बिहार स्टेट पावर ट्रांसमिशन कंपनी लिमिटेड

(An ISO 27001 : 2013 Certified Company)

(रजिस्टर्ड ऑफिस : विद्युत भवन, बेली रोड, पटना)

संचिका संख्या :

पृष्ठ सं० : 12

A.O(T)

Notes from prepage may kindly be seen.

In the light of prepage mark 'A', File may kindly be sent to CE (SO) for needful action. Submitted.

25-09-25

25/09/25

SM(F&A)

25/09/25

GM(F&A)

CE(SO)

25/9/25

Notes on prepage and above.

- Instant matter is regarding installation of 2X 315 KVA, 11/0.415 KV Sub Station Transformer with extension of nearby 11 KV 02 (two) separate line for providing reliable, stable and uninterrupted power supply to upcoming SLDC (Main-B) under SCADA Phase-III at Chandauti (Gaya).
- SBPDCL has submitted 02(Two) separate estimate amounting to Rs. 16,76,901=00 for 1X315 KVA with 3 Nos.

C/15-14

106

TC - 36 - Oriental - 1.50 Lac - 2024

आधार ः विहार

बिहार स्टेट पावर ट्रांसमिशन कंपनी लिमिटेड

(An ISO 27001 : 2013 Certified Company)

(रजिस्टर्ड ऑफिस : विद्युत भवन, बेली रोड, पटना)

संचिका संख्या : पृष्ठ सं० :

poles and Rs. 17,69,994=00 for LX315 KVA SST and 4 Nos. poles CC/17-16).

- Finance wing has accorded FC for amounting to Rs. 34,46,895=00 (Rupees Thirty four lakhs forty six Thousand Eight hundred Ninty five) only. N/11-12.

File is put up for kind perusal and according administrative approval for rebate of Rs. 34,46,895=00 to SBPDCL for installation of 2X 315 KVA SST with extension of LL KV HT line at Chandauti for SLDC (Main-II) Chandauti, Gaya.

'A'

Director (Operations)

25/09/25

ARUN KUMAR CHOUDHARY
CHIEF ENGINEER (SYSTEM OPRETION)
BSPTCL, PATNA

497/C.E(S.O)
25-09-25

696/Dir(op)
26.09.25

Approval on 'A' above may kindly be considered.

MD. BSPTCL

29/9/25
A.K. Singh
Director (Operation)
BSPTCL

Rahul Kumar

1337/HD(Trg)
26.09.25

CE (S.O.)

29/09/25
A.K. Singh
Director (Operation)
BSPTCL

ESE/ULDC
A.No-1
29/09/2025

ESE/ULDC
29.9.25

AEE, ULDC
Aurangabad
29.09.2025

TC - 36 - Oriental - 1150 Dec - 2024

हमारा आधार
उर्जांस्वत बिहार

served vide estimate no. 412.b while 2nd 1x315 MVA distribution transformer the amount is ₹ 1676901/- served vide estimate No. including applicable GST.

In view of the Financial concurrence at ₹ 3,446,895/- only including GST. may be obtained from account dept of BSPTCL. to execute this work on priority basis.

File is being put-up for kind perusal and further needful.

25.09.2025
Arvind Kumar
ESE ULDC
BSPTCL

CE (SO)

Notes from N108 may kindly be perused.

— Instant matter is regarding installation of 2x315 KVA Sub-Station Transformer (SST 11/0.415KV) with extension of 11 KV 02(two) lines for providing stable and uninterrupted power supply of SLDC (Main-II) at Chandauti (Gaya).

— SBPDCL has sanctioned 02 (two) separate estimates amounting to Rs. 16,76,901=00 (C/15-14) and Rs. 17,69,994=00 (C/17-16). Total cost comes to Rs. 34,46,895=00 for installation of 2x315 KVA 11/0.45 KV SST at Chandauti GSS, Gaya for SLDC (Main-II).

108

BIHAR STATE POWER TRANSMISSION COMPANY LTD., PATNA
A subsidiary company of Bihar State Power (Holding) Company Ltd., Patna
CIN – U74110BR2012SGC018889
[SAVE ENERGY FOR BENEFIT OF SELF AND NATION]
Head Office, Vidyut Bhawan, Bailey Road, Patna – 800021
Telephone No. 0612 – 2504655. E-mail address – so.dept@bsptcl.bihar.gov.in,
Fax No. 0612 – 2504655. Website- www.bsptcl.in

O.O. No. 65 /

Dated... 27-08-25

ULDC/electrical connection/42/2025

Office Order

In continuation of Letter No. 1917 dated **14.08.2025**, regarding approval of payment of **Rs. 30,41,809.00 (Excluding GST as applicable)** towards installation of **11/0.433 KVA × 2 additional DT** for providing **300 KVA HTS-I Connection under ESSD Board Colony, ESD New Capital, PESU (W), Patna**, it is to state that an amount of **Rs. 30,41,809.00 (Rupees Thirty Lakh Forty-One Thousand Eight Hundred Nine only)** is to be deposited by the BSPTCL as the total estimated cost.

The payment shall be made **only through online transfer** in favour of:
Electrical Executive Engineer, New Capital Division, PESU (W)
A/c No.: 442920110000087
IFSC Code: BKID0004429
Bank: Bank of India, Secretariat Branch, Mangles Road, Patna

The aforesaid amount must be deposited **within three months from the date of sanction of estimate.**

This payment amounting to **Rs. 30,41,809.00 (Excluding GST as applicable)**, in reference to **Letter No. 1917**, will be transferred from the **Internal Resource Fund (IRF)** of **BSPTCL** to the **SBPDCL Deposit Work Account.**

The **approval of the competent authority** has been obtained for the said amount of **Rs. 30,41,809.00 (Rupees Thirty Lakh Forty-One Thousand Eight Hundred Nine only).**

Yours faithfully,

Sd/-
(A.K Chaudhary)
Chief Engineer (System operation)

Memo No. 571 /

Patna, Dated... 27-08-25

Copy forwarded to GM(F&A)/Sr. Manager (F&A),BSPTCL for information and further necessary action.

27/08/25

(A.K Chaudhary)
Chief Engineer (System operation)

बिहार स्टेट पावर ट्रांसमिशन कंपनी लिमिटेड

(An ISO 27001 : 2013 Certified Company)

(रजिस्टर्ड ऑफिस : विद्युत भवन, बेली रोड, पटना)

Annexure-B

सचिका संख्या : ULDC/Electrical connection/ 42/2025 पृष्ठ सं० : 08

The matter is regarding Financial Concurrence of estimate for installation of 2 X 315 KVA DSS for providing new 150 KVA HT Power connection in Back up control Center, Gaya (Chanduti, Gaya).

The sanctioned estimate for installation of 2 X 315 KVA DSS for providing new 150 KVA HT power connection has been submitted by transmission circle, Gaya for Back up control Center, Gaya and is placed at C/14-21 via email on dated 20/Sept/2025 and 24/Sept/2025. The estimated amount of ₹ 17,69,994 (Rupees Seventeen Lakh Sixty Nine Thousand Nine Hundred Ninety Four Only) and ₹ 16,76,901 (Rupees Sixteen Lakh Seventy Six Thousand Nine Hundred One Only) may be sanctioned in SLDC head. Accordingly, file may kindly be send to Accounts Department, BSPTCL for the Financial Concurrence of the same.

Put up for kind perusal & further needful.

