

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 154/2010

**Coram: Shri S. Jayaraman, Member
Shri V.S. Verma, Member
Shri M. Deena Dayalan, Member**

Date of Hearing: 11.10.2011

Date of Order: 13.6.2012

In the matter of

Approval of generation tariff of Indira Sagar Power Station (8x125 MW) for the period from 1.4.2009 to 31.3.2014.

And

In the matter of

NHDC Ltd, Bhopal

Vs

1. Madhya Pradesh State Electricity Board, Jabalpur
2. Narmada Valley Development Department, Bhopal

.....Petitioner

....Respondents

Parties Present:

1. Shri Anurag Seth, NHDC
2. Shri Ashish Jain, NHDC
3. Shri Manoj Dubey, MPPTCL
4. Shri M.L. Agrawal, NVDA

ORDER

This petition has been filed by the petitioner, NHDC Ltd, for determination of generation tariff for Indira Sagar Power Station (8 x 125 MW) (hereinafter referred to as "the generating station") for the period from 1.4.2009 to 31.3.2014, based on the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 (hereinafter referred to as "the 2009 Tariff Regulations").

2. The petitioner is a joint venture company of NHPC Ltd and the Government of Madhya Pradesh (GoMP). The generating station was declared under commercial operation on 25.8.2005 and the cut-off date of the generating station, in terms of the 2004 Tariff Regulations

is 31.3.2007. The generating station comprises of three units, of which Unit-I comprise of dam and appurtenant works, Unit-II comprise of irrigation system and Unit-III is dedicated to power generation. Unit-I is common to both power generation and irrigation system. Unit-III comprises of power station with installation of 8 machines each of 125 MW installed capacity, associated water conductor system and switchyard. The annual fixed charges of the generating station for 2004-09 were determined by Commission's order dated 6.2.2007 in Petition No.119/2005 based on the capital cost of ₹294991.98 lakh as on 24.8.2005. Subsequently, by Commission's order dated 20.10.2009 in Petition No. 33/2009, the annual fixed charges of the generating station was revised, considering the additional capital expenditure incurred for the period 25.8.2005 to 31.3.2008 and based on the capital cost of ₹305861.71 lakh as on 31.3.2008. Thereafter, the Commission by its order dated 19.4.2011 in Petition No.207/2010, revised the annual fixed charges for 2008-09, considering the impact of additional capital expenditure during 2008-09, based on the capital cost of ₹309451.55 lakh as on 31.3.2009. The annual fixed charges, approved *vide* order dated 19.4.2011 is as under:

(₹ in lakh)	
	2008-09
Interest on Loan	12570.23
Interest on working Capital	1248.24
Depreciation	6647.33
Advance against depreciation	8360.56
Return on Equity	16287.25
O&M Expenses	4900.81
Total	50014.42

3. The annual fixed charges claimed by the petitioner for the period 2009-14 are as under:

(₹ in lakh)					
	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	13008.41	13075.47	13169.74	13263.89	13387.87
Interest on loan	13226.95	12364.86	11332.53	10262.60	9213.61
Return on equity	20472.51	20587.64	20725.51	20839.66	20979.12
Interest on working capital	1238.16	1239.12	1238.45	1237.41	1238.93
O&M expenses	5290.97	5593.61	5913.57	6251.82	6609.43
Total	53237.00	52860.70	52379.80	51855.38	51428.96

4. Reply to the petition has been filed by the respondents and the petitioner has filed its rejoinder.

Capital Cost as on 1.4.2009

5. The last proviso to Regulation 7 of the 2009 Tariff Regulations, as amended on 21.6.2011, provides as under:

“Provided also that in case of the existing projects, the capital cost admitted by the Commission prior to 1.4.2009 duly trued up by excluding un-discharged liability, if any, as on 1.4.2009 and the additional capital expenditure projected to be incurred for the respective year of the tariff period 2009-14, as may be admitted by the Commission, shall form the basis for determination of tariff.”

6. The Commission vide its order dated 19.4.2011 in Petition No. 207/2010 has approved the capital cost of ₹309451.55 lakh as on 31.3.2009. Accordingly, the capital cost of ₹309451.55 lakh has been considered as the opening capital cost as on 1.4.2009, in respect of the generating station for the purpose of tariff for the period 2009-14.

