

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Coram

1. **Shri Ashok Basu, Chairman**
2. **Shri G.S. Rajamani, Member**
3. **Shri K.N.Sinha, Member**

Petition No. 20/1999

In the matter of

Approval of tariff in respect of Vindhyachal Super Thermal Power Station for the period from 1.7.2000 to 31.3.2001.

Petition No 77/2002

In the matter of

Approval of tariff in respect of Vindhyachal Super Thermal Power Station for the period from 1.4.2001 to 31.3.2004.

And in the matter of

National Thermal Power Corporation Ltd.

.... **Petitioner**

Vs

1. Madhya Pradesh State Electricity Board, Jabalpur
2. Maharashtra State Electricity Board, Mumbai
3. Gujarat Electricity Board, Vadodra
4. Chhattisgarh State Electricity Board, Raipur
5. Electricity Department, Govt of Goa, Panaji
6. Electricity Department, Administration of Daman & Diu, Daman
7. Electricity Deptt., Administration of Dadra and Nagar Haveli, Silvassa ..**Respondents**

The following were present:

1. Shri K.K. Garg, GM (Commercial), NTPC
2. Shri M.S. Chawla, AGM (Commercial), NTPC
3. Shri T.R. Sohal, NTPC
4. Shri D. Khandelwal, SE (Commercial), MPSEB
5. Shri D. K. Shrivastava, EE (Commercial), MPSEB

ORDER
(DATE OF HEARING 19-12-2002)

These petitions have been filed by the petitioner, NTPC, a generating company owned by the Central Government for approval of tariff in respect of Vindhyachal Super Thermal Power Station Stage-II (2 X 500 MW), (hereinafter referred to as “Vindhyachal STPS II”) for the period from 1.7.2000 to 31.3.2004.

2. The techno-economic clearance for Vindhyachal STPS II was accorded by CEA in terms of its letter dated 9.5.1989 at a cost of Rs. 1261.25 crore. Subsequently, the Central Government in Ministry of Power, vide its letter dated 16.2.1995 accorded investment approval for Rs. 2753.38 crore, including IDC of Rs. 589.40 crore and WCM of Rs. 56.29 crore, based on 3rd Quarter of 1994 prices. CEA revised its sanction to Rs. 2837.00 crore, vide its letter dated 16.4.1999 considering the prices of 4th Quarter of 1996. Ministry of Power vide its letter dated 30.10.2001 issued the revised cost estimates for the generating station based on 2nd Quarter 2001 prices, for Rs. 2702.00 crore, including IDC of Rs. 254.57 crore, Working Capital Margin of Rs. 57.70 crore and FERV of Rs. 108.95 crore.

3. Vindhyachal STPS II comprises of two units with capacity of 500 MW each, the date of commercial operation of these units being 1.7.2000 and 1.10.2000. Petition No 20/1999 has been filed for approval of tariff from 1.7.2000 to 31.3.2001 based on Ministry of Power notification dated 30.3.1992 and in Petition No 77/2002 approval of tariff for the period 01.04.2001 to 31.03.2004 is sought based on the Commission’s notification dated

26.3.2001. The periods for which approval of tariff for different units has been sought are thus as under:

Unit	Basis	Period
Unit I	Ministry of Power Notification dated 30.3.1992	1.7.2000 to 30.9.2000
Units I and II	Ministry of Power Notification dated 30.3.1992	1.10.2000 to 31.3.2001
Units I and II	Commission's Notification dated 26.3.2001	1.4.2001 to 31.3.2004

4. The details of the fixed charges claimed by the petitioner are given hereunder:

(Rs. in lakh)

Ser No.	Particulars	As per the Petition				
		1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	2001-02	2002-03	2003-04
1	Interest on Loan	6694	12125	14334	14070	12632
2	Interest on Working Capital	1795	3415	3322	3489	3647
3	Depreciation	9532	17685	9599	9599	9599
4	Advance Against Depreciation	0	0	5826	5826	5826
5	Return on Equity	6711	12202	12693	12693	12693
6	O & M Expenses	4539	8292	7007	7428	7874
7	Water Charges	0	0	1896	1896	1896
	TOTAL	29272	53720	54677	55001	54167

5. The details of Working Capital furnished by the petitioner and its claim for interest thereon are summarised hereunder:

(Rs. in lakh)

Ser No.	Particulars	As per the Petition				
		1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	2001-02	2002-03	2003-04
	Interest on Working Capital					
	Fuel Cost	1628	3264	3899	4178	4479
	Coal Stock	745	1493	1810	1927	2051
	Oil stock	276	555	557	648	753
	O & M expenses	378	691	584	619	656
	Spares	1816	3317	2803	2971	3149
	Receivables- 2 months	8834	16754	18085	18697	19161
	Total Working Capital	13676	26074	27737	29039	30250
	Working capital Margin(WCM)	2815	5630	5770	5770	5770
	Total Working Capital allowed	10861	20444	21967	23269	24480
	Weighted Average Interest Rate	14.02%	14.02%	12.35%	12.35%	12.35%
	Interest on Working Capital	1493	2811	2712	2873	3022
	Interest on WCM	167	334	332	339	348
	Return on WCM	135	270	277	277	277
	Total Interest on working capital	1795	3415	3322	3489	3647

6. In addition, the petitioner has claimed Energy Charges @ 62.83 paise/kWh in petition No 20/1999 and @ 70.07 paise/kWh for the period from 1.4.2001 to 31.3.2004 in petition No 77/2002.

