Tariff order

for

Tenughat Vidyut Nigam Limited

for FY 2005-06

Jharkhand State Electricity Regulatory Commission (JSERC)

CHAPTER 4

SUMMARY OF TARIFF PROPOSAL SUBMITTED BY TVNL

4.1 Tariff Proposal submitted by TVNL

The petition filed by the TVNL for approval of its electricity generation tariff for FY 2005-06 has been summarized in this section.

4.2 Total Generation and Station Plant Load Factor (PLF)

The table below gives the total generation and the Plant Load Factor of the station from FY 2000-01 to FY 2004-05.

Table 3: Total generation and Station PLF – 2000/01 – 2004/05

Year	Total Generation (MU)	Station Plant Load Factor (%)
2000-01	1330	36.11
2001-02	1156	31.39
2002-03	1368	37.18
2003-04	1347	36.62
2004-05	1326	36.04

The petitioner has projected a total generation of 1938 MU in FY 2005-06 and PLF of 52.7%. The petitioner has stated that due to some reasons both the units have not been working throughout the year and even when both the units work there are transmission constraints to transmit the entire power generated.

In addition JSEB is not in a position to consume the power generated when both the units work and the station is asked to back down and the frequent tripping of transmission lines results in tripping the units sometimes. Apart from this there are unit outages due to tube leakages etc. Due to these reasons the station PLF is low. However, efforts are being made to remove the

constraints and improve the performance of the station. Efforts are also being made to sell the surplus power to others instead of backing down the units whenever JSEB does not require the power when both the units are working.

The petitioner has stated that Unit II of the plant is out of service for capital overhaul and is expected to be back in service by September 2005 will full generation starting from October 2005. This Unit was expected back in service by September 2005 with full generation, from October 2005. TVNL in its petition submitted the following projections for generation from the two units.

Table 4: Actual and Projected monthly generation, FY 2005-06

Month/Year	Unit-I	Unit -II	Total generation
April 2005	106 (A)	-	106
May 2005	102 (A)	-	102
June 2005	111(A)	-	111
July 2005	92(A)	-	92
August 2005	105	-	105
Sept 2005	112	105	217
Oct 2005	-	105	105 Unit-I Maintenance
Nov 2005	110	110	220
Dec 2005	110	110	220
Jan 2006	110	110	220
Feb 2006	110	110	220
March 2006	110	110	220
Total	**1178**	**760**	**1938**
PLF (%)	62.7	42.7	52.7
Availability (%)	85	55	72.5

The Unit II went out of service for capital overhaul from December 2003 but was taken up by BHEL for capital maintenance only in February 2004. Further, since it was not possible to carry out the rectification work at the site, therefore, the damaged parts were sent to Haridwar in May 2004. Unit II was finally synchronized on mid-November 2005. Initially, Unit-1 was proposed to be taken out for maintenance after Unit II became operational. However, during discussions with TVNL staff, it was clarified that this plan was modified since soft maintenance of the Unit I was undertaken from November 14, 2005 to December 9, 2005 and therefore it will remain in operation atleast till March 2006.

The table below gives the monthly projections for generation as submitted by the TVNL during the discussions with the JSERC.

Table 5: Monthly Projected Generation Unit-wise the period April 05 to March 06 (MU)

Month/ Year	Generation Unit – 1	Generation Unit - 2	Total Generation
	MU	**MU**	**MU**
April 2005	106(A)	-	106
May 2005	102 (A)	-	102
June 2005	111 (A)	-	111
July 2005	92(A)	-	92
August 2005	109.41 (A)	-	109.41
September 2005	94.80 (A)		94.80
October 2005	112.80 (A)		112.80
November 2005	45.18 (A)	43.62 (A)	89.80
December 2005	110 (P)	110 (P)	220

January 2006	110 (P)	110 (P)	220
February 2006	110 (P)	110 (P)	220
March 2006	110 (P)	110 (P)	220
Total (MU)	**1213.19**	**483.62**	**1696.81**

A: Actual; P: Projected

4.3 ENERGY CHARGES

For computing energy charges, the fuel cost viz. coal and oil consumption and cost details are taken into consideration.