24/Sept/2025

Khushboo Gupta
Assistant Executive Engineer
ULDC, BSPTCL, PATNA

EEE(ULDC)

Noted above

E.S.E TC Gaya has submitted estimate (technically sanctioned) for establishing electric connection for back up SLDC building, Chanduti Gaya, ^ under deposit head. Amounting ₹ 3,446,895/- (Thirty four lakh forty six thousand Eight hundred Ninety five) only for installation commissioning of Two no of ~~two~~ 315 KVA D.S.S with extension of 11KV line, connection load 150 KVA HT Connection line, estimate if sanctioned will be booked in SLDC CAM head, the same may be sent to Accounts

110

TC - 36 - Oriental - 1.50 Lac - 2024

आधार बिहार

wing for obtaining financial concurrence of amounting ₹ 3,446,895/- (Thirty four lakh forty six thousand eight hundred ninety five only) including GST.

Anupam Kamal
24/09/25
ANUPAM KAMAL
ELECTRICAL EXECUTIVE ENGINEER
ULDC

E.S.-ULDC

Notes above and from pre pages may kindly be seen.

ESE/TC/Gaya vide letter no. 614, dated 20.09.2025 has submitted sanction estimate for installation of 2×315 KVA DSS for providing new 150 KVA HT power connection in Back-up control Centre, Gaya (chandauti).

It is to be mention that both 315 KVA distribution transformer shall be connected seperately.

1×315 MVA transformer will be connected through 80 mtr ACSR Dog conductor from 11 KV DRC feeder while another 1×315 KVA distribution transformer will be connected through 70 mtr, 11 KV police line feeder.

The total estimated amount is ₹ 3,446,895/- including GST offered by concerned DISCOM including GST.

→ The estimated amount of 1×315 KVA distribution transformer is ₹ 17,69,994/-

TC - 36 - Oriental - 1.50 Lac - 2024

हमारा आधार
उर्जस्वित बिहार

served vide estimate no. 412.0
while 2nd 1x315 MVA distribution transformer the amount is ₹ 1676901/- served vide estimate No.4 including applicable GST.

In view of the Financial concurrence at ₹ 3,446,895/- only including GST may be obtained from account dept of BSPTCL to execute this work on priority basis.

File is being put-up for kind perusal and further needful.

25.09.2025
Arvind Kumar
ESE ULDC
BSPTCL

CE (SO)

Notes from N/08 may kindly be perused.

- Instant matter is regarding installation of 2x315 KVA Sub-Station Transformer (SST 11/0.415KV) with extension of 11 KV 02(two) lines for providing stable and uninterrupted power supply of SLDC (Main-II) at Chandauti (Gaya).
- SBPDCL has sanctioned 02(two) separate estimates amounting to Rs. 16,76,901=00 (C/15-14) and Rs. 17,69,994=00 (C/17-16). Total cost comes to Rs. 34,46,895=00 for installation of 2x315 KVA 11/0.45 KV SST at Chandauti GSS, Gaya for SLDC (Main-II).

बिहार स्टेट पावर ट्रांसमिशन कंपनी लिमिटेड

(An ISO 27001 : 2013 Certified Company)

(रजिस्टर्ड ऑफिस : विद्युत भवन, बेली रोड, पटना)

संचिका संख्या : UDC/ Electrical Connection/42/2025 पृष्ठ संo : 11.

File is put up for according F.C for Rs. 34,46,895=00 (Rupees Thirty Four Lakh Forty six thousand Eight Hundred ninty five) only for payment to SAPDCL (including GST) for said work.

GM(F&A)

ARUN KUMAR CHOUDHARY
CHIEF ENGINEER (SYSTEM OPRETION)
BSPTCL, PATNA

494/CE(SO)
25-09-25

SM(FRA)

AO(T)
25/09/25

47/GM(F&A)
25-09-2025

ACCHIEF
25/09/25

Accountant

Notes from Pre-Page and above may kindly be seen.

The Instant matter is related to F.C for installation of 2X315 KVA Sub station Transformer CSST 11/0.415KV with extension of 11 KV c2 (two) lines for providing stable and uninterrupted power supply of SLDC (main-II) at chandauti (Gaya). C.E.(S.O) has sent the file for F.C amounting to Rs. 3446,895=00.

In view of above facts and proposal of CE(SO) (at/above) F.C may be concur for amounting to Rs. 3446,895=00 (Rupees Thirty four Lakh forty six thousand eight hundred ninety five) only under IRF (Capital) Plant & Machinery Head.

Submitted

25-09-25

F.C No. IRF-(Capital) Plant Machinery/08
Date 25-09-25
Page No. 12
Reg No. 2025-26

TC - 36 - Oriental - 1.50 Lac - 2024

हमारा आधार
उर्जस्वित बिहार

112

A.O (T)

Notes from prepage may kindly be seen.

In the light of prepage mark 'A', File may kindly be sent to CE (SO) for needful action. Submitted.

25-09-25

25/09/25

SM (F&A)

25/09/25

GM (F&A)

CE (S.O)

25/9/25

Notes on prepage and above.

- Instant matter is regarding installation of 2X 315 KVA, 11/0.415 KV Sub-Station Transformer with extension of nearby 11 KV 02 (two) separate line for providing reliable, stable and uninterrupted power supply to upcoming SLDC (Main-II) under SCADA Phase-III at Chandauti (Gaya).
- SBPDCL has submitted 02 (Two) separate estimate amounting to Rs. 16,76,901=00 for 1X315 KVA with 3 Nos.

TC - 36 - Oriental - 1.50 Lac - 2024

आधार
त बिहार

बिहार स्टेट पावर ट्रांसमिशन कंपनी लिमिटेड

(An ISO 27001 : 2013 Certified Company)

(रजिस्टर्ड ऑफिस : विद्युत भवन, बेली रोड, पटना)

संचिका संख्या : पृष्ठ सं० :

poles and Rs. 17,69,994=00 for LX315 KVA SST and 4 Nos. poles (C/17-16).

- Finance wing has accorded FC for amounting to Rs. 34,46,895=00 (Rupees Thirty four lakhs forty six Thousand Eight hundred Ninty five) only. N/11-12.

File is put up for kind perusal and according administrative approval for release of Rs. 34,46,895=00 to SBPDCL for installation of 2x 315 KVA SST with extension of LL KV HT line at Chandauti for SLDC (Main-II) Chandauti, Gaya.

'A'

Director (Operations)

25/09/25

ARUN KUMAR CHOUDHARY
CHIEF ENGINEER (SYSTEM OPRETION)
BSPTCL, PATNA

497/CE(SO)
25-09-25

696/Dir(Op)
26.09.25

Approval on 'A' above may kindly be considered.

M.D. BSPTCL

29/09/25
A.K. Singh
Director (Operation)
BSPTCL

Rahul Kumar

1337/HD(IT)
26-09-25

CE (S.O.)

29/09/25
A.K. Singh
Director (Operation)
BSPTCL

ESE/ULDC
29/09/2025

SEE/ULDC
29.9.25

AEE, ULDC
Awadhesh
29.09.2025

TC - 36 - Oriental - 150 Gsm - 2024

हमारा आधार
उर्जान्वित बिहार

BIHAR STATE POWER TRANSMISSION COMPANY LTD., PATNA
A subsidiary company of Bihar State Power (Holding) Company Ltd., Patna
CIN – U74110BR2012SGC018889
[SAVE ENERGY FOR BENEFIT OF SELF AND NATION]
Head Office, Vidyut Bhawan, Bailey Road, Patna – 800021
Telephone No. 0612 – 2504655, E-mail address – so.dept@bsptcl.bihar.gov.in,
Fax No. 0612 – 2504655, Website- www.bsptcl.in

O.O. No. ....65..... /

Dated....27-08-25

ULDC/electrical connection/42/2025

Office Order

In continuation of Letter No. 1917 dated 14.08.2025, regarding approval of payment of **Rs. 30,41,809.00 (Excluding GST as applicable)** towards installation of **11/0.433 KVA × 2 additional DT** for providing **300 KVA HTS-I Connection under ESSD Board Colony, ESD New Capital, PESU (W), Patna**, it is to state that an amount of **Rs. 30,41,809.00 (Rupees Thirty Lakh Forty-One Thousand Eight Hundred Nine only)** is to be deposited by the BSPTCL as the total estimated cost.