DATE OF COMMERCIAL OPERATION

7. In so far as the dates of commercial operation of respective units are concerned, we find that the techno-economic clearance of the Central Electricity Authority dated 26.5.1989 is silent on the subject. The Commission, therefore, has relied on investment approval of Government of India dated 16.2.1995. The scheduled commercial operation dates (CODs) as per this investment approval of Government of India dated 16.2.1995 and actual CODs of Unit-I and Unit-II of stage-II are as follows :

	<u>Scheduled COD</u>	<u>Actual COD</u>
Unit-I	8/2000	1.7.2000
Unit-II	8/2001	1.10.2000

From the above, it can be seen that both the units of Stage-II have been commissioned ahead of schedule. The Commission, therefore, accepts these actual dates of commercial operation for the purpose of tariff.

CAPITAL COST

8. As per Ministry of Power notification dated 30.3.92 and the Commission's notification dated 26.3.2001, the actual capital expenditure incurred on completion of the generating station shall be the criterion for fixation of tariff. It is further provided that where actual expenditure exceeds the approved project cost, the excess expenditure as approved by CEA or an appropriate independent agency shall be deemed to be actual capital expenditure for the purpose of determining the tariff. Ministry of Power notification further provides that in case of a multi unit project, the percentage of capital cost as specified by CEA in its techno-economic clearance shall be considered for fixation of

tariff, on commercial operation of the progressive units but in case of delay in commissioning of second or subsequent units from the scheduled date, the project cost, for the period of delay, shall be retrospectively approved for the tariff purpose in the ratio of proportionate allocation of units. The provisions contained in the Commission's notification dated 26.3.2001 in regard to multi unit generating station are that in respect of such stations, for the purpose of tariff the capital cost of the project shall be broken up into stages and by distinct units forming part of the project. The common facilities shall be apportioned on the basis of the installed capacity of the units where break up of the project cost is not available and in case of on-going projects.

9. The petitioner was not following the practice of drawing the account and getting them audited on the dates of commercial operation of each of the units. Accordingly these are not available on the respective dates of commercial operation of the units. The petitioner has, however, submitted the following details of capital cost, though these are not certified by the statutory auditors:

Ser No.	Description	Amount (Rs. in lakh)
1.	Gross Capital expenditure as on 31.3.2001	239211.00
2.	Capital works in progress	701.00
3.	Construction spares and advances	1916.00
4.	Capital commitments (Committed liabilities)	1734.00
	SUB - TOTAL	243562.00
5.	Additional capitalisation from 1.10.2000 to 31.3.2001 (within the scope of approved project)	1004.00
6.	TOTAL	244566.00

10. The petitioner in its written submission dated 28.8.2002 stated that the capital cost as on the date of commercial operation of Unit-I (1.7.2000) can be derived by considering 55 % of the capital cost as on the date of commercial operation of the station, as according to the petitioner, at the time of commissioning of the first unit all common auxiliary systems are completed and their cost gets capitalised along with capitalisation of Unit-I. Accordingly, 55 % of the capital cost as on the date of commercial operation of the station, that is, 1.10.2000 has been allocated to Unit-I and the balance 45 % of project cost has been considered as the cost of Unit-II, since the Ministry of Power notification dated 30.3.1992 envisages allocation of capital cost in proportion to capacity, only if there is delay in the inter-unit commissioning. Accordingly, the capital cost of units-I and Units-I & II to be considered for tariff works out as detailed below:

(Rs in lakh)	
The capital cost of Unit-I as on the date of commercial operation, that is, 1.7.2000	131014.00
The capital cost of Unit-I & II as on the date of commercial operation, that is, 1.10.2000	238207.00
Additional Capital Expenditure during the period 1.10.2000 to 31.3.2001	1004.00
Capital cost as on 1.4.2001, that is, the start of new tariff period	239211.00

11. The expenditure being considered is less than the revised cost estimates approved by the Central Government in Ministry of Power vide its letter dated

30.10.2001. We, therefore, allow tariff based on the capital expenditure on the respective date as arrived at above

12. The amount of spares capitalized should be taken as Rs.1984 lakh as indicated by the petitioner, based on books of accounts for 2000-2001.

DEBT-EQUITY RATIO

13. As per Ministry of Power Notification dated 30.3.92 and the Commission's notification dated 26.03.2001, the interest on loan capital and return on equity are to be computed, as per the financial package approved by CEA or an appropriate independent agency, as the case may be. The petitioner has claimed tariff by considering debt and equity in the ratio of 70:30. It has been submitted by the respondents that debt and equity should be in the ratio of 80:20 as applicable to IPPs.

14. The approved financial package for the generating station is not available on record. Based on the actual allocated gross block of the project as on 31.3.2001 and loans drawn up to 31.3.2001, the debt-equity ratio works out to be approximately 67:33. However, debt and equity in the ratio of 70:30 is stated to have been considered by the petitioner in the revised cost estimates. The petitioner has adopted the same ratio in its tariff calculations. Therefore, debt-equity ratio of 70:30 has been considered for calculation of the fixed charges.

TARGET AVAILABILITY /PLF

15. The petitioner has considered PLF of 68.49% for the generating station for the period 1.7.2000 to 31.3.2001 on the basis of Ministry of Power notification dated 30.3.1992. This has been allowed. For the period 1.4.2001 to 31.3.2004 the petitioner has considered Target Availability of 80% which is in line with Commission's notification dated 26.3.2001, for recovery of full fixed charges and computation of fuel element in the working capital for the period from 1.4.2001 onwards.

