



भारत सरकार  
Government of India  
विद्युत मंत्रालय  
Ministry of Power  
उत्तर क्षेत्रीय विद्युत समिति  
Northern Regional Power Committee

दिनांक: 22.08.2025

सेवा में

As per attached list of Members and Other invitees

**विषय: संरक्षण उप-समिति की 62 वीं बैठक की अतिरिक्त कार्यसूची।**

**Subject: Additional Agenda for 62<sup>nd</sup> Protection Sub-Committee Meeting.**

संरक्षण उप-समिति की 62 वीं बैठक, 26.08.2025 को 10:30 बजे से एनआरपीसी सचिवालय, कटवारिया सराय, नई दिल्ली में आयोजित की जाएगी। उक्त बैठक की अतिरिक्त कार्यसूची संलग्न है। यह उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट (<http://164.100.60.165/>) पर भी उपलब्ध है।

The 62<sup>nd</sup> meeting of Protection Sub-Committee is scheduled to be held on 26.08.2025 at 10:30 Hrs at NRPC Secretariat, Katwaria Sarai, New Delhi. The additional agenda for the meeting is attached herewith. The same is also available on NRPC website (<http://164.100.60.165/>).

डी. के. मीणा  
निदेशक (संरक्षण)

***Additional Agenda of 62<sup>nd</sup> Protection Sub-Committee Meeting (26<sup>th</sup> Aug, 2025)***

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**Additional Agenda of 62<sup>nd</sup> Protection Sub-Committee Meeting (26<sup>th</sup> Aug, 2025)**

**Additional Agenda for  
62<sup>nd</sup> Meeting of Protection Sub-Committee (PSC) of  
Northern Regional Power Committee**

**Date and time of meeting** : 26.08.2025 10.30 Hrs.

**Venue** : NRPC Secretariat, Katwaria Sarai, New Delhi

**1. Frequent tripping of 70 kV HVDC Vindhyachal Pole 1 & 2 of POWERGRID due to auxiliary supply source issues (agenda by NRPC Secretariat)**

- 1.1 NRPC Secretariat has observed that 70 kV HVDC Vindhyachal Pole 1 & 2 of POWERGRID has failed several times in recent past.
- 1.2 Recent events are:

Element	Outage Time	Restoration Time	Cause of Outage (Reported by PGCIL)
VINDH HVDC B/B BLOCK-II	11/01/25 16:39	11/01/25 17:26	Taken in standby mode to avoid any tripping due to voltage dip / fluctuation in 6.6KV (3BB30) feeder as start -up of MDBFP in Unit#3 at NTPC.
VINDH HVDC B/B BLOCK-II	12/01/25 15:26	12/01/25 16:05	Taken in standby mode to avoid any tripping due to voltage dip / fluctuation in 6.6KV (3BB30) feeder as start -up of MDBFP in Unit#3 at NTPC.
VINDH HVDC B/B BLOCK-II	11/01/25 16:39	11/01/25 17:26	Taken in standby mode to avoid any tripping as on start -up of MDBFP in Unit#3 at NTPC Singrauli the only available 6.6kV feeder to Block-1 will be subjected to voltage dip/fluctuation.
VINDH HVDC B/B BLOCK-I	07/02/25 11:29	07/02/25 12:28	Vindhyachal block-1 tripped at 11:29hrs on 07.02.25 due to disturbance in only available 6.6KV auxiliary feeder "3BA28"

***Additional Agenda of 62<sup>nd</sup> Protection Sub-Committee Meeting (26<sup>th</sup> Aug, 2025)***

			from Unit-3 catering to B1LB auxiliary transformer. The 6.6KV Auxiliary supply feeder "5BB29" catering to HVDC Block-1 auxiliary transformer B1LA is already out since 20-Jan-25 from NTPC end.
VINDH HVDC B/B BLOCK-I	01/03/25 15:01	01/03/25 16:29	Tripped due to voltage dip in only available 6.6KV auxiliary supply feeder B1LA due to start of Boiler Feed Pump by NTPC VSTPP.
VINDH HVDC B/B BLOCK-I	30/07/25 20:25	31/07/25 00:46	Tripped along with 400 KV Vindhyachal(PG)-Vindhyachal(NT) (PG) feeder-1&2 due to tripping of both auxiliary supply on NTPC Vindhyachal units.
VINDH HVDC B/B BLOCK-II	30/07/25 20:25	31/07/25 00:47	Tripped along with 400 KV Vindhyachal(PG)-Vindhyachal(NT) (PG) feeder-1&2 due to tripping of both auxiliary supply on NTPC Vindhyachal units.

1.3 NLDC vide letter dated 21.08.2025 has given detailed report (**Annexure-1**) on tripping of 30.07.2025.

1.4 **Points for discussion:**

- i. NTPC may explain issues at their end causing elements tripping at NTPC end as well as causing failure of 70 kV HVDC Vindhyachal Pole 1 & 2.
- ii. POWERGRID may explore options for two separate and distinct sources of supply for auxiliaries at HVDC Vindhyachal.

**Decision required from Forum:**

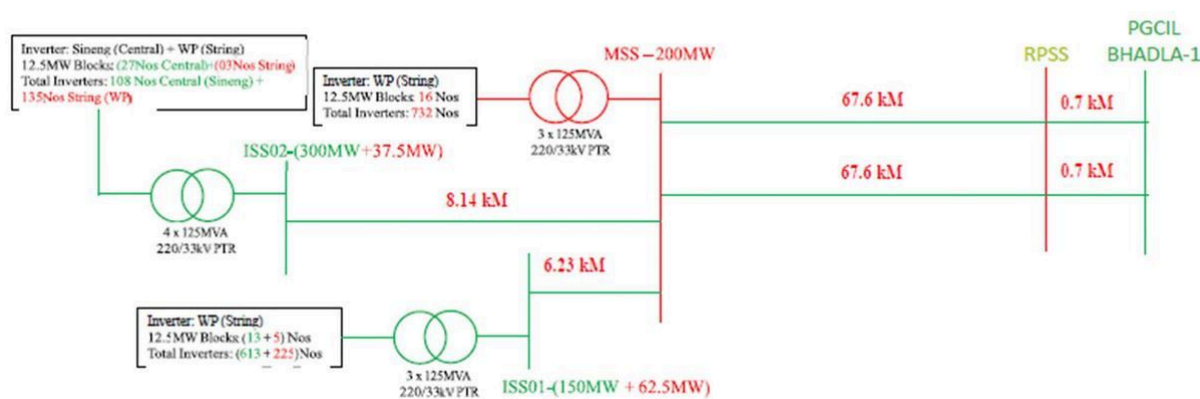
*Forum may like to discuss.*

*Additional Agenda of 62<sup>nd</sup> Protection Sub-Committee Meeting (26<sup>th</sup> Aug, 2025)*

**2. SPS Proposal for ESUCRL 750 MW Solar Park at ISS-1, ISS-2, MSS and RPSS substation (agenda by ESSEL)**

- 2.1 As per the transmission system connectivity, total 750 MW Power evacuation (Aggregated Power from MSS, ISS-1 and ISS-2) is envisaged to be flow from MSS to PGCIL Bhadla substation via RPSS through Double circuit transmission line.
- 2.2 Following 220 kV Transmission System / Network exists at ISS-1, ISS-2, MSS, RPSS,

PGCIL Bhadla-1 S/S for Power Evacuation:



- 2.3 During N-1 Line Contingency, between MSS to RPSS or RPSS to PGCIL Bhadla-1 S/S, total power being evacuated will be shifted to single line, which may be more than its current carrying capacity as per real time power evacuation scenario.
- 2.4 To avoid such scenario for longer duration and prevent overloading of single transmission line, appropriate SPS need to be designed to limit the power evacuation during N-1 contingency.
- 2.5 SPS proposal of ESSEL is attached as **Annexure-2**.

