

CHAPTER - III

VTPS : A PROFILE

VIJAYAWADA THERMAL POWER STATION

3.1 GENERAL

Vijayawada Thermal Power Station is located on the left side of river Krishna within a distance of 2 K.M. and is situated between Ibrahimpatnam and Kondapalli villages in Krishna District and is 16 K.M. to the Northern side of Vijayawada City in Andhra Pradesh.

The site lies at an elevation of about 26.5 Mtrs. above the mean-sea level. Coal comes from Singareni Coal Mines about 310 Kilometers away.

The Civil works were commenced in February 1976 and actual plant erection was taken up from October 1976. The Plant erection was completed in a record period of thirty six months and the first unit was commissioned in November, 1979 while the second Unit was commissioned in October, 1980.

The Boilers were manufactured by M/s B.H.E.L., Trichy to the design of M/s. Compustion Engineering Incorporation, U.S.A. and the Turbo Alternator with its auxiliaries were manufactured and supplied by M/s. B.H.E.L., Hardwar.

The instruments and controls were supplied, erected and commissioned by M/s. Instrumentation Ltd., Kota. These instruments and the auto control equipment are of George Kent-U.K. make. Other equipment like the panels, servo drives, power cylinders, control valves and other instruments etc., are of M/s. Instrumentation Ltd., make.

Vijayawada Thermal Power Station is a unique one in the country; unique in its lay out and numerous facilities provided for easy operation and maintenance.

The Coal bunkers and mills are in between the Boiler and Precipitators unlike usual arrangements else where in the country of placing the bunkers and mills in between the turbine houses and the Boiler. Thus the Turbine house is completely isolated from the Boiler House to ensure dust free atmosphere in the turbine house and also to ensure easy accessibility for maintenance of mills.

Provision has been made for stocking uncrushed coal, by-passing the crushers. This will enable to over come the difficulties being experienced in reclaiming crushed coal from the yard during rainy season.

Multiple Flue chimney is also a new feature at this Power Station although similar chimneys are now coming up in Power Stations elsewhere.

The absence of smoke from the Chimney has made many visitors including foreign visitors from U.K. and Germany to assume that the Units were not in operation even though both the Units were in service at their full rated capacity.

There are many other features which are too numerous to detail here but which are unique for a power station in this country.

The performance of the plant right from its commissioning has been highly satisfactory and this proves that quality of work has not been ignored in expediting erection of the plant in a record time.

The capital investment for the 1st stage was Rs.193 crores and the power generated till the end of September 1988 was 24,316 Million Units.

The second stage consisting of 2x210 M.W. Units at an estimated project cost of Rs.400 crores has been cleared by the Planning Commission and foundation

stone was laid by Smt.Indira Gandhi, the then Prime Minister of India on 30th October,1982. Works are still in progress and following is the expenditure incurred during 1982-83 Rs.11.85 Lakhs, 1983-84 Rs.1485.20 Lakhs, 1984-85 Rs.2960.17 Lakhs, 1985-86 Rs.3763 Lakhs, 1986-87 Rs. 5400 Lakhs, 1987-88 (upto Dec.87) Rs. 4,343.32 Lakhs, Total so far incurred (upto Dec.87) Rs.17,963.54 Lakhs.

3.2 SPECIAL DESIGN FEATURES OF VIJAYAWADA THERMAL POWER STATION:

1. Tower Boilers: Among the advantages: Drainable heat exchange surfaces 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 flue 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 skyclimber for maintenance of super heaters and Economisers.

2.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 mill is prone to frequent shutdown due to

its design consisting of several moving and wear parts within the system. Besides the mill rejects system is completely dispensed with.

3. 6.6 KV Vacuum circuit Breakers.

4. Distributor Digital Control Systems (DDC):

Advantages of D D C systems as compared to conventional hard-wired systems are:

- i) Combination of all automation functions (Measurements, open and closed loop controls, supervision etc.) in one system resulting in reduced hardware, fewer hard-wired connections and uniform documentation.
- ii) High availability achieved by functional distribution and redundancy at the process interface level.
- iii) Reliable communication with digital signals.
- iv) Serial data transmission over a data highway, thereby reducing cabling.