RETURN ON EQUITY

16. As per Ministry of Power notification dated 30.3.92 and the Commission's notification dated 26.03.2001, return on equity shall be computed on the paid up and subscribed capital and shall be 16% of such capital. The petitioner has claimed return on equity @ 16%. The respondents have, however, submitted that that return on equity should be payable at 12%. In case of generating stations, return on equity was charged in tariff @ 12% per annum till 31.10.1998. However, it was increased to 16% with effect from 1.11.1998. The respondent has contended that there was no justification to increase return on equity from 12% to 16%. As the things stand, the terms and conditions prescribed by the Central Government as also the Commission legislate that return on equity should be allowed @ 16%. Accordingly, we do not find any justification in support of the issue raised. In our computation of tariff, return on equity @ 16% per annum has been allowed. The charges payable by the respondents on account of return on equity as under:

(Rs in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
Opening Balance	39304	71462	71763	71763	71763
Increase/Decrease due to FERV	0	0	0	0	0
Increase/Decrease due to additional capitalisation	0	301	0	0	0
Closing Balance	39304	71763	71763	71763	71763
Average Equity	39304	71613	71763	71763	71763
Rate of Return on Equity	16.00%	16.00%	16.00%	16.00%	16.00%
Return on Equity	6289	11458	11482	11482	11482

INTEREST ON LOAN

17. As per Ministry of Power Notification dated 30.3.92 and the Commission's notification dated 26.03.2001, the interest on loan capital shall be computed on the outstanding loans, duly taking into account the schedule of repayment, as per the financial package approved by CEA or an appropriate independent agency, as the case may be. The normative loan amount has been worked out by considering debt-equity in the ratio of 70:30 as already decided. In accordance with earlier decisions of the Commission, the annual repayment amount for calculation of interest on loan as worked out by the following formula, or as claimed in the petition, whichever is higher, has been considered:

Annual actual repayment during the year x normative loan at the beginning of the year / Actual loan at the beginning of the year.

18. The other salient features in regard to calculation of interest on loan are stated herein after:

- (a) Loan amount has been worked out from the normative debt-equity ratio.
- (b) The loan draws up to 31.3.2001 only have been considered.
- (c) Some of the loans carry floating rate of interest. Therefore, interest rate prevailing as on 1.4.2001 has been considered for interest computation for the period 1.4.2001 onwards. However, interest on loan would be subject to adjustment on the basis of actual rate of interest applicable for the period 1.4.2001 onwards. In case the parties are unable to agree to adjustment of rate of interest, any one of them is at liberty to approach the Commission for appropriate decision.
- (d) The commitment fee @ 0.75 % per annum as indicated by the petitioner in Form-8 of the petition has not been allowed in case of IBRD loans as commitment fee is generally applicable on un-disbursed portion of loans and would have been capitalised.
- (e) The Government Guarantee fees @ 1% per annum as indicated in Form-8 of the petition in case of IBRD loan has been allowed.
- (f) On the basis of actual rate of interest on actual average loan, the weighted rate of interest on loan has been worked out and the same has been applied on the normative average loan during the year to arrive at the interest on loan. The necessary calculations in support of weighted average rate of interest are appended below:

(Rs. in lakh)

	2000-01	2000-01	2001-	2002-	2003-
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	02	03	04
Days in the Year	365	365	365	365	366
Period (days)	92	182	365	365	366
1HDFC-II					
Gross Loan -Opening	8000	8000	8000	8000	8000
Cumulative Repayment up to previous year	0	0	0	0	0
Net Loan-Opening	8000	8000	8000	8000	8000
Addition	0	0	0	0	0
Repayment	0	0	0	0	1143
Net Loan-Closing	8000	8000	8000	8000	6857
Average loan	8000	8000	8000	8000	7429
Rate of Interest	11.82%	12.05%	12.05%	12.05%	12.05%
Interest	945	964	964	964	895
2SBT					
Gross Loan -Opening		0	1000	1000	1000
Cumulative Repayment up to previous year		0	0	0	0
Net Loan-Opening		0	1000	1000	1000
Addition		1000	0	0	0
Repayment		0	0	0	0
Net Loan-Closing		1000	1000	1000	1000
Average loan		500	1000	1000	1000
Rate of Interest		12.55%	12.55%	12.55%	12.55%
Interest		63	125	125	125
3SBH					
Gross Loan -Opening		0	1000	1000	1000
Cumulative Repayment up to previous year		0	0	0	0
Net Loan-Opening		0	1000	1000	1000
Addition		1000	0	0	0
Repayment		0	0	0	0
Net Loan-Closing		1000	1000	1000	1000
Average loan		500	1000	1000	1000
Rate of Interest		12.55%	12.55%	12.55%	12.55%
Interest		63	125	125	125
4SBI-I					
Gross Loan -Opening	12100	12100	21100	21100	21100

Cumulative Repayment up to previous year	0	0	0	0	0
Net Loan-Opening	12100	12100	21100	21100	21100
Addition	0	9000	0	0	0
Repayment	0	0	0	0	3014
Net Loan-Closing	12100	21100	21100	21100	18086
Average loan	12100	16600	21100	21100	19593
Rate of Interest	11.82%	12.05%	12.05%	12.05%	12.05%
Interest	1430	2000	2542	2542	2360
5 SBI NY-I (in INR)					
Gross Loan -Opening	19406	19993	20224	20224	20224
Cumulative Repayment up to previous year	0	0	0	0	0
Net Loan-Opening	19406	19993	20224	20224	20224
Addition	0	0	0	0	0
Repayment	0	0	0	0	20224
Net Loan-Closing	19993	20224	20224	20224	0
Average loan	19700	20109	20224	20224	10112
Rate of Interest	7.58%	7.58%	7.58%	7.58%	7.58%
Interest	1492	1523	1532	1532	766
ERV	587	231	0	0	0
6A IBRD-O (USD-EQ)-INR					
Gross Loan -Opening	88235	90697	85512	85512	85512
Cumulative Repayment up to previous year	6805	6805	8728	13044	17686
Net Loan-Opening	81430	83892	76784	72468	67826
Addition	0	0	0	0	0
Repayment-15th June	0	0	2118	2279	2451
Repayment-15th Dec		1923	2198	2363	2542
Net Loan-Closing	83892	76784	72468	67826	62833
Average loan	82661	80338	74626	70147	65329
Rate of Interest	6.21%	6.15%	6.11%	6.11%	6.11%
Interest	5133	4942	4560	4286	3992
ERV	2462	-5185	0	0	0
6B IBRD-A (USD)-INR					
Gross Loan -Opening	12287	12659	12804	12804	12804
Cumulative Repayment up to previous year	0	0	0	0	2134
Net Loan-Opening	12287	12659	12804	12804	10670
Addition	0	0	0	0	0
Repayment-15th June	0	0	0	1067	1067
Repayment-15th Dec				1067	1067
Net Loan-Closing	12659	12804	12804	10670	8536