**Decision required from Forum:**

*Forum may deliberate and may approve accordingly.*

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**ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड**  
(भारत सरकार का उद्यम)  
**GRID CONTROLLER OF INDIA LIMITED**  
(A Government of India Enterprise)



[formerly Power System Operation Corporation Limited (POSOCO)]  
राष्ट्रीय भार प्रेषण केन्द्र / **National Load Despatch Centre**

कार्यालय : बी-9, प्रथम एवं द्वितीय तल, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016  
Office : 1<sup>st</sup> and 2<sup>nd</sup> Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016  
CIN : U40105DL2009GOI188682, Website : www.grid-india.in, E-mail : gridindiacc@grid-india.in, Tel.: 011- 42785855

संदर्भ/Reference: Grid-India/NLDC/2025/Aug/

दिनांक/Date: 21.08.2025

सेवा मे,

- [1] Member Secretary, Northern Regional Power Committee, 18-A, Qutab Institutional Area, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110 016
- [2] Member Secretary, Western Regional Power Committee, F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri East, Mumbai-400093

महोदय/महोदया,

**विषय/Subject:** / एक से अधिक क्षेत्रों से संबंधित ग्रिड दुर्घटनाओं/घटनाओं की ड्राफ्ट ट्रिपिंग रिपोर्ट  
**Draft Tripping Reports of Grid Disturbances/Incidents Involving Multiple Regions**

With reference to IEGC Section 37.2 (f), the draft grid event reports for the following incidents involving more than one region are attached:

1. GD -1: Outage of HVDC Vindhyachal Bipole on 30<sup>th</sup> July 2025

सधन्यवाद,

भवदीय,

(सुहास धमभरे)

मुख्य महा प्रबंधक, रा.भा.प्रे.के.

Copy to:

1. MS, NPC
2. Member (GO&D), CEA





**ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड**  
(भारत सरकार का उद्यम)  
**GRID CONTROLLER OF INDIA LIMITED**  
(A Government of India Enterprise)



[formerly Power System Operation Corporation Limited (POSOCO)]  
राष्ट्रीय भार प्रेषण केन्द्र / **National Load Despatch Centre**

कार्यालय : बी-9, प्रथम एवं द्वितीय तल, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016  
Office : 1<sup>st</sup> and 2<sup>nd</sup> Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016  
CIN : U40105DL2009GOI188682, Website : [www.grid-india.in](http://www.grid-india.in), E-mail : [gridindiacc@grid-india.in](mailto:gridindiacc@grid-india.in), Tel.: 011- 42785855

## Report on Event of tripping at 400KV Vindhyachal (PG)

1. **Date & Time of event:** 20:25 hrs on 30.07.2025
2. **Location/Control Area:** VSTPS, Madhya Pradesh (WR), Uttar Pradesh (NR)
3. **Plant/Substation Name:** 400KV Vindhyachal(PG)
4. **GD/GI Category:** GD-1
5. **Antecedent Condition:**
  - NR Demand : 75651 MW
  - WR Demand : 58458 MW
  - Frequency : 50.02 Hz
  - weather condition : Normal
  - NR IR exchange : 20222 MW
  - 400 kV VSTPS Stage III – Stage V ckts 1&2 opened since 29-07-2024 to control tie line loading between Stage IV to V
6. **Generation loss/Load loss:**
  - Generation loss of 206 MW in VSTPS Unit 3 (210 MW).
  - As informed by MP SLDC, 70 MW load loss occurred due to the event
7. **Duration of interruption:** ~ 03:43 (hh:mm) (Restoration time: 00:08 hrs on 31st Jul'25)
8. **Tripped elements:**

क्र.सं. S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	वापसी का समय Restoration time	रिले संकेत Relay Indication
1	400/132 kV VSTPS ICT 1	20:25	20:51	B/U E/F protection operation DRs provided are not of required duration
2	400/132 kV VSTPS ICT 2	20:25	-	
3	400/132 kV VSTPS ICT 3	20:25	21:45	
4	400 kV Vindhyachal - Vindhyachal HVDC 1	20:25	00:08 /31-07-2025	6.6 kV auxiliary supply failed
5	400 kV Vindhyachal - Vindhyachal HVDC 2	20:25	00:08 /31-07-2025	
6	70 kV HVDC Vindhyachal Pole 1	20:25	00:31 /31-07-2025	
7	70 kV HVDC Vindhyachal Pole 2	20:25	00:31 /31-07-2025	
8	132 kV VSTPS- Waidan 1	20:25	23:09	Waidan end: R-E fault, Zone 2 DPR operation
9	132 kV VSTPS- Waidan 2	20:25	23:42	
10	VSTPS Unit 3 (210 MW)	20:28	14:36 /31-07-2025	Drum level low

#### 9. घटना का सारांश / Event Summary:

- (i) At 20:25 Hrs /30-07-2025, Bus fault occurred in 132 kV VSTPS Main Bus but the fault was not cleared by Bus bar protection operation and resulted in tripping of all the elements connected to 132 kV VSTPS Main bus on respective Backup protection operation.
- (ii) 400/132 kV VSTPS ICTs 1, 2 & 3, 132 kV VSTPS- Waidan 1&2 & 132/6.6 kV VSTPS STs 1, 2&3 tripped during the event.



- (iii) Due to the tripping of 132 kV/6.6 kV Station Transformers, 70 kV HVDC Vindhyachal Poles 1&2 blocked due to Auxiliary supply failure.
- (iv) Due to the tripping of 132 kV/6.6 kV Station Transformers, Auxillary supply of VSTPS Unit 3 (210 MW) failed and resulted in tripping of Boiler Feed Pump and tripping of the unit on Drum level low at 20:29 Hrs.
- (v) Generation loss of 206 MW occurred due to VSTPS Unit 3 (210 MW) tripping.
- (vi) As informed by MP SLDC, 70 MW load loss occurred due to the event.

