

Before
UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 62 of 2026

In the Matter of:

Petition for seeking prior approval of Capital Investment for Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tiloth HEP, Uttarkashi under Section 61 and 86 of the Electricity Act, 2003 read with the relevant regulations and guidelines of the Commission.

And

In the Matter of:

UJVN Limited,
"UJJWAL", Maharani Bagh, GMS Road,
Dehradun.

...Petitioner

Coram

Shri M. L. Prasad	Chairman
Shri Anurag Sharma	Member (Law)
Shri Prabhat Kishor Dimri	Member (Technical)

Date of Order: September 17, 2026

ORDER

This Order relates to the Petition filed by UJVN Ltd. (hereinafter referred as 'the Generator' or 'the Petitioner') seeking approval of the Commission under Section 61 and 86 of the Electricity Act, 2003 read with Regulation 22 (4) of Uttarakhand Electricity Regulatory Commission (Terms & Conditions for Determination of Multi Year Tariff) Regulations, 2024 (UERC Tariff Regulations, 2024) for seeking prior approval of Capital Investment for Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tiloth HEP, Uttarkashi.

Background

2. The Petitioner vide its letter No. M-1333/UJVNL/02/D(O)/B8 dated 08.12.2025 submitted its Petition under Section 61 and 86 of the Electricity Act, 2003 read with Regulation 22 (4) of Uttarakhand Electricity Regulatory Commission (Terms & Conditions for Determination of Multi Year Tariff) Regulations, 2024 (UERC Tariff

Regulations, 2024) for seeking prior approval of Capital Investment for Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi.

3. The Petitioner under the 'Facts of the case' has submitted that:

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- 3.4 *Tilothe Hydro Power Station with an installed capacity of 90 MW (3x30 MW) is a run of river with pondage scheme constructed on river Bhagirathi, a major tributary of river Ganga and situated in District Uttarkashi of Uttarakhand state. This powerhouse was commissioned in year 1984.*
- 3.5 *... UJVNL filed was a petition in 2014 for seeking prior approval regarding Capital Investment for Renovation and Modernization of 3 x 30 MW, Tilothe HEP.*
- 3.6 *Hon'ble Commission vide order dated 30.07.2015 accorded in-principle approval for the following works: -*
- a) Replacement of underwater parts with HVOF coating.*
 - b) Revamping of Generators, Generator Transformers and other station auxiliaries.*
 - c) Replacement of excitation system.*
 - d) Replacement of governing system.*
 - e) Revamping of cooling system.*
 - f) Refurbishing works of Civil and Hydro-mechanical system proposed under this Petition except office & residential building and play ground.*
- 3.7 *The work of comprehensive Renovation, Modernization and upgradation of Tilothe HEP was awarded to M/s Andritz Hydro Pvt. Limited, New Delhi through open tender basis and contract for "Comprehensive Renovation, Modernization & Upgradation (RM&U) of Tilothe HEP on Turnkey basis" was signed with M/s ANDRITZ Hydro Pvt. Limited (AHPL), New Delhi vide contract agreement No. 02 (Supply), 03(Services), 04(Wrap)/DGM(M&U-GV)/Tilothe- RMU/2016-17 Dated 14.12.2016.*
- 3.8 *After completion of the RMU works, the units were handed over to UJVNL on following dates:*
- a) Unit no. 1 on 17.04.2020.*
 - b) Unit no. 3 on 06.07.2021.*
 - c) Unit no. 2 on 08.09.2022.*
- 3.9 *In the Comprehensive RMU of Tilothe HEP, the works of replacement of Spherical Main Inlet Valve (MIV) was not covered.*
- 3.10 *The spherical Main Inlet Valve (MIV) installed at Tilothe Power House is one of the most critical safety and operational components of the hydro-mechanical system. It serves as the primary isolating and protective device between the penstock and the turbine unit. Since there is no additional shut-off valve provided upstream of the MIV-except for the Surge Shaft Gate-the MIV performs a dual function of both isolation and emergency protection.*

In the event of a malfunction or failure of the guide apparatus to close the guide vanes, the MIV acts as an emergency closing device, thereby preventing uncontrolled water flow into the turbine. This quick isolation capability is crucial for protecting the turbine, generator, and downstream components from mechanical or hydraulic damage.

Furthermore, the MIV provides an essential safeguard in case of any structural damage or rupture in the inlet pipe, spiral case, or other components located downstream of the valve. By closing the MIV, the affected unit can be safely isolated from the penstock pressure, ensuring plant safety and preventing flooding or abnormal water discharge inside the powerhouse.

Apart from its emergency function, the MIV also acts as a maintenance isolation valve, allowing the spiral case and associated turbine components to be dewatered, inspected, and maintained without requiring complete draining of the penstock. This greatly facilitates maintenance operations, reduces downtime, and enhances plant availability.

- 3.11 *The Main Inlet Valves (MIVs) presently installed at Tiloth Power House are of an old and conventional design. Over decades of continuous operation, these valves have undergone multiple maintenance interventions and partial refurbishments. However, their fundamental design and operating principles remain outdated compared to the latest technological advancements available in the market.*
- 3.12 *The existing Main Inlet Valve (MIV) at Tiloth Power House is operated through an electro-hydraulic servomotor system of an old conventional design. The operating mechanism primarily consists of a hydraulic cylinder connected to the valve through a lever arrangement for opening and closing operations. This mechanism is actuated by an electro-hydraulic Oil Pressure Unit (OPU) system, which supplies the required hydraulic pressure for valve movement.*
- 3.13 *It is also to mention here that in the past major repair of MIV of Unit no. 2 was carried out in monsoon season of 2016 from 10.08.2016 to 09.09.2016 (30 days). Interim repair of MIV of Unit no. 2 in monsoon season of 2017 from 26.07.2017 to 11.08.2017 (17 days). Interim repair of MIV of Unit no.2 in monsoon season of 2018 from 24.07.2018 to 6.08.2018 (14 days). The major repair of spherical valve of Unit No. 2 was scheduled in the monsoon season of 2019 but it could not be carried out due to space constraints in Machine/MIV floor, erection bay (stator and other assemblies were being built up) etc. and EoT crane being occupied for RMU activities as RMU works of Machine no. 1 were going on with full pace. Interim repair of MIV of Unit no. 2 in monsoon season of 2020 from 05.08.2020 to 19.08.2020.*
- 3.14 *During the Renovation, Modernization & Uprating (RMU) works, the OPU system was replaced and modernized with a new electro-hydraulic unit equipped with a nitrogen-charged accumulator station to provide backup pressure in case of power or pump failure. However, the Main Inlet Valve itself was not replaced, and hence the existing valve design remains of an older generation. The upgraded OPU ensures improved hydraulic performance, but the absence of compatible modern features in the old MIV limits the overall efficiency, reliability, and safety of the operating system.*
- 3.15 ***Incident on MIV of Unit no. 2***

