 Te Heavy Water to Moderator Systems and Addition of Heavy Water to PHT System of KAPP-3	March 18, 2020
Permission for Heavy Water Addition to PHT System of KAPP-3	April 06, 2020
Permission for Bulk Addition of Heavy Water of the Moderator System of KAPP-3	July 07, 2020

NPCIL had submitted an application (dated May 11, 2020) seeking consent for Bulk addition of heavy water to the moderator system with minimum specified boron level in heavy water to prevent reactor criticality, First approach to Criticality (FAC) & Low power Reactor physics experiments (LPPE) for KAPP-3. Based on the reviews carried out by the Review Groups/ Working Groups, PDSC-PHWR, ACPSR-NPP and the Board of AERB, the Permission for Bulk Addition of Heavy Water to the Moderator System was issued earlier on July 07, 2020. Compliance check of the identified pre-requisites for FAC and LPPE, as identified while according permission for Bulk Addition of Heavy Water of the Moderator System of KAPP-3 have been carried out.



**AERB STIPULATIONS AND CONDITIONS DURING  
FIRST APPROACH TO CRITICALITY AND LOW POWER REACTOR PHYSICS EXPERIMENTS**

- S.1.1. All Recommendations of PDSC, ACPSR and CRSA shall be strictly adhered to, including compliance to the respective timelines specified therein.
- S.1.2. Satisfactory resolution of all the review comments shall be ensured before proceeding with the process of FAC and LPPE.
- S.1.3. First Approach to Criticality and Low Power Physics Tests and Experiments of KAPP-3 shall be carried out as per the approved commissioning procedures (CP) and applicable QA. Deviation from the CPs, if any, should be promptly informed to AERB.
- S.1.4. Continuous & reliable core neutron monitoring and monitoring of reactivity devices shall be ensured. Start-up instrumentation shall be ensured healthy at all times. Any abnormality observed in the start-up counter readings shall be promptly reported to AERB.
- S.1.5. No changes shall be made to the programs, procedures or technical specifications, which have been approved by AERB, without prior intimation and review of AERB.
- S.1.6. Consentee shall implement the Quality Assurance Program laid down as per requirements of the Quality Assurance Code AERB/SC/QA and any other requirements stipulated by the Regulatory Body in this regard from time to time.
- S.1.7. In the event that during FAC, less than two counters are available, reactor shall be immediately shutdown manually by SDS-1 (if not tripped on auto). Approach to criticality shall be resumed after ensuring that at least two counters are made available.
- S.1.8. All the required radiological protections shall be in place before taking up the activity, and the Radiation protection procedures shall be strictly adhered to.
- S.1.9. Technical Specifications for Operation of KAPP-3&4 shall be strictly adhered to.
- S.1.10. Witness points identified by AERB as per the Safety Review Plan for Commissioning Phase of KAPP-3&4, and those communicated during the course of further review, shall be timely informed.
- S.1.11. All the Industrial & Fire Safety Requirements shall be strictly complied.
- S.1.12. Any abnormal occurrence, significant events, industrial accidents or fatalities during the activity shall be promptly reported to AERB.
- S.1.13. Compliance to the Stipulations of the Statutory Clearances shall be ensured.

\*\*\*\*\*



No. AERB/CH/KAPP-3&4/2020/24

July 07, 2020

Permission for Bulk Addition of Heavy Water to the Moderator System of KAPP-3

References

1. Application of Authorisation of KAPP Unit-3 for 1) Bulk addition of heavy water to Moderator System with minimum specified boron level in heavy water to prevent reactor criticality, (2) First Approach to Criticality (FAC), and (3) Low Power Reactor Physics tests and experiments; No. KAPP-3&4/SD/2020/S/55 dated May 11, 2020
2. Application incorporating the review comments towards Authorization of KAPP Unit-3 for 1) Bulk addition of heavy water to Moderator System with minimum specified boron level in heavy water to prevent reactor criticality, (2) First Approach to Criticality (FAC), and (3) Low Power Reactor Physics tests and experiments; No. KAPP-3&4/SD/2020/S/79 dated June 18, 2020