- v) Flexibility to easily accommodate later engineering changes.
- vi) Better optimisation possible by experimenting with different control structures and algorithms.
- vii) Process observation and operation by CRT's and keyboards. Pictorial presentation of comprehensive and relevant information to operators.

3.3 MAJOR EVENTS OF V.T.P.S.

Table No: 3.1

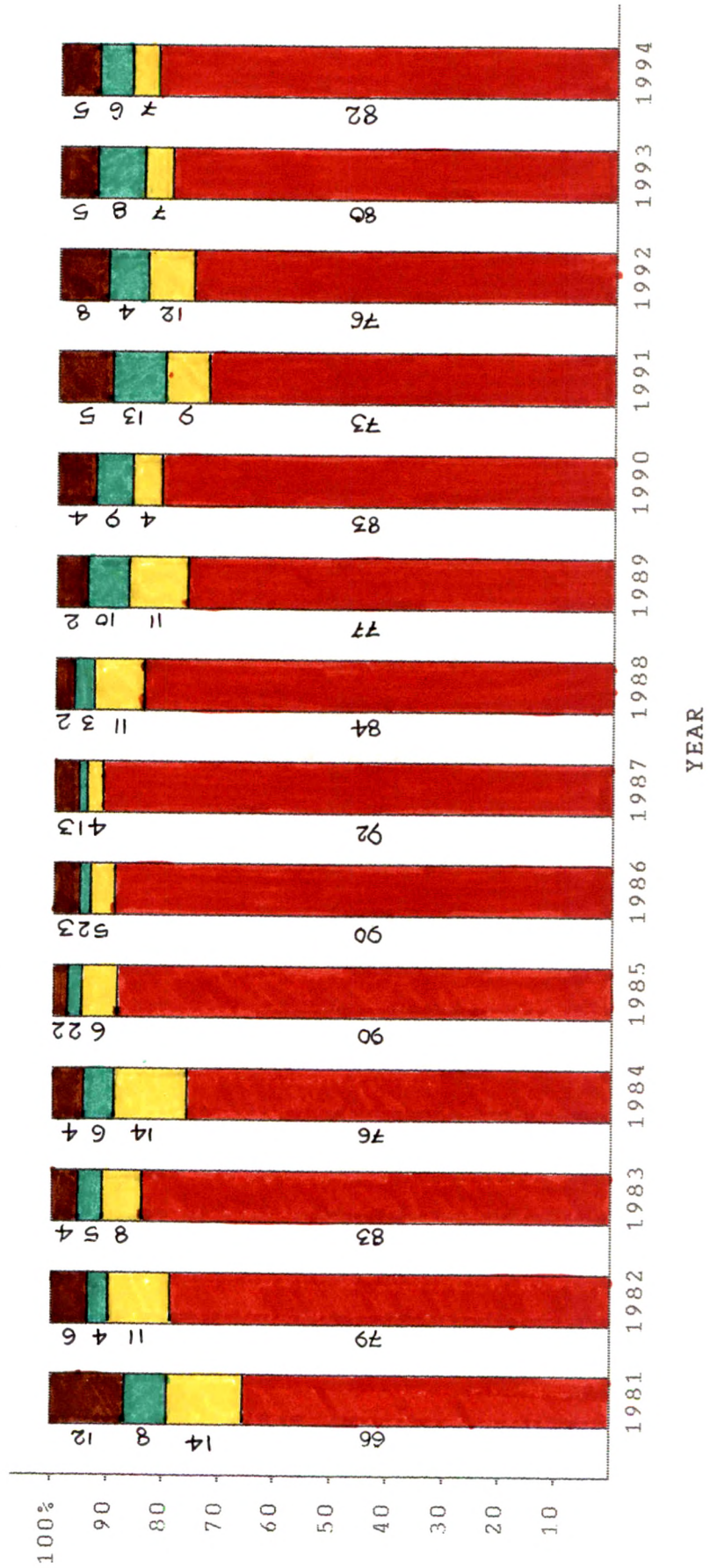
MAJOR EVENTS OF V.T.P.S.STAGE I-2 X 210 M.W