- On dated 09.11.2020 afternoon that there was sudden load reduction on Unit No. 2 from 27.4 MW to 24.8 MW along with some abnormal sound in the machine. It was also observed that oil pressure of spiral case pressure relief valve (PRV) was reduced to zero. During examination it was found that there were abnormal sound in the spiral case pressure relief valve and there was excessive water leakage from it even there was continuous abnormal sound in the spiral case pressure relief valve (PRV) in standstill condition and there was heavy water leakage from MIV bypass valve to spiral casing. Operation of the MIV could also not be done as no pressure could be built up in the spiral casing after normalizing oil pressure. There had been malfunctioning of the MIV seal valve also. The maintenance seal of the MIV could also not be engaged due to faults in it. After shutdown of the plant on 18.11.2020 and dewatering of penstock in-situ inspection it was observed that there were Heavy pitting on seating area of the bypass valve, Pitting, cutting, damages in guide vanes and bearing bodies, Seating area of the seal valve were damaged, Shaft of spiral case pressure relief valve (PRV) were broken/sheared from water piston side, MIV service seal/disk found shifted from original position with uneven gaps of 15-20 mm on entire periphery and 4 Nos. of SS ring holding fasteners of MIV disc were broken.
- The rectification of the shifted disc of MIV was carried out with the help of turn buckles and pulling jacks by restoring the minimum gaps of service seal/disk. After repair the penstock charging was started through filling valve however, it was observed that pressure could not be built up in the penstock even after a period of 10-12 hours & penstock pressure could not rise above 2.5 kg/cm² alongwith heavy leakage from the draft tube gate of Unit no. 2. The maintenance seal of the MIV could also not be engaged due to faults in it since service seal of the MIV get engaged (for the sealing) properly as the penstock pressure reaches around 5 kg/cm² (full pressure 17 kg/cm²). Hence, it was expected that in spite of some minor leakages from the MIV, the engaging of service seal and further rise in penstock pressure and consequent penstock charging to the full pressure of 17 kg/cm² may be possible. But it could not happen as the leakage from the MIV was abnormally high. As spiral case pressure relief valve, bypass valve and seal valve were functioning properly, it was pertinent that leakage has again been caused from the MIV due to its malfunctioning. Since MIV could not be made functional under such condition and machine could not be put on run, it was decided to again attend the MIV disc after dewatering of penstock and machine. The machine was again dewatered on 30.11.2020.
- After inspection of the MIV, the disk of the MIV was again found misaligned and tilted from the original position. Necessary high capacity arrangements etc. were prepared inside the spiral casing for alignment of the disc of MIV and attempts were made for reducing the gaps of moving seal and fixed seal. The gaps in the top portion of the disc of MIV was made within the permissible limits but gaps on the bottom side of the disc were not matched and remained on the higher values beyond the permissible limits. In spite of putting strenuous efforts with high capacity jacks, the disk of the MIV could not be matched with gaps within permissible limits. The gaps of both top and bottom side of the disk of MIV could not be matched simultaneously as either of the side remained mismatched despite massive and arduous efforts. It was analyzed that the reason behind the failure to repair the disk was due to cutting in the bottom side of the disk along with cutting in the spigot of the rotor of MIV. This could only be repaired in the factory workshop with necessary state of the art facilities after complete dismantling of the MIV which shall need minimum 15 days period

closer of the plant & minimum 30 days period for the repair activities on the MIV and again 15 days period for reinstallation of the MIV.

- *The MIV of Unit no. 2 was almost 36 years old as same is being in operation since commissioning. Any more high capacity jacks or arrangements used for in-situ repair may cause permanent failure of some component of MIV. This kind of permanent damage to MIV may put the complete plant at the risk of long time closure with huge generation loss and imperilling the safety of plant & machinery along with life of workers.*
- *From the reports submitted by the M/s AHPL (RMU contractor) regarding MIV of Unit no.1 and Unit no. 3, it was found that there were body cracks in the MIVs along with severe damages to the seals, disk and trunnion, bearings etc. Any more attempts for in-situ repair of MIV may cause such scenario wherein revival of the plant for future generation may be put to jeopardy due to permanent failure of the MIV.*
- *Since, any more time consumed in the repair and maintenance of the Unit no. 2 was causing generation loss by way of Unit no. 1 not being utilized for generation in spite of water availability. In view of water availability of current lean season, one unit shall be sufficient to cater to the generation of the plant utilizing almost entire water available.*
- *Further, the comprehensive RMU works of Tilothe Power House was in progress and Unit no. 2 was proposed to be handed for removal of its MIV along with fitment of the MIV of Unit no. 3 for which RMU activities were underway. Hence, the immediate removal of MIV of Unit no. 2 and its long gestation repair & maintenance work with associated uncertainties & huge financial implication shall not be a prudent commercial decision when Unit no. 2 is to be handed over for RMU works just after around one month period.*

In view of elucidation above, there was no cost-benefitted recourse factored with associated risks but to close the Unit no. 2 and resume generation of the plant by operating Unit no. 1. & it was suggested that Unit no. 2 shall be handed over for RMU works as early as possible. The MIV of Unit no.2 was plugged with necessary arrangement ensuring safety of the plant and machine. The generation of the plant was resumed on dated 4.12.2020 with Unit no.1 on 34.1 MW.

- 3.16 *During the refurbishment and renovation works (RMU) of MIVs installed in Unit no. 1, Unit no. 2 and Unit no. 3, extensive inspections revealed long and deep cracks at critical structural locations such as the body and trunnion regions. Although these cracks were repaired by welding and surface treatment to the best extent possible, there remains an inherent risk of crack propagation under cyclic loading during future operation.*
- 3.17 *Over long years of operation, the existing Main Inlet Valves at Tilothe Power House have undergone several repairs, but their old design and limited features no longer meet present-day safety and reliability standards.*
- 3.18 *The absence of several modern safety and operational features, the existing MIVs have become prone to frequent malfunctioning, uneven sealing performance, and higher maintenance requirements. This has a direct impact on the reliability, safety, and operational efficiency of the generating units. The following obsolete features in existing MIVs have been identified for necessary upgradation: -*

- a) **Service Seal Engagement by internal pressure only:** - The service seal of the old MIV engages only through internal penstock pressure of approximately 5 kg/cm² developed inside the valve body. There is no arrangement for external or controlled hydraulic engagement.
- b) **Manually Operated Maintenance Seal:-** The existing MIV uses a screw-driven, manually operated maintenance seal. Manual operation often results in non-uniform torque application, causing uneven sealing pressure and a higher risk of leakage or seal damage.
- c) **Absence of Mechanical Locking Arrangement:** - The existing MIVs do not have any provision for a mechanical locking system to prevent accidental opening or closing of the valve during maintenance or pressure fluctuation conditions. In the current setup, the valve position is maintained primarily through hydraulic pressure or penstock pressure alone, which can be unreliable in case of hydraulic failure or sudden pressure loss.
- d) **Material fatigue and structural cracks:** - During refurbishment of MIVs for Unit #1 and Unit #3, long cracks were observed at critical structural areas such as the valve body and trunnion. Although repaired, these areas remain susceptible to further crack propagation due to metal fatigue from decades of service and multiple maintenance.
- e) **High risk of malfunction and maintenance downtime:** - Due to the limitations of manual operation, lack of uniform sealing pressure, and fatigue of structural components, the existing MIVs frequently require maintenance and inspection, causing operational delays and plant downtime.
- f) **Absence of Counterweight Mechanism for Gravity Closing:** -The absence of such hydraulic sealing facilities in the existing MIVs makes them more prone to operational faults and malfunctions, often resulting in frequent maintenance and extended outages.