	Average loan	12473	12731	12804	11737	9603
	Rate of Interest	6.64%	6.64%	6.64%	6.64%	6.64%
	Interest	828	845	850	779	638
	ERV	371	145	0	0	0
6C	IBRD-B (Tr. A) (EURO)-INR					
	Gross Loan -Opening	10927	10419	10518	10518	10518
	Cumulative Repayment up to previous year	0	0	0	0	1753
	Net Loan-Opening	10927	10419	10518	10518	8765
	Addition	0	0	0	0	0
	Repayment-15th June	0	0	0	877	877
	Repayment-15th Dec				877	877
	Net Loan-Closing	10419	10518	10518	8765	7012
	Average loan	10673	10468	10518	9641	7888
	Rate of Interest	5.18%	5.18%	5.18%	5.18%	5.18%
	Interest	553	542	545	499	409
	ERV	-508	99	0	0	0
6D	IBRD-B (Tr. B) (EURO)					
	Gross Loan -Opening	580	553	558	558	558
	Cumulative Repayment up to previous year	0	0	0	0	47
	Net Loan-Opening	580	553	558	558	511
	Addition	0	0	0	0	0
	Repayment-15th June	0	0	0	0	47
	Repayment-15th Dec			0	47	47
	Net Loan-Closing	553	558	558	511	418
	Average loan	566	555	558	535	465
	Rate of Interest	5.59%	5.59%	5.59%	5.59%	5.59%
	Interest	32	31	31	30	26
	ERV	-27	5	0	0	0
6	IBRD-Total INR					
	Gross Loan -Opening	112029	114327	109392	109392	109392
	Cumulative Repayment up to previous year	6805	6805	8728	13044	21620
	Net Loan-Opening	105225	107522	100664	96348	87772
	Addition	0	0	0	0	0
	Repayment-15th June	0	0	2118	4223	4441
	Repayment-15th Dec	0	1923	2198	4353	4532
	Total repayment	0	1923	4316	8575	8974
	Net Loan-Closing	107522	100664	96348	87772	78799
	Average loan	106373	104093	98506	92060	83286

Rate of Interest	6.15%	6.11%	6.08%	6.08%	6.08%
Interest	6546	6360	5986	5595	5064
ERV	2298	-4935	0	0	0
TOTAL LOAN					
Gross Loan -Opening	151535	154420	160716	160716	160716
Cumulative Repayment up to previous year	6805	6805	8728	13044	21620
Net Loan-Opening	144731	147615	151988	147672	139097
Addition	0	11000	0	0	0
Repayment	0	1923	4316	8575	33355
Net Loan-Closing	147615	151988	147672	139097	105742
Average loan	146173	149802	149830	143384	122419
Rate of Interest	7.12%	7.33%	7.53%	7.59%	7.63%
Interest	10414	10973	11275	10884	9336
ERV	2885	- 4704	0	0	0

19. The computations in support of interest on notional loan are appended hereinbelow:

COMPUTATION OF INTEREST ON NOTIONAL LOAN

(Rs. in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
Gross Loan –Opening	91710	166745	167447	167447	167447
Cumulative Repayment up to the Previous Year	6805	7348	9425	13912	22828
Net Loan-Opening	84905	159397	158023	153535	144619
Increase/ Decrease due to FERV	0	0	0	0	0
Increase/Decrease due to additional capitalisation	0	703	0	0	0
Total	84905	160099	158023	153535	144619
Repayments of loan during the year	0	2077	4487	8916	34679
Net Loan-Closing	84905	158023	153535	144619	109940
Average Net Loan	84905	158710	155779	149077	127280
Rate of Interest	7.12%	7.33%	7.53%	7.59%	7.63%
Interest	6049	11626	11723	11316	9707

DEPRECIATION

20. As per Ministry of Power notification dated 30.3.1992, depreciation for computation of annual fixed charges is to be considered in accordance with the rates notified by the Central Government from time to time under Section 43A (2) of the Electricity (Supply) Act, 1948. These rates were notified by the Central Government vide notification dated 29.3.1994. The Commission's notification dated 26.3.2001, prescribes that the value base for the purpose of depreciation shall be historical cost of the asset and the depreciation shall be calculated annually as per straight line method at the rates of depreciation prescribed in the Schedule thereto.

