Typically, there may be a case where the relationship between governor output and active power is nonlinear among different operating levels. Hence to explore the effect of non-linearity on the stability of island operation a non-linearity between the governor output and active power was introduced in the simulation model in the range of 630 MW to 680 MW as shown in Figure 63. The load variations of 26 MW and 30 MW post island formation is simulated with linear and nonlinear behavior.

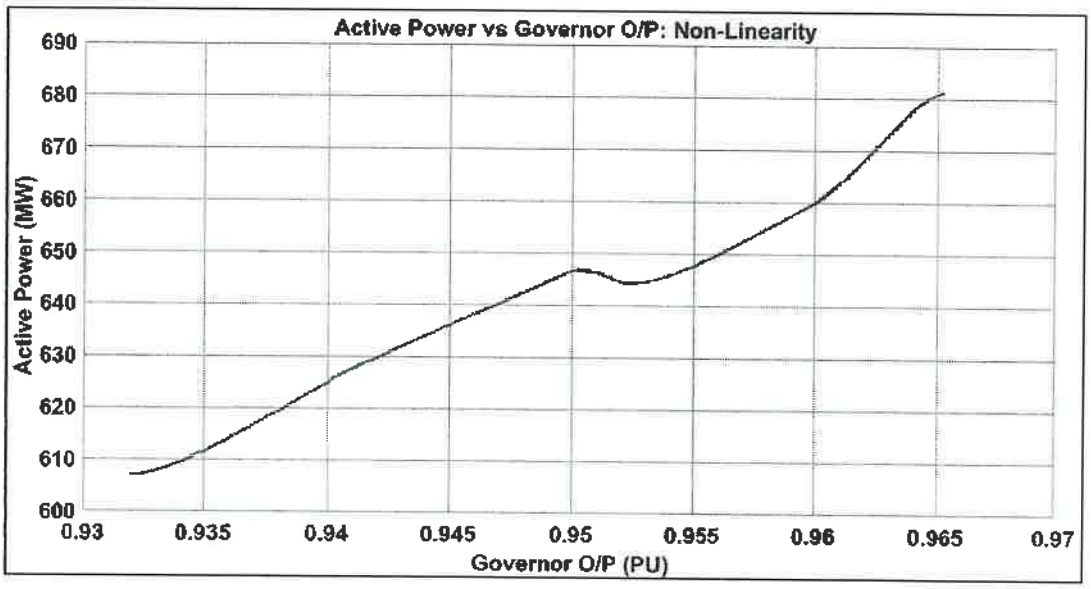

Figure 63:Non- Linear behavior in governor output and Active Power.

To compare the effects of linearity and non-linearity between the governor output and active power, the following simulation cases are conducted and discussed below.

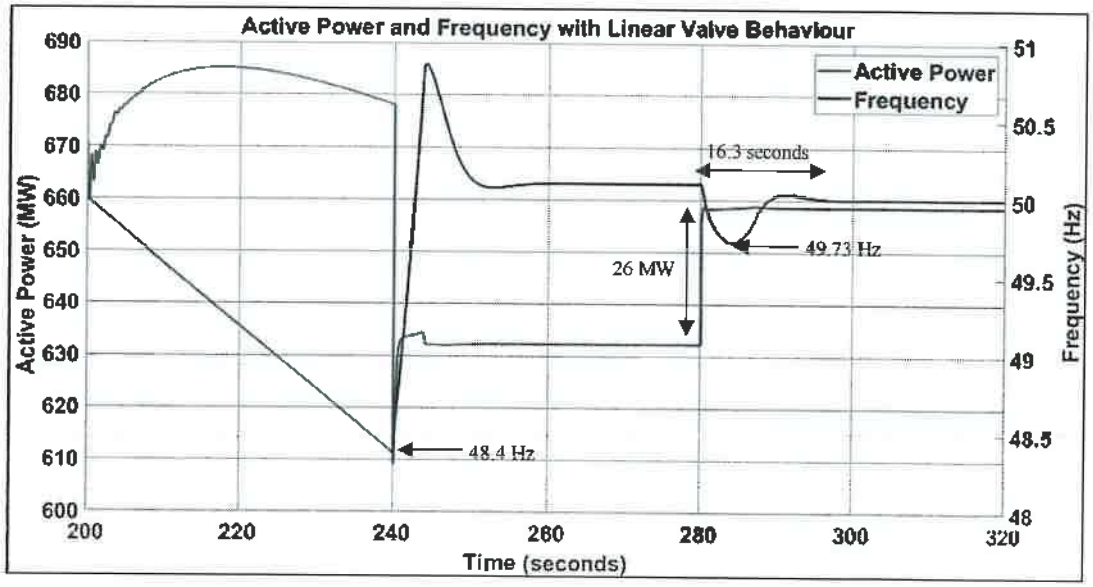

Figure 64:Effect of Linear Valve behavior in increment of 26MW in post island network.

A load increment of 26MW post islanding is simulated taking linear behaviour in that region, while adding 26MW post islanding, it was observed that for linear valve

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behaviour a frequency dip of 49.72Hz for a time span of 16.35seconds. Later the frequency was stabilized to the final value of 50.08 Hz as shown in Figure 64.

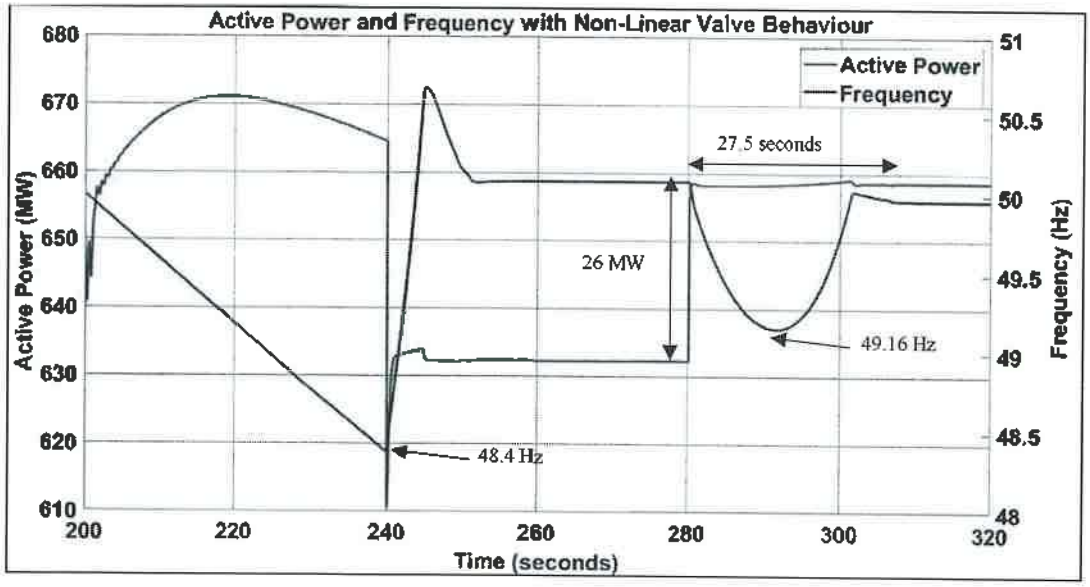

Figure 65: Effect of Non- Linear Valve behavior in increment of 26MW in post island network.