4.4 Auxiliary Consumption

The auxiliary consumption for the period from FY 2000-01 to FY 2005-06 is given in the table below:

Table 6: Auxiliary Consumption, FY 2000/01 – 2004/05

Year	Generation	Auxiliary Consumption	Auxiliary Consumption
	MU	**MU**	**%**
2000-01	1330.74	213.18	16.02
2001-02	1156.07	185.08	16.01
2002-03	1368.76	216.54	15.82
2003-04	1347.20	215.55	16.00
2004-05	1325.98	233.33	17.60

The petitioner has stated that the auxiliary consumption of the station has been high due to measuring auxiliary consumption by defective meters. The petitioner further stated that on getting meters tested and calibrated it was found the auxiliary consumption was 12%. The petitioner has also stated that the high auxiliary consumption includes colony consumption, other loads in the vicinity of the power station, transmission losses of 220/6.6 kV Transformers and the fact that only one generating unit is working at present.

The petitioner further submitted that it was taking the following measures to reduce the auxiliary consumption.

- Feeding station loads from the unit transformers (2x16 MVA) instead of station transformers (4x40 MVA).
- Metering the colony consumption and other loads fed from the station.
- Second generating unit coming to operation.

TVNL has submitted that digital energy meter have been installed in colony sub station and therefore colony power consumption will be communicated from January 2006 onwards. With the above measures it is estimated that the auxiliary consumption would reduce from 12%, however, for FY 2005-06 it should be taken as 12%.

4.5 Fuel Consumption

4.5.1 Coal consumption

It has been submitted by TVNL that coal for the thermal stations is procured from the collieries of Central Coal Fields Limited and is transported by road over a distance of about 34 to 49 km. Initially TVNL had proposed that coal would be

transported by rail, through the MGR (Merry-Go-Round) system. The completion of MGR system has however been delayed and efforts are being made to complete this as early as possible, and therefore, till then coal has to be transported by road.

4.5.1.1 Loss of coal due to weigh bridge tolerance, foreign materials, transit loss etc.

TVNL has requested the JSERC to allow loss level of 1% of total coal transported towards transit & other losses. It has submitted the following points with regard to loss of coal:

- Coal is transported on a bumpy road in fully loaded trucks which results in loss of coal due to spilling from the trucks.
- Loss of coal on account due to wind, evaporation of moisture, during rainy season the coal powder gets washed out.
- Loss due to weigh bridge tolerance and foreign materials like stone, shells, etc., since loading is done through Mechanical devices and segregation of foreign materials not possible

Since the coal is weighed at loading end and at receiving end, the difference accounts for loss in transit, which is approximately 1%.

4.5.1.2 Coal Consumed for Power Generation

TVNL has proposed consumption of coal at 0.687 kg/kwh. It has submitted that the TTPS is operating under various constraints, as given below:

i) Momentary outages due to tripping of transmission lines.

ii) Outages due to other reasons.

iii) Backing down of the units under instructions of JESB due to lack of load.

An internal Committee of TTPS that gave its report in August 2004 recommended specific consumption of 0.687 kg/kwh. The Committee after detailed study and deliberation with station engineers also identified some of the reasons for high coal consumption. These are:

a) High silica content in boiler water, Unit-I is run with one/two stream of CBD, fully open since last one year causing heavy heat loss.

b) Due to non-availability of new tube bunches, appreciable number of ejector and LP heater tubes have been plugged causing deterioration of plant efficiency.

TVNL has thus proposed a station heat rate of 2960 kcal/kWh and specific consumption of coal as 0.687 kg/kWh based on caloric value of coal at 4300 kcal/kg.

The average coal rate has been proposed as Rs.1383.66/MT for FY 2005-06, based on a 10% escalation on the rate of Rs 1257.87/MT for FY 2004-05. The actual coal consumption is proposed to be 1316174.79 MT and after accounting for transit loss it is projected to be 1329469.48 MT. The total cost of coal (Grade D) including transportation cost to the TTPS has been proposed as Rs 183.95 Crore for FY 2005-06. This translates into a per unit cost of Rs 1.079/Kwh for TTPS. The table below gives the proposal of the TVNL with respect to coal consumption and cost for generation in FY 2005-06.