The payment shall be made **only through online transfer** in favour of:
Electrical Executive Engineer, New Capital Division, PESU (W)
A/c No.: 442920110000087
IFSC Code: BKID0004429
Bank: Bank of India, Secretariat Branch, Mangles Road, Patna

The aforesaid amount must be deposited **within three months from the date of sanction of estimate.**

This payment amounting to **Rs. 30,41,809.00 (Excluding GST as applicable)**, in reference to **Letter No. 1917**, will be transferred from the **Internal Resource Fund (IRF) of BSPTCL** to the **SBPDCL Deposit Work Account.**

The approval of the competent authority has been obtained for the said amount of **Rs. 30,41,809.00 (Rupees Thirty Lakh Forty-One Thousand Eight Hundred Nine only).**

Yours faithfully,

Sd/-
(A.K Chaudhary)
Chief Engineer (System operation)

Memo No. 571 /
Patna, Dated.....27-08-25

Copy forwarded to GM(F&A)/Sr. Manager (F&A),BSPTCL for information and further necessary action.

27/08/25

(A.K Chaudhary)
Chief Engineer (System operation)

Annexure-C

BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

(A Wholly Owned Subsidiary of Bihar State Power (Holding) Company Limited)
Registered Office : Vidyut Bhawan, Bailey Road, Patna-800021
(CIN : U74110BR2012SGC018889)

U.O.I. No. 46
BSPTCL/CS/2025-26/149

Patna, Dated: 18th July, 2025

SUBJECT: REGARDING APPROVAL OF IMPLEMENTATION OF PATNA ISLANDING SCHEME:

The Board of Directors of Bihar State Power Transmission Co. Ltd. in its 131st Meeting held on 17.07.2025 vide its Resolution No. 131- 06 took following decision:

"RESOLVED THAT Board of Directors of the company be and is herby accord its approval on following proposal:

i) Implementation of Patna Islanding Scheme with total estimated cost of Rs. 9,79,32,664., out of which ₹ 7,74,74,538 is eligible for PSDF Funding i.e. (90% of Rs. 8,60,82,820).

ii) To meet the rest 10% of the cost i.e ₹ 86,08,282 & Cost of civil and other items which are not covered in PSDF i.e 1,18,49,844 from BSPTCL Internal resources Fund."

Distribution to:

CE (SO), BSPTCL for information and issuance of needful executive order.

for and on behalf of Board of Directors of
Bihar State Power Transmission Company Limited

18/7/25

(Kriti Kiran)
Company Secretary

883/CE(SO)
18/07/25

BIHAR STATE POWER TRANSMISSION CO. LTD., PATNA

(Regd. Office – Vidyut Bhawan, Bailey Road, Patna) (Contact No– 0612-2504655,
M No- 7763817701, Fax No– 0612-2504655, Email ID – so.dept@bsptcl.bihar.gov.in)
(GST No. :- 10AAFCB2393H1Z1, CIN – U74110BR2012SGC018889)
(Department of System Operation of BSPTCL)

Tender Extension Notice for (NIT) NO.- 57/PR/BSPTCL/2025, PR.No. 013388 (B&C)2025-26

Due date for submission and opening of Online tenders for NIT No.57/PR/BSPTCL/2025 turnkey Contracts for "Appointment of agency for turn key contracts for Design, Supply, Erection, Testing and Commissioning for Implementation of Islanding scheme for the city of Patna" is extended as follows: -

Date of Pre-bid meeting	**On 11:00 Hrs. of 25.09.2025**
Bid submission End Date and Time	**Up to 17:00 Hrs. of 09.10.2025**
Last date of submission of EMD and hard copy of receipt of BSEDCL processing fees and tender cost	**Up to 18:00 Hrs. of 09.10.2025**
Date of opening of Techno-Commercial Bid (Part-I):	**After 16:00 Hrs. of 10.10.2025**

1. "Bid Processing Fee is mandatory to be paid through online mode i.e. Internet Payment Gateway (Credit/Debit Card), Net Banking, NEFT/RTGS".
2. Bidders are requested to submit Bid Security Declaration Form (in hard copy) to Chief Engineer (SO), BSPTCL, Vidyut Bhawan, Patna positively up to 18:00 Hrs. of 09.09.2025 failing which the tender shall be summarily rejected.
3. "Bid along with necessary online payments must be submitted through e-payment portal https://eproc2.bihar.gov.in/ before the date & time specified in the NIT. The department doesn't take responsibility for the delay/ Non submission of Tender/ Non-Reconciliation of online Payment caused due to Non-availability of Internet Connection, Network Traffic/ Holidays or any other reason".
4. Eligibility Criteria, tender documents along with General/Special condition, bids and any corrigendum/ addendum of the tender are available only at website **www.eproc2.bihar.gov.in**

Chief Engineer (System Operation)

E-tendering introduced in BSPTCL for tenders above Rs. 25 lacs. For registration log in to www.eproc2.bihar.gov.inand e-Procurement Help Desk Toll free No: 1800 572 6571 , Email Id: eproc2support@bihar.gov.in
Working Hours: 8AM to 7PM (All days in week except few selected state holidays).
While participating in e-tendering process, the contractor shall have to get them registered to get user ID, Passwords and digital signature. This will enable them to access the Website: www.eproc2.bihar.gov.in only.

"विवादों के निष्पादन के लिए लोक अदालत का लाभ उठायें, परस्पर सहमति से न्यायिक निर्णय प्राप्त करें, समय एवं खर्च की बचत करें।"

Sd/-
Chief Engineer (System Operation)

Memo No...../ **Patna, dated** ..... /
Copy forwarded to GM (H.R/Adm.), BSPTCL, Patna for kind information.

Sd/-
Chief Engineer (System Operation)

Memo No...../ **Patna, dated**...../
Copy forwarded to DBA, BSPTCL Patna for uploading the above tender notice on the websites.

Sd/-
Chief Engineer (System Operation)

Memo No...../ **Patna, dated**...../
Copy submitted to Director (Operation), BSPTCL/ OSD to MD, BSPTCL for kind information.

Chief Engineer (System Operation)

VOLUME-II

DETAILED PROJECT REPORT

FOR

IMPLEMENTATION OF ISLANDING SCHEME FOR PATNA CITY, BIHAR

BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

1. REQUIREMENT OF THE PROJECT

One of the key features of a resilient power system is robust islanding scheme. It allows a part of the System to continue functioning in case of blackout events or any large disturbance in the system. It ensures that essential loads continue to receive power during any major outage.

Ministry of Power (GoI) has directed that islanding schemes should be implemented for all major cities of the country considering all the strategic and essential loads. After deliberation with all stakeholders in different fora, it was decided that an islanding scheme would be implemented for capital city of Bihar, Patna.

Success of an islanding scheme depends on the design as well as implementation of the logic. Logic needs to be robust as well as simple for successful implementation and must have redundancies to ensure its successful operation. It also needs to be impervious to demand growth of the selected area and it should be successful in all possible scenarios.

Extensive studies are required to design an effective islanding scheme considering all possible scenarios. The dynamic behavior of islanding generator needs to be studied in detail while accurately modelling the generating unit coupled with network modelling and estimated load modelling of the island load.