Figure 65, shows the non-linear valve behaviour, with the active power, after a load increment of 26 MW in the post island network, shows a frequency dip of 49.15Hz for a span of 26.94 seconds and final frequency stabilizing to 49.97 Hz.

Thus, it can be concluded that for a load increment of 26 MW post islanding there is large frequency dip for a longer duration in non-linear valve behaviour compared to linear valve behaviour.

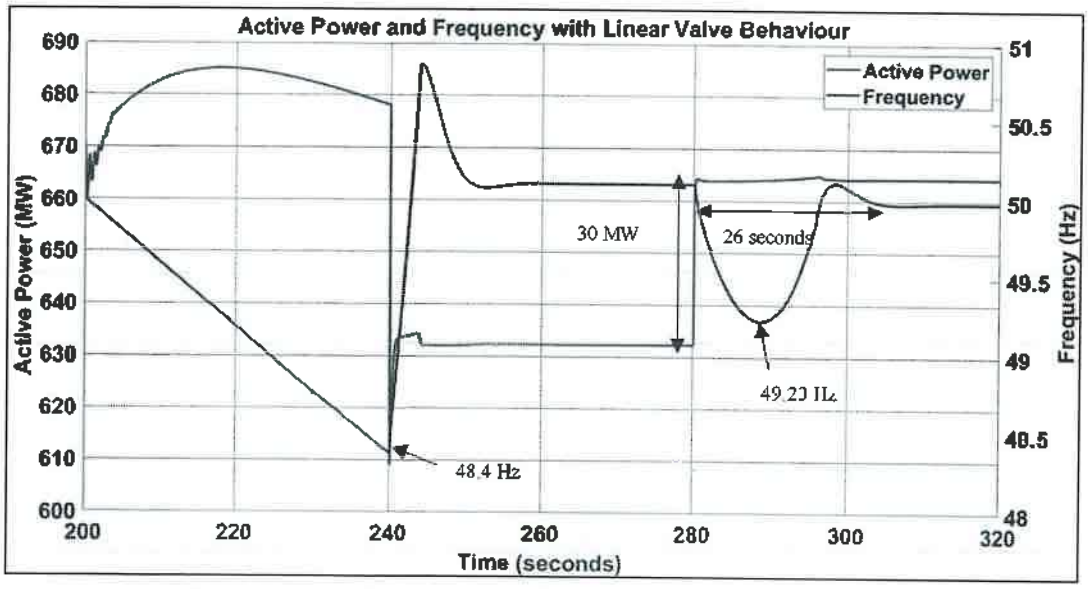

Figure 66: Effect of Linear Valve behavior in increment of 30MW in post island network.

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As shown in Figure 66, a load increment of 30 MW in post island network is shown, considering a linear behaviour, between the valve and active power. It was observed that for linear valve behaviour for the increment of 30MW in post island network a frequency dip of 49.22 Hz was observed for a time span of 25.25 seconds in the post island network, and unit finally stabilizing to 49.98 Hz.

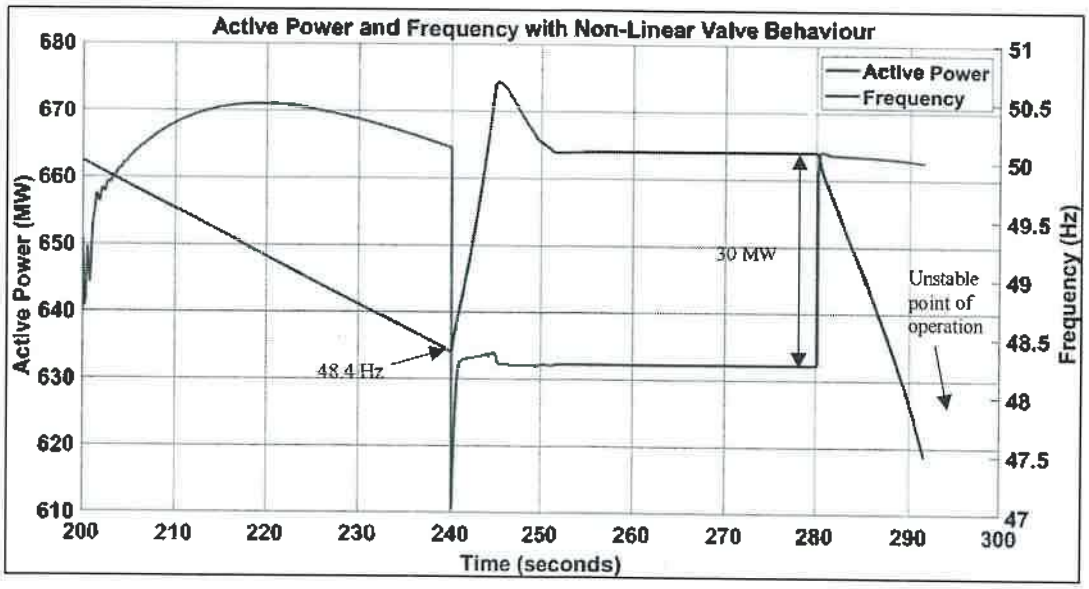

Figure 67:Effect of Non-Linear Valve behavior in increment of 30MW in post island network.

As shown in Figure 67, it was observed that for non-linear valve behaviour, a load increment of 30MW post islanding results in tripping of unit indicating an unsuccessful operation of the unit which earlier showed a successful island operation of the unit due to linear valve behaviour for similar load increment of 30MW.

From the preceding cases, it is evident that the non-linearity between the governor output and active power yields adverse outcomes compared to the linear relationship between them. Hence, to verify the simulation results from cases 1 to 19 (refer to sections 3.1.1 and 3.1.19), it is advisable to conduct online island operation tests for a more comprehensive understanding of unit undergoing islanding.