#### 10. Network across the affected area:

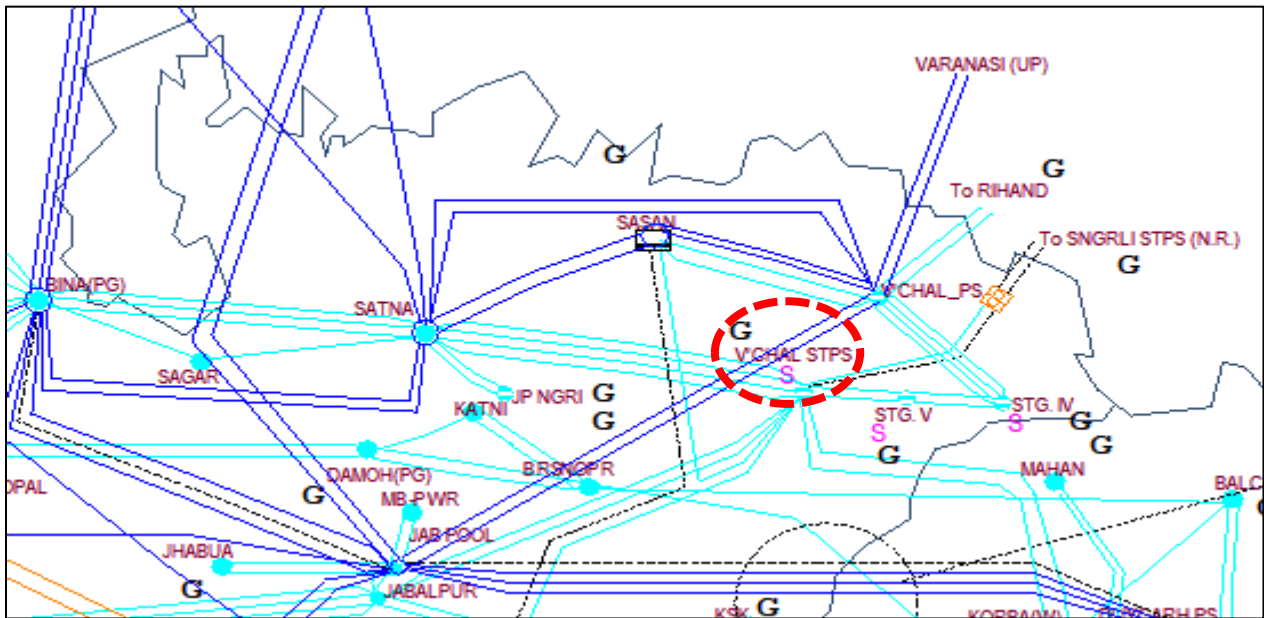


Figure 1. Network across the affected area

#### 11. घटना का विश्लेषण / Event Analysis (Based on PMU, SCADA & DR):

- As shown in figure 2 & 3 , it is observed that initially fault was in R phase and converted into R-Y phase fault. The total duration of fault is 1.08 seconds.
- Both 132kV VSTPS-Waidhan circuit trip in zone-2 from remote end on R-phase to Earth fault.
- As per information received by **NTPC VSTPS:-**  
On 30.07.2025 (20:21)132KV Bus-1 got tripped and its feeders Waidhan-1 ,2, ST-2, ST-4, Bus section-1, IBT-2 Got tripped after a delay of 1098 ms. along with BS-2. This delayed

tripping led to fault feeding from ICT-1, 2 & 3 and all three ICTs got tripped on back up protection leading to complete outage of 132KV System.