21. Depreciation for the tariff period has been calculated by taking the individual assets and their depreciation rates as per Ministry of Power's notification dated 30.3.92 read with notification dated 29.3.1994 and the Commission's notification dated 26.03.2001. For the period 1.4.2001 onwards. Since both the units have been put on commercial operation in the year 2000-01, no depreciation has been provided for the year 2000-01, because the depreciation for the period prior to 1.4.2001 is worked out on the opening gross block during the year. For the period 1.4.2001 onwards, since the Commission's notification dated 26.3.2001 stipulates that the depreciation shall be chargeable from the first year of operation on pro-rata basis, the depreciation has been worked out on the average of opening and closing block during the year. The necessary calculations in support of depreciation are appended below:

(Rs. in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
Rate of Depreciation			3.63%	3.63%	3.63%
Depreciation recovered in tariff	0	0	8688	8688	8688
Advance Against Depreciation (AAD) recovered in tariff			0	228	5266
Depreciation	0	0	8688	8916	13954

ADVANCE AGAINST DEPRECIATION

22. As per the Commission's notification dated 26.3.2001, Advance Against Depreciation shall be permitted wherever originally scheduled loan repayment exceeds the depreciation allowable and shall be computed as follows:

AAD= Originally scheduled loan repayment amount subject to a ceiling of 1/12th of original loan amount minus depreciation as per schedule.

23. The provision of Advance Against Depreciation was not applicable prior to 1.4.2001. The actual gross loan and actual repayment as on 1.4.2001 has been considered for computing Advance Against Depreciation. The petitioner is entitled to claim any Advance Against Depreciation as shown below:

(Rs. in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
1/12 th of Loan(s)	13954	13954	13954	13954	13954
Scheduled Repayment of the Loan(s)	4487	8916	34679	4487	8916
Minimum of the above	4487	8916	13954	4487	8916
Depreciation during the year	8688	8688	8688	8688	8688
Advance Against Depreciation	0	228	5266	0	228

O&M EXPENSES

24. As per Ministry of Power notification dated 30.3.1992, operation and maintenance expenses including insurance for the first full year, after commissioning of the generating station shall be calculated as a percentage on the actual capital expenditure on the basis of one of the following alternatives, namely:

- (i) At the rate of 2.5 per cent of the actual capital expenditure of ceiling on capital provided in the power purchase agreement; or
- (ii) At 2 per cent of the actual capital expenditure on ceiling on capital expenditure provided in the power purchase agreement together with actual expenditure on insurance.

Provided that total of 2 per cent of the actual capital expenditure on ceiling on capital expenditure provided in the power purchase agreement and the actual expenditure on insurance shall not exceed 3 percent on the capital expenditure.

25. The Commission's notification dated 26.03.2001 lays down that the base O&M expenses for the new generating stations shall be fixed at 2.5% of the actual capital cost as approved by CEA or an appropriate Independent agency, as the case may be, in the year of commissioning and shall be escalated @10% p.a. for subsequent years to arrive at O&M expenses for the base year 1999-2000 level. Thereafter, the base O & M expenses shall be further escalated at the rate of 6% p.a. to arrive at permissible O & M expenses for the relevant year.

26. In the present case, the base year is 2000-2001, which is also the year of commissioning of the generating station. In accordance with the above methodologies, the petitioner shall be entitled to O&M expenses in tariff as computed hereinbelow:

(Rs. in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
%age of Capital Cost	2.50%				
Escalation Factor after 1 year	6.00%				
Unit -I	3275	3275	3423	3628	3846
Unit -II		2680	2760	2926	3101
Additional Capitalisation – year I		13	25	27	29
O & M Expenses	3275	5968	6208	6581	6976

27. The petitioner has claimed water charges separately. As the O&M charges have been allowed on normative basis, the water charges as claimed by the petitioner have not been approved.

INTEREST ON WORKING CAPITAL

28. Working capital has been calculated considering the following elements:

- (a) Fuel Cost: As per Ministry of Power notification dated 30.3.92 and the Commission's notification dated 26.03.2001, fuel cost for one month corresponding to normative Plant Load Factor/Target Availability is permissible. Accordingly, the fuel cost is worked out for one month on the basis of operational parameters as given in Ministry of Power notification dated 30.3.1992 and the Commission's notification dated 26.03.2001.
- (b) Coal Stock and Oil stock: As consolidated audited accounts are available for Vindhyachal stage-I & II, coal and oil stock figures for stage-II for the period prior to 1.4.2001 have been worked out after excluding the provision of coal/oil stock made in tariff for stage-I and for the period 1.4.2001 onwards, coal and oil stock figure for stage-II has been worked out based on corresponding capacity.
- (c) O&M Expenses: As per Ministry of Power notification dated 30.3.1992 and as per the Commission's notification dated 26.03.2001, operation and maintenance expenses (cash) for one month are permissible as a part of the working capital. Accordingly, O&M expenses for working capital has

been worked out for 1 month of O&M expenses considered in tariff of the respective year.

- (d) Spares: As per Ministry of Power notification dated 30.3.92 and as per the Commission's notification dated 26.03.2001, maintenance spares at actuals subject to a maximum of 1% of the capital cost but not exceeding 1 year's requirements less value of 1/5th of initial spares already capitalised for first 5 years are required to be considered in the working capital. Accordingly, the spares requirement for the purpose of working capital has been worked out @ 1% of the capital cost less value of 1/5th of initial spares already capitalised. The amount of initial spares stated to be capitalized by the petitioner is Rs. 1984 lakh. The calculations in support of spares are as under:

(Rs. in lakh)

	2000-2001	2000-01	2001-02	2002-03	2003-2004
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
Capitalised Initial Spares	1984				
1% of the Capital Cost	330	1188	2392	2392	2392
Less: 1/5th of Capitalised Initial Spares	100	198	397	397	397
	230	990	1995	1995	1995

- (e) Receivables: As per Ministry of Power notification dated 30.3.92 and as per the Commission's notification dated 26.03.2001, receivables will be equivalent to two months average billing for sale of electricity calculated on normative plant load factor/Target Availability. However, receivable has been worked out on the basis of two months of fixed and variable charges.