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4. Islanding Scheme:

Based on the simulation performed for the Dynamic Study of Patna Islanding, it was observed that, during the event of grid disturbance unit undergoing islanding should be disconnected from the grid as soon as the grid frequency reaches 48.4Hz taking unit tripping limits of 47.4Hz into consideration OR at 49Hz, if rate of change of frequency (ROCOF) is 0.5Hz/sec (i.e., df/dt ≥ 0.05Hz/sec) (refer section 3.1.9 & 3.1.17). Additionally, the fault at the grid bus should be cleared within 220 milliseconds considering the critical clearing time (refer section 3.1.5).

When there is an excess of generation compared to the island's load demand (refer section 3.1.2), it is crucial to initiate islanding to match the generation with the island network's load demand.

However, at the same time, it's important to ensure the stable operation of the unit, considering the steam dynamics, bypass control, boiler response etc. Additionally, to validate the simulation results, conducting island testing for scenarios where generation is in surplus and the island network's load demand is low is recommended.

In the event of a generation shortfall relative to its loading conditions, a load shedding of 50MW could be triggered (see section 3.1.3), followed by an additional load shedding of 10% of the island's load demand to balance the mismatch between generation with loading conditions. A load shedding of 150MW (see section 3.1.4) could also be activated along with a load shed of 10% of island load demand, aiming to balance the generation and load demand.

The simulation results (refer to section 3.1.7& 3.1.14) indicate the feasibility of incorporating an additional 4% of island load demand into the post-islanding network. However, based on the simulation results for unit generation at Maximum Continuous Rating (MCR), equivalent to 660MW, an additional load of 6.5% of the island network load demand is achievable.

Simulation studies on both linear and non-linear valves behavior demonstrate the necessity of conducting island operation tests to enhance our understanding of valve operation and control loop interaction of the boiler and turbine within islanded networks.

To ensure the successful operation of the unit during islanding, it is recommended that the governor operates in a free governing mode and gives priority to speed control post islanding.

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5. Simulation Observations

Based on the simulations performed for several cases as mentioned in the report, the following observations with subsequent recommendations are listed below:

Case 1 and Case 2: To ensure that island frequency remains within the under-frequency setting of 47.4 Hz, it is recommended to initiate islanding at 48.4Hz. It's essential to balance the island load demand of the network in line with the generating unit undergoing islanding to maintain stable operation.

Case 3 and Case 4: To ensure that island frequency remains within the under-frequency setting of 47.4 Hz, it is recommended to initiate islanding at 48.4Hz. Whenever there is mismatch between the generation and island load demand, load shed should be conducted as necessary, with the extent determined by the criticality of the island load demand.

Case 5: By simulating the three phase to ground fault at the grid bus, it was observed that a clearing time of 220 milliseconds or below would prevent the unit from desynchronizing. Hence any delay larger than 220 milliseconds would will results in loss of synchronism for the unit.

Case 6 to Case 8: With reference to Case 1, when unit goes into island, three cases (case 6 to case 8) of incremental load were carried out post islanding. Based on this it was concluded that an increment of load to 6.5% of the total island load demand constitutes a safe operating limit. Thus, it is recommended that in the scenarios involving post island load addition, an additional load of higher than 6.5% should not be added for stable island operation.

Case 09 to Case 11: In reference to Case 1, during grid events with a high rate of change of frequency (ROCOF) of 0.5Hz/sec, islanding the network at 48.4Hz resulted in continuous oscillations in actual power, indicating difficulty in stabilizing the unit. While, for such high ROCOF events, islanding the unit at 49 Hz shown more suitable, suggesting that for rapid frequency changes, unit islanding should occur with minimum delay. However, for events with relatively slower rate of change of frequency (0.25Hz/sec) (refer case 12), it is suggested that islanding at 48.4 Hz, would give stable island operation. be safe option for the unit.

Case 12: Referring to case 3, if a load shed of 68MW was performed at the moment of islanding instead of 74MW, frequency stabilizes to its final of 50Hz at a slower rate. This implies that if the power plant process could accommodate this slower rate, a load shed of 68MW could be implemented, resulting in 6MW less reduction in the load compared to the typical load shedding scheme of 74MW.

Case 13 to Case 15: In reference to Case 3 effect of load increment post islanding was observed, from simulations it can be concluded that an increment of load to 4% of the total island load demand constitutes a safe operating limit. Thus, it can be suggested that in the scenarios involving post island load addition, an additional load of approximately 4% of the island load demand can be safely accommodated, subjected to boiler response.

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Case 16: In reference to Case 3, a time delay of 600 milliseconds in load shedding was introduced while islanding, it was observed that this time delay caused the unit to initiate frequency recovery from 47.6Hz, which is in close proximity to the tripping frequency of 47.4Hz. Thus, suggesting that a delay less than 600 milliseconds is more favourable from the perspective of ensuring unit stability.

Case 17 to Case 18: In reference to case 3, During events with a rate of change of frequency (ROCOF) of 0.5Hz/sec, islanding the unit at 48.4Hz resulted in continuous oscillations in actual power, indicating difficulty in stabilizing the unit. While, for such high ROCOF events, islanding the unit at 49 Hz was observed to be more suitable, suggesting that for rapid frequency changes, unit islanding should occur at a frequency higher than 48.4Hz.

Case 19: While performing the simulation studies, to understand the effect of linear and non-linear valve behavior, it was noted that unit exhibits unstable operation when subjected to non-linear valve behavior, leading to tripping of unit during 30MW load increment in the post-island network. Thus, it is recommended to perform the online island operation test to analyze any non -linear valve behavior within the unit and also it will help to gain insights into control loop interaction including the effect of the boiler and turbine.

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6. Recommendations

In all the simulation cases performed, the following assumptions were made:

- Main steam pressure was constant.
- Linear control valve behavior was considered.
- Response of the boiler along with turbine was assumed to be linear.

However, in practical situations, the results might vary from the findings of simulations.

To address the objectives outlined in scope item (3), Solvina had proposed conducting islanding testing at one of the units of NTPC Nabinagar in the kickoff meeting held on 01-12-2023. This test would have not only fulfilled the requirements of scope (3) but also would have provided an opportunity for NTPC Nabinagar to gain insights into governor behavior under varying load conditions.