S.No	ITEM	UNIT-I	UNIT-II	S.No.	ITEM	UNIT-I	UNIT-II
1.	Approval of the Project by Planning Commission	---	Sep.1973	g)	Steam blowing	4-08-79 to 25-09-79	1-06-80 to 30-07-80
				h)	Safety Valve floating	29-09-79	14-07-80
2.	a) Land Acquisition	---	Aug.1975				
	b) Commencement of Civil Works	---	Feb.1976	4.	TURBO-GENERATOR:		
				a)	T.G.Foundations	3/78	3/78
				b)	Condenser assembly & erection.	10/77	4/78
3.	BOILER			c)	Boxing up of Turbine	12/78	1/80
	a) Boiler foundation	Sept.76	Oct.76	d)	Barring gear	28-03-79	8-03-80
	b) Boiler structural erection	Sept.76	Oct.76	e)	Oil flushing	26-03-79	3/80
	c) Drum lifting	2-04-77	23-09-77	f)	Turbine rolling	26-10-79	17-09-80
	d) Hydraulic test	13-12-78	27-09-79	g)	Generator dry out.	29-10-79	6-10-80
	e) Boiler flashing	12-04-79	15-05-80	5.	SYNCHRONISATION	1-11-79	10-10-80
	f) Alkali Boil out.	15-04-79 to 18-04-79	17-05-80 to 22-05-80	6.	UNIT ON COAL FIRING	2-01-80	12-10-80
				7.	COMMERCIAL OPERATION	2-01-80	30-11-80

GRAPH No: 3.1

V.T.P.S. - PERFORMANCE ANALYSIS

■ UNDER UTILISATION
■ FORCED OUTAGE
■ PLANNED OUTAGE
■ ACHIEVED GENERATION



3.4 PERFORMANCE ANALYSIS:

The performance of the Plant right from its commissioning has been highly satisfactory and this proves that quality work has not been ignored in expediting and completing erection of the Plant in a record time.

The Capital investment for the 1st stage was Rs.193 crores and the Power generated till the end of January 1988 was 22,308 million units.

1981 - 82 :

Unit - II and I at V.T.P.S. have been ranked FIRST and SECOND respectively in India followed by Ukai Unit-IV in Gujarat State ranking THIRD and Koradi Unit-V in Maharashtra State ranking FOURTH taking in to consideration the performance of all 200/210 MW units in the country.

1982-83:

The Power Generated by Unit - I was 1618 MUs with a Plant Load Factor of 88% which was an all time record for a Unit of this capacity.

1983 - 84 :

Unit - II and I at V.T.P.S. were ranked first and second respectively at all India level followed by Singrauli Unit-I, U.P. ranking 3rd among the Units of 200/210 MW in the country.

Unit - II at V.T.P.S. set up a world record by generating 157.44 M.Us with a Plant Load Factor of 100.7% during a continuous thirty-one days period of operation from 24-11-82 to 24-12-82.

1984 - 85 :

The generation on Unit No. II was 1631 M.Us with a Plant Load Factor of 88.64% surpassing the record performance of Unit No. I at Vijayawada Thermal Power Station in 1982-83.

The Unit has been ranked First at all India level followed by N.T.P.C. Singrauli Unit -IV ranking Second among Units of 200/210 MW in the Country.

Unit - I at V.T.P.S. generated 1217 M.Us during this year, the total generation during the year being 2848 MUs.

1985 - 86 :

The Generation on Unit-I was 1663 M.U.s with a Plant Load Factor of 90.38% surpassing the record Generation of Unit-II during 1984-85 and Generation on Unit-II was 1607 MUs with a Plant Load Factor of 87.35%.