Additional Capital Expenditure for 2009-14

7. Regulation 9 of the 2009 Tariff Regulations provides as under:

“9. Additional Capitalization. (1) The capital expenditure incurred or projected to be incurred, on the following counts within the original scope of work, after the date of commercial operation and up to the cut-off date may be admitted by the Commission, subject to prudence check:

- (i) Un-discharged liabilities;*
- (ii) Works deferred for execution;*
- (iii) Procurement of initial capital spares within the original scope of work, subject to the provisions of regulation 8;*
- (iv) Liabilities to meet award of arbitration or for compliance of the order or decree of a court; and*
- (v) Change in law;*

Provided that the details of works included in the original scope of work along with estimates of expenditure, un-discharged liabilities and the works deferred for execution shall be submitted along with the application for determination of tariff.

(2) The capital expenditure incurred on the following counts after the cut-off date may, in its discretion, be admitted by the Commission, subject to prudence check:

- (i) Liabilities to meet award of arbitration or for compliance of the order or decree of a court;*
- (ii) Change in law;*
- (iii) Deferred works relating to ash pond or ash handling system in the original scope of work;*
- (iv) In case of hydro generating stations, any expenditure which has become necessary on account of damage caused by natural calamities (but not due to flooding of power house attributable to the negligence of the generating company) including due to geological reasons after adjusting for proceeds*

from any insurance scheme, and expenditure incurred due to any additional work which has become necessary for successful and efficient plant operation; and

(v) In case of transmission system any additional expenditure on items such as relays, control and instrumentation, computer system, power line carrier communication, DC batteries, replacement of switchyard equipment due to increase of fault level, emergency restoration system, insulators cleaning infrastructure, replacement of damaged equipment not covered by insurance and any other expenditure which has become necessary for successful and efficient operation of transmission system:

Provided that in respect sub-clauses (iv) and (v) above, any expenditure on acquiring the minor items or the assets like tools and tackles, furniture, air conditioners, voltage stabilizers, refrigerators, coolers, fans, washing machines, heat convectors, mattresses, carpets etc. brought after the cut-off date shall not be considered for ₹additional capitalization for determination of tariff w.e.f. 1.4.2009.

(vi) In case of gas/liquid fuel based open/ combined cycle thermal generating stations, any expenditure which has become necessary on renovation of gas turbines after 15 year of operation from its COD and the expenditure necessary due to obsolescence or non-availability of spares for successful and efficient operation of the stations.

Provided that any expenditure included in the R&M on consumables and cost of components and spares which is generally covered in the O&M expenses during the major overhaul of gas turbine shall be suitably deducted after due prudence from the R&M expenditure to be allowed.

(vii) Any capital expenditure found justified after prudence check necessitated on account of modifications required or done in fuel receipt system arising due to non-materialisation of full coal linkage in respect of thermal generating station as result of circumstances not within the control of the generating station.

(viii) Any un-discharged liability towards final payment/withheld payment due to contractual exigencies for works executed within the cut-off date, after prudence check of the details of such deferred liability, total estimated cost of package, reason for such withholding of payment and release of such payments etc.”

Provided that in respect sub-clauses (iv) and (v) above, any expenditure on acquiring the minor items or the assets like tools and tackles, furniture, air conditioners, voltage stabilizers, refrigerators, coolers, fans, washing machines, heat convectors, mattresses, carpets etc. brought after the cut-off date shall not be considered for ₹additional capitalization for determination of tariff w.e.f. 1.4.2009.

8. The additional capital expenditure claimed by the petitioner for 2009-14 is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Liabilities to meet award of arbitration or for compliance of the order or decree of a court.- Regulation 9 (2) (i)	4000.00	4179.00	0.00	0.00	0.00
Work which has become necessary for successful and efficient plant operation. Regulation 9 (2) (iv)	338.00	1466.00	453.00	1750.00	3571.00
Additional expenditure on items necessary for successful and efficient operation of transmission system (up-gradation in transmission system). Regulation 9 (2) (v)	0.00	100.00	40.00	0.00	218.00
Additional capital expenditure claimed	4338.00	5745.00	493.00	1750.00	3789.00