Hence to assess the response during any contingency situations considering the above-mentioned assumptions, it is recommended to perform simulated online island operation test. By performing simulated island operation test, the actual behavior of the unit would be known, making the islanding scheme more reliable. It will further validate the findings from the simulation studies. The results of simulated island operation test shall give the following:

- Load handling capability of the turbine undergoing islanding.
- Effect of valve linearity in the entire operating range.
- Boiler response and other related control loop along with turbine.
- Identify the system bottlenecks.
- To validate the simulation results performed in this report.

The simulated online test method and benefits are described in Annexure 7.

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7. References

[1] Patna islanding Revised.pdf

[2] PO-Detailed Dynamic Study of Patna Islanding Scheme with one unit of 3X660 MW at NTPC Nabinagar.pdf

[3] 2023-10-06-1.0-Input Data Validation Report for Dynamic studies of Patna Islanding.pdf

[4] Assessment-of-Inertia-in-Indian-Power-System.pdf

[5] MASTER ELECTRICAL SLD NPGC.pdf

[6] Generator data sheet and curves_0370-110-PVE-Y-0195-0A.pdf

[7] Governor model.pdf

[8] Generator Stability Study report_0370-110-PVE-W-0159-00.pdf

[9] 2020006-ER-09-01-2.0 PFR test and model validation report of Unit 1 at NPGCL Nabinagar.pdf

[10] MOM Kick-off meeting_Patna Islanding Scheme_NTPC Nabinagar.pdf

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List of Annexures

Annexure 1: Generator datasheet

Generator datasheet as shared by NTPC Nabinagar Island network can be accessed using the link mentioned below:

https://drive.google.com/open?id=1L4eVKdCi9ZQgAl0GKt0A54whfNeNUcL_&usp=drive_fs

Annexure 2: Governor and turbine datasheet

Governor datasheets shared by NTPC Nabinagar Island network can be accessed using the link mentioned below:

https://drive.google.com/open?id=1LJPml_osa6gvROBP-lw6TvmLV0Og0XkZ&usp=drive_fs

Annexure 3: Turbine datasheet

Turbine datasheet shared by NTPC Nabinagar Island network can be accessed using the link mentioned below:

https://drive.google.com/open?id=1LU8Tvnb4_GCuNWgLcCyX5EqR7kGJNhuq&usp=drive_fs

Annexure 4: Transmission line data

Transmission line data shared by NTPC Nabinagar Island network can be accessed using the link mentioned below:

https://drive.google.com/open?id=1LYZihUe2xTG9po_5odS-VTdEMzWcPAhg&usp=drive_fs

Annexure 5: MOM_Kick-off meeting_Patna Islanding Scheme_NTPC Nabinagar

https://drive.google.com/open?id=1Lg6WC6NUOtIbMHAmnVCamzCtt9RJEdnf&usp=drive_fs

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Annexure 6: Generator voltage variations in all simulation cases performed.

Table of voltage variation of NTPC Nabinagar generator for different simulations scenarios

Cases	Simulation Scenario	Initial voltage (kV)	Final voltage (kV)	Change in voltage(kV)	Percentage change in voltage
1	Maximum Generation and Maximum Load	22	21.83	-0.17	-0.77%
2	Maximum Generation and Minimum Load	22	21.7	-0.3	-1.36%
3	Minimum Generation and Minimum Load	22	21.6	-0.4	-1.81%
4	Minimum Generation and Maximum Load	22	21.44	-0.56	-2.54%
6	Load increment of 33.25MW post island formation (in reference to case 1)	22	21.9	-0.1	-0.45%
7	Load increment of 42.75MW after island formation (in reference to case 1)	22	21.86	-0.14	-0.63%
8	Load increment of 52.25MW after island formation (in reference to case 1)	22	21.83	-0.17	-0.77%
9	Island formation at 49Hz with f_{rate} = 0.5Hz/s (in reference to case 1)	22	21.84	-0.16	-0.72%
10	Island formation at 48.4Hz with ROCOF (f_{rate}) = 0.5Hz/s (in reference to case 1)	22	21.85	-0.15	-0.68%
11	Island formation at 48.4Hz with f_{rate} = 0.25Hz/s (in reference to case 1)	22	21.84	-0.16	-0.72%

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12	Optimal load reduction during island formation (in reference to case 3)	22	21.58	-0.42	-1.91%
13	Load increment of 12.5MW (2.5% of island load) after island formation (in reference to case 3)	22	21.98	-0.02	-0.09%
14	Load increment of 20MW (4% of island load) after island formation (in reference to case 3)	22	21.96	-0.04	-0.18%
15	Load increment of 22MW (4.4% of island load) after island formation (in reference to case 3)	22	21.97	-0.03	-0.14%
16	Load shed time delay (in reference to case 3)	22	21.58	0.42	-1.9%
17	Island Formation (49Hz) with Rate of Change 0.5Hz/s (in reference to case 3)	22	22.26	0.26	+1.18%
18	Island Formation (48.4Hz) with Rate of Change of frequency 0.5Hz/s (in reference to case 3)	22	22.18	0.18	+0.81%

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Annexure 7: Simulated online island operation test.

The purpose of the tests is to investigate the generator's capability to control the frequency in island operation, in a simulated grid similar to the real island grid. Furthermore, the linearity test (load sweep) & governor's open loop step response test will be performed to assess steam valve response linearity and to ensure governor's correct function in island operation respectively.
The following goals shall be reached when the tests are carried out:

- Verify correct function of droop and response to frequency changes.
- Clarify how large electric load changes can be managed during island operation without exceeding the frequency limits and within the capability of the steam system.
- Assessment of the steam valve response linearity.
- Suggestion for tuning the governor speed control if required.
- Impact of various control loop interactions (including influence from the boiler and turbine side).

The benefits of conducting island operation test:

- Optimization during testing (Parameter tuning)
- Determine operation limits.
- Find malfunctioning equipment.
- Correct improper settings.
- Validation of dynamic model with the test results
- Control loop interaction form boiler & turbine side during islanding.

Method of Island operation test

Solvina has developed a method and test equipment for testing the capability of a turbine to keep the frequency stable in island operation while still keeping the generator synchronized to the main grid. The equipment is called SolvSim Power Station, SSPS.

The test method uses the principle of "HardWare In the Loop", meaning that a simulator, which is simulating an island grid, is connected to the speed governor of a turbine and sends a simulated frequency signal to the frequency input of the governor. The simulated frequency is calculated in real time from the balance between turbine power (which is measured as the corresponding generator power since the actual frequency is mainly constant) and the simulated electric load of the island. The speed controller will then act as if it is actually running in island operation.