Table 7: Coal Consumption details, FY 2005-06

4.5.2 Oil consumption

The specific consumption of secondary fuel (oil) during the last five years is given below:

Table 8: Specific Oil Consumption, FY 2000/01 – 2004/05

Year	Specific Consumption- ml / kWh
2000-01	11.55
2001-02	14.32
2002-03	5.95
2003-04	8.77
2004-05	2.327

TVNL has estimated the specific consumption of oil to be 4.0 ml/kWh for FY 2005-06 taking into consideration of extra consumption involved during commissioning of Unit II after capital overhauling. It has submitted that the norm of 2.0 ml/kWh fixed by the Commission during FY 2004-05 may be difficult to achieve for TVNL due to the large number of outages due to transmission line trippings etc. The delivered cost of oil at the thermal station by the oil companies was Rs 20555/KL in FY 2004-05. TVNL has proposed a 10% increase in this and has estimated the cost of oil at Rs.22610.5/KL for the FY 2005-06. The details submitted by TVNL for oil consumption and cost are given in the table below.

Table 9: Oil consumption details, FY 2005-06

Specific oil consumption	4 ml/kWh
Calorific value of oil	10000 kCal/litre
Actual oil consumption	7752.80 KL
Cost of oil per KL	Rs 22610.50/KL
Total cost of oil	Rs 17.52 Crore
Oil cost per unit	Rs 0.103/kWh

4.6 Total Energy Charge

The total energy charge that has been proposed by TVNL for FY 2005-06 is Rs. 1.18 per unit. This includes a per unit coal cost of Rs. 1.079/ kWh and a specific oil consumption cost of Rs. 0.103/ kWh.

4.7 Capital cost of the project - Funding

The Project cost as indicated by TVNL is Rs.1355.58 Crores, with financing of the project being done as follows:

Table 10: Financing of Project

Funding Source	Amount (Rs Crore)
Bihar Government – Equity Contribution	100.00
Loan from Bihar Government	608.9
Investment by BSEB	168.39
Loan from PFC	158.00
Interest during Construction	320.29
Total	1355.58

According to the TVNL, the loan taken from PFC amounting to Rs.158 Crores has been repaid completely along with interest in March 2003. The petitioner has stated in the petition that it plans an extension of another three units (Stage II) of 210 MW each which will require further investment of about Rs. 2300 Crores.

4.8 Fixed Charge

For computing fixed charge, the different cost components that have been considered are (a) Interest rate on loan, (b) Return on equity, (c) Depreciation, (d) Operation and Maintenance (O&M) Expenses and (e) Interest on working capital.

4.9 Return on equity (RoE)

At present the Equity contribution in the TTPS (Stage I) is Rs. 100 Crores and the debt component of the project is Rs. 1255.58 Crores. Hence, the proportion of equity in the total project cost is 0.07. The petitioner has submitted a proposal to the State Government to raise the present equity of Rs 100 Crores to Rs 1100 Crores by converting the outstanding loan of Rs 608.90 Crores and part of the accumulated interest of Rs 949.52 Crores into equity (amounting to Rs 391 Crore approximately). It has also requested the State Government to waiver the balance interest payable on the State Government loan of Rs 608.90 Crores.

The petitioner further states that since the capital cost of the Project (Stage 1) is Rs 1355.58 Crores and in view of the 30% limitation on Equity portion, it proposes to claim Return on Equity on 30% of the Capital Cost – i.e. on Rs 406.7 Crore. The loan portion would be then be Rs 302.3 Crore (Rs 608.9 Crore- Rs 306.7 Crore converted into equity) taken from Bihar Government in the initial construction phase itself and Rs 52 Crore taken from the Jharkhand Government subsequently, i.e, Rs 30 Crore in FY 2003-04 and Rs 22 Crore in FY 2005-06.

TVNL has proposed return on equity of Rs 56.93 Crore estimated at the rate of 14% for the year 2005-06 on equity amount of Rs 406.70 Crore.

4.10 Interest on Loan capital

TVNL has submitted that the loan amount outstanding as on March 31, 2005 is Rs.638.90 crores. The loan drawal and repayment/ conversion into Equity are detailed in the following table:

Table 11: Loan Outstanding and Interest Charges (Rs Crores)

Sl.No	Name of the Institution	Balance at the beginning of the year	Loan received during the year	Repayment During the year	Balance O/S at the end of the year	Rate of Interest %	Interest for the year
	2003-04						
1	Bihar Govt.	608.90	-	-	608.90	13	79.16

	Loan						
	Jharkhand Govt. Loan	30.00	-	-	30.00	13.25	3.98
	Total 2003-04	638.90	-	-	638.90		83.14
	2004-05						
1	Bihar Govt. Loan	608.90	-	-	608.90	13	79.16
2	Jharkhand Govt. Loan	30.00	-	-	30.00	13.25	3.98
	Total 2004-05	638.90	-	-	638.90		83.14
	2005-06						
1	Bihar Govt. Loan	608.90	-	306.70*	302.20	13	39.29
2	Jharkhand Govt. Loan	30.00	22.00	-	52.00	13.25	6.89
	Total 2005-06	638.90	22.00				46.18

* Proposed for conversion into Equity by Jharkand Government.