9. During the hearing, the learned counsel for the respondent no. 1, MPPTCL mainly reiterated the submissions made in its reply dated 19.9.2011 and pointed out that amended petition has been filed after completion of more than two years and hence, to avoid uncertainty and retrospective revision of tariff and to keep the impact of tariff revision to bare minimum, the petitioner may be directed to file actual/audited figures of additional expenditure. He also submitted that the claim of the petitioner for capitalization after the cut-off date, in respect of works like rehabilitation of bridge, auditorium, recreation hall, boundary wall, double storey buildings, extra room, security equipments, sewage treatment plant, construction of store shed and F-type quarters etc, envisaged in original scope of work, shall not be permitted under Regulation 9(2)(iv) of the 2009 Tariff Regulations. The learned counsel further submitted that the land for reservoir shall not be a depreciable asset and its cost shall be excluded from the capital cost while computing depreciation. He also added that the claim of the petitioner for average rate of interest ranging from 9.0223% to 9.1533% is higher and may not be allowed and the O&M expenses claimed by the petitioner are not in accordance with Regulation 19(f)(iv) of the 2009 Tariff Regulations. In response, the petitioner *vide* its affidavit dated 5.10.2011 has submitted that based on the directions of the Commission *vide* letter dated 10.6.2010, the consolidated petition filed on 10.5.2010 were segregated and separate petitions (Petition No. 207/2010 for revision of tariff of generating station for 2008-09 based on additional capitalization for 2008-09 and Petition No. 154/2010 for determination of tariff of generating station for 2009-14) were filed by it on 20.7.2010. It has also submitted that after determination of tariff for the period 2008-09 in Petition No. 207/2010, revised calculations were also filed by it in Petition No. 154/2010 based on the admitted parameters as on 31.3.2009. Hence, it has prayed that the submissions of the respondent no.1 be rejected. As regards other issues raised by the respondent, the petitioner has submitted that the expenditure claimed for 2009-14 is in terms of the provisions of the 2009 Tariff Regulations and the objections raised by the respondent are not sustainable.

10. The submissions of the parties have been considered. This petition was revised and filed by the petitioner (as stated above) based on the directions of the Commission in its letter dated dated 10.6.2010. It is noticed that pursuant to the Commission's order dated 19.4.2011 in Petition No.207/2010, revising the tariff of the generating station on account of additional capital expenditure for 2008-09, the petitioner has revised its calculations taking into consideration the parameters admitted by the Commission as on 31.3.2009. As regards the filing of petition with actual figures, it is to be noted that the first proviso to Regulation 5(2) of the 2009 Tariff Regulations provides that in case of existing projects, the application shall be based on the admitted capital cost including any capitalization already admitted upto 31.3.2009 and estimated additional capital expenditure for the respective years of the tariff period 2009-14. Also, the last proviso to Regulation 7(2) of the 2009 Tariff Regulations provides that that in case of the existing projects, the capital cost admitted by the Commission prior to 1.4.2009 duly trued up by excluding un-discharged liability, if any, as on 1.4.2009 and the additional capital expenditure projected to be incurred for the respective year of the tariff period 2009-14, as may be admitted by the Commission, shall form the basis for determination of tariff. Thus, as per the last proviso, the projected additional capital expenditure to be incurred for the respective years of the tariff period 2009-14 shall be considered by the Commission while determining the tariff in respect of the existing projects. Also, the tariff determined for the generating station as above, is subject to truing-up in terms of Regulation 6 of the 2009 Tariff Regulations. The collection of the audited figures of the capital expenditure incurred, the revision of petition to bring on record the revised audited figures, service of copies to the respondents and the completion of pleadings thereafter, would in our view, result in enormous delay in the disposal of the petition for determination of tariff for 2009-14. Hence, taking into consideration the facts in totality and keeping in view the scheme of the 2009 Tariff Regulations, we consider the petition for determination of tariff for 2009-14 based on projected additional capital expenditure. As regards objections on the consideration of additional capital expenditure on projection basis, under Regulation 9(2), it is to

mention that by order dated 13.4.2012 in Petition No. 282/2009 pertaining to the determination of tariff for 2009-14 in respect of Kahalgaon STPS of NTPC, the Commission, keeping in view the scheme of the 2009 Tariff Regulations and in order to remove the inconsistency between last proviso to Regulation 7(2) and Regulation 9(2), has relaxed the provisions of Regulation 9(2) of the 2009 Tariff Regulations, in exercise of the power under Regulation 44 to allow additional capital expenditure projected to be incurred after the cut-off date. In line with this, the projected additional capital expenditure claimed by the petitioner for 2009-14, is considered in terms of the provisions under Regulation 9(2) of the 2009 Tariff Regulations.

11. After examining the asset-wise details and justification for additional capital expenditure claimed by the petitioner under various categories, the replies of the respondents and after prudence check, the admissibility of the additional capital expenditure is discussed in the subsequent paragraphs.