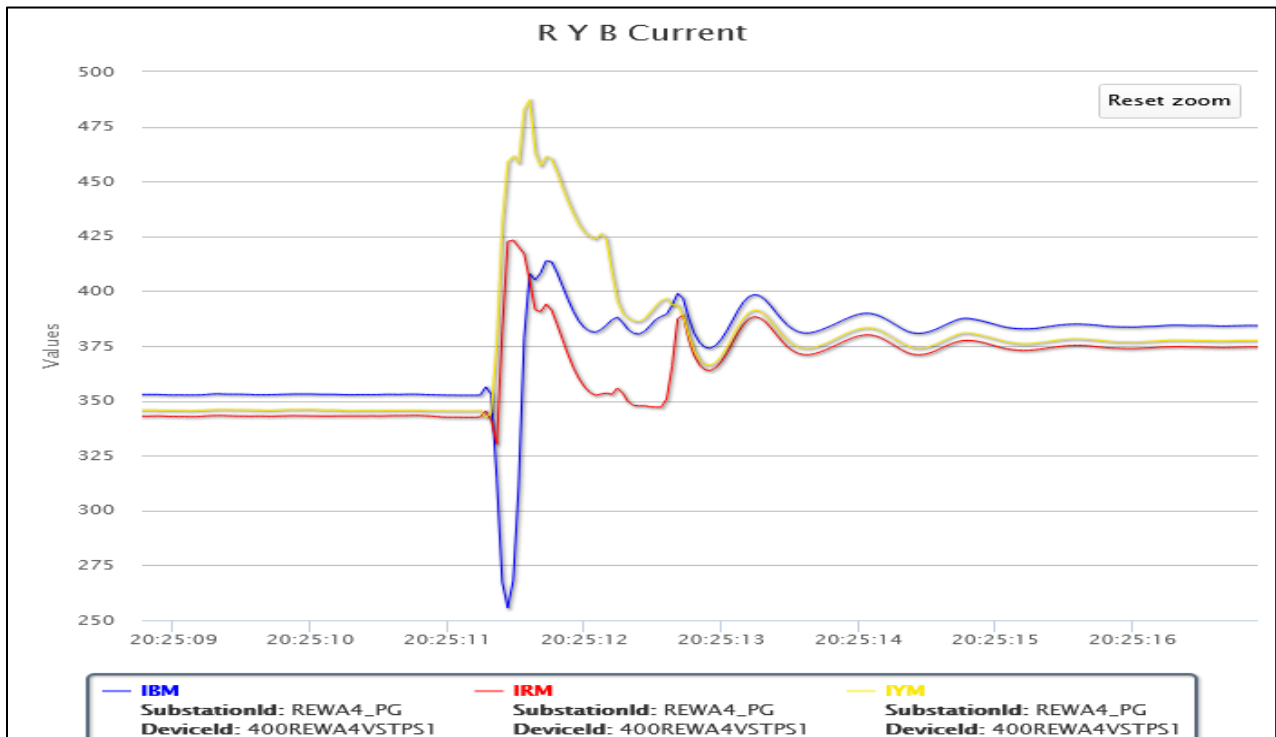


Figure 2. PMU Current Plot of 400 kV Rewa-VSTPS-1

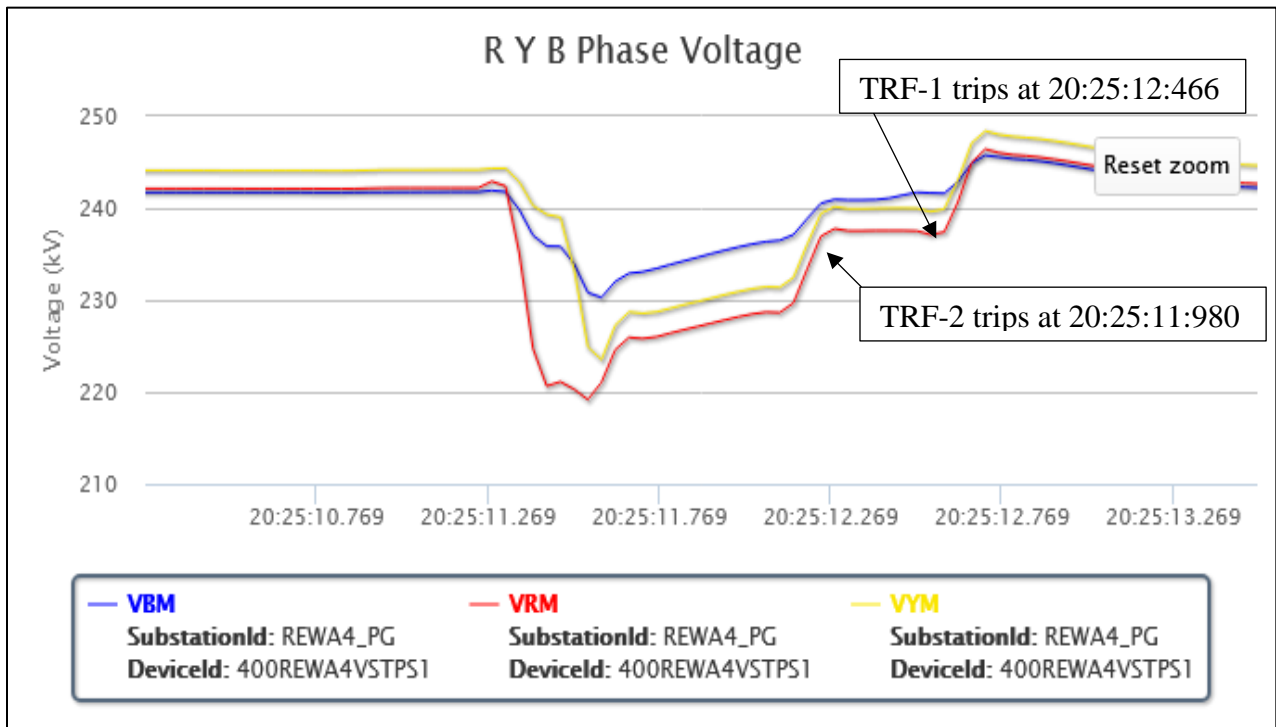


Figure 3. PMU Voltage Plot of 400 kV Rewa-VSTPS-1

**12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:**

- Bus bar protection not operated.

**13. सुधारात्मक उपाय / Action Taken/Remedial Measures :**

- After analysis by VSTPS, Visible tracking marks were observed in Y ph. of BPI of ICT-2 Bus isolator. After isolation of ICT-2 Bay, all three Buses of 132KV were normalized its feeders were taken in service.
- On 31.07.2025 Bus-1 S/D was taken to replace the Y-Phase BPI of ICT-2 Bus isolator, on analysis slight tracking marks were also observed on R-PH BPI and in consultation with COS, R-ph BPI also replaced along with Y-Ph BPI.

## अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA -

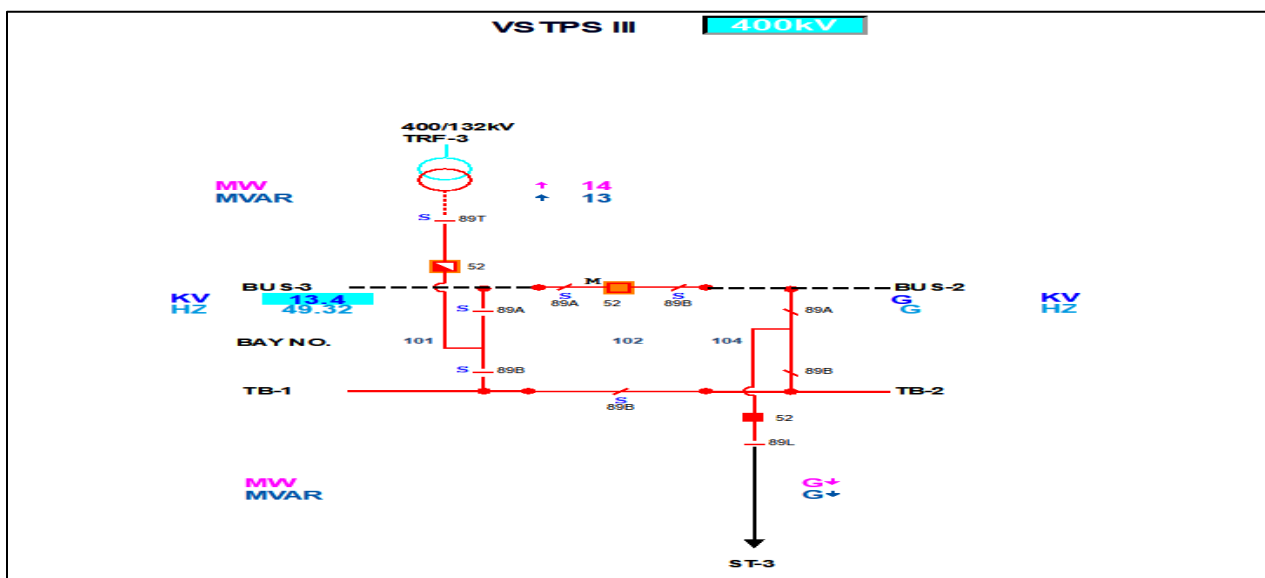
SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS:MS
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41152 ( T2_P ) FAULTY	20:25:11:974
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41152 ( T2_P ) OPEN	20:25:11:980
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41752 ( T1_P ) FAULTY	20:25:12:461
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41752 ( T1_P ) OPEN	20:25:12:466
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB CB 40952 ( G3 ) FAULTY	20:28:52:864
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB CB 40952 ( G3 ) OPEN	20:28:52:869
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41752 ( T1_P ) FAULTY	20:51:36:491
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41752 ( T1_P ) CLOSED	20:51:36:505
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41152 ( T2_P ) FAULTY	20:57:32:23
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41152 ( T2_P ) CLOSED	20:57:32:37
WRLDC	400KV-CB	VSTPS_GS	VSTPS 1 2 CB 41152 ( T2_P ) FAULTY	20:57:32:68