3.19 Modern MIVs are equipped with advanced systems like hydraulic actuation, mechanical locks, and counterweight-assisted closing, which are missing in the existing setup. The old obsolete features are rectified in the new proposed MIV's as :-

- a) Modern designs provide dual engagement options, allowing the service seal to be operated both by penstock pressure and external hydraulic control, thereby offering greater flexibility and reliability during operation and testing.
- b) New-generation MIVs employ a hydraulically operated maintenance seal, ensuring uniform pressure distribution, improved sealing reliability, and safer operation with reduced manpower dependency.
- c) New generation MIVs are equipped with a dedicated mechanical lock mechanism designed to hold the valve securely in the desired position (either open or closed). This feature ensures operational safety by eliminating the risk of unintentional valve movement, thereby protecting both equipment and personnel during maintenance, inspection, and emergency conditions.

- d) *New MIVs, made of high-grade alloy steel or forged components, are designed for longer service life, higher fatigue resistance, and minimal maintenance requirements.*
 - e) *New MIVs provide enhanced reliability and automation, significantly reducing maintenance needs and ensuring smoother plant operation.*
 - f) *The latest design MIVs are provided with a counterweight-assisted gravity closing arrangement, which ensures that in the event of power or pressure loss, the valve closes safely and fully under its own weight, maintaining plant and personnel safety at all times.*
- 3.20 *Considering these technical constraints and reliability concerns, it is proposed that new MIVs with advanced design, improved sealing arrangements, and modern hydraulic actuation systems be procured and installed in a phase wise manner.*
- The detailed requirement/justification/reason for SITC of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi is detailed in the DPR.*
- 3.21 *As per Regulation 22 (4) of UERC Tariff Regulations, 2024, a generating company is required to get prior approval for the additional capitalization works exceeding ₹ 5 Crore. The Regulation 22 (4) of UERC Tariff Regulations, 2024 states that: -*
- “Any addition/modification to the existing assets exceeding Rs. 2.50 Crore in case of distribution licensees, Rs. 5 Crore in case of generating companies/transmission licensees shall be taken up only after prior approval of the Commission. The application for approval of the Commission shall be accompanied with the approval of BoD in accordance with UERC (Conduct of Business), Regulations, 2014.”*
- 3.22 *The total cost of Capital Investment for Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi is Rs. 8.11 Crore exclusive of Tax.*
- 3.23 *The DPR for SITC of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi amounting to Rs. 8.11 Crore excluding tax was put up in 128th Board of Directors, UJVNL held in 04.09.2025. BoD in its 128th meeting held on 04.09.2025 approved the DPR for SITC of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi amounting to Rs. 9.57 Crore including GST...*
- 3.24 *Financing Plan and Phasing of Expenditure:*
- That the Petitioner shall arrange Rs. 2.871 Crores (30%) as Equity and Rs. 6.699 Crores (70%) from financial institution/ banks. The total expenditure of Rs. 9.57 Crore including GST will be incurred in FY 2027-28 as proposed in the DPR.*
- 3.25 *Based on all the above, the Petitioner humbly prays before the Hon’ble Commission to kindly approve the total capital investment of ₹ 9.57 Crore including GST for SITC of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi.*
4. Further, the Petitioner under the section ‘Relief sought’ has mentioned that:
- “
- In view of submissions contained in the Petition, it is respectfully prayed that the Hon’ble Commission may kindly:*
- ...
- ii. *Approve the total capital investment of ₹ 9.57 Crore including GST for SITC of Spherical Main Inlet Valve of Unit no. 2 of Tilothe HEP, Uttarkashi.”*

- iii. *The cost of proposed works has been developed on the basis of estimates as detailed in this filing. There may be difference between the present estimates and the cost of actual implementation. The Hon'ble Commission is therefore requested to kindly consider and approve the actual expenditure that may be claimed during the true-up of the expenditure.*
- ..."

5. The Petitioner alongwith its Petition has enclosed certified true copy of 128th Board of Directors meeting dated 04.09.2025. The resolution passed by BoD states that: -

"ITEM NO. 128.07: Supply, Installation, Testing & Commissioning of Spherical Main Inlet Valve (MIV) for 3X30 MW Tiloth Power House, Uttarkashi.

"RESOLVED THAT approval of the Board be and is hereby accorded for DPR of Supply, Installation, Testing & Commissioning of Spherical Main Inlet Valve (MIV) for 3x30 MW Tiloth Powerhouse, Uttarkashi."

"RESOLVED FURTHER THAT approval of the Board be and is hereby accorded for Submission of the investment petition for "Supply, Installation, Testing & Commissioning of Spherical Main Inlet Valve (MIV) for 3x30 MW Tiloth Powerhouse, Uttarkashi, amounting to Rs.9.57 crore including GST to the Hon'ble UERC for Seeking prior approval."

6. The Commission appointed an expert consultant for analyzing the matter, and a meeting was convened on 19.03.2026 for preliminary discussion on the various techno-commercial aspects of the instant proposals.
7. On preliminary examination of the Petition and discussion held on 19.03.2026, the Commission vide its letter No. 85 dated 16.04.2026 issued following deficiencies/infirmities to UJVN Ltd. and directed it to submit point-wise reply before the Commission latest by **30.04.2026**:

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1. *With regard to the incident in Unit#2 occurred on 09.11.2020, the Petitioner in its Petition has mentioned following sequence of events: -*
- (1) There was sudden load reduction in Unit#2 from 27.04 MW to 24.8 MW, alongwith same abnormal sound in the machine.*
 - (2) The oil pressure of spiral casing Pressure Release Valve (PRV) got reduced to zero followed by abnormal sound in the spiral casing PRV and excessive water leakage from it.*
 - (3) Further, there was heavy water leakage from MIV by pass valve also.*
 - (4) Operation of MIV could also not be done due to unequal pressure across the MIV.*

(5) Thereafter, shutdown was taken and MIV was inspected, wherein following were observed:

- malfunctioning of MIV seal,
- maintenance seal of MIV could also not be engaged.
- heavy pitting on sealing area of the by pass valve and damages on the seating area of the seal valve
- shaft of spiral casing PRV was found broken sheared from water piston side.
- MIV Services seal/disk found shifted from original position with uneven gaps of 15-20 mm on entire periphery.

In this regard, prima-facie it has been observed that the incident occurred due to failure of hydraulic pressure to spiral case PRV and in case had there been no failure in PRV, the aforesaid incident would not have occurred. UJVN Ltd. is required to clarify regarding what measures have been taken by the Petitioner to mitigate such occurrences in future. Further, confirm whether any standby hydraulic pressure system for emergency closing of MIV has been installed in the new OPU system.

2. The rectification work of the shifted disc of MIV was carried out by putting extra force with the help of turn buckles and pulling jacks. But the leakage problem from MIV could not be addressed so machine was again dewatered on 30.11.2020. On inspection, the disc of MIV was found again misaligned and tilted from original position. It was analyzed that reason of failure was due to cutting in the bottom side of the disc and cutting in the spigot of the rotor of MIV, which could be possible to repaired in the workshop only after dismantling the MIV.

In this regard, UJVN Ltd. is required to clarify the reason for cutting of the bottom side of disc and spigot of the rotor of MIV.

3. In the petition, it has been mentioned that in case of failure of closing of guide vanes of machine, it may go beyond control if MIV does not close. It is true, but history of any such occurrences has not been mentioned.

UJVN Ltd. is required to furnish the details of such occurrences in past. Further, confirm whether any incident when MIV has opened from close position either on its own or on failure of hydraulic pressure.

4. UJVN Ltd. is required to confirm why the modifications in existing MIVs w.r.t. counterweight and mechanical lock cannot be done.

