DEPARTMENT OF MECHNICAL ENGINEERING

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Industrial Tour Report

Organized by : **Ramachandra College of Engineering**

Name of the Station : **Dr. NARLA TATA RAO THERMAL POWER STATION**

Location : **Ibrahimpatnam.**
Krishna Dist, A.P.

Date & Time : **18-09-2019 at 9.30.00 am**

Branch	Year	Semester	No of Students Attended
ME-A&B	III	I	47 (43 Boys+3 girls)
Total No of Students Attended			47

Dr. NARLA TATA RAO THERMAL POWER STATION

Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) is located on the left bank of river Krishna with in a distance of 2 KM and is in between Ibrahimpatnam – Kondapalli Villages and 16 KMs of the North side of Vijayawada City in Krishna District. The site lies at an elevation of about 26.5 Mtrs. Above the mean–sea-level. Total Land Ac 3147.17 cts

Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) complex consists of four stages. For Stage-I, II & III each stage consists of 2 x 210 MW Units and for Stage-IV the unit is of 500 MW rating. Stage-I, II, III & IV Units are commissioned as detailed below:

Stage No.	Unit No.	Capacity	Date of Commissioning
I	1	210 MW	01-11-1979
	2	210MW	10-10-1980
II	3	210 MW	05-10-1989
	4	210MW	23-08-1990
III	5	210 MW	31-03-1994
	6	210MW	24-02-1995
IV	7	500 MW	06-04-2009

The total capacity of the station is **1760MW**.

Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) is a unique one in the country, unique in its layout and numerous facilities provided for easy operation and maintenance.

The large reservoir created by the PRAKASAM Barrage provides an efficient Direct Circulation Cooling Water System and also other requirements of the plant.

Originally the Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) is linked to Singareni Collieries Company Limited (S.C.C.L.) for supply of coal. The average distance of S.C.C.L. coal fields by train is about 250 KM.

Dr.NTTPS, Stage-II,. III & IV are linked to Talcher Coal Fields in Orissa to meet the increased demand. The average distance of Talcher Coal Fields by train in 950 KMs.

SPECIAL DESIGN FEATURES OF Dr. NARLA TATA RAO THERAML POWER STATION (Vijayawada Thermal Power Station) :

STAGE-I:

The Coal bunkers and Mills are located in between the Boiler house and ESPs unlike usual arrangement elsewhere in the country, of placing the bunkers and mills in between the Turbine House and Boiler. Thus, the Turbine House is completely isolated from the Mils to ensure dust – free atmosphere in the Turbine House and also to ensure easy accessibility of Mils of maintenance. Multiple Flue Chimney is also a new feature at this Power Station.

STAGE – II & III:

1) The Second and Third Stage Boilers, Turbines and Generators are of a completely new design

TOWER Type Boilers of Single pass design manufactured by M/s B.H.E.L. under collaboration with M/s. Stein Industries (France), KWU Turbines and Generators of West Germany design are installed in the Second and Third Stages.

2) TOWER TYPE BOILERS:

Among the advantages: Drainable heat exchangers and their edge over Two Pass Boilers when using high ash content coals, lesser erosion of the heating surfaces compared to Two Pass Boilers etc. The spacing of the tubes and velocity of gases can be suitably adjusted at the Design stage to achieve better results. Maintenance of this Boiler could be faster as there is no need for scaffolding or sky climber for maintenance of Super Heaters and Economizer.

3) DIRECT FIRED TUBE MILLS:

The Tube Mills can run for a very long time (Several thousand hours) without stopping as the forged balls are fed into the running mill while a vertical Bowl Mills is prone to frequent shut downs due to its design consisting of several moving and wear parts with in system. Moreover the mill rejects system is completely dispensed with.

4) 6.6 KV Vacuum Circuit Breakers – Free from oils and Maintenance.

5) DISTRIBUTED DIGITAL CONTROL SYSTEMS (DCS):

Several advantages are there with Distributed Digital Control System as compared to conventional Hardwired system. The performance of the plant right from its commissioning has been highly satisfactory.

STAGE –IV (1 x 500 MW):

The 7th Unit of Dr. N.T.T.P.S. with an installed capacity of 500 MW was synchronized with grid on 06-04-2009. The commercial operation of the above unit was commenced form 28-01-2010.

Details of Capital / Investments made on each Stage:

SNo	Stage	Amount spent in crores
1	I (2 X 210 MW)	193.00
2	II (2 X 210 MW)	533.33
3	III (2 X 210 MW)	840.00
4	IV (1 X 500 MW)	2100.00

ALTERNATIVE COOLING WATER SYSTEM (A.C.W.S.):

The scheme of Alternative Cooling Water System was constructed in 2003-04 to facilitate repair works at Prakasam Barrage.