SOE submitted by NTPC Vindhyachal S/S:-

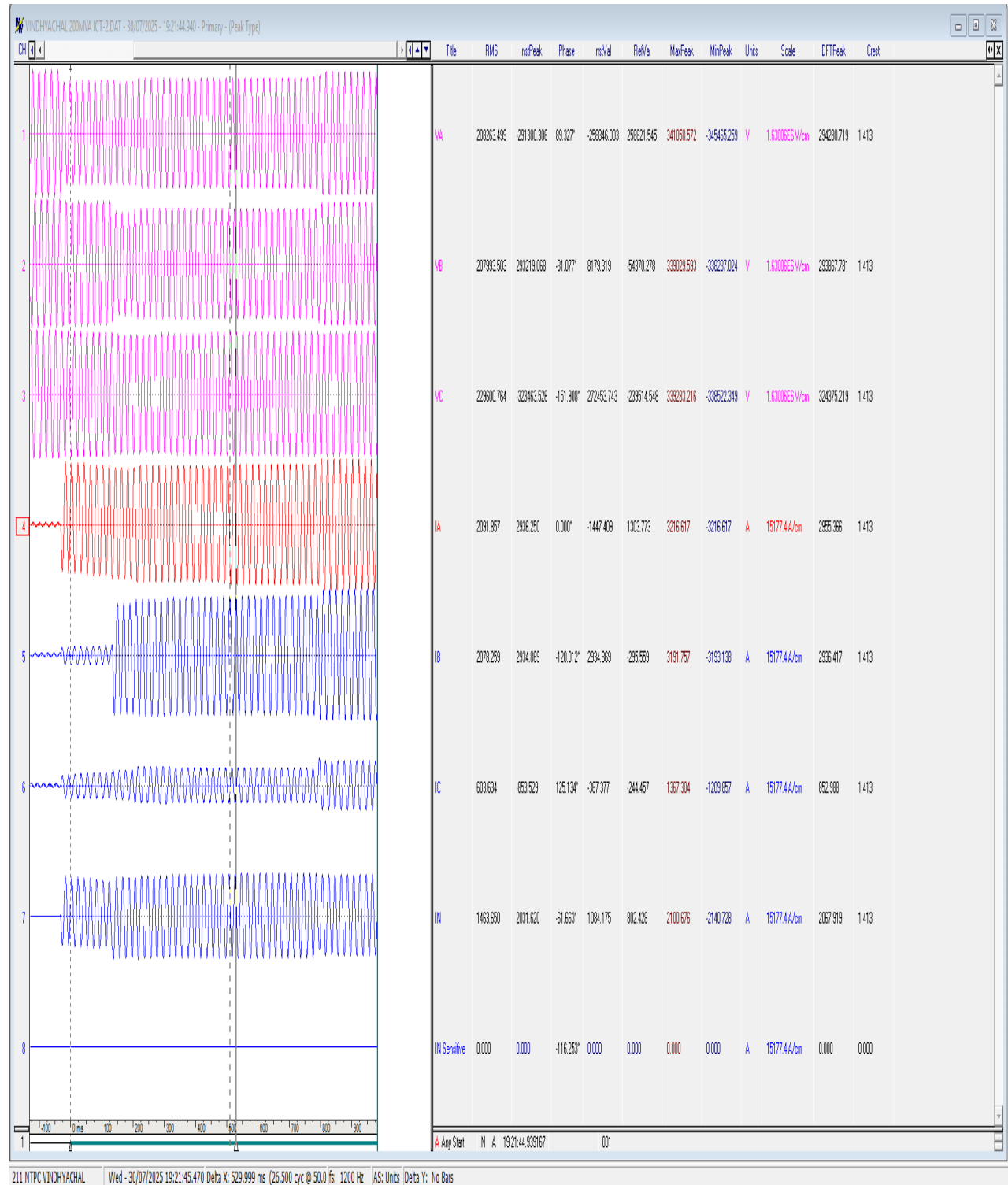
NTPC LIMITED-VINDHYACHAL Plant Name : 400/220KV SWITCHYARD					
Sr. No.	SER Name	SER	Status	Date and Time	Point No. Legend
41	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:41:920	276 132KV BUS-1 TRIP
42	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:42:1	276 132KV BUS-1 TRIP
43	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:42:40	276 132KV BUS-1 TRIP
44	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:138	302 BS#1 132KV BB LBB TRIP
45	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:138	303 ST#4 132KV BB LBB TRIP
46	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:138	304 ST#2 132KV BB LBB TRIP
47	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:138	309 IBT#2 132KV BB LBB TRIP
48	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:175	229 Normal Legend 229
49	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:180	307 W#2 132KV BB LBB TRIP
50	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:183	306 BT#2 132KV BB LBB TRIP
51	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:185	305 CPT 132KV BB LBB TRIP
52	NTPC Vindhyachal STG-II	SER01	Alarm	7/30/2025 20:21:43:193	308 W#1 132KV BB LBB TRIP
53	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:210	276 132KV BUS-1 TRIP
54	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:473	302 BS#1 132KV BB LBB TRIP
55	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:473	303 ST#4 132KV BB LBB TRIP
56	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:473	304 ST#2 132KV BB LBB TRIP
57	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:473	309 IBT#2 132KV BB LBB TRIP
58	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:515	306 BT#2 132KV BB LBB TRIP
59	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:523	305 CPT 132KV BB LBB TRIP
60	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:527	307 W#2 132KV BB LBB TRIP
61	NTPC Vindhyachal STG-II	SER01	Normal	7/30/2025 20:21:43:528	308 W#1 132KV BB LBB TRIP

A. 400kV VSTPS SLD :-



### अनुलग्नक-3 / Annexure-3: Disturbance recorder highlighting the observations as per below:

#### DR of VINDHYACHAL 200MVA ICT-2



DR provided doesn't contains the tripping instance, Fault present in R phase for more than 900 msec indicating ICT must have tripped on B/U E/F operation

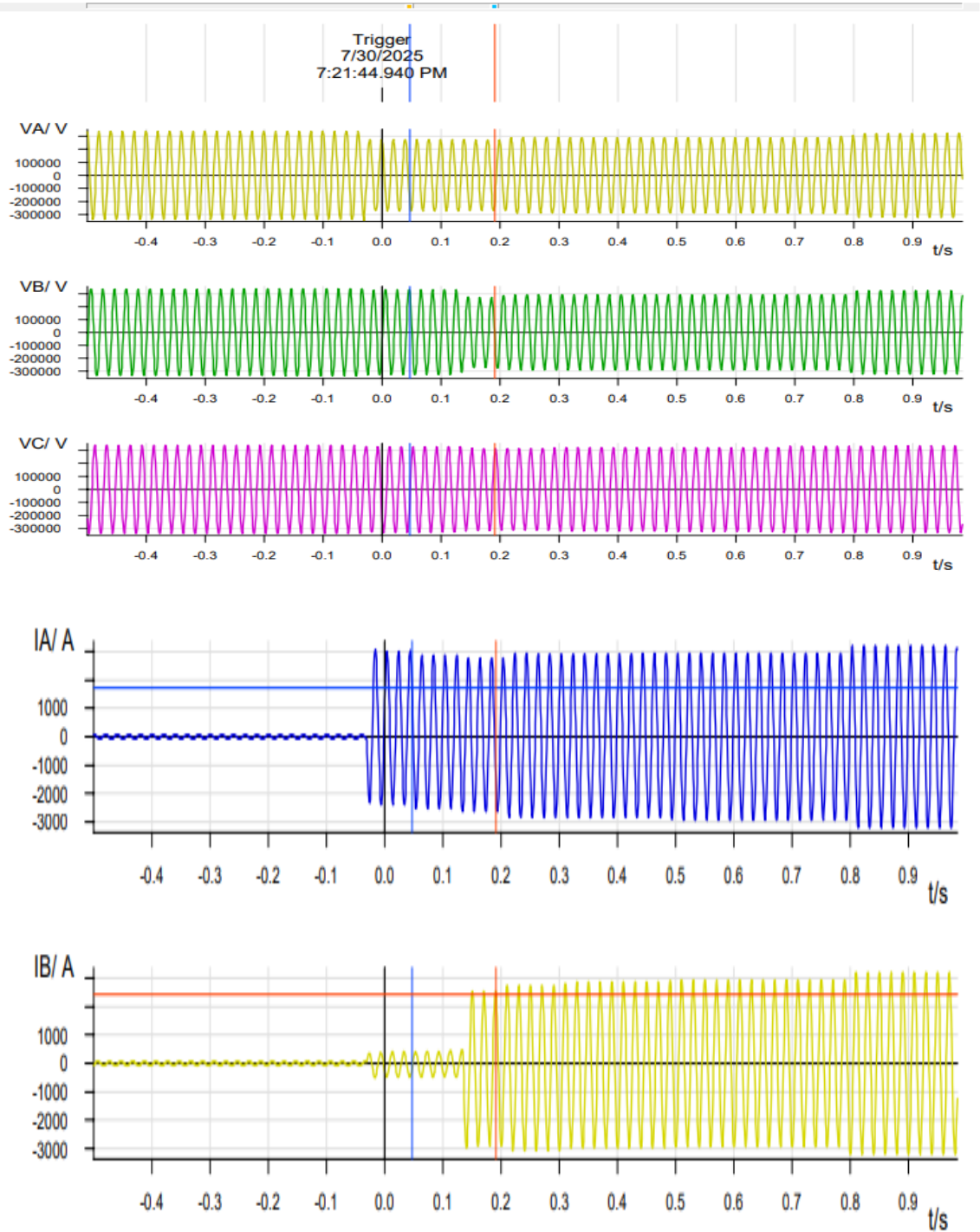
DR of VINDHYACHAL 200MVA ICT-3 (Provided in pdf format)