Consent No.	KAPP-3/CM/BAFACLPE/0/07072020
Stage of Consent	Bulk addition of Heavy Water to Moderator system of KAPP-3
Applicant	Shri M. Venkatachalam Station Director, KAPP-3&4
Brief description of Nuclear Power Project	<b>Name:</b> Kakrapar Atomic Power Project Unit 3&4 <b>Type:</b> 700 MWe Pressurized Heavy Water Reactor based Nuclear Power Plant <b>Location:</b> Anumala, Dist. Surat, Gujarat, Pin-394651 <b>Present Status:</b> At KAPP-3, Initial Fuel Loading has been completed. Addition of 65 Te Heavy Water to Moderator System and Addition of Heavy Water to Primary Heat Transport System has been completed. At KAPP-4, Construction and Equipment erection is in progress
Basis of issuing the Consent	AERB regulatory requirements as per the AERB Codes and Guides, mainly AERB/SC/G (Regulation of Nuclear & Radiation Facilities), AERB/SG/O-4 (Commissioning of PHWR based NPPs) and AERB/NPP&RR/SG/G-1 (Consenting Process for NPPs and Research Reactors).


**परमाणु ऊर्जा नियामक परिषद**  
**Atomic Energy Regulatory Board**

	Also satisfactory compliance to the Safety Review Plan for Commissioning of KAPP-3&4.
<b>Safety Review</b>	<p>After review by NPSD Review Groups and Working/ Specialist Groups, safety review by the Project Design safety Committee for Pressurized Heavy Water Reactors (PDSC-PHWR) and Advisory Committee for Project Safety Review of Nuclear Power Plants (ACPSR-NPP) was carried out towards bulk addition of heavy water to the moderator system, First approach to Criticality &amp; Low power Reactor physics tests and experiments of KAPP-3. After satisfactory reviews as above, final review was done by the Board of AERB. Reviews carried out towards the grant of consent is briefly given in Annexure-1.</p> <p>The proposed activity of Bulk addition of heavy water to the moderator system can be carried out without undue risk to the workers, public or the environment.</p>
<b>Responsibility of Safety</b>	The Prime responsibility for safety of the facility or activity lies with the Consentee. It is the responsibility of the Consentee to comply with safety requirements as specified in Regulations.
<b>Other Statutory requirements</b>	Consentee shall ensure that all other necessary Statutory Clearances are obtained and are valid for the present stage of Permission, i.e. Bulk addition of heavy water to moderator system.
<b>AERB Stipulations and Conditions</b>	Refer Annexure-2

Based on the satisfactory Safety reviews as brought out above, Permission is hereby granted for Bulk addition of heavy water to the Moderator system of KAPP-3, 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 August 31, 2020. The activity as per AERB/NPP&RR/SG/G-1 shall be completed within the validity period, else extension shall be sought with justification.

Permission for First Approach to Criticality and Low Power Physics Experiments of KAPP-3 will be issued after satisfactory review of the pre-requisites for these activities.

  
(G. Nageswara Rao) 7-7-2020

*Encl.: Annexures-1 and 2*

**Chairman & Managing Director**  
**Nuclear Power Corporation of India Limited**  
**NUB, Anushakti Nagar**  
**Mumbai – 400 094.**

**परमाणु ऊर्जा नियामक परिषद**  
**Atomic Energy Regulatory Board**

**Copy to:**

**AERB**

Chairman  
Executive Director  
Director, NFRG  
Director, NSARG  
Head, NPSD  
Head, DRI  
Head, OPSD  
Head, NSAD  
Head, DRPE  
Head, PHWR-PS

**NPCIL**

Director (T)  
Director (P)  
Director (O)

**AERB Committees**

Chairman & Member Secretaries, ACPSR-NPP  
Chairman & Member Secretaries, PDSC-PHWR  
Chairman & Member Secretary, CRSA  
Chairman & Member Secretaries, SCRIP  
Chairman & Member Secretaries, SCCI&CS  
Chairman & Member Secretary, AERB-PSA-NF

**Kakrapar Site**

Site Director  
Station Director, KAPP-3&4  
Project Director, KAPP-3&4  
Chief Superintendent, KAPP-3&4