Liabilities to meet award of arbitration or for compliance of the order or decree of a court- Regulation 9 (2) (i)

12. The petitioner has claimed expenditure of ₹4000.00 lakh and ₹4179.00 lakh during 2009-10 and 2010-11 for Unit-I under this head, towards balance R&R work being executed by the Government of Madhya Pradesh as per decree of the Hon'ble Supreme Court and the High Court of Madhya Pradesh, to fill up the reservoir upto FRL i.e EL 262.13 M from the existing EL of 260.0 M. It has also submitted that the matter is sub-judice. Since the expenditure on account of balance R&R works incurred is in compliance with directions of the Courts, the same is allowed to be capitalized under this head.

13. It is noticed that the petitioner has claimed expenditure of ₹51.54 lakh during 2010-11 in respect of Unit-III, towards the construction of sub-station and installation of separate distribution transformer to separate out the loads of NHDC (the petitioner) and non-NHDC Township area as per decree of the Hon'ble High Court of Madhya Pradesh, under Regulation 9 (2)(iv) of the 2009

Tariff Regulations. Since, the expenditure incurred is in compliance with the orders of the Court, as stated, the said claim is considered under Regulation 9(2)(i) of the 2009 Tariff Regulations and allowed.

Expenditure necessary for successful and efficient operation of plant- Regulation 9(2) (iv)

14. The petitioner has claimed the following expenditure in respect of assets which are necessary for successful and efficient operation of the generating station under Regulation 9(2) (iv) of the 2009 Tariff Regulations. This also includes assets which are within the original scope of work but could not be completed within the cut-off date of the generating station.

	<i>(₹ in lakh)</i>				
	2009-10	2010-11	2011-12	2012-13	2013-14
Work necessary for successful and efficient operation of plant.	338.00	1466.00	453.00	1750.00	3571.00

15. It is noticed that the petitioner has claimed additional capital expenditure on items such as relays, control etc which are necessary for successful and efficient operation of transmission system under Regulation 9(2)(v) of the 2009 Tariff Regulations. Since assets like switchyard, relays control and/or other appurtenant equipments etc, form part of the generating station, the expenditure claimed in respect of assets under Regulation 9(2)(v) has also been considered under Regulation 9(2)(iv) of the 2009 Tariff Regulations. Accordingly, after considering the justification for additional capital expenditure under Regulation 9(2)(iv) submitted by the petitioner and the reply of the respondents, the expenditure allowed, unit-wise, for the period 2009-14, based on findings after prudence check, is tabulated as under:

<i>(₹ in lakh)</i>				
2009-10		Unit-I	Unit-III	Findings
	Development of approach road to PH top at EL 231 from Bhopal to ISPS	0.00	1.74	Allowed- Since this additional work is necessary for development of approach road to power house top to have convenient access to DT gantry/tail pool area. Also, the work is included in the original scope could not be completed within the cut-off date.
	Double Storey Building near GM office at ISPS including its electrification and driver	45.9	14.56	Allowed- The old quarters were provided by NCA and were handed over to NHDC. In order to develop adequate office space as per entitlement of

	room			promoted officers/staff, this work has become necessary.
	Construction of Store shed 1-B including parking sheds/ car sheds/ Heavy vehicle sheds/ washing ramp at central stores premises at ISPS	18.59	5.89	Allowed- As the work is required to be executed based on the requirement of CISF for providing proper stores and parking space of light & heavy vehicles.
	Construction of extra room in F-Type Quarters at Indira Sagar Power Station.	21.26	6.74	Allowed- In order to provide adequate residential space / amenities as per entitlement of promoted officers/ staff, this work has become necessary.
	Construction of Boundary Wall around Quarters and main gate.	57.51	18.24	Allowed- Based on the requirement of CISF, the construction of boundary wall around the quarters is necessary, in order to provide security to the residential complex.
	Purchase of chartless recorder	0.00	56.15	Allowed- This item is necessary for improving the efficiency of generating station by acquiring and recording the data of various parameters with accuracy in digital format.
	Purchase of 5 No. Oil storage tank at power house.	0.00	22.17	Not allowed- Expenditure on assets which are minor in nature.
	Augmentation of Dewatering Facilities	16.07	8.93	Allowed- On account of augmentation of de-watering facilities at different locations of power house/ dam, to avoid flooding due to seepages especially during monsoon and thereby ensuring the successful operation of generating station
	Purchase of LP compressor, HP compressor, Air dryer for LP & HP compressor & Air dryers	15.94	5.06	Allowed- As the items are required for augmentation of LP compressor system for ensuring successful operation of the generating station.
	Security equipments	17.46	5.54	Not Allowed- As the expenditure on these equipments is recurring in nature. Also, the expenses are required to be met from the O&M expenses.
	Total allowed	175.27	117.31	
2010-11	Assets	Unit-I	Unit-III	Findings
	Rehabilitation of 506M long HLB over river Narmada	98.70	35.30	Allowed- This high level bridge is situated on main Bhopal highway over river Narmada is downstream to dam and is subject to heavy floods during the spillage of water from radial gates of Indira Sagar dam. This bridge was constructed by NVDA and after taking over of the project by petitioner during the year 2000, its rehabilitation was felt necessary and accordingly the replacement of concrete roller bearings