The supporting calculations in respect of variable charges as a part of receivables are tabulated hereunder:

Computation of variable charge component of working capital

		For the period 1.7.2000 to 30.9.2001	For the period 1.10.2000 to 31.12.2001	For the period 1.1.2001 to 31.3.2001	For the period 1.4.2001 to 31.3.2004
Annual Generation corresponding to Normative PLF	MU	2249.90	4499.79	5249.76	7008.00
Value of 15 days Coal Stock	Rs. in Lakh	485.85	971.70	1114.75	1725.43
Value of 60 days Oil Stock	Rs. in Lakh	200.94	401.89	398.54	489.86
Fuel Cost-1Month	Rs. in Lakh	1087.06	2174.12	2462.49	3747.12
Energy Charges for Two month	Rs. in Lakh	2174.12	4348.24	4924.98	7494.25

29. The other relevant details in support of computation of fuel cost, oil/coal stock and receivables are appended herein below:

	1.7.2000 to 30.9.2000	1.10.2000 to 27.12.2000	28.12.2000 to 29.3.2001	1.10.2000 to 29.3.2001	30.3.2001 to 31.3.2001	1.10.2000 to 31.3.2001	2001-02	2002-03	2003-04
	Stabilisation period	Stabilisation period	After Stabilisation period	Stabilisation period	After Stabilisation period				
	Unit-I	Unit-I		Unit-II	Combined				
Days	92	88	92	180	2	182	365	365	366
Days in the Full Year	365	365	365	365	365	365	365	365	366
Hours in a Day	24	24	24	24	24		24	24	24
Annual Hours of Operation	8760	8760	8760	8760	8760		8760	8760	8784
Hours of Operation for the period	2208	2112	2208	4320	48		8760	8760	8784
Plant Load Factor (hours/kW/year)	4500	4500	6000	4500	6000		7008	7008	7027
Normative PLF/Target Availability (%)	51.37%	51.37%	68.49%	51.37%	68.49%		80.00%	80.00%	80.00%
Capacity (MW)	500	500	500	500	1000		1000	1000	1000
Energy Generated for the period (MU)	567	542	756	1110	33		7008	7008	7027
Aux. Power Consumption (With cooling tower and steam driven pumps)	8.50%	8.50%	8.00%	8.50%	8.00%		8.00%	8.00%	8.00%
Aux. Power Consumption for the period (MU)	48	46	60	94	3		561	561	562
Energy Sent Out for the period (MU)	519	496	696	1015	30		6447	6447	6465
Gross Station Heat Rate (Kcal/kWh)	2600	2600	2500	2600	2500		2500	2500	2500
Specific Oil Consumption (ml/kWh)	5.00	5.00	3.50	5.00	3.50		3.50	3.50	3.50
Oil Stock									
Weighted Avg. GCV of Oil (Kcal/Lit.)	9977.00	9977.00	9977.00	9977.00	9977.00		9986.37	9986.37	9986.37
Heat Contribution by Oil (Kcal/kWh)	49.89	49.89	34.92	49.89	34.92		34.95	34.95	34.95
Requirement of Oil for the period (ltrs)	2835616	2712329	2646575	5547945	115068	11021918	24528000	24528000	24595200
Oil Stock(60 days) (KL)	1849.32					3633.60	4032.00	4032.00	4032.00
Weighted Avg. Price of Oil (Rs./KL)	10866.35	10866.35	10866.35	10866.35	10866.35	10866.35	12149.36	12149.36	12149.36
Oil Stock- 60 days- (Rs. in Lakh)	201					395	490	490	490
Coal Stock									
Weighted Avg. GCV of Coal (Kcal/kg)	4039.00	4039.00	4039.00	4039.00	4039.00		3910.64	3910.64	3910.64
Heat Contribution by Coal (Kcal/kWh)	2550.12	2550.12	2465.08	2550.12	2465.08		2465.05	2465.05	2465.05
Specific Coal Consumption (kg/kWh)	0.6314	0.6314	0.6103	0.6314	0.6103		0.6303	0.6303	0.6303
Requirement of Coal for the period (mt)	358066	342498	461502	700564	20065	1524630	4417449	4417449	4429552

Coal Stock (15 days) (mt)	58380					125656	181539	181539	181539
Weighted Avg. Price of Coal (Rs./mt)	832.25	832.25	832.25	832.25	832.25	832.25	950.45	950.45	950.45
Coal Stock-15 days- (Rs. in Lakh)	486					1046	1725	1725	1725
Fuel Cost									
Oil Stock -1 Month (KL)	938					1842	2044	2044	2050
Oil Stock -1 Month (Rs. in Lakh)	102					200	248	248	249
Coal Stock -1 month (mt)	118382					254803	368121	368121	369129
Coal Stock -1 month (Rs. in Lakh)	985					2121	3499	3499	3508
Fuel Cost - 1 month (Rs. Lakh)	1087					2321	3747	3747	3757
Receivables									
Variable Charges									
Coal (Rs/kWh)	0.5743	0.5743	0.5521	0.5743	0.5521		0.6512	0.6512	0.6512
Oil (Rs/kWh)	0.0594	0.0594	0.0413	0.0594	0.0413		0.0462	0.0462	0.0462
Rs./kWh	0.6337	0.6337	0.5934	0.6337	0.5934		0.6974	0.6974	0.6974
Variable Charges for the period	3288	3145	4128	6433	179	13885	44966	44966	45089
Variable Charges -2 months	2174					4641	7494	7494	7515
Fixed Charges - 2 months	2753					5149	6771	6804	7455
Receivables	4927					9790	14265	14298	14970

30. The Commission's notification dated 26.03.2001 is silent about the financing of the working capital margin. Therefore the return and interest is not separately calculated on working capital margin and interest on the total working capital is worked out.