5. It is observed that the counterweight arrangement have some lacuna during opening operation of MIV as extra jacking force is required for opening of MIV as in case of Khodri Power house additional jacks have been provided to facilitate the opening of MIV against counterweights. This results in delay in starting of the machine.

UJVN Ltd. is required to furnish the pros & cons of the counter-weight system.

6. UJVN Ltd. in the instant Petition has mentioned that heavy long cracks in the body of MIV & Trunnion have been observed. However, the reasons for the same have not been mentioned. It is observed that the same may be due to improper greasing/maintenance.

UJVN Ltd. is required to furnish reasons for heavy long cracks.

7. *In cost benefit analysis (CBA), UJVN Ltd. has not furnished the detailed computation of Gen. loss 84.5 MUs. Further, no justification w.r.t. the quantified benefits due to reduced maintenance & operation time and reduced maintenance cost have not been taken into consideration while carrying CBA calculations.*

UJVN Ltd. is required to furnish details of the aforesaid quantified benefits and revise the CBA calculation by covering the above-mentioned aspects and furnish hard & soft copy of the same in MS excel format.

8. *In the proposal submitted by UJVN Ltd., the supplier M/s AES Hydro has expertise of maximum 10 MW projects and that too is not clear whether he has supplied the spherical valves or not. The supplier should have experience of atleast supplying MIV for 30 MW high head machines.*

In this regard, UJVN Ltd. is required to confirm why the offer was not taken from the OEM i.e. BHEL or its subsidiary units or suppliers with proven track record. Further, UJVN Ltd. is required to furnish the item-wise break-up of the total offer price of Rs. 8.11 Crore (excluding taxes & duties).

9. *UJVN Ltd. is required to furnish the reasons why the major repair /replacement of the spherical valve for unit#2 was not carried out during the RMU of Unit#2 as the 'incident on MIV of Unit#2' occurred on 09.11.2020 and the RMU of Unit#2 was completed on 08.09.2022.*

10. *UJVN Ltd. is required to furnish the history of unit-wise maintenance of MIV and details of failures, associated generation loss and expenditure incurred on the same in last 10 years.*

11. *UJVN Ltd. in its petition has proposed replacement of spherical valve of unit # 2. Whereas, in the instant petition, UJVN Ltd. has submitted that cracks were observed in all three units.*

In this regard, UJVN Limited is required to furnish rationale for proposing replacement of MIV of Unit# 2 when the same has been recently repaired at manufacturer works and is in use since then.

12. *UJVN Ltd. is required to furnish details of time in days required for Annual maintenance in IN-SITU and major maintenance of MIV at manufacturer works along with details of expenditure on the same.*

13. *UJVN Ltd. in its Petition has submitted that a constant pressure is required for maintaining its spherical valve in closed position.*

In this regard, UJVN Ltd. is required to clarify the same and submit history of such failure/occurrences in past.

14. *UJVN Ltd. is required to furnish the work breakdown structure of various activities for the replacement of MIV with linkages such as finish-finish, finish-start, start-finish & start-start and confirm how the shutdown time would be minimized.*

15. *UJVN Ltd. is required to confirm regarding the total service life and maintenance free service life for the proposed new MIV.*

16. *UJVN Ltd. has submitted that the proposed new MIV has a feature of hydraulic actuation of maintenance seal and service seal.*

17. *The Commission vide its letter dated 04.12.2025 had categorically directed UJVN Ltd. to furnish certain information in standardized template in each BoD approval. However, the said information has not been furnished in the instant matter.*

UJVN Ltd. is required to furnish the information in the standardized template issued alongwith the aforesaid letter.

18. *UJVN Ltd. is required to furnish a comparative of MIV and Penstock Protection Valve (PPV), if any, details for its 11 LHPs in the format mentioned below:*

Name of LHP/ MW	Type of MIV/PPV (Spherical/ Butterfly)	Rated Discharge in Cumecs	Max. Head in Meter	Hydraulic Test Pressure of MIV (in Kg/cm2)	Operating Oil Pressure (in Kg/cm2)	Nominal Diameter (in mm)	Opening/ closing time (in Seconds)	Counter weight provided or not	Year of installation

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8. In response to the above observations/ deficiencies, Petitioner vide its letter No. M-471/UJVN/02/D(O)/B8 dated 05.05.2026 submitted its reply and furnished the following:

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1. *It is hereby clarified that there was no failure of the hydraulic system associated with the spiral case PRV, as the same hydraulic pressure is also utilized for the operation of the guide vanes. In the event of any hydraulic system failure, the pressure switch would have actuated the master trip relay, bringing the machine to a standstill.*

The '0' pressure reading pertains to the independent pressure of the spiral case PRV in its closed condition. Under normal operating conditions, this pressure drops to zero when the PRV opens. In the present case, the PRV shaft was found to be broken, causing it to behave as an open valve, which resulted in a zero reading on the pressure gauge.

It is further clarified that the hydraulic system for the MIV and turbine is equipped with two pressure pumps (one main and one standby), along with an accumulator station, to cater to both normal and emergency operating conditions. The system is also capable of performing COC (close-open-close) operation even in the event of an AC power failure.

2. *The earlier observation was based on past experience and sound engineering judgment to assess the likely cause of disc misalignment. However, determination of the exact cause necessitated complete dismantling of the MIV from the penstock, along with disassembly of its internal components.*

Following dismantling, the MIV was handed over to AHPL for refurbishment. A detailed workshop inspection subsequently confirmed severe damage to the rotor disc and bearing housing. In addition, multiple cracks were detected in the trunnion bearing area, as documented in the report attached to the DPR. The observed damage is primarily attributed to the ageing of the MIV and its prolonged exposure to high concentrations of quartz particles present in the river water.

3. *There is no documented or recorded instance of a simultaneous failure of both the guide vanes and the MIV within the plant. The system is engineered with multiple*

safeguards, including independent hydraulic controls and dedicated trip mechanisms, to mitigate the risk of such an occurrence.

Although this scenario cannot be entirely excluded in absolute terms, its probability is considered to be extremely low.

4. *It is hereby clarified that modification of the existing MIV to incorporate counterweight and mechanical locking arrangement is not feasible due to inherent design and structural limitations. The valve was not originally configured to accommodate such provisions, and their implementation would necessitate extensive alterations that could adversely impact alignment and operational reliability.*

Furthermore, the MIV body has been found to contain numerous internal cracks. In view of this condition, complete replacement of the MIV is considered more appropriate than undertaking modifications, thereby mitigating potential future risks associated with these defects.

5. *The requirement for additional jacking force during the opening of the MIV is not attributable to any deficiency in the counterweight arrangement, as the hydraulic pressure system has been designed to adequately account for the counterweight force. The counterweight primarily serves to assist in the closing operation and to ensure fail-safe performance.*

The increased jacking force during opening is mainly due to operational factors such as sealing pressure, friction, and the characteristics of the MIV sealing system, as well as the presence of foreign particles such as silt or quartz.