Units-I & II of Vijayawada Thermal Power Station are ranked Second and Third at all India level during the year 1985-86 first being Korba Unit-III among the Units of 200/210 M.W capacity in the country.

1986-87

The Generation on Unit-I was 1684.79 M.U.s. with a Plant Load Factor of 91.59% surpassing its own earlier record of 90.38% during 1985-86 and Unit-II generated 1640.85 with a Plant Load Factor of 89.2% which is incidentally the highest so far for Unit-II.

This Station also achieved all time high generation of 3325.64 M.U.s. with a Plant Load Factor of 90.39%.

1 9 8 6 :

During the calendar year 1986, January-86 to December-1986, the Generation on Unit-I was 1680.99 M.U.s.,

with a Plant Load Factor of 91.38%, and that of Unit-II was 1633.64 M.U.s., with a Plant Load Factor of 88.80% and aggregating to a record 3314.63 M.U.s., for the Station, and a Plant Load Factor of 90.09% which works out to 7892 KWhr/ Kw installed.

This high generation during the year 1986 has qualified Vijayawada Thermal Power Station for a Cash Award of Rs.12.80 Lakhs for the 4th Consecutive year in succession instituted by the Ministry of Energy, Department of Power, Government of India.

Another notable achievement during the year was the completion of 50,000 Service Hours by Unit-I of Vijayawada Thermal Power Station which was acknowledged by all as the First Unit of that range in the Country as on 9-12-1986 with an Utilisation Factor of 45,376.19 KWhr/Kw installed i.e., a Utilisation Factor of 90.75%.

1 9 8 7 :

1. During the calender year 1987, the Generation on Unit-I was 1682.77 M.U. with a Plant Load Factor of 91.47% and that of Unit-II was 1711.05 M.U.s. with a Plant Load Factor of 93.01% and aggregating to a record of

3393.82 M.U.s. for the Station and a Plant Load Factor of 92.24% which works out to 8080 Kwhr/Kw installed which is an all time record and the year 1987 can be reckoned as the brightest year since commissioning of Vijayawada Thermal Power Station as there is alround increase in efficiency of the plant due to awareness of its employees.

2. During the year 1987 V.T.P.S. has qualified for a cash award of Rs.13.20 Lakhs for the 5th consecutive year in succession, instituted by Ministry of energy. Department of Power, Government of India.

3. During the year, Unit-I has Generated 10,000 M.U.s. by 16-3-1987 yet another land mark (in a span of 7 years since synchronisation of the unit).

4. During the year, Unit II achieved the land mark i.e., 50,000 service hours by 28-6-87 with an utilisation factor of 46391.05 KWhr/KW installed i.e., utilisation factor of 93.78% and generated 10,000 M.U.s. by 13-8-1987.

1 9 8 8 :

During the calender year 1988, January-1988 to December-1988, the Generation on Unit-I was 1432.84

M.Us, with a Plant Load Factor of 77.89% and that of Unit-II was 1670.19 M.Us, with a Plant Load Factor of 90.78% and aggregating to a 3103.03 M.Us., for the station, and a Plant Load Factor of 84.33%.

This high generation during the year 1988 has qualified V.T.P.S for a cash award of Rs.11.80 Lakhs for the 6th consecutive year in succession instituted by Ministry of Energy, Department of Power, Government of India.

1 9 8 9 :

During the calender year 1989, the Generation on Unit-I was 1698.73 M.U's with a Plant Load Factor of 91.16 and that of Unit-II was 1505.16 M.Us., with a Plant Load Factor of 74.48 and aggregating to a record of 3203.89 M.Us for the Station and a Plant Load Factor of 82.8%.

During the year 1989 V.T.P.S. has qualified for a cash award of Rs.11.60 lakhs for the 7th consecutive year in succession instituted by Ministry of Energy, Department of Power, Government of India.