It is facilitating to deplete the reservoir level at PRAKASAM Barrage to still level i.e. El+13.73 Mtrs. for about 3-4 months every year; during these months, the water requirement of Dr. N.T.T.P.S. is to be met by the Alternative Cooling Water System.

The Alternative Cooling Water System commissioned in March'2004 mainly consists of (a) River Water

Pump House at Bhavanipuram on the bank of River Krishna, to pump 1100 cusecs of water into existing cooling water canal (b) Three Nos. induced draft cooling towers in Dr. N.T.T.P.S premises to bring down the temperature of Hot Water to normal temperature so as to re-circulate the same by adding into inlet canal through energy dissipation system and (C) Hot Water Pump House near Cooling Towers in Dr. N.T.T.P.S. premises to pump 1000 cusecs of Hot Water into 3 cooling towers from Budameru Diversion Canal.

The Alternative Cooling Water System was completed at a cost of Rs.85 Crores. It was commissioned in March'2004.

Environment:

APGENCO is striving hard to maintain greener and cleaner atmosphere in and around the Power House premises. 1,25,000 Nos. trees have been planted so far and further plantation on regular basis is being done. Ash is being issued free of cost for the users like, Cement / Asbestos industries and brick manufacturers. 2Nos. Brick manufacturing units at Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) each with a capacity of 15,000 bricks per day for beneficial utilization of fly ash, have been in operation. So far utilization of Ash up to 62% is achieved. APGENCO is advocating utilization of ash for better yield in agricultural sector and soil conservation and improving its fertility. Fly ash is being issued in large scale to farmers in Eluru, Nuziveedu and Ibrahimpatnam. The station has bagged 'Green tech' environment award for its best environment practices in the plant for the year 2013.

Performance:

The high level performance of Dr. N.T.T.P.S. has been a benchmark for the Power Sector in India; Winning & Awards at National level has been a routine for this unique power station. The station has received Meritorious Productivity Awards from the Government of India for the last 21 years consecutively and also Gold Medals for 12 years in a row. It has also got incentives for its Economic operation by improved Specific Oil Consumption / Auxiliary Consumption for 12 consecutive years.

His Excellency Dr. A.P.J. ABDUL KALAM, Hon'ble PRESIDENT OF INDIA presented a GOLD SHIELD to Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) on 24-08-2004 at New Delhi in recognition of its outstanding performance for the period from 2000-01 to 2003-04.

In the year 2004-05, Capital overhaul works of Unit-I were carried out.

For the year 2005-06 V.T.P.S. was awarded Bronze Shield under Comprehensive Performance Award Scheme of GOI by the Hon'ble Prime Minister Sri Manmohan Singh on 21-03-2007. Bronze shield could be bagged inspite of backing down of generation on the units to the tube of 692 MU to comply with the load dispatch instructions.

For year 2006-07 & 2008-09 also Dr. N.T.T.P.S. has bagged Bronze shield in recognition of outstanding performance from the Ministry of Power, Govt. of India.

DR. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) has accredited for ISO 9001:2008 Certification by M/s Lloyds Register Quality Assurance n May, 2010.

Dr. Narla Tata Rao Thermal Power Station (Vijayawada Thermal Power Station) continues to maintain its prominence among the best performing power stations in the Country.

Distinciton of Unit – V:

Unit-5 has recorded all time high financial year generation of 1818.35 MU with a PLF of 98.84% in 2009-10. This is the highest PLF ever achieved by any single unit of APGENCO in any financial year.

Unit III has established a grand record of 441 days of uninterrupted running from 14-12-2004 to 28-02-2006 and proved its reliability as one of the best units in the country.

Unit-I has also proved its unmatched reliability even after 27 years of service, by running continuously for 238 days from 09-12-2005 to 05-08-2006.

Report

1. Report in brief by Organizer / Coordinator / Convener:

We have spent there for almost 8 hours to know about the complete Power generationand its process and we returned from there by 6 PM.

The tour is very useful for the students since they have Thermal engineering and power plant engineering subjects.

All the students are very happy after watching the real equipment which they are listening in the class room.

2. Photos

3. Feedback from students:

- Your overall experience: Excellent
- The comprehensiveness, clarity and accuracy of the information provided in Power plant by sub engineers and assistant professor: Excellent
- In Power plant Trainers knowledge, cooperation and level of assistance: Excellent
- The transportation vehicle: Good
- Trip safety: Good
- This trip in terms of value for money: Good
- Guide's enthusiasm: Excellent
- Guide's knowledge: Excellent
- Guide's Communication: Excellent

4. Remarks from Resource Person:

- The students are showing very anxious to know about the equipment and their operation.
- All are very much disciplined in their behaviour.
- We feel Very happy in receiving and giving information about our plant.
- The Staff members who accompanied them also very co-operative to us.
- Advised to apply for internship in plant