6. *It is hereby clarified that the significant longitudinal cracks observed in the MIV body and trunnion are not attributable to inadequate greasing or maintenance practices. These defects are primarily due to the ageing of the MIV and its prolonged exposure to abrasive particles, such as quartz, present in the river water, resulting in progressive deterioration over time.*

7. *Copy attached as ...*

8. *This is to clarify that, subsequent to the RMU, M/s Andritz Hydro Pvt. Ltd. (AHPL) is the OEM for the Tiloth Power House. An offer was accordingly obtained from AHPL (copy enclosed as ...). As the case is being processed through an open tender, a quotation was also obtained from M/s AES Hydro, and the lower of the two has been adopted for estimation purposes. Moreover, M/s AES Hydro has entered into a joint venture (JV) with M/s Rolex Fabricator, which possesses adequate experience in the supply of Main Inlet Valves (MIVs) of sizes of dia 3600 mm and more as compared to the 1300 mm requirement of Tiloth Power House. (Copy enclosed)*

9. *This is to clarify that, during the Renovation and Modernization (RMU) programme, only the underwater components of the machine were replaced in compliance with applicable regulatory requirements, and the Main Inlet Valve (MIV) does not fall within this scope. Furthermore, the comprehensive RMU works at Tiloth Power House were under progress, and Unit No. 2 was planned to be taken up after completion of the ongoing RMU works of Unit No. 3, in accordance with the sequence duly approved by M/s AHPL.*

10. *Copy attached as ...*

11. *It is hereby clarified that, although cracks have been observed in all three units, the extent and severity of damage differ across the units. The MIV of Unit No. 2, despite*

having undergone recent repairs at the manufacturer's works, has exhibited further deterioration during subsequent operation and inspection. The earlier repairs were limited in scope and did not adequately address the underlying material degradation. In view of the present condition, and with due consideration to long-term reliability and safe operation, replacement of the MIV of Unit No. 2 has been proposed.

12. Copy attached as ...
 13. *There is no documented evidence of any such failure or occurrence in the past.*
 14. Copy attached as ...
 15. *The total service life is considered to be 35 years, while the maintenance-free service life is estimated at approximately 3 to 5 years.*
 16. *Yes, the system shall be hydraulic or hydrostatic, in accordance with the applicable system requirements and the OEM design specifications.*
 17. Copy attached as ...
 18. *Copy attached as"*
9. Further, a meeting was held with the Petitioner at the Commission office on 15.05.2026 with Commission's officers & Expert Consultant. Subsequently, the Petitioner, vide its letter dated 11.06.2026, submitted its additional point-wise information on its earlier submission dated 05.05.2026 as detailed below:

"

- (1) Additional Reply: - *It is hereby clarified that the problem in the MIV was detected during the inspection of the PRV. The cutting/erosion observed in the trunnion/spigot is primarily attributed to the abrasive effect of heavy silt and quartz content present in the water of the Bhagirathi River. Furthermore, the possibility of occurrence of a similar issue in the other units cannot be ruled out.*
- (2) Additional Reply: - *Due to inherent design constraints, regular inspection and monitoring of greasing is not feasible. However, during annual maintenance outages, manual greasing is also carried out to ensure proper lubrication and operational reliability.*
- (3) Additional Reply: - *UJVN Ltd already ruled out the possibility of such failure occurrence.*
- (4) Additional Reply: - *Due to space constraints within the existing MIV body, provision of a counterweight in the present system is not feasible. Furthermore, installation of a mechanical locking arrangement is also not recommended in the existing body considering the aging and structural condition of the equipment.*
- (5) Additional Reply: - *The requirement for additional jacking force during the opening of the MIV is not attributable to any deficiency in the counterweight arrangement, as the hydraulic pressure system has been designed to adequately account for the counterweight force. The counterweight primarily serves to assist in the closing operation and to ensure fail-safe performance. The increased jacking force during opening is mainly due to operational factors such as sealing pressure, friction, and the characteristics of the MIV sealing system, as well as the presence of foreign particles such as silt or quartz. In the new MIV proposed for MB-II, the above-*

mentioned issues shall be adequately addressed and incorporated into the design considerations.

Pros-

- 1. Provides fail-safe operation of the MIV during total power failure conditions.*
- 2. Ensures automatic closing of the MIV even in case of failure of AC supply, DC supply, hydraulic system, or OPU.*
- 3. Enhances overall safety of the turbine and Power House by preventing turbine overspeeding.*
- 4. Acts as an independent mechanical safety feature, reducing dependency on electrical and hydraulic systems.*
- 5. Improves reliability of emergency shutdown operation during abnormal or fault conditions.*
- 6. Minimizes the risk of uncontrolled water flow to the turbine in emergency situations.*
- 7. Provides additional protection to downstream equipment and personnel.*

Cons-

- 1. Requirement of extra installation space, which may not be feasible in existing MIV bodies or old power house layouts.*
- 2. Maintenance requirements for counterweight links, pins, bearings, and guide mechanisms.*

- (6) Additional Reply: - It is hereby clarified that the significant longitudinal cracks observed in the MIV body and trunnion are not attributable to inadequate maintenance or greasing practices. These defects are primarily due to the ageing of the MIV and its prolonged exposure to abrasive particles, such as quartz, present in the river water, resulting in progressive deterioration over time.*
- (7) Additional Reply: - Both calculations are correct, as they are based on different assessment criteria. The first calculation is based on the actual time period from the date of occurrence of the problem until the date of handing over of the respective unit before handing over for RMU as per scheduled activities. The second calculation is based on the estimated time of around one year required for complete successful testing and commissioning of the MIV assembly, assuming that the same problem arises under present conditions. Copy attached ...*
- (8) Additional Reply: - The budgetary offer has already been obtained from Andritz Hydro (OEM), along with offers from other manufacturers/JVs. However, the quoted price appears to be considerably high (copy enclosed as ...) Since the procurement shall be carried out through an open tendering process, the lowest available offer has been considered for the purpose of estimation. Moreover, the tender eligibility criteria shall be finalized in such a manner that only reputed and technically qualified manufacturers are eligible to participate in the bidding process.*
- (9) Additional Reply: - The replacement of the MIV was not proposed during the RMU works due to the following reasons:*

The MIV is a major customized hydro-mechanical equipment having a long manufacturing and delivery cycle of approximately 12 months. Proposing its

replacement during the RMU works would have extended the machine outage period by nearly one additional year beyond the scheduled RMU timeline. This was not feasible, as the plant was required to be commissioned immediately after completion of RMU works in order to minimize adverse impact on power supply to UPCL as well as on overall grid stability.

The existing MIV had already been refurbished during the RMU works. In view of statutory financial guidelines and prudent financial management practices, obtaining management approval for recurring back-to-back capital expenditure on the same equipment was not considered financially justified at that stage.

- (10) Additional Reply: - Copy attached as ...
- (11) Additional Reply: - *It is hereby clarified that, although cracks have been observed in all three units, the extent and severity of damage differ across the units. The MIV of Unit No. 2, despite having undergone recent repairs at the manufacturer's works, has exhibited further deterioration during subsequent operation and inspection. The earlier repairs were limited in scope and did not adequately address the underlying material degradation. In view of the present condition, and with due consideration to long-term reliability and safe operation, replacement of the MIV of Unit No. 2 has been proposed.*
- (12) Additional Reply: - *As per the received offers and the various alternatives explored, it has been concluded that, since the concerned equipment is highly customized in nature, the complete process including design, engineering, manufacturing, testing and commissioning is expected to take around than one year.*
- (13) Additional Reply: - *There is no documented evidence of any such failure or occurrence in the past*

..."