Since Patna city is connected with the rest of the grid at multiple nodes, tripping of all tie lines is necessary for successful islanding of the grid from the grid. Therefore, it is required that the network chosen should be in such a way that minimum number of tie lines need to be disconnected to island the system. It is also required that maximum load selected for the islanding should not be more than 560-570 MW, apart from auxiliary requirement of islanding generator plant.

2. BACKGROUND

In a meeting held on 28th December 2020 and chaired by the Hon'ble Minister of State (IC), in the backdrop of Mumbai Grid disturbance that occurred on 12th October 2020, it was directed that islanding schemes should be implemented for all major cities of the country considering all the strategic and essential loads.

This was deliberated in a special meeting held by ERPC on 01.04.2021 through MS Teams to identify the major cities of Eastern Region for implementation of Islanding Schemes wherein it was decided that an islanding scheme for Patna city would be designed. The same was discussed in 10th NPC meeting held on 09.04.2021.

In another meeting held subsequently on 06.08.2021 by ERPC, it was decided that one unit of NPGCL (3*660 MW) will be taken as the participating generator for Patna islanding. The provision of island formation with one unit of NPGCL with corresponding logic need to be studied and its feasibility need to be checked. ERLDC was advised to conduct a preliminary study to check the feasibility of the Patna islanding with one unit of NPGCL. Bihar was advised to prepare a rough map/SLD of Patna Islanding Scheme with the all the substations and lines intended to form a successful island and submit the same to ERLDC.

Accordingly, a preliminary study was done by ERLDC to check the feasibility of Patna islanding with one unit (660 MW) of NPGCL after taking necessary inputs from Bihar and NPGCL (attached at Annexure-E). A tender was thereafter floated by Bihar for preparation of DPR, however it was cancelled due to no participation from vendors.

In 45th TCC Meeting held on 25.03.2022, a technical committee was formed comprising of the members from BSPTCL, SLDC Bihar, and NPGC, PowerGrid, ERLDC and ERPC for finalizing the Islanding Scheme. NPGCL was directed to conduct a detailed dynamic study of the islanding, which was conducted by M/s Solvina and the final report was submitted in May 2024 (attached at Annexure-F).

In 221st OCC Meeting held on 27.11.2024, ERLDC was advised to form a joint committee with SLDC Bihar, NTPC and Bihar DISCOMs for regular monitoring of implementation of Patna islanding scheme.

An online meeting was conducted on 05.12.2024 to expedite the implementation of Patna islanding scheme wherein SLDC Bihar was advised to submit load details (Maximum and minimum) of Patna Island in current scenario and the list of feeders to be tripped. NPGCL, NTPC was requested to communicate within a week via letter that NPGC unit is capable of islanding operation and there is no requirement of non-linearity test.

NTPC submitted that one limitation of machine as pointed out by M/s GE is that the maximum time limit for which the NSTPS turbine can be exposed to 103% overspend limit is 20 minutes for the complete lifecycle of turbine. The said condition is appearing for 5 seconds in one of the scenarios when generation is maximum and Patna load is minimum. NTPC consented for participation of NPGC Unit for islanding subject to the mentioned limitation.

In 222nd OCC meeting held on 23.12.2024, ERLDC was advised to finalize Patna islanding logic considering overspeed limitation of NPGC units. Bihar SLDC was advised to identify loads to be included in the islanding scheme.

Based on the feasibility study conducted by ERLDC, detailed dynamic study by M/s Solvina, necessary inputs from NPGCL, NTPC and network and load details from Bihar, a Detailed Project Report has for the islanding has been prepared in consultation with all the stakeholders.

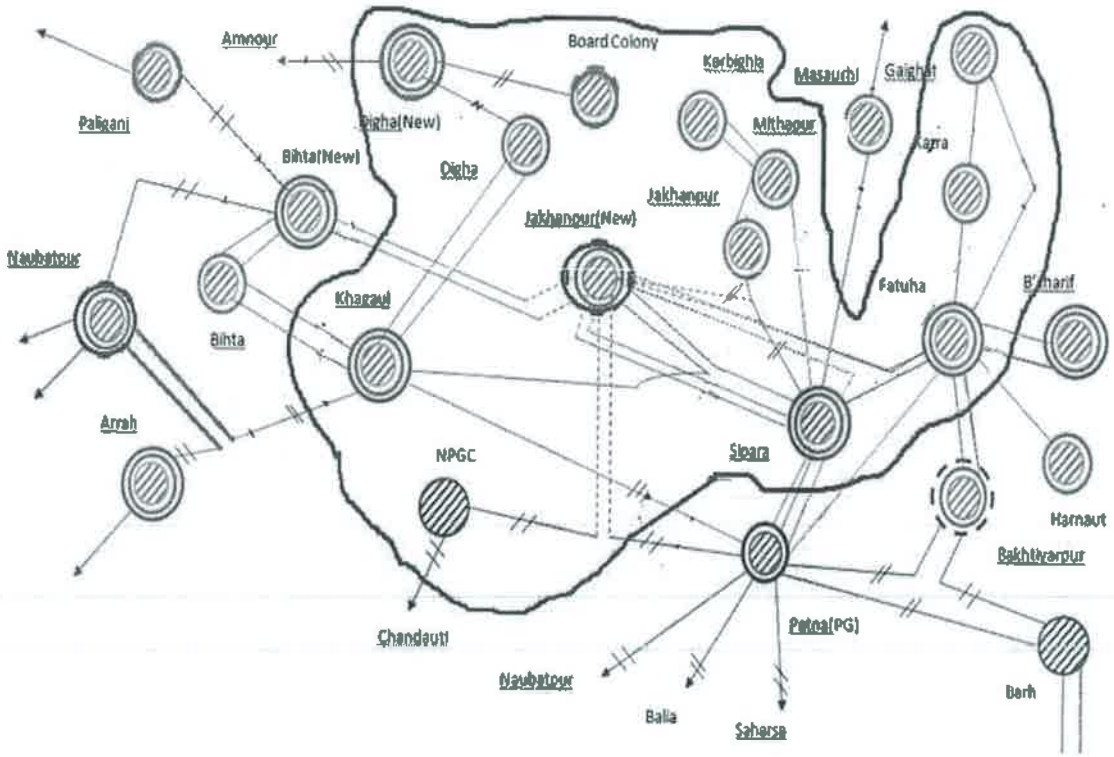
3. OBJECTIVES OF ISLANDING SCHEME OF PATNA:

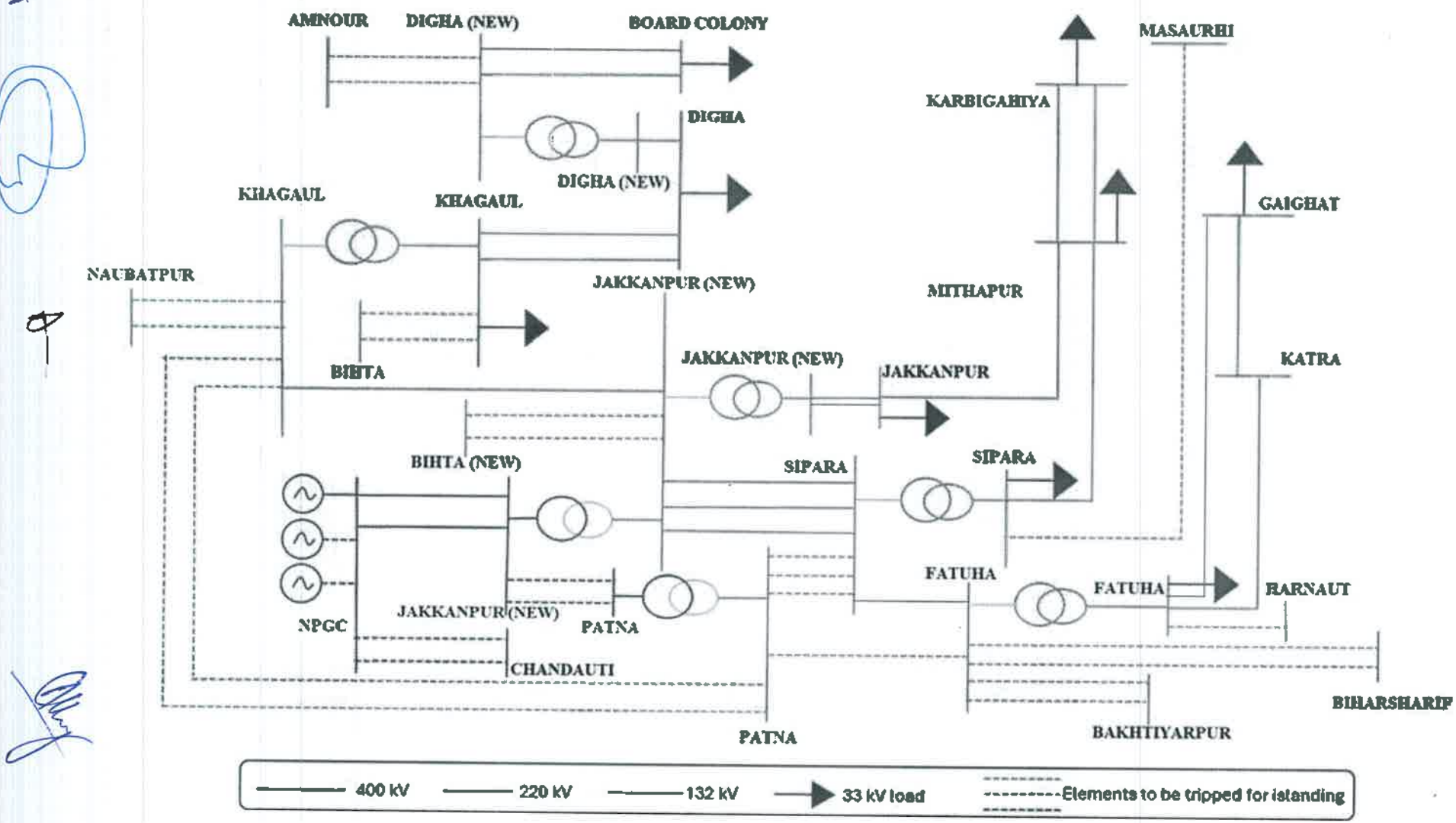
Objectives of the islanding scheme are:

- To isolate one running unit of NPGC (660 MW) with pre-identified load of Patna city and nearby areas.
- After isolation of selected loads and NPGC through the identified network, run the island in islanded mode to cater the city load.
- To extend start-up supply to generating stations in adjoining area to facilitate early restoration.

4. PATNA ISLANDING NETWORK:

Patna city and nearby loads will be islanded with one of the running units of NPGC (660 MW). NPGC is connected to the grid through 400 kV NPGC-Jakkanpur D/c and 400 KV NPGC-Chandauti D/c lines. For the islanding 400 kV NPGC-Jakkanpur D/c and at Jakkanpur through 400/220 kV ICTs, pre-identified 400, 220 and 132 kV feeders will be tripped to confirm the islanding of the Patna city load from the rest of the grid with one unit of NPGC.





SLD of Patna Island

ISLANDING SCHEME OVERVIEW

Pre-Islanding 48.4 < F < 48.6 Hz

- Load -generation balancing for smooth islanding by Optimizing load curtailment among **37 Nos** of Feeders based on priority.
- Tripping of pre identified tie lines (**20 Nos** of tie lines at 220 & 132 KV level) for getting prepared for smooth and reliable islanding.

Stage 1 — **Islanding at 48.4 Hz**

Tripping of Pre identified feeders/ tie lines with grid (2 Nos of 400 KV feeders) for island formation and isolation from rest of the Grid. Breaker tripping at NPGC for keeping 1 unit with Island.

Stage 2 — **Post-Islanding**

- Stage 2A: 80 MW (**5 Nos** of 33kv Feeders) at 48.2 Hz
- Stage2B: 40 MW (**2 Nos** of 33kv Feeders) at 48.0 Hz
- Stage 2C: 50 MW (**3 Nos** of 33kv Feeders) at 47.8 Hz

5. ARCHITECTURE OF THE ISLANDING SCHEME:

To safeguard the system from grid collapse, a robust Islanding system is required which will consist of numerical islanding controller having features of under frequency with Special Protection Schemes depending upon system conditions.

It is proposed to install a numerical controller on each sub-station depending upon number of feeders at the sub-station. Master Islanding Controller will be installed at SLDC Bihar which will have inputs of load and generation of identified islanding feeders and islanding unit of NPGC. The master controller will calculate load generation balance and will start minimizing the imbalance by tripping low priority feeders within the islanding network once frequency reaches a threshold (48.6 Hz) which is higher than the islanding frequency. The slave islanding controller will be installed at different sub-stations on the load side at 33 kV level. The Master islanding controller shall monitor the frequency of the bus and have a programmable feature to issue command based on different frequency stages or as per the output logic to minimize load generation imbalance. The output command will transmit through BSPTCL's OPGW network to trip different lines/ feeders as per logics through Slave islanding controller. Slave islanding controller will issue the trip command through auxiliary tripping relay and give feedback to the master controller.

After normalization of grid disturbance, the tripped lines/ distribution feeders may be restored after obtaining clearance from SLDC.

The status of all circuit breakers, Protection stages, operation of Auxiliary relay of islanded zone shall be monitored through OWS (Operating WorkStation) at SLDC Bihar. Sequence of event will be recorded with time stamping at master controller.

6. ISLANDING SCHEME AND LOGIC

As demand of identified feeders may increase/decrease with time, to maximize chance of survival, it is necessary to have a central logic system which will monitor load and generation balance and will trip feeders prior to islanding if frequency reaches below a certain point.

Since the islanding is being done with one unit of NPGC along with the critical loads of Patna city amounting 568 MW (Feeders mentioned in list of feeders priority wise) only needs to remain within the island at the time of island formation, rest other loads within Island should trip before the Island formation via UFR stage 3 & 4 and if required one additional UFR at 48.7

Hz with 100ms delay to be put in remaining feeders to ensure that only available list of priority feeder is only in service .

As the cities demand may further grow slowly on yearly basis, it is important to ensure that only the priority list /critical load feeder is there at the time of island formation.

So, if any additional feeder is coming in future, it should trip before Pre-islanding frequency (48.6 Hz), either by integrating in UFR stage 3 or 4 or by putting the additional stage at 48.7 Hz with 100 Ms delay so as to ensure that no other feeder is in service apart from the mentioned feeder list before pre-islanding stage (48.6 Hz).