				with neoprene pads bearings, protection of bridge piers by concrete jacketing and external pre-stressing of bridge span were to be carried out. Phase-I rehabilitation works in main span over river course were carried out during 2003 and 2004. The Phase-II rehabilitation work of balance spans of bridge could not be taken up within the cut-off date. The work needs to be carried out in view of the safety of bridge on main connecting road to the State capital. In view of this justification, expenses for additional work are necessary for successful operation of generating station.
	Construction of various toilet near CISF check post at ISPs	0.00	5.00	Allowed- The continuous presence of CISF personnel's at various check-posts in strategic locations is necessary for safety of the generating station. At present, these check-posts are not provided with amenities like toilets etc. Hence, additional work on this count is necessary for safety and security of the areas of generating station.
	Construction of the gates to the entrance of Power House ,Entrance and Exit of the Power Station	0.00	40.00	Allowed- Based on the requirements of CISF, construction of gates with security post at three strategic locations of generating station area is constructed.
	Construction of parisar building at shyamala hills	187.28	0.00	Not Allowed- This work included in the original scope of works but could not be completed within the cut-off date on account of stay order granted by Hon'ble Madhya Pradesh High Court. However, the full expenditure for construction of Corporate office building cannot be considered in the capital cost of one generating station of the petitioner. The petitioner is directed to submit details of expenditure incurred on the construction of promotion building as considered in the original scope of work for the consideration on the Commission.
	Decking panel for heavy duty racks	7.37	2.63	Not Allowed- Since these are in the nature of minor assets.
	Auditorium & Recreation hall	58.93	21.07	Allowed- In order to create recreational facilities to the employees of power station and their families at remote / isolated location.
	Water recreation structures	58.93	21.07	Not Allowed- Expenditure towards <u>additional</u> recreational facilities cannot be passed on to beneficiaries.
	Slope protection on right bank	10.0	0.00	Allowed- Rain cuts have been observed in Right Bank downstream of dam due to soil erosion during monsoon period of previous years. As such, in order to

				arrest the soil erosion and to ensure the safety of dam structure, this additional work is necessary for successful operation of generating station.
	2X500 KVA DG sets including DG room and LT distribution	195.0	0.00	Allowed- In the absence of a dedicated back-up power supply to the dam, the necessity of having redundancy to the availability of power to the radial gates of dam, especially during monsoon, is felt necessary to avoid any eventuality on account of heavy floods to the tune of (\pm) 30,000 cusecs. As such, this work is necessary to ensure operation of dam Radial gates successfully and to improve the overall efficiency in operation of the plant.
	Purchase of centrifuging machines-2 (two) no & recycling oil tank of 8 KL capacity.	29.0	0.00	Not Allowed- Expenditure on assets in the nature of tools and tackles/ minor assets.
	Purchase of 1 no LVDH machine	3.50	0.00	
	Purchase of 1(one) no.ELC machine	4.00	0.00	
	Providing of cadge ladder for radial gates	15.00	0.00	
	Adjacent mode operation of intake gates	5.00	0.00	Not Allowed- Expenditure on assets in the nature of minor asset.
	Providing dedicated local control panel to each intake gate with recording facility	50.00	0.00	Allowed- Presently, there is a common control panel for two adjacent intake gate and there is no facility of fault recording. Hence, in order to attend to the fault and to take the corrective measures expeditiously, expenditure on asset is necessary.
	Bottom Elements for Intake Gate Stop log	14.00	0.00	Not Allowed- Expenditure on assets in the nature of tools and tackles/ minor assets.
	Lifting beam for Radial gates, draft tube gate and Intake gate	15.00	0.00	
	Implementation of Restricted Governor Mode Operation (RGMO)	0.00	60.80	Allowed under Regulation 9 (2)(ii)-Change in law- The restricted (Free Governor Mode Operation) is to be implemented in all hydroelectric power generating stations above 10 MW. Accordingly, the existing governor system needs up gradation and modifications for successful implementation of RGMO (software portion).
	Modification of stator cooler outlet cooling water line hand wheel valves with motorized actuators	0.00	20.0	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at