Commission's Observations, Views & Directions: -

10. Based on the examination and analysis of the petition & subsequent submissions made by the Petitioner before the Commission, the observations, views & directions of the Commission are as follows: -

- (1) The Petitioner in its Petition has proposed 'Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tiloth HEP'. The total estimated cost of the project, as submitted by the Petitioner, is Rs. 9.57 Cr. (including GST) which has been duly approved by its Board of Directors in its 128th BoD meeting held on 04.09.2025, with no provision for any variation in the approved cost.
- (2) With regard to the funding of the instant project, the Petitioner has submitted that the project is proposed to be funded in a debt-equity ratio of 70:30, wherein 70% of the project cost amounting to Rs. 6.70 Cr. is proposed to be met through debt from financial institutions/banks, while the remaining

30% amounting to Rs. 2.87 Cr. is proposed to be met through equity (Internal Resource).

- (3) The Petitioner has submitted that on 09.11.2020, Unit No. 2 experienced a sudden reduction in load from 27.4 MW to 24.8 MW along with abnormal sound from the machine. The oil pressure of the Spiral Case Pressure Relief Valve (PRV) reduced to zero, and heavy water leakage was observed from the MIV bypass valve. Upon inspection after dewatering of the penstock, heavy pitting and damage were found in the bypass valve, guide vanes, bearing bodies, seal valve and PRV shaft. The MIV service seal/disk was also found shifted from its original position, with uneven gaps of 15–20 mm, and four SS ring holding fasteners were found broken.

Further, the Petitioner has submitted that attempts were made to realign the MIV disk using turnbuckles and high-capacity jacks. However, the MIV continued to leak and the penstock pressure could not be raised beyond 2.5 kg/cm² against the full pressure of about 17 kg/cm². On further inspection, the MIV disk was again found misaligned and tilted, with damage to the disk and MIV rotor spigot. It was therefore assessed that the MIV could not be reliably repaired in-situ and would require complete dismantling and workshop-level repair.

The existing MIV also does not have a counterweight arrangement for assisting with emergency closure or a mechanical locking arrangement. Since the MIV is a critical safety device for isolating the turbine from the penstock and there is no separate shut-off valve for the individual unit, its reliable operation is essential for safe operation of the generating unit. The Commission opines that continued operation of the existing MIV in its present condition may pose a risk during normal & emergency conditions, and any failure or delayed closure may result in uncontrolled water flow to the turbine, damage to equipment, extended outages and loss of power generation.

- (4) The Petitioner has submitted that most of the major equipment of the Powerhouse was renovated/replaced during the RMU works carried out

during 2020, 2021 and 2022. However, the existing MIV could not be covered under the RMU works as the same was not covered in the works approved by the Commission. The MIV is a critical safety component of the Powerhouse, particularly because there is no separate penstock gate, PPV or other independent shut-off arrangement for the individual generating unit. Therefore, reliable operation of the MIV is essential during both normal and emergency conditions to protect the turbine and other downstream equipment and to prevent uncontrolled water flow into the Powerhouse. The existing MIV has been in operation for more than decades and has undergone several repairs during its service life. The existing MIV also lacks certain important safety and operational features, such as a counterweight arrangement for emergency closure and a mechanical locking arrangement. Further, the service seal is operated through the internal penstock pressure, with no provision for external or controlled hydraulic engagement, while the maintenance seal is operated manually. During refurbishment of the MIVs of other units, long cracks were also observed in critical structural areas, indicating the possibility of further deterioration and crack propagation due to prolonged operation, fatigue and repeated maintenance.

In view of the above, the Commission observes that the existing MIV has limitations in terms of safety, reliability and ease of maintenance, and replacement with a new MIV having improved safety and operational features prima-facie appears necessary.

- (5) With regard to the age of the existing MIV, the Petitioner has submitted that the existing MIVs installed at Tiloth HEP has been in operation since commissioning of the Power House in 1984 and were not replaced during the Renovation, Modernization and Upgradation (RMU) works of the Power House, which were completed in year 2022. The MIV of Unit No. 2 continues to be the original MIV installed at the time of commissioning of the Plant i.e. year 1984 and remained in service for entire 42 years of period. In this context, the Commission has observed that Regulation 3(81)(a) of the UERC (Terms and Conditions for Determination of Multi Year Tariff) Regulations, 2024 provides the useful life of a Hydro Electric Generating Station as 40

years and the existing MIVs are found to be in operation for more than the prescribed useful life of the Station.

The Commission is of the view that continued operation of such an aged MIV, which has undergone repeated repairs and has developed deterioration and cracks in critical components, may adversely affect the safe and reliable operation of the generating unit. Further, the existing MIV lacks certain additional safety features such as counterweight-assisted emergency closing and mechanical locking arrangement.

- (6) On examination of the DPR, the Commission has observed that the technical specifications of the existing MIV and the proposed replacement MIV are as follows: -

Sl. No.	Particulars	Technical specification of existing/proposed MIV
(1)	Type	Spherical
(2)	Nominal diameter	1800 mm
(3)	Elevation of valve centreline	1108.80 Mtr.
(4)	Min. Head	145.0 Mtr.
(5)	Design Head	147.5 Mtr.
(6)	Max. Head	180.0 Mtr.
(7)	Rated Discharge	23.8 m ³ /sec
(8)	Design Penstock water pressure	18 Kg/cm ²
(9)	Pressure rise at 100% load throw off	25 Kg/cm ²
(10)	Hydrostatic Test pressure (on valve bode)	28 Kg/cm ²
(11)	Opening time	60 s, adjustable
(12)	Closing time	60 s, adjustable
(13)	Operating Oil Pressure	110-120 bar from N2 based

- (7) The Commission has observed that the Petitioner has carried out a detailed inspection and investigation of the MIV after its dismantling, including necessary Non-Destructive Testing (NDT) checks. The technical assessment was carried out by the Andritz Group and the said reports indicated that there is high risk associated with the old MIV during normal operation of the machine at site, which needs to be replaced with new MIV at the earliest.

In this context, the Commission has observed that Regulation 22(2)(e) of UERC (Terms and Conditions for Determination of Multi Year Tariff) Regulations, 2024, provides that “any additional capital expenditure which has

become necessary for efficient operation of generating station or transmission system as the case may be. The claim shall be substantiated with the technical justification duly supported by the documentary evidence like test results carried out by an independent agency in case of deterioration of assets, report of an independent agency in case of damage caused by natural calamities, obsolescence of technology, up-gradation of capacity for the technical reason such as increase in fault level...” **[Emphasis Added]**

The Commission acknowledges that the Petitioner has complied with the aforesaid regulatory requirement by submitting technical inspection and assessment report, which depicts and also support the necessity and justification of the proposed investment.

On examination of the aforesaid technical audit reports, the Commission observes that the said report highlighted that the existing MIV, being an old equipment, requires extensive maintenance and has limitations in terms of its operational reliability and safety. The inspection findings further indicate that continued operation of the existing MIV involves higher operational risk, particularly during normal operation of the generating unit. On the basis of the inspection findings & technical assessment, the Petitioner has recommended replacement of the existing MIV of Unit No. 2 with a new MIV at the earliest, in order to ensure safe, reliable and efficient operation of the generating unit.