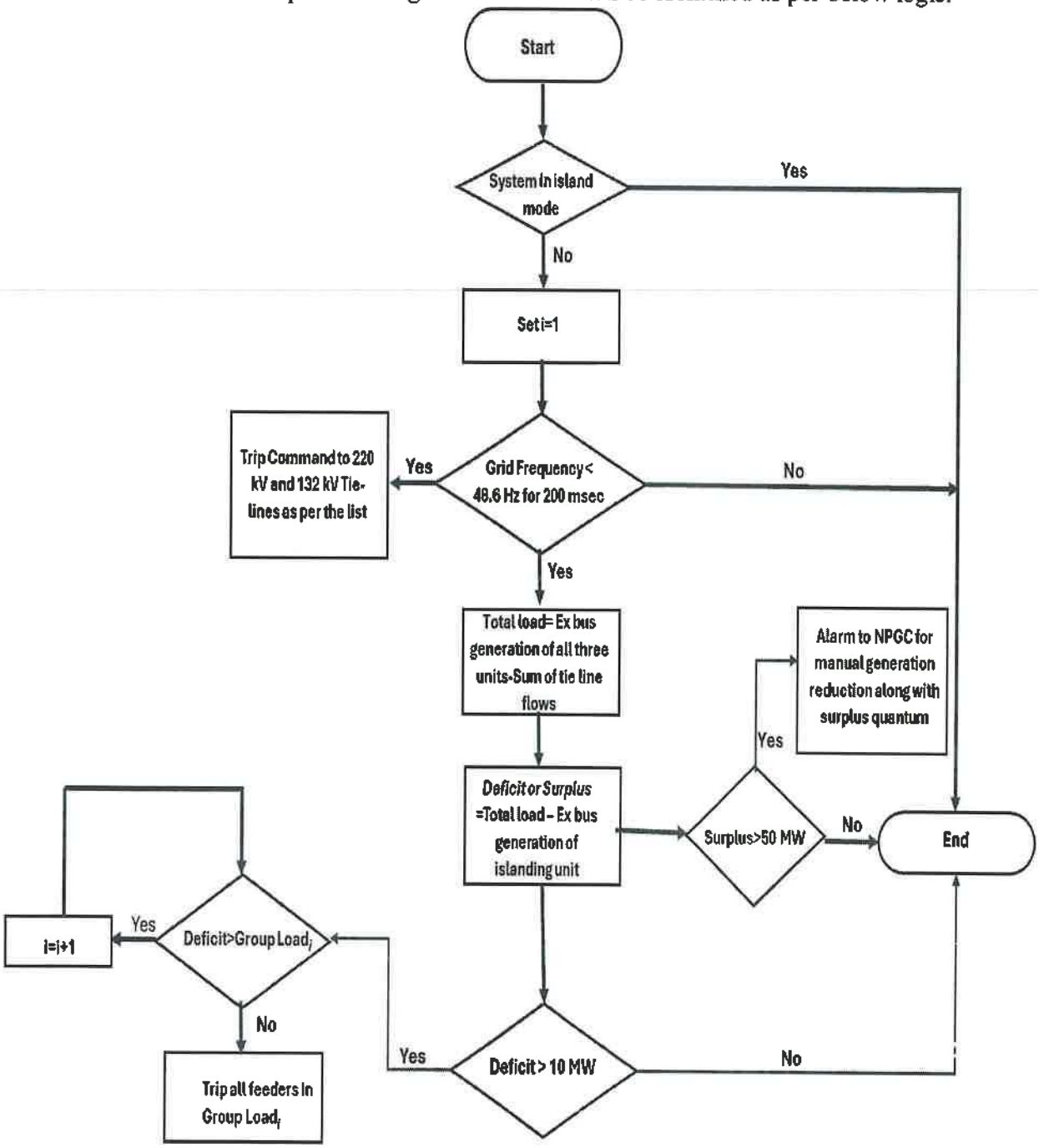
a. **Pre-islanding (Centralized Island Monitoring Unit):**
   - There will be a **Centralized Island monitoring and control unit** needs to be installed at SLDC Bihar for continuous monitoring of load and generation balance in the island. It is necessary to maintain the load generation balance within the island for island stability.
   - The control scheme will continuously monitor frequency, load generation imbalance and will trip identified feeders' priority wise if load generation imbalance goes beyond a certain limit and frequency reaches 48.6 Hz for 200 msec.

b. **Islanding (2 stages):**
   - When Frequency reaches 48.4 Hz, then with a delay of 500 msec, identified system will be islanded. For islanding, several tie lines need to be tripped to isolate the system from the grid. The command to trip the feeders will go from the Central master controller. As a back-up UFR relays may be installed in the identified feeders set at 48.4 Hz and 500 msec time delay.
   - After islanding, another stage of feeder disconnection is also to be done if island frequency decreases. Three sub-stages are set after islanding and UFR relays will be installed on the identified feeders to get the desired load relief.
     i. Stage 2A: 80 MW at 48.2 Hz
     ii. Stage 2B: 40 MW at 48.0 Hz
     iii. Stage 2C: 50 MW at 47.8 Hz

Logic schemes for each stage is detailed as below:

Pre-Islanding tie-lines and load disconnection at 48.6 Hz for smooth islanding through Central Master Controller

Load /Feeders selected for pre-islanding disconnection will be identified as per below logic:



Sum of flow all the tie-lines that will be tripped during islanding will be taken to calculate total load within the island. The list of tie lines is given in the islanding logic Stage-1. (Sign Convention for tie line flow: +Ve if flowing towards the grid, -Ve if flowing from the grid)

Group load will be calculated as sum of loads in individual feeders taking low priority feeders in following way:

Group Load$_1$=Low Priority_ 1
Group Load$_2$=Low Priority_ 1 + Low Priority_ 2

Group Load$_3$=Low Priority_ 1 + Low Priority_ 2 + Low Priority_ 3

.

.

.

.

Group Load$_n$=Low Priority_1 + Low Priority_ 2 + Low Priority_ 3 +..... + Low Priority_ n

The list of feeders identified for tripping to maintain load generation balance are as follows:

Priority wise list of Feeders within the Island:

S.No	At S/s	Feeder	Peak Load (MW)	Priority
1	GAIGHAT GSS	33 KV BAHADURPUR (GAIGHAT)	19.4	Low Priority_1
2	JAKKANPUR GSS	33 KV URJA BHAWAN	18.0	Low Priority_2
3	JAKKANPUR GSS	33 KV PESU 8	14.8	Low Priority_3
4	KARBIGAHIYA GSS	33 KV RAILWAY	6.9	Low Priority_4
5	MITHAPUR GIS GSS	33 KV BAHADURPUR (MITHAPIUR GIS GSS)	18.0	Low Priority_5
6	KARBIGAHIYA GSS	33 KV PESU-4	17.0	Low Priority_6
7	KARBIGAHIYA GSS	33 KV PAHARI-2 & 33 KV PRESS CLUB	21.9	Low Priority_7
8	GAIGHAT GSS	33 KV MEENABAZAR	15.5	Low Priority_8
9	GAIGHAT GSS	33 KV MACHHUATOLLI	20.9	Low Priority_9
10	DIGHA GSS	33 KV Rajapur	21.1	Low Priority_10
11	MITHAPUR GIS GSS	33 KV IOCL	1.1	Low Priority_11
12	KHAGAUL GSS	33 KV KHAGAUL-5	19.0	Low Priority_12
13	KARBIGAHIYA GSS	33 KV PESU-5	12.3	Low Priority_13
14	MITHAPUR GIS GSS	33 KV MITHAPUR-3	6.0	Low Priority_14
15	KHAGAUL GSS	33 KV DANAPUR-2	20.0	Low Priority_15
16	DIGHA GSS	33 KV Excise -1	21.2	Low Priority_16
17	GAIGHAT GSS	33 KV SAIDPUR	19.3	Low Priority_17
18	KARBIGAHIYA GSS	33 KV PESU-2	21.1	Low Priority_18
19	JAKKANPUR GSS	33 KV URJASTADIUM	19.3	Low Priority_19
20	JAKKANPUR GSS	33 KV SACHIWALAY	8.6	Low Priority_20