1 9 9 0 :

During the calender year 1990, the Generation on Unit-I was 1513.13 M.U's with a Plant Load Factor of 82.25, Unit-II was 1530.39 with a Plant Load Factor of 83.19 and that of Unit-III was 1584.00 M.Us., with a Plant Load Factor of 86.11 and Unit-IV was 71.03 M.Us., and aggregating to a record of 4698.55 M.Us., for the Station and a Plant Load Factor of 83.85%.

This high generation during the year 1990 has qualified for a cash award of Rs.16.63 lakhs for the 8th consecutive year in succession instituted by Ministry of Energy, Department of Power, Government of India.

1 9 9 1 :

During the calender year 1991, January-1991 to December 1991, the Generation on Unit-I was 1443.51 M.Us., with a Plant Load Factor of 78.25, Unit-II was 1321.89 with a Plant Load Factor of 71.66, Unit-III was 1174.86 M.Us., with a Plant Load Factor of 63.39 and that of Unit IV was 1374.25 M.Us., with a Plant Load Factor of 74.50 and aggregating to a record of 5314.51 M.Us., for the Station and a Plant Load Factor of 72.26%.

During the year 1991 V.T.P.S. has qualified for a cash award of Rs.12.39 lakhs for the 9th consecutive year in succession instituted by Government of India.

1 9 9 2 :

During the year 1992, the Generation on Unit-I was 1275.80 M.U.s., with a Plant Load Factor of 69.34, Unit-II was 1386.21 M.U.s., with a Plant Load Factor of 75.35, Unit-III was 1444.93 M.U.s., with a Plant Load Factor of 78.55 and that of Unit-IV was 1551.93 M.U.s., with a Plant Load Factor of 84.36 and aggregating to a 5558.65 M.U.s., for the Station, and a Plant Load Factor of 76.90%.

During the year 1992, V.T.P.S. has qualified for a cash award of Rs.10 lakhs towards its efficient and economic operation by way of reducing the Secondary Oil consumption.

1 9 9 3 :

During the year 1993, the Generation on Unit-I was 1420.58 M.U's with a Plant Load Factor of 71.26, Unit-II was 1499.55 with a Plant Load Factor of 84.37,

Unit-III was 1587.90 M.U.s., with a Plant Load Factor 82.42 and that of Unit-IV was 1401.36 M.U.s., with a Plant Load Factor of 68.98 and aggregating to a 5909.39 M.U.s., and a Plant Load Factor of 76.75%.

During the year 1993 V.T.P.S. has qualified for a cash award of Rs.10.20 lakhs for achieving the record generation and also qualified for the reward of an amount of Rs.4.80 lakhs towards its efficient and economic operation by way of reducing the furnace oil consumption.

1 9 9 4 :

During the calender year 1994, the Power Generated by Vijayawada Thermal Power Station was 6468.85 M.U.s., with a Plant Load Factor of 82.69 percentage.

HIGHLIGHTS

(a) Station Maximum Generation in a Calendar Year-1987 Max.Plant Load Factor (Year 1987)	..... 3393.82 M.U. 92.24%
(b) Station Maximum Generation in a Financial Year (1987-88) Max.Plant Load Factor (1987-88)	..... 3411.69 M.U. 92.48%
(c) Station Maximum Generation (July - 1985)	..... 307.87 M.U.
(d) Maximum Generation Unit-I (December - 1986)	..... 153.35 M.U.
(e) Maximum Generation Unit-II (May - 1987)	..... 155.15 M.U.
(f) Maximum Generation Station (Daywise) (15-12-82)	..... 10.21 M.U.
(g) Maximum Generation Unit-I (Daywise) (16-11-85)	..... 5.17 M.U.
(h) Maximum Generation Unit-II (Daywise) (22-12-82)	..... 5.21 M.U.
(i) Units Generated/Kv. installed during the Calendar Year-1987(Max.)	..... 8080 Kwh/Kv
(j) Units Generated/Kv. installed during the financial year 1987-88 (Max.)	..... 8123.07 Kwh/Kv
(k) Maximum continuous running hours of Unit-I. 9-5-82 (14-03 Hrs.) to 2-10-82 (13-46 Hrs.)	..... 3509 Hrs. (147 Days)
(l) Maximum continuous running hours of Unit-II. 18-2-87 (13.44 Hrs.) to 26-7-87 (01-52 Hrs.)	..... 3780 Hrs. (157 Days)

VIJAYAWADA THERMAL POWER STATION

A W A R D S

1 9 8 2

"GOOD HOUSE KEEPING" by Loss Prevention Association of India Limited, Bombay, Director of Factories and Boilers, Government of Andhra Pradesh and National Safety Council, A.P. Charter, Andhra Pradesh.

1 9 8 3

i) Cash award of Rs.10.50 Lakhs by the Ministry of Energy, Department of Power, Government of India, New Delhi for better Performance of Thermal Power Stations.

a n d

ii) National Productivity Council Productivity Award for 'BEST PRODUCTIVITY PERFORMANCE IN THERMAL POWER GENERATION SECTOR'. (Below 500 MW Capacity).

1 9 8 3 - 8 4

Productivity award by Ministry of Energy, Department of Power, Government of India, New Delhi.

1 9 8 4

i) Cash award of Rs.11.50 Lakhs by the Ministry of Energy, Department of Power, Government of India, New Delhi, for the second consecutive year for better performance of Thermal Power Stations.

ii) Best Productivity Performance in Thermal Power Generation Sector (Below 500 M.W. capacity) of National Productivity Council.

1 9 8 4 - 8 5

"PRODUCTIVITY AWARD" by Ministry of Irrigation and Power, Department of Power, Government of India, New Delhi.

1 9 8 5

Cash award of Rs.16.00 Lakhs by the Ministry of Energy, Department of Power, Government of India, New Delhi for the third consecutive year for better performance of Thermal Power Stations.

1 9 8 6

Cash award of Rs.12.80 Lakhs by Ministry of Energy, Department of Power, Government of India, New

Delhi for the 4th consecutive year for better performance of Thermal Power Stations.

1 9 8 7

Cash award of Rs.13.20 Lakhs by Ministry of Energy, Department of Power, Government of India, New Delhi for the 5th consecutive year for better performance of Thermal Power Stations.

1 9 8 8

Cash award of Rs.11.80 Lakhs by Ministry of Energy, Department of Power, Government of India, New Delhi for the 6th consecutive year for better performance of Thermal Power Stations.

1 9 8 9

Cash award of Rs.11.60 Lakhs by Ministry of Energy, Department of Power, Government of India, New Delhi for the 7th Consecutive year for better performance of Thermal Power Stations.

1 9 9 0

Cash award of Rs.16.63 Lakhs by Ministry of Energy, Department of Power, Government of India,

New Delhi for the 8th consecutive year for better performance of Thermal Power Stations.

1 9 9 1

Cash award of Rs.12.39 Lakhs by Ministry of Energy, Department of Power, Government of India, New Delhi for the 9th consecutive year for better performance of Thermal Power Generation.

1 9 9 2

Reward for an amount of Rs.10.00 Lakhs towards its efficient and economic operation by way of reducing the Secondary Oil consumption.

1 9 9 2 - 9 3

Cash award of Rs.15.00 Lakhs for achieving the Performance level to 6736.488 Kwh/Kw installed under the productivity Reward Scheme (New) hoisted by Department of Power, Government of India.

1993-94

This year VTPS has qualified for the meritorious Productivity Reward Scheme (New) hoisted by

Department of Power, Government of India for an amount of Rs.10.20 lakhs for achieving the performance level of 7,500 Kwh/Kw installed. Also VTPS has bagged in addition to the above for achieving the above performance level under the same field.

1993

This year VTPS has qualified for the reward of an amount of Rs.4.80 lakhs towards its efficient and economic operation by way of reducing the furnace oil consumption.