- (8) On enquiry regarding the unit-wise maintenance details of the existing MIVs, the Petitioner, in its submission dated 11.06.2026, furnished details of the maintenance activities carried out in the three generating units during FY 2016-17 to FY 2025-26, along with the corresponding generation loss. On examination of the information submitted by the Petitioner, the Commission observes that the existing MIVs required repeated interim and major repairs, apart from refurbishment works carried out in connection with RMU works of the respective generating units. These maintenance activities resulted in outages of the generating units and consequent generation loss. The generation loss reported by the Petitioner is summarized below: -

FY 2016 – 17 to FY 2025 – 26						
Sl. No.	Unit	Interim Repair – Gen. Loss (MU)	Major Repair – Gen. Loss (MU)	Refurbishment / RMU – Gen. Loss (MU)	Breakdown- Gen. Loss (MU)	Total Generation Loss (MU)
1.	Unit 1	34.00	19.36	68.00	5.60	126.96
2.	Unit 2	36.58	31.60	84.00	0.00	152.18
3.	Unit 3	57.38	0.00	90.00	0.00	147.38
Total		127.96	50.96	242.00	5.60	426.52

From the above table, it is observed that a total generation loss of 426.52 MU has been reported during FY 2016-17 to FY 2025-26 due to maintenance-related activities of the existing MIVs. Out of this, 56.73% is due to refurbishment/ RMU works, 30.01% due to interim repairs, 11.95% due to major repairs and 1.31% due to breakdown-related repairs. The Commission further observes that Unit No. 2 has the highest total generation loss of 152.18 MU, which is about 35.68% of the total generation loss of 426.52 MU. Unit No. 2 has also recorded the highest generation loss among all 03 Units due to major repairs (31.60 MU) and a significant generation loss of 36.58 MU due to interim repairs. In addition, 84 MU of generation loss has been reported in Unit No. 2 in connection with refurbishment/RMU works.

The above details indicate that Unit No. 2 required repeated repair and maintenance interventions and has suffered the highest cumulative generation loss among all three units. This shows that the existing MIV of Unit No. 2 is impacting higher maintenance burden on the generating unit and has a greater impact on its availability vis-a vis other generating units.

The Commission also observes that continued reliance on repeated repairs and refurbishment of the existing MIV may lead to further maintenance requirements, unit outages and generation loss. Therefore, prima-facie replacement of the existing MIV of Unit No. 2 would be prudent, reliable and sustainable solution compared to continued repair of the existing equipment.

- (9) With regard to the Cost Benefit Analysis (CBA), the Petitioner has submitted that the continued operation of the existing MIV involves recurring interim and major repair expenditure of Rs. 2.20 Cr over a period of 10 years, comprising Rs. 0.60 Cr towards interim repairs and Rs. 1.60 Cr towards major

repairs. In addition, a potential breakdown-related financial impact of Rs. 19.00 Cr has been considered, comprising Rs. 13.00 Cr towards generation loss & Rs. 6.00 Cr towards capacity-related loss. Accordingly, the total estimated financial impact of continued operation of the existing MIV has been assessed at Rs. 21.20 Cr over 10 years.

The Petitioner has further submitted that replacement of the existing MIV at an estimated cost of Rs. 9.57 Cr, is expected to reduce the requirement for recurring repairs & minimise the risk of breakdown-related generation and capacity losses, thereby improving the availability and reliability of the generating unit. Moreover, based on the submitted 10-year cash flow analysis, the proposed investment is expected to be recovered by the end of the 5th year, resulting in a simple payback period of approx. 5 years. The Benefit to Cost Ratio (BCR) has been calculated at 2.22 based on the estimated financial benefit of Rs. 21.20 Cr against the proposed investment of Rs. 9.57 Cr. The aforesaid estimation of losses for the purpose of CBA calculations appears to be on higher side. However, the Commission has observed that the proposed replacement of the existing MIV of Unit #2 appears justified considering its recurring repair & maintenance requirements, the potential risk of breakdown-related generation and capacity losses, and its critical role in ensuring safe and reliable operation of the generating unit. The MIV serves as the primary and first line of defense for isolating the generating unit from the penstock and acts as a protective device between the penstock and the turbine. The role of MIV also becomes critical for Hydro plant having high head like in instant case of MB-I.

However, the Commission is of the view that the intended benefits of the proposed replacement would depend upon its timely and effective implementation, proper operation & maintenance of the MIV, and adherence to the prescribed technical and safety requirements. Therefore, the Petitioner is directed to ensure prudent execution, proper commissioning and optimal operation of the proposed MIV so as to ensure safe, reliable and uninterrupted operation of the generating unit and realize the intended benefits.

- (10) With regard to the provision of counterweight arrangement in the proposed MIV, the Commission has observed that the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, under Regulation 38(5), stipulates that:

*“(5) the main inlet valve, whether butterfly or spherical, shall be provided for emergency closure in case of any eventuality, including turbine speed increasing to runaway speed, **with counterweight only.**”*

[Emphasis Added]

In line with the aforesaid provision of the Regulations, the Petitioner has proposed a counterweight arrangement along with the proposed new system for emergency closing of the MIV of Unit No. 2 of Tiloth HEP. The generating unit is a high-head machine and does not have a separate Penstock Protection Valve (PPV) or any other independent valve to isolate the unit from the penstock. Therefore, in the instant case the MIV is the main device for stopping and isolating the water flow to the turbine, and its reliable operation is essential for the safety of the turbine and powerhouse. The proposed counterweight arrangement would help in closing the MIV during an emergency condition particularly in case of failure of hydraulic pressure or DC/control supply, thereby reducing the risk of uncontrolled water flow to the turbine.

Further, the Petitioner has envisaged the installation of mechanical lock arrangement in new system to engage the same for eliminating the possibility of accidental opening or closing of the MIV.

Thus, the Commission is of the view that the proposed mechanical locking arrangement would provide fool-proof operation.

The Commission further observes that the Oil Pressure Unit (OPU) system was upgraded during the RMU works with a nitrogen-charged accumulator to provide backup hydraulic pressure. However, the existing MIV was not replaced and did not have a counterweight arrangement.

Moreover, the existing MIV neither have provision for counterweight arrangement nor for mechanical locking arrangement and the same cannot be installed in the existing MIV due to space constraints.

In view of the above, considering the circumstances prevailing in MB-I HEP and its high-head conditions, the provisions of counterweight arrangement and mechanical lock arrangement in Unit No. 2 MIV appear to be technically justified, which is in accordance with the aforesaid CEA requirement.

- (11) The Commission has observed that the Petitioner, in its DPR, has submitted provisions for inspection and maintenance of the trunnion area of the proposed MIV. However, considering the deterioration and cracks previously reported in the trunnion area of the existing MIV, the Commission is of the view that additional provisions should be incorporated in the proposed MIV to facilitate inspection, lubrication and future maintenance.

Accordingly, the Commission directs the Petitioner to incorporate the following provisions in the technical specifications of the proposed MIV: -

- (i) The valve body should be provided with two self-lubricated, Teflon-coated bushes for supporting the trunnion.
- (ii) The trunnion seal packing should be provided at the outer end to facilitate its replacement without dewatering the penstock.

The above provisions should be incorporated in the technical specifications of the proposed MIV to ensure safe & reliable operation and would facilitate future maintenance beside minimize outage duration.

- (12) With regard to the service life of the MIV, the Commission has observed that the proposed MIV has been considered with an anticipated service life of about 35 years, including initial 3-5 years of maintenance-free operation. The Commission further observes that the MIV is not a continuously rotating component and, therefore, its mechanical wear and tear is comparatively lower than that of rotating equipment. Accordingly, with proper operation, periodic inspection and timely maintenance, the service life of the MIV may reasonably extend beyond the assumed period.