NTPC VINDHYACHAL

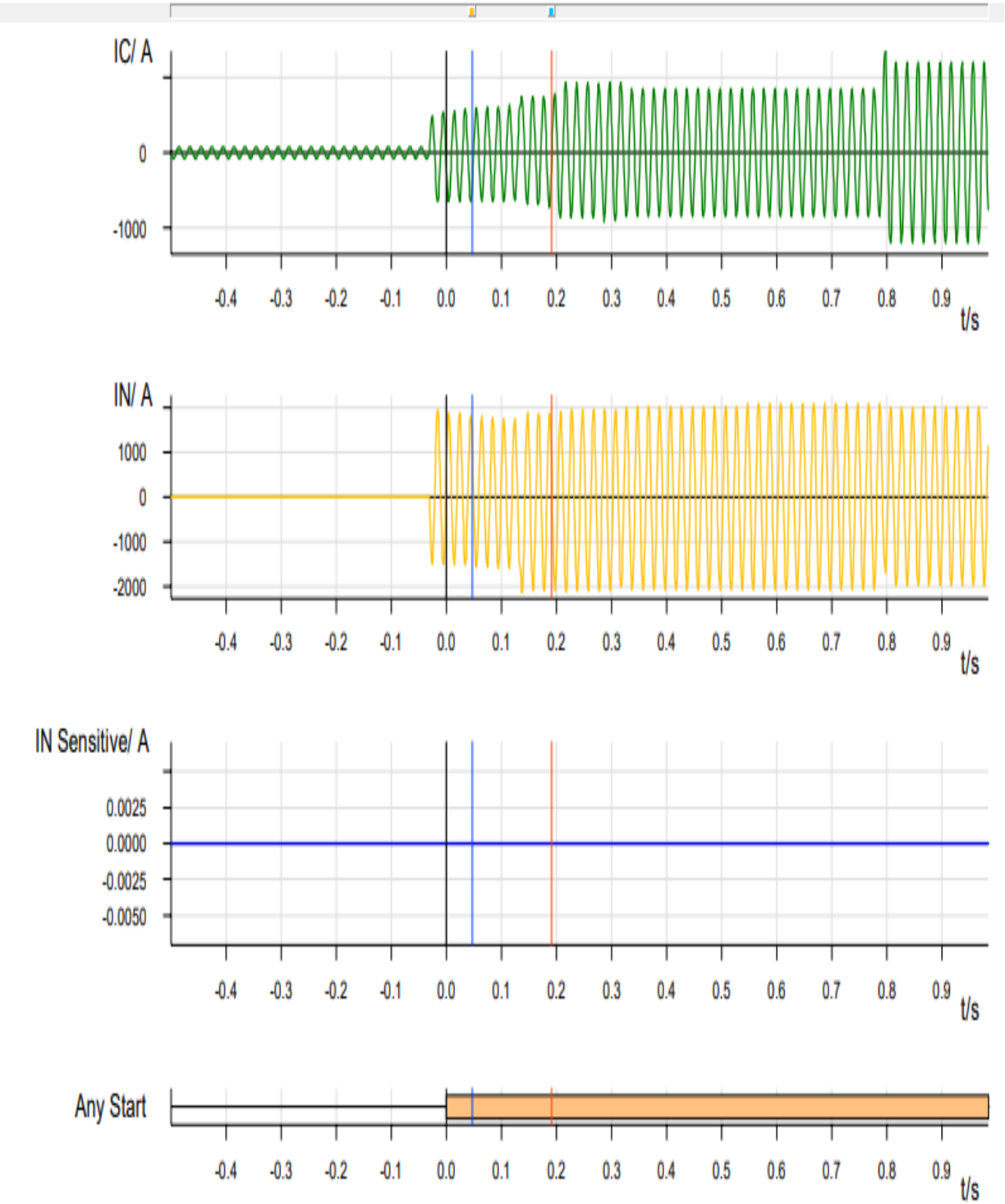
- 2 -

7/30/2025 / 7:21:44.940 PM

	Time in ms	Measuring Signal	Instantaneous	R.M.S.
<div><div></div>Cursor 1:</div>	46.9	IA	1.7300 kA	1.9419 kA
<div><div></div>Cursor 2:</div>	191.3	IB	2.4252 kA	1.9379 kA
C2 - C1	144.4	IB - IA	0.6953 kA	-0.0039 kA







**अनुलग्नक-D / Annexure-D:** Any other photographs from site (Equipment damage, switchyard, tower collapse or the case may be)

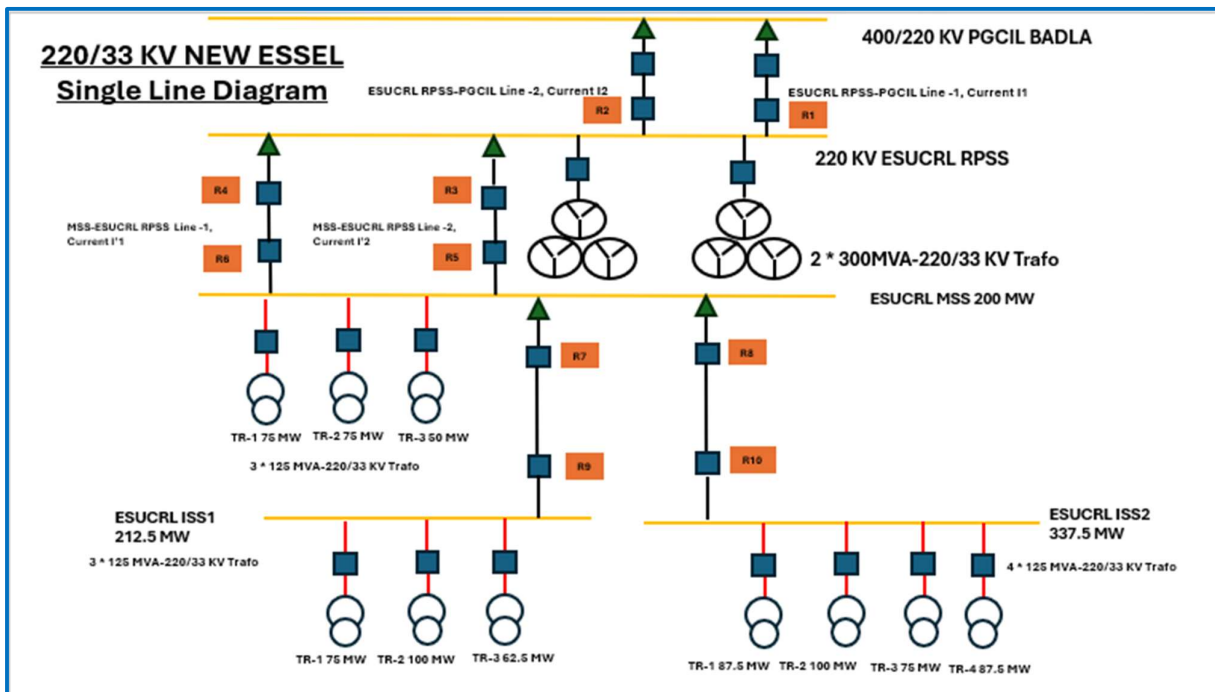


## Proposal - Special Protection Scheme for 220 KV ESUCRL 750 MW SOLAR PARK, PHALODI, RAJASTHAN

### ▪ Plant Details:

- Plant Name : ESUCRL Solar Park, 750 MW, Phalodi, Rajasthan
- Plant Capacity : 750 MW (Aggregated)
- Switchyard Voltage : 220 kV
- Switchgear Voltage : 33 kV
- PPC Set Limit : 750 MW
- No of Lines : 2 no's (MSS to RPSS and RPSS to PGCIL)
- No Transformers : 2\*300 MVA at RPSS,  
3\*125 MVA at MSS,  
3\*125 MVA at ISS1,  
4\*125 MVA at ISS2

### ▪ Plant SLD:



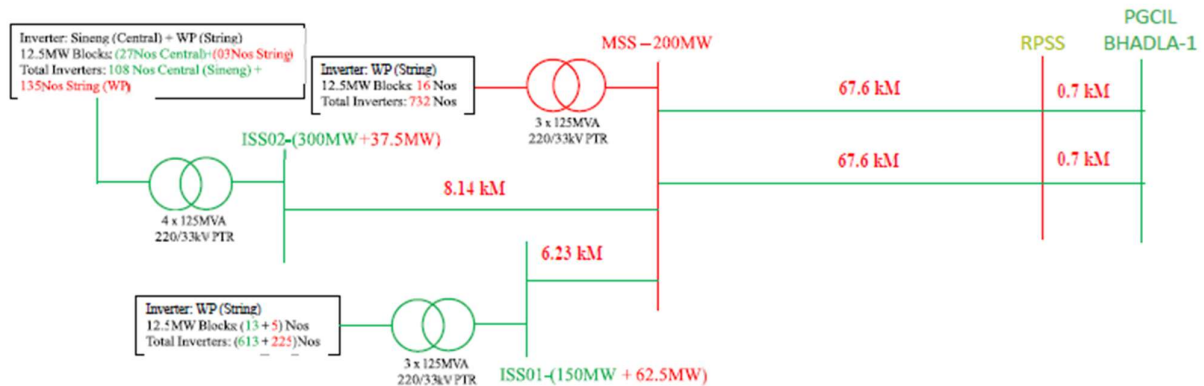
#### Relay Details for SPS Scheme at various substation

<b>R1</b>	ESUCRL RPSS to PGCIL LINE-1: RELAY M1:RED670 at ESUCRL RPSS END
<b>R2</b>	ESUCRL RPSS to PGCIL LINE-2: RELAY M1:RED670 at ESUCRL RPSS END
<b>R3</b>	ESUCRL RPSS to ESUCRL MSS LINE-1: RELAY M1: RED670 at ESUCRL RPSS END
<b>R4</b>	ESUCRL RPSS to ESUCRL MSS LINE-2: RELAY M1: RED670 at ESUCRL RPSS END
<b>R5</b>	ESUCRL MSS to ESUCRL RPSS LINE-1: RELAY M1:RED670 at ESUCRL MSS END
<b>R6</b>	ESUCRL MSS to ESUCRL RPSS LINE-2: RELAY M1:RED670 at ESUCRL MSS END
<b>R7</b>	ESUCRL MSS to ESUCRL ISS1 LINE: RELAY M1:RED670 at ESUCRL MSS END
<b>R8</b>	ESUCRL MSS to ESUCRL ISS2 LINE: RELAY M1:RED670 at ESUCRL MSS END
<b>R9</b>	ESUCRL MSS to ESUCRL ISS1 LINE: RELAY M1:RED670 at ESUCRL ISS1 END
<b>R10</b>	ESUCRL MSS to ESUCRL ISS2 LINE: RELAY M1:RED670 at ESUCRL ISS2 END

### ▪ **Need for Special Protection Scheme (SPS) at ESUCRL 750 MW Park:**

As per the transmission system connectivity, Total 750 MW Power evacuation (Aggregated Power from MSS, ISS-1 and ISS-2) is envisaged to be flow from MSS to PGCIL Bhadla substation via RPSS through Double circuit transmission line.

Following 220 kV Transmission System / Network exists at ISS-1, ISS-2, MSS, RPSS, PGCIL Bhadla-1 S/S for Power Evacuation.



- Single circuit 220 kV Line from ISS-1 to MSS
- Single circuit 220 kV Line from ISS-2 to MSS
- Double circuit 220 kV Line from MSS to RPSS **(SPS required during N-1)**
- Double circuit 220 kV Line from RPSS to PGCIL Bhadla-1 **(SPS required during N-1)**

During N-1 Line Contingency – Between MSS to RPSS or RPSS to PGCIL Bhadla-1 S/S, total power being evacuated will be shifted to single line, which may be more than its current carrying capacity as per real time power evacuation scenario.

To avoid such scenario for longer duration and prevent overloading of single transmission line, appropriate SPS need to be designed to limit the power evacuation during N-1 contingency.

220 kV Line has HTLS ACSS TEAL conductor with continuous current carrying capacity of 1127 A and Maximum current carrying capacity of 1231 A.

### ▪ **The Philosophy of SPS is based on limiting the generation to single Line current capacity between MSS to RPSS / RPSS to PGCIL**

- If one of the 220 kV lines tripped (between MSS to RPSS / RPSS to PGCIL), the remaining line may experience an overload situation based on Power evacuation at that point of time.
- With a plant max. capacity of 750 MW and current is 1968 A at 220 kV Voltage.
- One-line continuous current carrying capacity is considered 1184 Amp based on conductor GTP.
- During N-1 contingency, generation backdown of a total of 325 MW will be initiated in Staggered manner (Step by Step) by tripping of



- ✓ 33kV LV OG2 (PTR-2) and OG3 (PTR-3) feeders as Stage-1 at MSS End
- ✓ 33 KV LV OG2 (PTR-2) feeder as Stage-2 at ISS1 End
- ✓ 33 KV LV OG2 (PTR-2) feeder as stage-3 at ISS2 End.

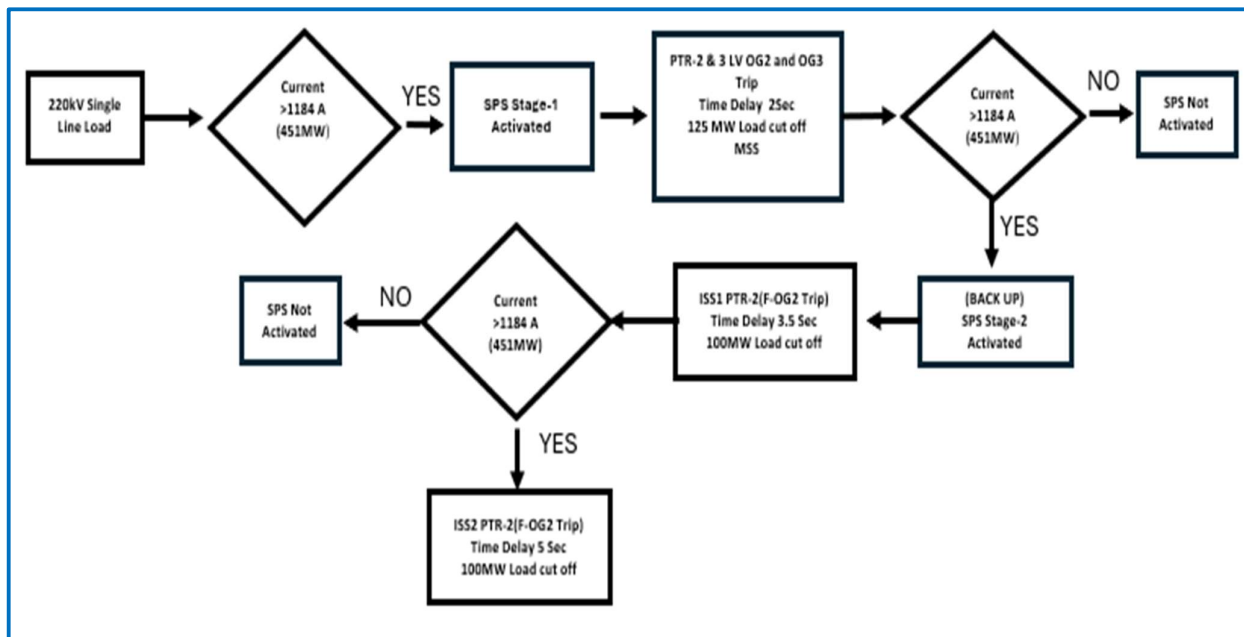
Above Condition is tabulated below:

SPS	Current	Time	Current Criteria	Action
Stage-1	1184 Amp	2 sec	In all three phases	Load Shedding of 125 MW at MSS
Stage-2	1184 Amp	3.5 sec	In all three phases	Load Shedding of 100 MW at ISS-1
Stage-3	1184 Amp	5 sec	In all three phases	Load Shedding of 100 MW at ISS-2
<b>Total: 325 MW</b>				

#### ▪ SPS configuration concept:

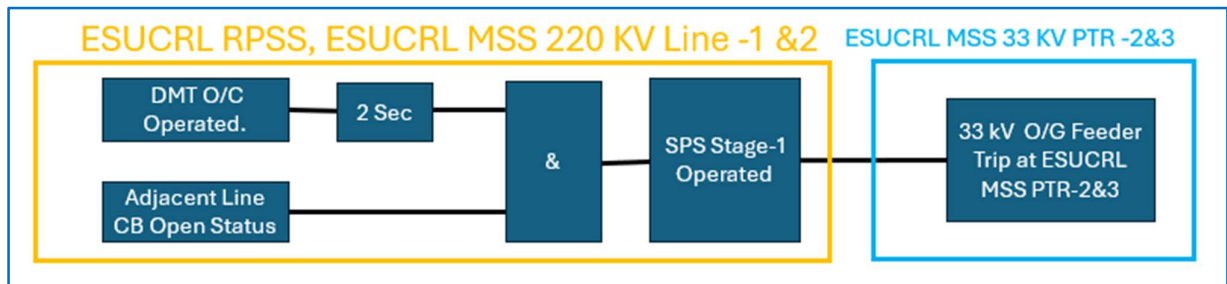
- SPS proposed to have three stages of operation to ensure required relief against line overloading conditions.
- The Over current stages with DT characteristics, available in the Numerical Line Protection Relays, are used to detect and initiate SPS action. Overcurrent function will be configured as 3 phase elements, to avoid undue initiation during line fault.
- The pickup of Overcurrent stage is considered as 1184A with time delay of 2 sec for Stage-1, 3.5 sec for Stage-2 and 5 sec for Stage-3.
- Staggered and step by step action is proposed to ensure required relief from each station i.e ISS-1, ISS-2 and MSS.
- In SPS action, SPS Stage-1 will activate and initiate tripping action of connected generation at MSS end.
- If Line Overloading still prevails, Stage-2 will be initiated for generation reduction at ISS-1.
- If Line continues to be overloaded even after Stage-2, SPS Stage-3 will be initiated for generation reduction at ISS-2.
- The functional flow chart of SPS and tripping sequence are mentioned below with different SPS stages operation.

#### ▪ SPS Flow Chart:

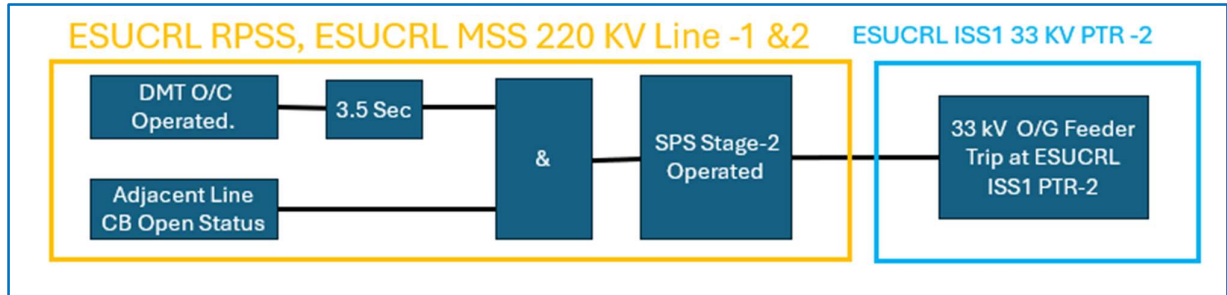


## Relay SPS Logic:

### Stage-1



### Stage-2



### Stage-3