				the time of truing up.
	Online EMS / automatic downloading of Energy meter reading	0.00	50.00	Allowed- The generating station has a vital role in coping with the varying grid conditions. In order to enhance the role of this vital station for maintenance of grid discipline in Western region, the Online monitoring system at control room is necessary in order to monitor the varying grid conditions continuously and to attend to grid requirements promptly.
	Purchase of ABB REL 670 relays	0.00	50.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
	Augmentation in the features of OPU system including VFD for OPU drive	0.00	120.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
	Construction of 33/11 KV sub-station including additional work demanded by MPSEB before taking over 33/11 KV sub-station.	0.00	51.54	Allowed- As the construction of sub-station and installation of separate distribution transformer is carried out to separate out the loads of NHDC and Non-NHDC township area as per decree of Hon'ble High Court of Madhya Pradesh.
	CCTV at ISPS	0.00	27.00	Allowed- As per requirements of CISF deployed for safety and security of the project.
	Augmentation of communication facilities by OFC / LAN connectivity between various locations of project.	0.00	60.0	Allowed- The augmentation of communication facilities by providing OFC / LAN connectivity is necessary amongst various locations like Power house, offices, central stores, dam etc. for better / uninterrupted communication.
	Procurement of HV/LV spare coil transformer	0.00	100.00	Not Allowed- Expenditure on assets in the nature of spares.
	Providing 2 nos high mast at various sites in colony	25.78	9.22	Allowed- As per the requirement of CISF for project safety and security, the high masts have to be erected at various locations.
	Providing & fixing of acoustic enclosures of 2 x 1000 KVA, 11 KV DG. sets	22.10	7.90	Allowed- The DG set of 1000 kVA without accountability enclosure generates enormous sound / vibration, which is hazardous to the health of operating staff in and around the DF room. Moreover, the provision of acoustic enclosure in DGs is also a requirement as per guidelines of the State Pollution Control Board. As such, this additional work is necessary for the

				successful operation of generating station.
	Installation of inventory management system / ERP	44.19	15.81	Allowed- Implementation of integrated material management system of store and ERP is treated as additional work, necessary for the efficient inventory management of generating station.
	Security equipments	18.41	6.59	Not Allowed- As the expenditure on these equipments is recurring in nature. Also, the expenses are required to be met from the O&M expenses.
	Total allowed	504.70	383.64	
2011-12	Assets	Unit-I	Unit-III	Findings
	Up gradation of seismological observatories	50.00	0.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
	Construction of approach road from HLB to downstream of dam at ISPS	50.00	0.00	Allowed- Consequent upon filling of downstream OSP reservoir upto FRL, it would not be possible to construct temporary approach on dried out river bed during post- monsoon season for the purpose of inspection and maintenance of energy dissipation system of dam by the dam safety committee as the back waters of OSP in the river Narmada upto down stream of Indira Sagar dam. Therefore, a permanent approach to dam bucket from downstream high level bridge is necessary. Hence, expenditure for additional work is necessary for safety of dam.
	Purchase of jack & pack for PTPS system	20.00	0.00	Not Allowed- Expenditure on assets in the nature of tools and tackles.
	Cutting machine	10.00	0.00	Not Allowed- Expenditure on assets in the nature of tools and tackles.
	Conversion of hydraulic hoist of 25T & 60T with VF drive	10.00	0.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
	Sewage treatment plant	42.57	17.43	Allowed- The township of the generating station was taken over by the petitioner during 2000, which was originally built by NVDA. This township has no proper sewage treatment facilities to maintain hygienic conditions. As such this additional work is required for maintaining healthy and hygienic conditions in and around the township area of the project.