- (13) With regard to the submission of the Petitioner w.r.t. maintenance period of the MIV, the Commission has observed that annual maintenance of the MIV generally requires about 10-15 days, mainly for interim repair/replacement of seals. However, for major repair, the MIV is required to be sent to the vendor's works, for which an extended period of about 12 months has been indicated.

In this context, the Commission is of the view that a period of about 12 months for major repair appears relatively high, particularly considering the nature of the repair and refurbishment work involved. The Commission opines that the Petitioner should explore the availability of competent vendors in and around BHEL Ancillary Industrial Estate, Haridwar, Ghaziabad, Noida and other suitable locations, which may also facilitate a reduction in the repair cost and turnaround time.

Accordingly, the Commission advises the Petitioner to explore and empanel competent vendors and make necessary efforts to reduce the major repair period from about 12 months to around 05-06 months, to the extent technically feasible, so as to ensure early restoration of the generating unit and minimize the associated generation loss.

- (14) The Commission has observed that the proposed MIV replacement would require shutdown of the concerned generating unit. As per the implementation schedule submitted by the Petitioner, the overall work is proposed to be completed within 24 months from the date of award of the contract, whereas the installation & testing activities are envisaged to be completed within one month. Accordingly, the Petitioner should properly plan and schedule the work so that the shutdown of the generating unit, and consequential generation loss, is limited to the period necessary for installation & testing, preferably during the lean discharge period. The Petitioner should also coordinate with UPCL well in advance to minimize generation loss and adhere to the proposed implementation schedule.
- (15) The Commission has observed that the proposed MIV incorporates various modern safety and operational features, including a counterweight

arrangement for emergency closure, a mechanical locking arrangement, hydraulically operated maintenance & service sealing arrangements. These features are expected to reduce leakage of water from upstream side during annual and major maintenance, improve the reliability of MIV operation and enhance the overall safety and reliability of the generating unit. Besides reducing O&M period due to presence of Hydraulic maintenance and service seal.

- (16) Based on the submissions made in the Petition and subsequent submissions, the Commission decides to grant in-principle approval for 'Supply, Installation, Testing & Commissioning (SITC) of Spherical Main Inlet Valve of Unit no. 2 of Tiloth HEP,' as proposed in the instant Petition and as per the above observations/views, subject to the following conditions: -
- (i) The Petitioner is directed to adopt the competitive bidding keeping the technical specification and qualifying criteria and by larger circulation of tender inviting notices in the pan India newspapers so as to promote larger participation for obtaining most competitive prices from the bidders under prevailing Rules & Regulations.
 - (ii) The Commission may verify/check the proposed works to be executed by the Petitioner at any point of time during/post execution of the works from the perspective of not only substantiating that the directions of the Commission and assertions & commitments made by the Petitioner have been fully complied and correct, but also to assess Quality, Optimum utilization of resources, Benefits accrued from the proposed investments etc. as has been projected by the Petitioner.
 - (iii) The BoD, in its meeting held on 04.09.2025, had accorded approval to the estimated cost of the project with no provision for any variation. Therefore, the Petitioner is directed to make all efforts for executing the works within the approved cost. Any variation beyond the approved cost shall require prior approval of the BoD and shall be subject to approval during prudence check.

- (iv) The Petitioner is directed to procure the new MIV from an OEM/reputed manufacturer having proven track record and experience of successful supply, installation, testing & commissioning of MIVs for high-head hydroelectric machines of 30 MW capacity or above.
- (v) The Petitioner is directed to ensure that the proposed new MIV is designed in such a manner that no additional jacking force is required for opening the MIV against the counterweight.
- (vi) The Petitioner is directed to ensure that the proposed new MIV complies with the requirements of IS 7332, as amended from time to time. The new servo motor for the MIV, wherever required, shall be supplied by the supplier within the quoted cost of the MIV and shall be capable of closing the MIV under full-load rejection, i.e., against full water flow. The valve body shall be provided with two self-lubricated, coated Teflon bushes for housing the trunnion. The trunnion seal packings shall be provided at the outer end and shall be designed to permit replacement without dewatering the penstock.
- (vii) The Petitioner is directed to ensure that the Contractor/Supplier arranges, at its own cost, all test equipment required for carrying out the prescribed field tests of the MIV.
- (viii) The Petitioner is directed to ensure that all tests are carried out in accordance with the applicable requirements and standards specified in the relevant IS codes.
- (ix) The Petitioner is directed to ensure that the supplier provides, without any additional cost, one complete set of spare parts as recommended by UJVN Ltd. and considered necessary for reliable operation and maintenance of the MIV.
- (x) Post execution of the project, the Petitioner shall submit the Project Completion Report including photographs, expenditure incurred/completed cost, financing of the Project, detailed analysis & benefits, deviations (if any) etc. to the Commission.

- (xi) The Petitioner shall decap the existing MIV of Unit#2 and is advised to get it repaired at vendor works so that the same can be utilized for Unit#1 and Unit#3 as and when required. Further, the Petitioner is advised to include the adequate provisions in its contract of the Contractor to refrain from subletting work of proposed New MIV manufacturing.
- (xii) The Petitioner is directed to adhere to the proposed implementation schedule and complete the project within timeframe without impacting the generation.
- (xiii) The Petitioner is directed to explore and empanel competent vendors and make necessary efforts to reduce the major repair period from about 12 months to around 06 months, to the extent technically feasible, so as to ensure early restoration of the generating unit and minimize the associated generation loss.
- (xiv) The Petitioner is directed to communicate the schedule for installation & commissioning of the proposed MIV preferably during lean discharge period to the concerned stakeholder i.e. UPCL, well in advance prior to commencement of the works, so as to facilitate necessary planning for power availability.
- (xv) The Petitioner shall ensure that all the works carried out by the contractors shall be duly executed as per the procedures laid down for ensuring the quality & quantity of the work and drawings approved by the competent authority.
- (xvi) The Petitioner is directed to incorporate adequate defect liability provisions in its contract so that the concerned contractors may be bound to execute their works within time and with quality & efficiency.
- (xvii) The Petitioner must submit the detailed sanctioned letter from the Financial Institution, if any, to the Commission as soon as they get approval for the same. All the loan conditions that may be laid down by the funding agency, if any, in their detailed sanction letter should

be strictly complied with. However, the Petitioner is directed to explore the possibility of swapping the loan with grant/cheaper debt option, if any, available from MoP/GoI/GoU.

(xviii) The Petitioner shall comply with the provisions of the Act and other Regulations pertaining to generating companies including below mentioned CEA Regulations and amendments thereof:

- (a) Central Electricity Authority (Safety requirements for construction, operation and maintenance of electrical plants and electric lines) Regulations, 2011.
- (b) Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.
- (c) Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2023.

(xix) The cost of servicing the project cost shall be allowed in the Annual Revenue Requirement of the Petitioner after the assets are capitalized and subject to prudence check of cost incurred.

The approval is given subject to the above conditions and on the basis of submissions and statement of facts made by the Petitioner in the Petition under affidavit. In case of violations of any of the condition mentioned above or in case any information provided, if at any time, later on, found to be incorrect, incomplete or in case relevant information was not disclosed, that materially affects the basis for granting the approvals, in such cases, the Commission may cancel the approval or refuse to allow all, or part of the expenses incurred in the ARR/True-up apart from initiating plenary action.

Ordered accordingly.

(Prabhat Kishor Dimri)
Member (Technical)

(Anurag Sharma)
Member (Law)

(M. L. Prasad)
Chairman