21	JAKKANPUR GSS	33 KV PESU 9	21.0	Low Priority_21
22	DIGHA GSS	33 KV Patliputra	19.1	Low Priority_22
23	DIGHA GSS	33 KV NEW BOARD COLONY (DIGHA GSS)	23.0	Low Priority_23
24	BOARD COLONY GSS	33 KV NEW BOARD COLONY (BOARD COLONY GSS)	11.7	Low Priority_24
25	BOARD COLONY GSS	33 KV IGIMS-I	13.9	Low Priority_25
26	BOARD COLONY GSS	33 KV BOARD COLONY (BOARD COLONY GSS)	7.3	Low Priority_26
27	JAKKANPUR GSS	33 KV PESU 3	20.1	Low Priority_27
28	JAKKANPUR GSS	33 KV S K PURI	19.2	Low Priority_28
29	GAIGHAT GSS	33 KV GAIGHAT GIS	10.0	Low Priority_29
30	BOARD COLONY GSS	33 KV VETERINARY (BOARD COLONY GSS)	4.7	Low Priority_30
31	KARBIGAHIYA GSS	33 KV BAHADURPUR (KARBIGAHIYA)	10.4	Low Priority_31
32	GAIGHAT GSS	33 KV GAIGHAT	13.0	Low Priority_32
33	JAKKANPUR GSS	33 KV BSEB	18.1	Low Priority_33
34	BOARD COLONY GSS	33 KV IGIMS-II	11.7	Low Priority_34
35	MITHAPUR GIS GSS	33 KV TELECOM	14.0	Low Priority_35
36	KARBIGAHIYA GSS	33 KV S K MEMORIAL	16.1	Low Priority_36
37	JAKKANPUR GSS	33 KV SINCHAI BHAWAN	8.0	Low Priority_37
Total			**562.8 MW**	

Action in case of deficit in the island: The master controller will send tripping command to 33 kV feeders based on the output of the Pre-islanding logic and all the 33 kV feeders coming in the Group $Load_n$ will be tripped at once.

Action in case of surplus in the island: The master controller will send an alarm to NPGC for manual generation reduction in case surplus is more than 50 MW. As per the dynamic study (Ref. Annexure-E & F), in the scenario when generation is maximum and load is minimum, with a surplus of 140 MW, frequency is rising to 51.7 Hz. Hence if an alarm is received at NPGC for generation reduction then same may be immediately acted upon.

*NPGC will also have an OWS where the load and generation of the island will be displayed based on the data received from master controller.

For ensuring smooth islanding, stepwise isolation of network needs to be ensured so that at the time of final islanding minimum number of breakers need to be opened at 48.4Hz. All

interconnection points with grid at 220 and 132 KV level will be tripped except 400 KV at 48.6 Hz with 200 msec delay.
The master controller at SLDC Bihar will send the tripping command for breakers to the following feeders (When frequency is below 48.6Hz for 200 msec) for getting prepared to ensure smooth islanding.

List of Feeder tripping when frequency is less than 48.6Hz

Sr.No.	Name	Breaker to be opened at	CKts
1	220 KV Patna -Sipara-1,2&3	Sipara	3
2	132 KV Sipara-Masaurhi		1
3	220 KV Patna-Khagaul D/c	Khagaul	2
4	220 kV Khagaul-Naubatpur D/c		2
5	132 KV Khagaul-Bihta D/c		2
6	220 kV Patna-Fatuha S/c	Fatuha	1
7	220 KV Fatuah -Bakhtiyarpur D/c		2
8	132 KV Fatuha-Harnaut		1
9	220 KV Fatuah -Biharsharif D/c		2
10	220 KV Digha New -Amnour D/c	Digha New	2
11	220 KV Jakkanpur (New)-Bihta (New) D/c	Jakkanpur	2
	Total		**20**

As a backup, UFR will be installed/enabled in all the above tie-lines at the nodes inside the island at 48.6 Hz with 200 msec delay ensuring isolation of the island from the rest of the grid.

Islanding at 48.4 Hz

Stage-1:

Islanding would commence at 48.4 Hz due to following reasons:

- As Last stage of UFR(Stage-4) is at 48.8 Hz and when frequency is going below last stage there is no further mechanism to improve the frequency hence to safeguard the critical load of city, islanding would commence at 48.4 Hz keeping a margin of 0.4 Hz.
- Also, Island should commence at a stage that after islanding frequency of island should not fall below the under-frequency setting of Islanding unit (47.5 Hz) else unit will trip and island will collapse.
- Once the island is formed the inertia of islanded system will be very small and ROCOF (Rate of change of frequency) will be very high and even for a small load generation imbalance frequency will decline sharply and may lead to tripping of islanded unit on Under frequency (Ref. Annexure-E & F).
- So, keeping a margin and stage wise scope of corrective actions for frequency improvements island formation will occur at 48.4 Hz.

For islanding the isolation of entire islanding network needs to be ensured. The master controller at SLDC Bihar will send the tripping command for breakers to the following feeders to ensure islanding:

Sr.No	Name	Breaker to be opened at	CKts
1	400 KV Patna-Jakkanpur D/c	Jakkanpur	2

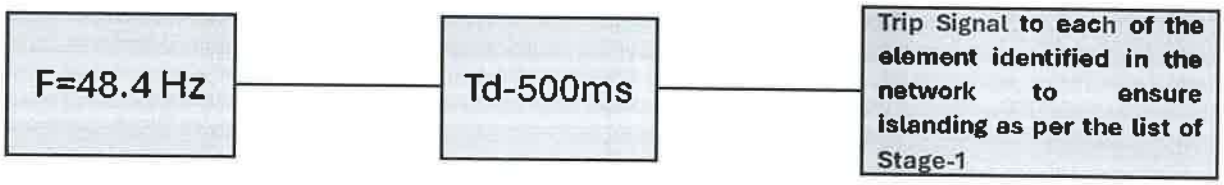
As a backup, UFR will be installed/enabled in all the above tie-lines at the nodes inside the island at 48.4 Hz with 500 msec delay ensuring isolation of the island from the rest of the grid.

<u>At NPGC</u>

- **The selected unit will be islanded with 400 kV NPGC-Jakkanpur D/c and ICTs and will be isolated from the rest of the network.**
- **Through slave controller, specific breakers need to be tripped as per the pre-identified islanding unit to ensure that the unit alongwith 400 kV kV NPGC-Jakkanpur D/c and ICTs for meeting the auxiliary load comes within the island and rest other elements at NPGC are shifted to other bus on the grid side (Ref. NPGC SLDs in Annexure-D).**
- **As a backup, UFR will be enabled at NPGC to trip breakers corresponding to selected islanding unit at 48.4 Hz with 500 msec delay ensuring isolation of the selected unit for island formation, rest other elements at NPGC will be shifted to other bus.**
- **A signal from master controller at SLDC will be sent to NPGC also to run the islanding unit in speed control mode after islanding.**
- **If UFR operates, then also a signal must go to the islanding unit to run in speed control mode.**

Logic of implementation:

At SLDC Patna:



Whenever grid frequency reaches to 48.4 Hz, Master controller unit will initiate Trip signal to all the circuit breakers of the above-mentioned lines through respective slave controller unit.

