

Detailed Report

Date of Submission : 08-06-2026 11:37

SABARIGIRI - 220KV tripped at 02-06-2026 06:37 and restored at 02-06-2026 07:45

Summary of Event (घटना का सारांश) : The total failure at Sabarigiri Hydro Electric Project was caused by the non-opening of one limb of the circuit breaker of Generating Unit #5 during a normal shutdown. The resulting abnormal condition led to the operation of protection systems and the shutdown of all generating units, resulting in a complete station outage.

Time and Date of the event (घटना का समय और दिनांक) : 02-06-2026 06:37

Name of the Substation/Generating Station/Pooling Station affected (Along with Voltage level) : SABARIGIRI - 220KV

Event Category (श्रेणी के साथ इवेंट प्रकार) : GD - 1

Location/Control Area (स्थान/नियंत्रण क्षेत्र) : KERALA

Configuration of Bus (HV/LV) . Along with details of Bus split Operation (if any) :

Bus Configuration Type : Double Bus with Bus coupler

Bus Coupler Status : NA

Bus 1 Connected Elements	Bus 2 Connected Elements	Bus 3 Connected Elements	Bus 4 Connected Elements

Station Connectivity / SLD during antecedent : **220kV Main Bus**

- 1. UNIT 5**
- 2. UNIT 6**
- 3. 2SBPT**
- 4. 2SBPL**
- 5. 2SBEM2**
- 6. 2SBEM3**
- 7. 50MVA TRANSFORMER**

220kV Transfer Bus

- 1. Unit 1**
- 2. Unit 3**
- 3. Unit 4**
- 4. 2SBTN**
- 5. 2SBAM**

Weather Conditions : Normal

Elements under outage prior to the event :

Other Information (Antecedent Cnditions) : Busbar protection operated.

Renewable Energy Trip : False

Details of SPS Operation (if any): : False

Reason of tripping : Others

Other Reason : BUSBAR PROTECTION TRIP

Load and Generation Loss (लोड और जेनरेशन हानि) :

Total Generation Loss (MW)	Total Load Loss(MW)
168 MW	0 MW

Duration of interruption (रुकावट की अवधि) :

Details of Equipment Failure (if any during the :

event):

Equipment Type	Equipment Make
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List of elements tripped during the event :
1. 220KV-EDAMON-SABARIGIRI-1
2. 220KV-EDAMON-SABARIGIRI-2
3. 220KV-SABARIGIRI-PALLOM-1
4. 220KV-THENI-SABARIGIRI-1
5. 220KV-AMBALAMUGAL-SABARIGIRI-1

Station Connectivity/SLD during the event :
220kV Main Bus
1. UNIT 5
2. UNIT 6
3. 2SBPT
4. 2SBPL
5. 2SBEM2
6. 2SBEM3
7. 50MVA TRANSFORMER

220kV Transfer Bus
1. Unit 1
2. Unit 3
3. Unit 4
4. 2SBTN
5. 2SBAM

Analysis of the event :
At 06:37 Hrs on 02.06.2026, the 220 kV Busbar Protection operated at Sabarigiri Power Station consequent to the operation of the Local Breaker Backup (LBB) protection associated with Unit-5.

While giving a normal shutdown to Unit-5, the R-phase pole of the Generator Main Circuit Breaker failed to open due to a mechanical defect. Since the stop command had already been issued to the generating unit, the control system simultaneously issued opening commands to the Main Circuit Breaker, Field Breaker, and Governor Stop mechanism. The Field Breaker opened successfully and the Governor Stop command was executed; however, the R-phase pole of the Main Circuit Breaker remained closed.

As a result, power flowed from the grid into the machine, causing the operation of Minimum Impedance Protection and Voltage Controlled Overcurrent Protection, leading to tripping of the generating unit. Along with the trip command, opening commands were again issued to the Main Circuit Breaker and Field Breaker, and LBB initiation was given to the Busbar Protection Relay. Since the Main Circuit Breaker failed to open even after the second trip command, the LBB protection operated, resulting in Busbar Protection operation.

Unit-5 was connected to the Main Bus at the time of the incident. However, due to an isolator discrepancy associated with Unit-5, both the Main Bus and Transfer Bus were tripped by the Busbar Protection scheme.

**Protection / Operational
Issues observed**

: The Busbar Protection scheme operated correctly for the fault condition. At the time of the incident, Unit-5 was connected to the Main Bus. However, due to an isolator discrepancy associated with Generating Unit #5, the busbar protection zone boundaries were adversely affected, resulting in an unwarranted operation of the Busbar Protection scheme. Consequently, both the Main Bus and Transfer Bus were tripped and the subsequent total outage of the station.

Restoration Details

: Units #1, #3, #4, and #6 were kept under Restricted Shutdown (RSD). The transmission feeders were restored in a phased manner as detailed below:

- 220 kV Sabarigiri–Edamon #2 feeder charged at **07:45 Hrs**
- 220 kV Sabarigiri–Edamon #3 feeder charged at **07:46 Hrs**
- 220 kV Sabarigiri–Ambalamugal feeder charged at **08:15 Hrs**
- 220 kV Sabarigiri–Theni feeder charged at **08:16 Hrs**
- 220 kV Sabarigiri–Pallom feeder charged at **08:27 Hrs**

DR Time synchronization : False
issues observed (सुरक्षा/प्रचालन समस्या)

Remedial Measures Taken (सुधारात्मक सुझाव) : Following the busbar protection operation and subsequent outage, restoration activities were carried out at Sabarigiri Power Station.

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The 220 kV Sabarigiri–Pathanamthitta feeder could not be restored along with the other feeders. The feeder was charged from the Pathanamthitta end at **08:22 Hrs**; however, while attempting to tie the feeder at the Sabarigiri end, it tripped at **08:25 Hrs** on **Pole Discrepancy Protection** indication.

Subsequently, necessary corrective actions were taken and the feeder was restored after rectification of the pole discrepancy condition.

Relay/PLCC Operation Details :

Control Panel Anunciation :

Main I Relay Indications :

Main II Relay Indications :

Other Relay Indications :
PLCC Counter Increment I/T :
PLCC Counter Increment D/T :
Fault Current Value (kAmp) : None
LA Counter :
Remarks :
Attachments :