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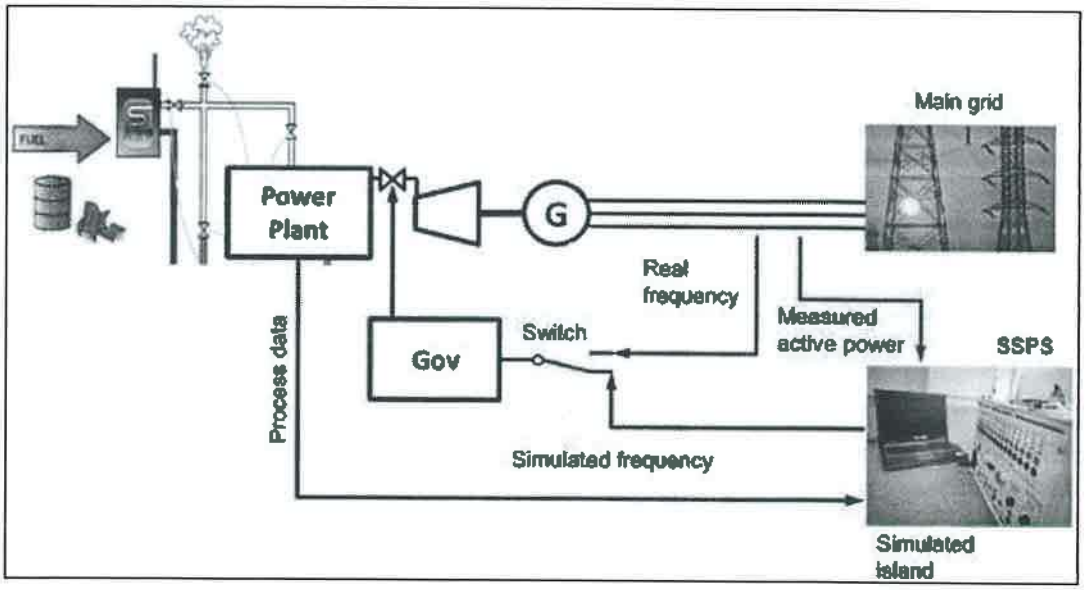

Method for island operation testing.

This method allows testing the island's operation capability in a safe manner and without risking a blackout. If the simulated frequency becomes unstable due to the power plant response, then the simulation is simply stopped, and the governor returns to normal operation.

At the same time, it is a complete test since it requires the same action of the steam valve and other equipment as in real islanded operation. The capability of the boiler to keep the steam pressure stable in islanded operation is tested at the same time. The governor can be tuned during the test for best frequency stability.

During the test, the governor must be set up so that it operates in the same control mode (speed control with droop) as it would in real islanding, despite that the islanding breaker remains closed. This can be done by simulating the breaker position open.

Models of loads as well as other power producers can be included in the model of the electric island.

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Annexure-D

DETAILED PROJECT REPORT

FOR

APPOINTMENT OF AGENCY FOR TURNKEY CONTRACTS FOR DESIGN, SUPPLY, ERECTION, TESTING AND COMMISSIONING FOR ESTABLISHMENT OF EWATCH SERVER FOR ABT METER AT BACKUP SLDC AT CHANDAUTI GSS AND FOR SHIFTING OF EXISTING EWATCH SERVER FROM EXISTING SLDC AT VIDYUT BHAWAN TO BREDA BHAWAN.

Bihar State Power Transmission Company Limited, Patna.
October-2025

PREAMBLE

This proposal covers the Detailed Project Report for Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA BHAWAN under SCADA Upgradation Phase-III and Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS including all related works.

The estimated cost of the project is based on prevailing market rate.

Details are furnished below:

(Rs. In Crs.)		
Total Cost		
Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS and Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA BHAWAN		
A.	**Supply & Service Portion for Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS**	
Sl. No.	**Description**	**Total Value (Rs.) (Incl. 18% GST)**
1	Total price for Supply of all items involved in Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS.	**2,94,85,205.86**
2	Installation and Service Cost involved in Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS including 3 years of AMC and Security Audit.	**2,92,68,648.39**
B	**Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA Bhawan**	
1	Installation and service cost for shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA Bhawan.	**11,50,500.00**
	Total	**5,99,04,354.25**
	Grand Total	**5,99,04,354.00**

Note:- *As the project is envisaged to be financed from "**Internal Resource Fund (IRF)**".*

CONTENTS

BACKGROUND:

Bihar State Power transmission Co. Ltd (BSPTCL) a wholly Owned corporate entity under Bihar Government was incorporated under the Companies Act 1956 on 1st Nov 2012 after re-organisation of erstwhile Bihar State Electricity Board (BSEB).

Bihar State Transmission Company Limited (BSPTCL) is a State Transmission Utility under BSP(H)CL formed under the Company Act 1956 to carry out the activities related with Intra State Transmission and wheeling of electricity in the State. BSPTCL is a Deemed transmission licensee in the State of Bihar.

EXECUTIVE SUMMARY

As per **Ministry of electronics and Information Technology guidelines for Indian government websites and applications, ver. 3.0, clause 5.3.2-**

"Department to ensure the HSP is providing DC, BCP and DR environments with state-of-the-art secure infrastructure configured in high availability (HA) mode for hosting the Websites, Web Applications, Web Portals or Mobile Apps and their respective Content Management System (CMS). The HSP must ensure that the Primary Data Centre (DC), Disaster Recovery Centre (DRC) are geographically located far from each other in different seismic zones."

The SCADA system and the scheduling module of SAMAST have been declared as **Critical Information Infrastructure (CII)** by the **National Critical Information Infrastructure Protection Centre (NCIIPC)** and notified as **Protected Information Infrastructure (PII)** in the Bihar Gazette.

A **Regional Disaster Management Group (RDMG)** has been constituted in accordance with the **Disaster Management Plan for Power Sector (2022)** formulated by the Central Electricity Authority (CEA) and approved by the **Ministry of Power, Government of India**, in compliance with the **Disaster Management Act, 2005**. The status of **Emergency Operation Centers (EOCs)** / Control Rooms and their corresponding Backup EOCs / Control Rooms in the power sector is being regularly reviewed in the meetings of the **Eastern Regional Disaster Management Group (RDMG)**.