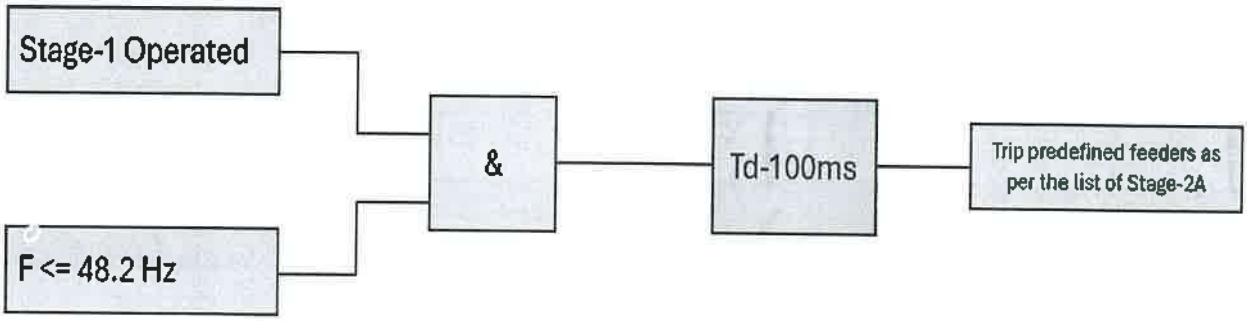
Stage-2:

After successful formation of the island in the first stage, frequency of the islanded network along with island voltage (at 220KV level) shall be monitored by the islanding panel. If the islanded system frequency again falls, then Stage -II islanding will be active. In Stage -II, tripping will be occurred in following three stages.

Under frequency load shedding inside the island is proposed to trigger at 48.2 Hz with 100 msec time delay. Load shedding of remote end feeders may be done accordingly via communication network established between the islanding panel and feeders in the islanded system.

Following logic may be used to implement under frequency load shedding in the islanded network.

Stage-2 A



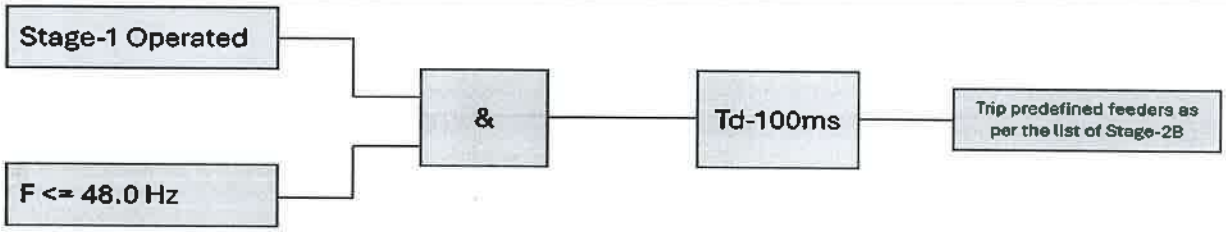
If frequency reaches 48.2 Hz, then around 80 MW will be disconnected. Following feeders* may be selected for UFR:

S.No.	At S/s	Feeder	Peak Load (MW)
1	KHAGAUL GSS	33 KV KHAGAUL-5	19.0
2	KARBIGAHIYA GSS	33 KV PESU-5	12.3
3	MITHAPUR GIS GSS	33 KV MITHAPUR-3	6.0

4	KHAGAUL GSS	33 KV DANAPUR-2	20.0
5	DIGHA GSS	33 KV Excise -1	21.2
Total			78.5 MW

*Considering a scenario of minimum generation and maximum load (350 MW minimum generation and 560 MW maximum load, 210 MW is kept for Central logic to disconnect pre-islanding. Feeders for UFR after islanding has been selected after that based on priority order submitted by SLDC Bihar.

Stage-2 B

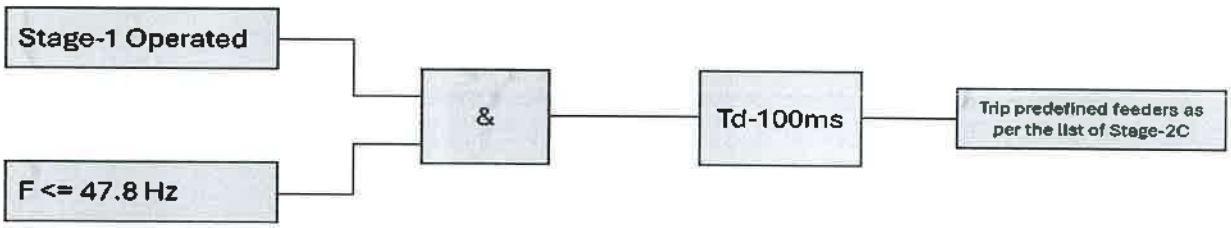


List of Feeders for stage-2B:

If frequency reaches 48.0 Hz, then around 40 MW will be disconnected. Following feeders may be selected for UFR:

S.No.	At S/s	Feeder	Peak Load (MW)
1	GAIGHAT GSS	33 KV SAIDPUR	19.3
2	KARBIGAHIYA GSS	33 KV PESU-2	21.1
Total			40.4 MW

Stage-2 C



List of Feeders for stage-2C:

If frequency reaches 47.8 Hz, then around 50 MW will be disconnected. Following feeders may be selected for UFR:

S.No.	At S/s	Feeder	Peak Load (MW)
1	JAKKANPUR GSS	33 KV URJASTADIUM	19.3
2	JAKKANPUR GSS	33 KV SACHIWALAY	8.6
3	JAKKANPUR GSS	33 KV PESU 9	21.0
Total			48.9 MW

Points to be kept in consideration:

- Redundant communication from centralized unit control at SLDC Patna to all feeders needs to be ensured without any delay.
- The centralized scheme should have test mode along with arming and disarming mode to ensure that mock testing can be performed without actual breaker tripping by ensuring communication/command signals are reaching the last mile.
- Scheme should be using the existing relays capability to maximum and should have enough redundancy at each level to ensure its successful operation.
- Scheme design should be done also considering in case of any failure of one main control unit, the backup controller should be live and in armed condition.
- In case of high rate of change of frequency, it may happen that islanding stage reaches before pre-islanding loop gives tripping command to 33 kV feeders for load generation balance. The time taken to trip 33 kV feeders after running of logic need to be checked and time delay for islanding and pre-islanding need to be adjusted to avoid any race around. The same needs to be measured during testing and documented.
- NPGC to decide about the scheme regarding unit selection during islanding as it will require tripping of breakers to create island. This requires flexibility based on selection of units with one and half scheme bus arrangement. It should be noted that islanding should not be unit specific and should work even with one unit in service during actual conditions.
- The information regarding the unit selected for islanding should automatically reach to the Centralized unit at SLDC Bihar, generation of that unit will be used for disconnection during pre-islanding.
- NPGC must ensure that during islanding, islanded unit auxiliary or any AC connection between existing units and islanded units should not be there as it will create a loop with the grid.
- In case of surplus generation, care needs to be taken that maximum frequency does not go beyond overspeed setting of the unit. As per the study conducted by M/s Solvina, maximum frequency is expected to touch 51.83 Hz, the overspeed setting need to be modified accordingly.
- Islanding system of Patna need to be implemented by inviting tender with suitable vendors with proposed scope of work and scheme.
- Remarks / observations of vendors in respect to SLDC Patna's scope are to be checked.
- Necessary changes of DCS system at NPGC may be implemented by NPGC with necessary support from OEM.
- Suggestion for revision of Over Speed and Over Frequency setting of NPGC generating units are to be discussed with OEM and final recommendation of OEM is to be implemented.
- No feeder within the islanded zone should be covered under the existing ADMS/UFR scheme.
- Data visibility up to 33KV feeders need to be ensured and made available to Central Logic scheme.
- A display page in the Scada system of Islanded Zone is to be setup at SLDC Bihar and ERLDC.

System Description and Scope of Work

I. **System Description**

As per the requirement of the Islanding & Load Shedding System, Architecture of the system will be: