Learning is Supreme Deity

PRAGATI ENGINEERING COLLEGE

(Autonomous)

(Approved by AICTE, Permanently Affiliated to JNTUK Kakinada)

1-378, ADB Road, Surampalem, E.G. District, A.P.-533 437

Ph: (08852) 252233, 34 Fax: (08852) 252232 W: www.pragati.ac.in

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Report on Industrial Visit to 220/132/33KV Substation, Kakinada

No. of days of Visit : Two days

Date of Visit : 14th and 15th of December,2021

Faculty In-charges : 4 Members

1. Mr. K.Siva Sankar , Asst. Prof
2. Ms.P.Sandhya , Asst. Prof.
3. Mr.K.V.Durga Prasad , Asst. Prof.
4. Mr.M.Mani Shankar , Asst. Prof

No. of Students : First Batch 68 Students of III B. Tech I sem EEE-A

:Second Batch 67 Students of III B. Tech I sem EEE-B

Reporting Time : 10:00A.M, 14thDec 2021 (Batch-1)

Session closing Time : 03:30P.M, 14thDec, 2021(Batch-1)

Reporting Time : 10:00A.M, 14thDec 2021 (Batch-2)

Session closing Time : 03:30P.M, 14thDec, 2021(Batch-2)

APTRANSCO Kakinada 220/132/33 KV Sub-Station authorities gave the permission for 2019 admitted batch of III year students to visit the Sub-Station on1 4^{th,},15 Dec 2021 and accordingly we proceeded to visit the Sub-Station on 14.12.2021 forenoon from our college at 9:15 A.M along with 68 students of IiI B. Tech I sem EEE-A as first batch accompanying with two Assistant Professors of EEE Department Mr. K.Siva Sankar & Ms.P.Sandhya, reached Sub-Station by 09:45 A.M and met the Assistant Engineer.

The Assistant Engineer permitted us at 10:00 A.M and provided two Sub-Engineers for explaining the overview of working of **Sub-Station** and **Switch-yard** Equipments and their functionality. We were divided into two groups facilitated by two Sub-Engineers. They explained about all the essential components of the 220/132/33KV substation. Also, they explained about SCADA and PLC control. Finally we checked out at 12:30 P.M after through observation of the Sub-Station and we came back to college at 04:15 P.M.

In the Next session from our college at 09:00 A.M, along with 67 students from III B.Tech I sem EEE-B as Second batch accompanying with three Assistant Professors of EEE Department Mr. K.Siva Sankar ,Mr.K.V.Durga Prasad & Ms.P.Sandhya reached Sub-Station by 9:45 A.M and met the Assistant Engineer.

The Assistant Engineer permitted us at 10:00 A.M and provided two Sub-Engineers for explaining the overview of working of **Sub-Station** and **Switch-yard** Equipments and their functionality. We were divided into two groups facilitated by two Sub-Engineers. They explained about all the essentials and components of the 220/132/33KV substation. Also, they explained about SCADA and PLC control. Finally we checked out at 3:45 P.M after through observation of the Sub-Station and we came back to college at 04:15 P.M.

AN OVER VIEW OF THE SUBSTATION:

The following details were observed during the visit. The first thing which we observe in the substation is having 5 no's of 220 KV 10 no's of 132 KV feeders and 16 no's of 33 KV feeders. In the layout of sub-station the transmission lines first parallel connected with lighting arresters to diverge surges, followed by CVT connected parallel.CVT measures voltage and step down at110V A.C for control panel, at the location of wave trap is connected to carrier communication at higher frequencies. A current transformer is connected in series with line which measures current and step down current at ratio 800:1 for control panel. Switchgear equipment is provided, which is combination of circuit breaker having isolator at each end. A transformer is connected to main bus through bus coupler. At both ends of the transformer lightning arresters, current transformers and switchgear equipment. Due to the unique properties of SF6, it is used for 132KV lines protection and vacuum for 33KV. In SF6-Circuit Breakers we use SF6 gas because it is an excellent gaseous dielectric for high voltage power applications. The combined electrical, physical, chemical and thermal properties offer many advantages when used in power switchgears. Relays used in controlling panel of substation are differential relays, over current relays, earth fault relays, tripping relays and auxiliary relays.

Generally the transmission line conductors are specified by a wild animal names according to increase in size of conductor and the voltage ratings.

1.Dog (33KV) <118.5 SQ.MM> 2. Panther (132KV) <261.5SQ.MM>
3.Zebra (220KV) <484.5SQ.MM> 4.Moose (greater than 220KV)

Lightening arresters are provided in order to discharge the high voltages, lightening surges coming at the fault conditions due to lightening. It acts as main protective device for feeder. After the Lightening arresters it is followed by "Capacitance Voltage Transformer – CVT" which together with the Wave trapper acts as LC circuit. Wave trapper is used as power line carrier communication. In this substation they uses CVT's in the place of PT's because it easily passes high frequency signals. The next device followed by CVT's is "Current Transformers – CT's". CT's are used for measuring the current and used for protection purpose. In this substation the 2 pole isolators are provided for minimum ground clearance.

Transformers are provided with many types of protections like differential protection, trip coil protection, trouble alarm protection, oil protection, PRV protection, OLTC protection, winding temperature protection, on-load tap changing, over flux, under voltage, HV/LV, E/F protection etc.Relay is used to sense the signals and these signals are send to Circuit Breaker at faulty condition. Relays used in the substation of Distance relays, Buchholz relay etc. Distance Relays are provided for distance protection at feeders. Buchholz relays are present in between the transformer main tank and the conservator tank. These relays are used for transformer protection.

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The bushing is a hollow insulator, allowing a conductor to pass along its Centre and connect at both ends to other equipment. Bushings are often made of wet-process fired porcelain, and may be coated with a semi-conducting glaze to assist in equalizing the electrical stresses along the length of the bushing. The largest high voltage bushings made are usually associated with high voltage direct current converters. A bus bar may either be supported on insulators, or else insulation may completely surround it. Bus bars are protected from accidental contact either by a metal earthed enclosure or by elevation out of normal reach.

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Co-ordinator **HOD-EEE**