Presently, more than **4200 ABT meters** have been installed across various **Grid Sub-Stations (GSS)** of BSPTCL, BGCL and other utilities of Bihar. All these meters communicate with SLDC through **Automatic Meter Reading (AMR)** via the **eWatch server** located at the SLDC Control Room. The data fetched from these ABT meters are used for Energy Accounting, State Transmission Loss computation, real time load monitoring and generation of various analytical reports.

In view of the critical nature of these data, there is a need to establish a **Disaster Recovery Centre (DRC)** to ensure the security and continuity of ABT meter data of BSPTCL. As per MeitY guidelines (Version 3.0, Clause 5.3.2), the **Primary Data Centre (DC)** and **Disaster Recovery Centre (DRC)** must be geographically distant and situated in different seismic zones. Accordingly, Gaya has been identified as

the suitable location for developing the **Backup SLDC**, where the **DRC** will be established, being geographically distant from the **Primary Data Centre at Patna.**

SCOPE OF WORK

The proposal for Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA BHAWAN under SCADA Upgradation Phase-III and Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS including all related works.

Sl. No.	*Proposed Schemes*
1.	Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS including all related works and AMC & Audit for 3 Years.
2.	Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA BHAWAN

SUMMARY OF THE ESTIMATED COST

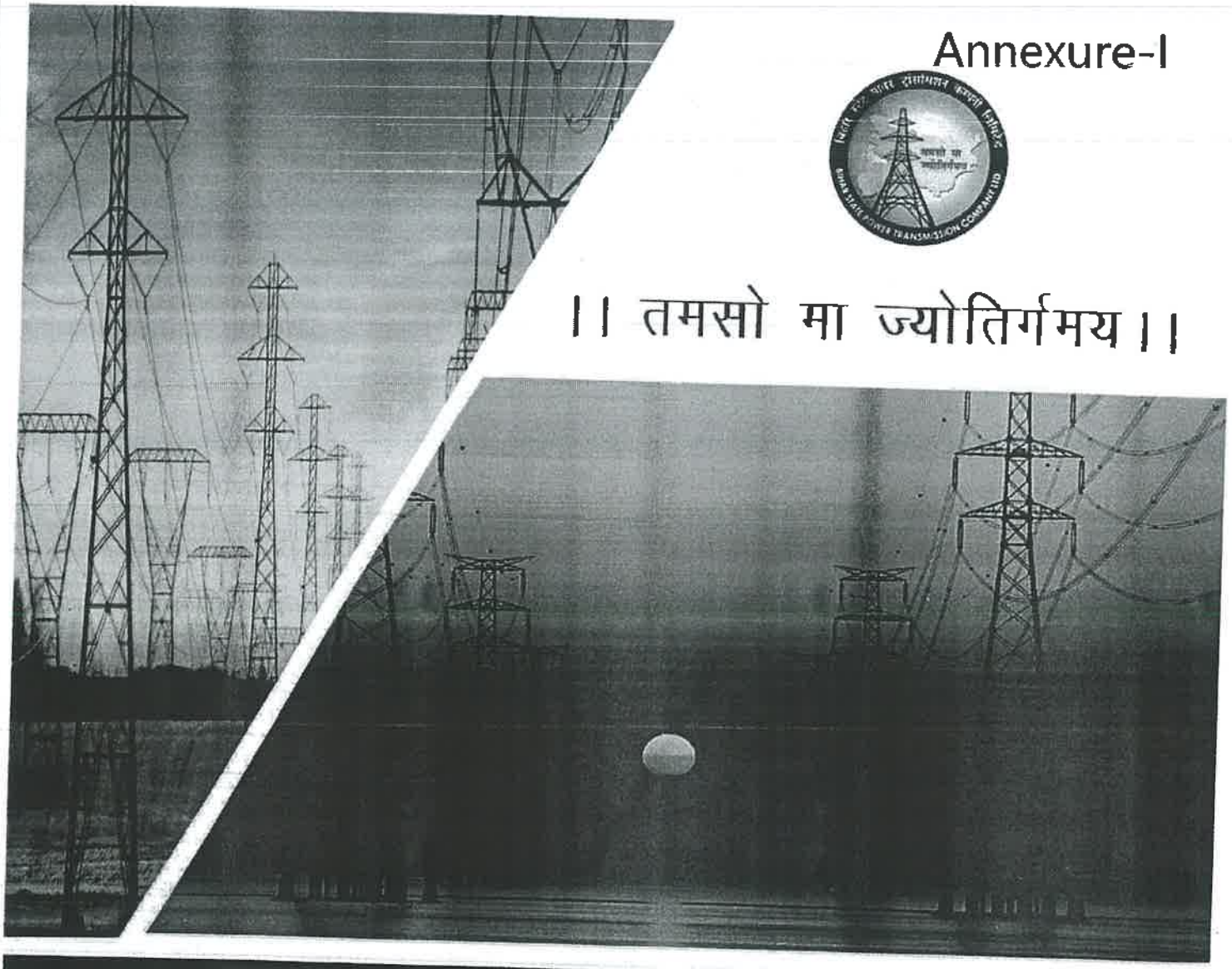
Estimate for the Establishment of a Backup eWatch Server at the Backup SLDC, Chandauti GSS, including Annual Maintenance Contract (AMC), Security audit, and all associated works, as well as the shifting of the existing eWatch Server from SLDC, Vidyut Bhawan to BREDA Bhawan under SCADA Upgradation Phase–III.		
A.	**Supply & Service Portion for Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS**	
Sl. No.	**Description**	**Total Value (Rs.) (Incl. 18% GST)**
1	Total price for Supply of all items involved in Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS.	**2,94,85,205.86**
2	Installation and Service Cost involved in Establishment of Backup eWatch server at Backup SLDC at Chandauti GSS including 3 years of AMC and Security Audit.	**2,92,68,648.39**
B	**Shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA Bhawan**	
1	Installation and service cost during shifting of eWatch Server from existing SLDC at Vidyut Bhawan to BREDA Bhawan.	**11,50,500.00**
	Total	**5,99,04,354.25**
	Grand Total	**5,99,04,354.00**

Detail sheet of Estimated Cost has annexed.