31. The annual average SBI PLR of 11.50% has been considered as the rate of interest on working capital during 2002-01 and the tariff period 2001-02 to 2003-04, in line with the Commission's earlier decision.

32. The necessary details in support of calculation of Interest on Working Capital are appended below:

(Rs. in lakh)

	2000-2001		2001-02	2002-03	2003-04
	1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
Days in the Year	365	365	365	365	366
Period (days)	92	182	365	365	366
Fuel Cost	1087	2321	3747	3747	3757
Coal Stock	486	1046	1097	1097	1097
Oil Stock	201	395	315	315	315
O & M Expenses	273	497	517	548	581
Spares	913	1985	1995	1995	1995
Receivables	4927	9790	14265	14298	14970
Total Working Capital	7887	16035	21937	22002	22716
Rate of Interest	11.50%	11.50%	11.50%	11.50%	11.50%
Interest on Working Capital	907	1844	2523	2530	2612

ANNUAL FIXED CHARGES

33. The annual fixed charges for the period 1.4.1999 to 31.3.2004 allowed in this order are summed up as below:

(Rs. in Lakh)

	Particulars	2000-2001		2001-02	2002-03	2003-04
		1.7.2000 to 30.9.2000	1.10.2000 to 31.3.2001	1.4.2001 to 31.3.2002	1.4.2002 to 31.3.2003	1.4.2003 to 31.3.2004
1	Interest on Loan	6049	11626	11723	11316	9707
2	Interest on Working Capital	907	1844	2523	2530	2612
3	Depreciation	0	0	8688	8688	8688
4	Advance Against Depreciation	0	0	0	228	5266
5	Return on Equity	6289	11458	11482	11482	11482
6	O & M Expenses	3275	5968	6208	6581	6976
	TOTAL	16520	30895	40624	40825	44731

VARIABLE CHARGES

34. In terms of Ministry of Power Notification dated 30.3.1992 and the Commission's notification dated 26.3.2001 following operational norms have been considered for the computation of energy charges:

Period	1.7.2000 to 30.9.2000	1.10.2000 to 31.12.2000	1.1.2001 to 31.3.2001	1.4.2001 to 31.3.2004
Station Heat Rate (kCal/kWh)				
Unit-I	2600	2600	2500	2500
Unit-II	-	2600	2600	2500
Average	2600	2600	2550	2500
Aux Energy Consumption (%)				
Unit-I	8.50	8.50	8.00	8.00
Unit-II	-	8.50	8.50	8.00
Average	8.50	8.50	8.25	8.00
Sec. fuel oil consumption				
Unit-I	5.00	5.00	3.50	3.50
Unit-II	-	5.00	5.00	3.50
Average	5.00	5.00	4.25	3.50

35. Energy charges computed by the petitioner for period 1.7.2000 to 31.3.2001 are based on average operational norms arrived at for 5.5/5.75 years tariff period. Escalation on fuel prices have been considered for computing working capital requirements. Since there is no specific provision of this either in Ministry of Power

notification dated 30.3.1992 or the Commission's notification dated 26.3.2001, the same has not been considered in our computations.

36. The above values of station heat rate correspond to gross calorific value of fuel.

37. Neither Ministry of Power notification dated 30.3.1992 nor the Commission's notification dated 26.3.2001 provide for limiting the actual stock as per audited balance-sheet. Therefore, the coal stock has been adopted based on stock for 15 days at normative PLF level.

38. The Energy Charges have been computed based on the data furnished in the petitions and are summarised below:

Computation of Energy Charge as on 1.7.2000 & 1.4.2001

		For the period 1.7.2000 to 30.9.2001	For the period 1.10.2000 to 31.12.2001	For the period 1.1.2001 to 31.3.2001	For the period 1.4.2001 to 31.3.2004
Description	Unit	As on 1.7.2000			As on 1.4.2001
Capacity	MW	500.00	1000.00	1000.00	1000.00
Normative PLF/ Availability	%	51.37	51.37	59.93	80.00
Gross Station Heat Rate	KCal/kWh	2600.00	2600.00	2550.00	2500.00
Specific Fuel Oil Consumption	ml/kWh	5.00	5.00	4.25	3.50
Aux. Energy Consumption	%	8.50	8.50	8.25	8.00
Weighted Average GCV of Oil	KCal/l	9977.00	9977.00	9977.00	9986.37
Weighted Average GCV of Coal	KCal/Kg	4039.00	4039.00	4039.00	3910.64
Weighted Average Price of Oil	Rs./KL	10866.35	10866.35	10866.35	12149.36
Weighted Average Price of Coal	Rs./MT	832.25	832.25	832.25	950.45
Rate of Energy Charge ex-bus per kWh Sent	Paise/kWh	63.37	63.37	61.35	69.74

39. The base energy charges have been calculated on base value of GCV, base price of fuel and normative operating parameters as indicated in the above table and are subject to fuel price adjustment. Ministry of Power notification dated 30.3.1992 as amended from time to time, and the Commission's notification dated 26.3.2001 provide for fuel price adjustment for variation in fuel price and GCV of fuels. It is further provided that for the purpose of calculating the tariff, the operating parameters, that is, 'Station Heat Rate', Secondary Fuel Oil Consumption' and 'Auxiliary Consumption' shall be determined on the basis of actuals or norms, whichever is lower. Accordingly, the base energy charges approved on the basis of norms shall be subject to following adjustments: -