As per the terms and conditions the state government loan is repayable in 15 equal installments. But the TVNL could not meet the repayment obligation for want of funds in as much as the Jharkhand State Electricity Board who are purchasing power are not regularly paying the electricity charges and there is large outstanding. It is proposed to obtain a loan of Rs.22 Crore from Government of Jharkhand to meet the capital expenditure during 2005-06 and the interest on this loan is calculated at 13.25%. The petitioner has requested the state government to reduce the interest rate on the earlier loans in view of the interest rates coming down. The petitioner has stated the outstanding loan at the beginning of the year as Rs 638.90 Crore. It plans to take a loan of Rs 22 Crore as mentioned above, taking the total amount to Rs 660.90 Crore. It has proposed a total interest liability of Rs 46.18 Crore for FY 2005-06.

4.11 Depreciation

Depreciation figures that have been submitted by TVNL have been calculated on fixed assets, based on the historical capital cost of the asset. Depreciation has been computed annually as per straight-line method at depreciation rates prescribed in the JSERC regulations. Depreciation has not been calculated on the assets where the cumulative depreciation has reached 90% of the historical cost of such assets. The actual depreciation figures as proposed by TVNL are given in the table below:

Table 12: Depreciation

(In Rs. Crores)

Sl. No	Asset Classification	Asset value at the beginning of 2005-06	Rate of depreciation (%)	Depreciation Amount
1	Land	38.65		
2	Factory Buildings	42.10	3.6	1.51
3	Res. Buildings	22.46	1.8	0.40
4	Non Residential Buildings	16.62	1.8	0.29
5	Pucca Roads	16.29	1.8	0.29
6	Others	1.18	1.8	0.02

7	Plant & Machinery	1042.31	3.6	37.52
8	D.G. Set	2.16	6.0	0.13
9	Refrigeration	0.02	6.0	0.0015
10	Internal wiring	0.0011	6.0	-
11	Over head line	42.95	3.6	1.54
12	Hydraulic works	79.24	1.8	1.43
13	Tools and Tackles	0.082	3.6	0.003
14	Miscellaneous Equipment	0.31	6.0	0.018
15	Dozers	2.82	18.0	0.51
16	Furniture and fixtures *	0.227	6.0	-
17	Office equipment *	0.076	6.0	-
18	Vehicles *	0.165	18.0	-
Total		1307.68	3.34	43.69

* Fully depreciated

TVNL has proposed a depreciation amount of Rs.43.69 crore for the FY 2005-06.

4.12 Operation and Maintenance Expenses

The operation and maintenance expenses in respect of TTPS cover mainly employee cost, repairs and maintenance, consumption of stores and spares, water charges, Ash disposal, pollution control cess and other administration and general expenses and the expenses of TVNL corporate office at Ranchi. The O&M expenses for FY 2002-03 to FY 2005-06 are given in the Table below

Table 13: O&M Expenditure for FY 2002-03 to FY 2005-06

	2002-03 (A)	2003-04 (A)	2004-05 (A)	2005-06 (Proposed)
	Rs Crore	Rs Crore	Rs Crore	Rs Crore
O&M Expenses	85.56	92.38	59.01	59.33

The major components of O&M have been explained as follows:

4.12.1 Employee Cost

The employee cost for FY 2004-05 was Rs.0.16 Crore. TVNL has proposed employee cost of Rs 0.17 Crore for FY 2005-06 with 8% increase towards sanction of normal annual increments, rise in dearness allowance, etc.

4.12.2 Repairs and Maintenance

TVNL has proposed Rs 2 crore for FY 2005-06 towards R&M expenditure.

4.12.3 Stores Consumed

The petitioner has proposed an expenditure of Rs 11.27 Crore for procuring materials for the repairs and maintenance which is budgeted to be consumed during FY 2005-06.