******

Cost of AMC & Audit for Backup eWatch at Gaya Ji	
AMC Cost for 3 Years (in Rs.)	
AMC Charges per lot for Year -1	3760000
AMC Charges per lot for Year -2	4211200
AMC Charges per meter lot Year -3	4716544
Cyber security audit (annualy)	
Audit -year-1st	3500399
Audit -year-2nd	3780430.92
Audit -year - 3rd	4082865.394
Total	**24051439.31**
GST @18 %	**4329259.076**
Grand Total	**28380698.39**

Annexure-I



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ANNUAL ACCOUNT 2024-25

Bihar State Power Transmission Company Limited

ANAND RUNGTA & CO.
Chartered Accountants

Phone: 0612-3569253
405, Capitol Tower-B
Fraser Road
Patna-800001

INDEPENDENT AUDITORS REPORT

TO THE MEMBERS OF **BIHAR STATE POWER TRANSMISSION COMPANY LIMITED**

Report on the Audit of the Standalone Financial Statements

Qualified Opinion

We have audited the accompanying Standalone Financial Statements of Bihar State Power Transmission Company Limited which comprise the Balance sheet as at 31st March 2025, the statement of Profit & Loss (including Other Comprehensive Income), the Statement of Changes in Equity and the statement of Cash Flow Statement for the year ended on that date and notes to the Standalone financial statements including significant accounting policies and other explanatory information(hereinafter referred to as "the Standalone Financial Statements").

In our opinion and to the best of our information and according to the explanations given to us, except for the effects of the matter described in the Basis for Qualified Opinion section of our report, the aforesaid standalone financial statements give a true and fair view in conformity with the Indian accounting Standards prescribed under section 133 of the Act read with the companies (Indian Accounting Standards) Rules, 2015 as amended (Ind AS) and other accounting principles generally accepted in India, of the state of affairs of the Company as at 31st March 2025, the profit and total comprehensive income, changes in equity and its cash flows for the year ended on that date.

Basis for Qualified Opinion

As per "**Annexure -A**"

We conducted our audit of the Standalone Financial Statements in accordance with the Standards on Auditing (SAs) specified under section 143(10) of the Companies Act, 2013. Our responsibilities under those Standards are further described in the Auditor's Responsibilities for the Audit of the Standalone Financial Statements section of our report. We are independent of the Company in accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India (ICAI) together with the ethical

requirements that are relevant to our audit of the standalone financial statements under the provisions of the Companies Act, 2013 and the Rules made thereunder, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ICAI's Code of Ethics. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our qualified opinion on the Standalone Financial Statements.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the Standalone Financial Statements of the current period. These matters were addressed in the context of our audit of the Standalone Financial Statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Reporting of key audit matters as per SA 701, Key Audit Matters are not applicable to the Company as it is an unlisted company.

Information Other than the Standalone Financial Statements and Auditor's Report Thereon

The Company's Board of Directors is responsible for the preparation of the other information. The other information comprises the information included in the Management Discussion and Analysis, Board's Report including Annexures to Board's Report, Business Responsibility and Sustainability Report, Corporate Governance and Shareholder's Information, but does not include the Standalone Financial Statements and our Auditor's Report thereon. The other information as identified above is expected to be made available to us after the date of this Auditor's Report.

Our opinion on the Standalone Financial Statements does not cover the other information and we will not express any form of assurance conclusion thereon.

In connection with our audit of the Standalone Financial Statements, our responsibility is to read the other information identified above when it becomes available and, in doing so, consider whether the other information is materially inconsistent with the Standalone Financial Statements or our knowledge obtained during the course of our audit or otherwise appears to be materially misstated.

When we read those documents including annexures, if any thereon, if we conclude that there is a material misstatement therein, we shall communicate the matter to those charged with the governance.

Responsibilities of Management and Those Charged with Governance for the Standalone Financial Statements

The Company's Board of Directors is responsible for the matters stated in section 134(5) of the Act with respect to the preparation of these Standalone Financial Statements that give a true and fair view of the financial position, financial performance including other comprehensive income, changes in equity and cash flows of the Company in accordance with the accounting principles generally accepted in India, including the Indian Accounting Standards(Ind AS) specified under section 133 of the Act read with the Companies (Indian Accounting Standards) Rules, 2015,as amended.

This responsibility also includes maintenance of adequate accounting records in accordance with the provisions of the Act for safeguarding the assets of the Company and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgements and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the Standalone Financial Statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

In preparing the Standalone Financial Statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

The Board of Directors are responsible for overseeing the Company's financial reporting process.

Auditor's Responsibilities for the Audit of the Standalone Financial Statements

Our objectives are to obtain reasonable assurance about whether the Standalone Financial Statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these standalone financial statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the Standalone Financial Statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal controls relevant to the audit in order to design audit procedures that are appropriate in the circumstances. Under section 143(3)(i) of the Act, we are also responsible for expressing our opinion on whether the Company has adequate internal financial controls system in place and the operating effectiveness of such controls.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the Standalone Financial Statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future

events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the Standalone Financial Statements, including the disclosures, and whether the Standalone Financial Statements represent the underlying transactions and events in a manner that achieves fair presentation.

Materiality is the magnitude of misstatements in the Standalone Financial Statements that, individually or in aggregate, makes it probable that the economic decisions of a reasonably knowledgeable user of the Standalone Financial Statements may be influenced. We consider quantitative materiality and qualitative factors in (i) planning the scope of our audit work and in evaluating the results of our work; and (ii) to evaluate the effect of any identified misstatements in the Standalone Financial statements.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the Standalone Financial Statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

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ANAND RUNGTA & CO.
Chartered Accountants

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Report on Other Legal and Regulatory Requirements

1. As required by section 143(3) of the Act, based on our audit we report that:
   a) We have sought and obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit,
   b) In our opinion, proper books of account as required by law have been kept by the Company so far as it appears from our examination of those books and except for the matters annexed in 'Basis for qualified opinion'.
   c) The Standalone Balance Sheet, the Standalone Statement of Profit and Loss, Standalone Statement of Changes in Equity and the Standalone Statement of Cash Flows dealt with by this Report are in agreement with the books of account except for the matters annexed in 'Basis for qualified opinion'.
   d) In our opinion, the aforesaid Standalone Financial Statements comply with the Ind AS specified under Section133 of the Act, read with the relevant rules issued thereunder except for the matters annexed in 'Basis for qualified opinion'.
   e) In view of exemption given vide notification no. G.S.R. 463(E) dated June 5, 2015, issued by the Ministry of Corporate Affairs, provisions of Section 164(2) of the Act regarding disqualification of Directors, are not applicable to the Company.
   f) With respect to the adequacy of the internal financial controls over financial reporting with reference to Standalone Financial Statements of the Company and the operating effectiveness of such controls, refer to our separate report in **"Annexure-B".**
   g) Pursuant to Notification No. GSR 463(E) dated 5th June 2015 issued by the Ministry of Corporate Affairs ,Government of India, provisions of Section 197 of the Companies Act, 2013, are not applicable to the Company, being a Government Company; and
   h) With respect to the other matters to be included in the Auditor's Report in accordance with Rule 11 of the Companies (Audit and Auditors) Rules, 2014, as amended, in our opinion and to the best of our information and according to the explanation given to us:
      i. The company has disclosed number of cases of pending litigations in Standalone Financial Statement for the FY 2024-25 in point no. 15 of notes to account. Though, the financial impact of case pertaining to service matters has not been quantified.