(i) Fuel price and GCV variation (Coal and Secondary Fuel oil) based on monthly weighted average as per the formula given below :-

$$\mathbf{FPA = A + B}$$

Where,

FPA – Fuel price Adjustment for a month in Paise/kWh Sent out

A – Fuel price adjustment for Secondary Fuel oil in Paise/kWh sent out

B – Fuel price adjustment for Coal in Paise/kWh sent out

And,

$$A = \frac{10 \times (SFC_n) \times (K_{os})}{(100 - AC_n)} \left[(P_{om} / K_{om}) - (P_{os} / K_{os}) \right]$$

$$B = \frac{10 \times \{ (SHR_n) - (SFC_n) \times (K_{os}) \}}{(100 - AC_n)} \left[(P_{cm} / K_{cm}) - (P_{cs} / K_{cs}) \right]$$

Where,

SFC_n – Normative Specific Fuel Oil consumption in ml/kWh

SHR_n – Normative Gross Station Heat Rate in kCal/kWh

AC_n – Normative Auxiliary Consumption in percentage

P_{om} – Weighted Average price of fuel oil as per PSL for the month in Rs./KL.

K_{om} – Weighted average GCV of fuel oils fired at boiler front for the month in Kcal/Litre

P_{os} – Base value of price of fuel oils as taken for determination of base energy charge in tariff order in Rs. / KL.

K_{os} – Base value of gross calorific value of fuel oils as taken for determination of base energy charge in tariff order in Kcal/Litre

P_{cm} – Weighted average price of coal as per PSL for the month at the power station in Rs. / MT.

K_{cm} – Weighted average gross calorific value of coal fired at boiler front for the month in Kcal/Kg

P_{cs} – Base value of price of coal as taken for determination of base energy charge in tariff order in Rs. /MT

K_{CS} – Base value of gross calorific value of coal as taken determination of base energy charge in tariff order in kCal/Kg

40. The energy charges shall be finally adjusted on annual basis as per actual annual average values of operating parameters achieved for the station i.e. station heat rate, auxiliary energy consumption and specific fuel oil consumption provided any or all of the actual operating parameters are lower than their respective normative values indicated in the table. The annual energy charge adjustment shall be done as per the formula given below: -

$$AECA = (P - Q - R) \times 10^{-9}$$

Where,

AECA - Annual Energy Charge Adjustment in Rs. Crore

P - Energy charge payable for the year based on operational parameters (Actual or normative whichever is lower) and weighted average price and GCV of fuels for the year in paise

Q - Total amount recovered as monthly fuel price adjustment for the year in Paise

R - Total amount recovered as base energy charge for the year in Paise

And,

$$P = (ESO_{Annual}) \times 10 \times \left[\frac{\{(SFC_A) \times P_O\} + \{(SHR_A) - (SFC_A) \times K_O\} \times (P_C/K_C)}{\{100 - (AC_A)\}} \right]$$

$$Q = \sum_{mi=1}^{12} (FPA_{mi}) \times (ESO_{mi})$$

$$R = (ESO_{Annual}) \times BEC$$

Where,

- ESO_{Annual} - Energy sent out in the year in kwh sent out based on actual draws for the tariff period up to 31.3.2001 and based on generation schedules given by RLDC for the tariff period 1.4.2001 to 31.3.2004
- SFC_A - Actual average secondary fuel oil consumption of the station for the year in ml/kWh sent out
- K_o - Weighted average GCV of secondary fuel oil for the year in kCal/Litre
- P_o - Weighted average price of secondary fuel oil for the year in Rs./KL
- SHR_A - Actual yearly weighted average gross station heat rate in kCal/kWh generated
- P_c - Weighted average price of coal for the year in Rs./MT
- K_c - Weighted average GCV of coal for the year in kCal/kg
- FPA_{mi} - Fuel price adjustment for the ith month in paisa/kWh sent out
- ESO_{mi} - Energy sent out for the ith month in kWh sent out based on actual draws for the tariff period up to 31.3.2001 and based on generation schedules given by RLDC for the tariff period 1.4.2001 to 31.3.2004
- BEC - Base Energy Charge as per tariff order in Paise/kWh sent out
- AC_A - Actual average Auxiliary Consumption of the station for the year in percentage

41. In case the adjustment period is less than a year, adjustment shall be done for the actual period.

42. The fixed and variable charges have been decided by us in the preceding paras for Vindhyachal STPS II. The petitioner has already recovered fixed and variable charges from the respondents based on the interim orders of the Commission. The amount already recovered shall be adjusted against the revised charges decided by us through this order.

43. In addition to these charges, the petitioner is entitled to recover other charges also like Foreign Exchange Rate Variation, incentive, claim for reimbursement of Income-tax, other taxes, cess levied by a statutory authority, Development Surcharge and other charges in accordance with the Commission's notification dated 26.3.2001, as applicable. This is subject to the orders, if any, of the superior courts. The petitioner shall also be entitled to recover from the respondents filing fee of Rs.10 lakh paid in petition No.77/2002, in ten equal monthly instalments of Rs. one lakh each and shall be shared by the respondents in proportion of fixed charges approved for the period from 1.4.2001 to 31.3.2004. This is subject to the confirmation that the amount has not been included in O&M expenses.

44. This order disposes of Petitions No 20/1999 and 77/2002.

Sd/-
(K.N. SINHA)
MEMBER

Sd/-
(G.S. RAJAMANI)
MEMBER

Sd/-
(ASHOK BASU)
CHAIRMAN

New Delhi dated the 1st August, 2003