4.12.4 Water Charges

The petitioner has proposed an expenditure of Rs 2 Crore for FY 2005-06 which includes part of arrears on account of water charges. Irrigation Department of Jharkhand State is charging water consumption at Rs.4.50 per thousand gallons and the water consumption is about 5000 M^3 per day. The petitioner has stated that water consumption charges work out to Rs 0.18 Crore per annum but there are a lot of arrear claims by the Irrigation Department of Jharkhand. The bills could not be cleared regularly in view of continuous losses being incurred by the corporation and outstanding from the JSEB. It is now proposed to clear the amount in installments other wise there is possibility of Irrigation Department stopping water supply.

4.12.5 Pollution Control Cess

The petitioner has stated it has to pay a pollution control cess of Rs 2.88 crore for FY 2005-06. It states that the Jharkhand State Pollution Control Board has been raising a bill for Rs 46 to 48 lakhs bi-monthly. The cost components are:

1. Industrial cooling spraying in mine pit or boiler feed@10 paise per KL (water consumption 225 Lakh KL/PM)
2. Domestic purpose @3 paise per KL (water consumption is about 1.15 lakh KL)
3. Processing whereby water gets polluted and the pollutants are not easily biodegradable and are toxic@30 PS/KL (water consumption is about @0.4 lakh/KL)

4.12.6 Ash Disposal

TVNL has proposed an expenditure of Rs 3.50 Crore in FY 2005-06.Huge quantities of ash are piled up at the project site and it incurred Rs.0.54 Crore towards disposal of ash during FY 2004-05.

4.12.7 Capital Maintenance

TVNL has made a provision of Rs.32.67 Crore in the budget for FY 2005-06towards capital maintenance. It is treating these charges as deferred revenue expenses and has proposed to charge them to the Revenue Account in 5 annual installments. The TVNL has incurred Rs. 21.42 Crore towards capital maintenance during the last 3 years i.e. FY 2002-03 to FY 2004-05 including towards spares, labour charges etc on account of frequent tube leakage in the boiler of unit 1 and problems in the rotor of turbine of Unit no. II. The year wise details of capital maintenance expenses and the amounts proposed to be charged to revenue account are given in the table below.

Table 14: Capital Maintenance Expenditure

Year wise capital Maintenance	Amount	Proposed to be charged to Revenue in 5 annual installments			
		2002-03 (Rs Crore)	2003-04 (Rs Crore)	2004-05 (Rs Crore)	2005-06 (Rs Crore)
2002-03	8.86	1.77	1.77	1.77	1.77
2003-04	0.45	-	0.09	0.09	0.09
2004-05	12.09	-	-	2.42	2.42
2005-06	32.67	-	-	-	6.53
Total		1.77	1.86	4.28	10.82

The amount proposed to be charged during 2005-06 is Rs 10.82 Crore.

4.12.8 Administrative and General Charges

TVNL has proposed an increase of 8% in the other Administration and general charges for FY 2005-06 over the expenses for FY 2004-05.

TVNL has proposed an O&M expense of Rs. 59.33 Crore for the FY 2005-06.

4.13 Interest on Working Capital

The petitioner has proposed its total working capital requirement at Rs 111.32 Crore. At an interest rate of 12.5%, the interest on working capital works out to Rs.13.91 Crore for 2005-06.

The table below gives the absolute value of interest on working capital over the last five years.

Table 15: Interest on Working Capital (Rs Crore)

Sl. No	Particulars	2005-06 Estimate
1	Cost of Coal for 1.5 months	22.99
2	Secondary fuel oil 1 month	1.46
3	O&M expenses 1 month	4.94
4	Maintenance spares @ of 1% of the plant and equipment	11.71
5	Receivables equivalent to 2 months fixed and variable charges	70.21
6	Total Working Capital	111.32
7	Interest on working capital @ 12.5%	13.91

4.14 Total Fixed Charge

The total fixed charges proposed by TVNL for FY 2005-06 is summarized in the table below:

Table 16: Summary of fixed charges proposed for FY 2005-06

S.N	Particulars (in Rs. Crores)	2005-06
1.	Depreciation	43.69
2.	Interest on Loan	46.25
3.	Return of Equity	56.94
4.	Advance against Depreciation	
5.	Interest on Working Capital	13.91
6.	O & M Expenses	59.33
7.	Total	220.12
8.	Less: Non Tariff Income	0.61
9.	Fixed Charges to be recovered	219.51

The per unit fixed cost of generation proposed by TVNL for FY 2005-06 is Rs. 1.29/ kWh.