ii. The Company has not entered into any long-term contracts including derivative contracts.

iii. There weren't any amounts which were required to be transferred to Investor Education and Protection Fund by the Company.

iv. (a) The Management has represented that, to the best of its knowledge and belief, no funds (which are material either individually or in the aggregate) have been advanced or loaned or invested (either from borrowed funds or share premium or any other sources or kind of funds) by the Company to or in any other person or entity, including foreign entity ("Intermediaries"), with the understanding, whether recorded in writing or otherwise, that the Intermediary shall, whether, directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Company ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries;

(b) The Management has represented, that, to the best of its knowledge and belief, no funds (which are material either individually or in the aggregate) have been received by the Company from any person or entity, including foreign entity ("Funding Parties"), with the understanding, whether recorded in writing or otherwise, that the Company shall, whether, directly or indirectly, lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Funding Party ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries;

(c) Based on the audit procedures that have been considered reasonable and appropriate in the circumstances, nothing has come to our notice that has caused us to believe that the representations under sub-clause (i) and (ii) of Rule 11(e), as provided under (a) and (b) above, contain any material misstatement

v. No dividend has been declared or paid by the company during the year.

vi. Based on our examination, which included test checks, the Company has used 3 types of accounting software (1.Prosix Software for Salary Register, 2. SAP Software for Inventories and 3. Tally Software for Accounting). *Prosix software which has no feature of recording audit trail /edit log facility* however, SAP software (for Inventories) has a feature of recording audit trail (edit log) facility and the same has operated throughout the year

or

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and Tally ERP software for Accounting has also a feature of recording audit trail (edit log) which is enabled from 25th September 2024 for all relevant transactions recorded in the software. Further, during the course of our audit we did not come across any instance of audit trail feature being tampered with. Additionally, the audit trail has been preserved by the company as per the statutory requirements for record retention.

2. In terms of section 143(5) of the Companies Act, 2013, we give in "**Annexure-C**", our report on the directions issued by the Comptroller and Auditor General of India.

3. As required by Companies (Auditor's Report) order, 2020 Issued by the Central Government of India in terms of sub section (11) of section 143 of the Act, we give in the "**Annexure-D**" statement on the matters specified in paragraph 3 and 4 of the order, to the extent applicable.

For ANAND RUNGTA& CO.
Chartered Accountants
FRN: 000681C

S.K. SHAHI
Partner.
Membership No: 071510
UDIN:25071510BMLBOI6544

Date: 12.11.2025
Place: Patna

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Chartered Accountants

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BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

Annexure-"A" to the Independent Auditor's Report
(Refer to first para, under 'Basis of Qualifled Opinion' of our Report of even date on accounts for the year ended 31st March, 2025)

1. *Non Compliance of Indian Accounting Standards (Ind AS):*

   a. *Amounts remaining unrecoverable / unpaid for fairly long period are categorized as Current Assets and Current Liabilities are not as per Ind AS1.*
   b. *Ind AS 16 not complied due to non-componentization of fixed assets pending maintenance of fixed assets register.*
   c. *Fair Value Measurement and Financial Instruments Disclosures: Financial Assets & Liabilities has not been valued at Fair Value and accordingly no adjustments has been made in its' book value as per Ind AS 32; 107; 109& 113.*
   d. *Disclosure in respect of prior period item is not as per Ind AS 8 (Accounting Policies, Changes in Accounting Estimates and Errors).*
   e. *Accounting policy 3 mention that tangible and intangible assets are reviewed at each reporting date to determine whether there is any indication of impairment as per Ind AS 36 but Impairment losses for PPE; if any, are not recognized by the company as per Ind AS 36 (Impairment of Assets) and no such review report was made available to us.*
   f. *Employee Benefit: Although Actuarial Gain / Losses (Adjustment) are recognized as Other Comprehensive Income (OCI) as per Ind AS 19 (Employee Benefits); but its' corresponding impact is not being reflected in "Other Equity" in Balance Sheet.*
   g. *EPS of previous year figure are not adjusted with "Prior period items" as per Ind AS 33 (Earnings per Share).*
   h. *Company is still evaluating the impact on account on implementation of Ind AS 116; as referred in point 20 of Company Information and Significant Accounting Policies.*

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2. ***Capital Work In Progress (Note 3); Financial Assets Others – Non Current (Note 5)& Financial Assets – Trade Receivables (Note 7)***
In absence of Capital Work in Progress Register, details regarding work status of the same worth ₹219885.50 lakhs have not been made available to us. Further ageing of Advance for Capital Works (₹16693.54 Lakhs); which include opening balance of advance to BREDA and balance Confirmation& details of Trade Receivables (₹524099.54 lakhs) were not provided during audit; hence provision required against above; if any could not be ascertained.

3. ***Financial Assets - Cash and Cash Equivalents (Note No.8)***

   a. *Bank Balance confirmation certificate of all the accounts except BSPTCL – E-Tax A/c (37015740242), BSPTCL Net Banking Etax, SBI – Bihar Sharif (11097389070), SBI (Civil Circle Muzaffarpur), SBI – TRZ Bhagalpur, SBI TRZ Muzaffarpur, State Bank of India – Sweep A/c, SBI (Civil Circle Bhagalpur), SBI Darbhanga, SBI Patna Circle, SBISaving Tr. Circle Patna(3774), SBI TRZ Bhagalpur, SBI TRZ Patna and State Bank of India were not made available to us.*
   b. *In SBI-Patna Circle and SBI-Patna (East) includes old outstanding entries since 2013 and 2019 respectively; without details.*
   c. *Bank Statement/BRS of following accounts have not been provided to us for our verification:*

Bank Account	**Dr. Balance Amount₹**
Axis Bank (Sweep A/c)	*5.00*
SBI A/c -11041920723	*57093.27*
SBI A/c 31160072095	*14396.10*
SBI-Patna Division, Central	*0.00*
SBI Patna(W) Division	*0.00*
SBI-Trans Div Bhagalpur CC	*20000.00*