	Modification of air suction system for runner	0.00	80.0	Allowed- During heavy floods in previous monsoon, when the TRC Level was (+) EL 202 M, and leakages from runner aeration valves were observed, endangering the inundation of TG area and thus the modification / relocation of runner aeration valve is necessary to avoid any eventuality of flooding. As such, this additional work is required for successful operation of power house.
	Procurement of dissolved gas analysis (DGA) kit for testing of transformer oil	0.00	40.00	Not Allowed- Expenditure on assets in the nature of tools and tackles.
	Firefighting system for stores	26.96	11.04	Allowed- Installation of fire fighting system is essential for safety of various materials like spares for generating station & machinery stored in central stores.
	Water supply system including overhead tank	88.69	36.31	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
	Security equipments	7.10	2.90	Not Allowed- As the expenditure on these equipments is recurring in nature. Also, the expenses are required to be met from the O&M expenses.
	Total allowed	119.53	108.47	
2012-13	Assets	Unit-I	Unit-III	Findings
	Electrical hoisting system at catwalk at radial gate including approach ladder from dam top	10.00	0.00	Not Allowed- Expenditure on assets in the nature of tools and tackles.
	Development of online condition monitoring facilities of generator	0.00	1500.00	Allowed- This facility is required to be developed in future to monitor online healthiness of the machines in order to rule out the possibility of undue forced outage.
	Augmentation / Up gradation of dewatering facilities at various locations of power house and dam	150.52	79.48	Not Allowed- There is no justification as to why the existing dewatering facility is not sufficient. Moreover, the gross value of old / replaced asset has also not been given.
	Security equipments	6.54	3.46	Not Allowed- As the expenditure on these equipments is recurring in nature. Also, the expenses are required to be met from the O&M expenses.
	Total allowed	0.00	1500.00	
2013-14	Assets	Unit-I	Unit-III	Findings
	Provisioning of fast hoisting system for draft tube gates including 3	660.0	0.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished.

Nos. DT gates			However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.
Providing fire protection arrangement for radial gate, intake gate and goose neck tunnel (GNT) gate	50.00	0.00	Allowed- Automatic fire system provided in Power pack rooms, DCR, in cable trays for radial gates, intake gallery and in goose neck tunnel.
Replacement of existing governing system with electronic governor	0.00	2000.0	Allowed- The existing governing system is mechanical based and its response is sluggish. Consequent upon implementation of restricted FGMO as per order of the Commission, the electronic based governing system with minimum response time is to be installed, to ensure the successful operation of FGMO.
De-capitalization of mechanical governing system	0.00	(-) 335.00	Allowed- The proposed de-capitalization of mechanical governing system consequent to its replacement with electronic governing system.
Replacement of existing SCADA system with upgraded SCADA system	0.00	1600.00	Allowed- The existing SCADA provided by the OEM M/s BHEL against the supply order placed by NVDA during 1996-97 for supply of main TG equipment has limited features. Therefore, for up gradation of technology with more advanced features commensurate to the present norms of operation of the generating station and the expectation with hydro power stations to respond quickly to the varying grid conditions, the latest technology based SCADA system along with associated hardware is to be installed, for successful and efficient operation of generating plant.
De-capitalization of existing SCADA system	0.00	(-) 414.00	Allowed- Proposed De-capitalization of existing SCADA system consequent to its replacement with the upgraded SCADA system.
Up gradation of the existing numerical relays of switchyard, generator & generator transformers and items of RTU	0.00	188.00	Not Allowed- Asset in the nature of replacement is required for improvement of the part of evacuation system of the project. However, the value of the original asset has not been furnished. The petitioner may undertake the work and the expenditure would be considered at the time of truing up.
Purchase of advanced version of independent disturbance recorder for phasing out inadequate 65C disturbance recorder	0.00	30.00	Not Allowed- As the asset is in the nature of replacement and the value of old asset has not been furnished. However, the petitioner may undertake the said work and submit the details of expenditure which will be considered at the time of truing up.

	Security equipments	0.00	10.00	Not Allowed -As the expenditure on these equipments is recurring in nature. Also, the expenses are required to be met from the O&M expenses.
	Total allowed	50.00	2851.00	

16. Based on the above, the additional capital expenditure [except the R&R liabilities allowed under Regulation 9(2)(i)] claimed and allowed for 2009-14 is summarized as under:

(₹ in lakh)

		Unit-I	Unit-III	Total
2009-10	Claimed	192.73	145.02	337.75
	Allowed	175.27	117.31	292.58
2010-11	Claimed	862.19	703.93	1566.12
	Allowed	504.70	383.64	888.34
2011-12	Claimed	305.32	187.68	493.00
	Allowed	119.53	108.47	228.00
2012-13	Claimed	167.06	1582.94	1750.00
	Allowed	0.00	1500.00	1500.00
2013-14	Claimed	710.00	3079.00	3789.00
	Allowed	50.00	2851.00	2901.00

R&R Works

17. The petitioner has submitted that an expenditure of ₹1641.34 crore has already been incurred on R&R works of the generating station upto March 2009 and the balance expenditure amounting to ₹81.79 crore is likely to be incurred during the period 2009-14. As per the terms of the Cabinet Committee of Economic Affairs (CCEA) clearance, 50% increase in R&R cost beyond the approved cost of ₹1160 crore is required to be borne by the Government of Madhya Pradesh (GoMP) as "Subvention" and the balance 50% shall be borne by the project which is booked to cost of Unit-I (Dam). The details are as under:

(₹ in lakh)

	2009-10	2010-11
Unit-I (Dam)	4000.00	4179.00
Less SSP 17.63%	(-)705.20	(-)737.00
Less: Irrigation Component 16.75%	(-) 551.90	(-) 577.00
Power Component	2743.00	2865.00
Booked to Generating station	1372.00	1433.00

18. Similarly, the additional capitalization booked to Unit-I (dam) has further been apportioned to SSP and Irrigation and their contribution to Power component is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Unit-I (Dam)	175.27	504.70	119.53	0.00	50.00
Less SSP 17.63%	30.90	88.98	21.07	0.00	8.82
Less: Irrigation Component 16.75%	24.18	69.63	16.49	0.00	6.90
Booked to Generating station	120.19	346.09	81.97	0.00	34.29

19. Based on the above discussions, the additional capital expenditure allowed for 2009-14, with adjustment of power component, R&R subvention, is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Apportioned to Unit-I (dam) and booked to generating station	120.19	346.09	81.97	0.00	34.29
Power Component	117.31	383.64	108.47	1500.00	2851.00
R&R component booked to generating station	1372.00	1433.00	0.00	0.00	0.00
Total additional capitalization allowed	1609.50	2162.73	190.44	1500.00	2885.29

Un-discharged liabilities

20. The petitioner vide its affidavit dated 15.7.2010 has submitted the details of un-discharged liabilities in Power component as on 31st March of the financial year of the tariff period is as under:

	(₹ in lakh)					
	31.3.2009	31.3.2010	31.3.2011	31.3.2012	31.3.2013	31.3.2014
Un-discharged liabilities	6204.00	6529.00	6189.00	4405.00	3939.00	4574.00

21. These un-discharged liabilities have been deducted from the year in which claimed and added to the years during which the liabilities have been discharged. Accordingly, the additional capital expenditure allowed for the purpose of tariff for 2009-14 is as under:

		(₹ in lakh)				
Sl. No		2009-10	2010-11	2011-12	2012-13	2013-14
1	Additional capital expenditure allowed after adjustment of R&R subvention but prior to adjustment on account of un-discharged liabilities	1609.50	2162.73	190.44	1500.00	2885.29
2	Un-discharged liabilities at the beginning of the	6204.00	6529.00	6189.00	4405.00	3939.00

	financial year					
3	Un-discharged liabilities as on 31 st March of the financial year	6529.00	6189.00	4405.00	3939.00	4574.00
4	Increase/Decrease of Un-discharged liabilities during the period (3-2)	325.00	(-) 340.00	(-) 1784.00	(-) 466.00	635.00
5	Additional Capital Expenditure allowed for the purpose of tariff (1-4)	1284.50	2502.73	1974.44	1966.00	2250.29

Capital Cost for 2009-14

22. Accordingly, the capital cost approved for the period 2009-14 is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Opening Capital cost as on 1 st April of the financial year	309451.55	310736.05	313238.78	315213.22	317179.22
Additional Capital Expenditure allowed	1284.50	2502.73	1974.44	1966.00	2250.29
Capital Cost as on 31st March of the financial year	310736.05	313238.78	315213.22	317179.22	319429.51

Debt- Equity Ratio

23. Regulation 12 of the 2009 Tariff Regulations provides as under:

“(1) For a project declared under commercial operation on or after 1.4.2009, if the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff.

Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment.

Explanation.- The premium, if any, raised by the generating company or the transmission licensee, as the case may be, while issuing share capital and investment of internal resources created out of its free reserve, for the funding of the project, shall be reckoned as paid up capital for the purpose of computing return on equity, provided such premium amount and internal resources are actually utilized for meeting the capital expenditure of the generating station or the transmission system.

(2) In case of the generating station and the transmission system declared under commercial operation prior to 1.4.2009, debt-equity ratio allowed by the Commission for determination of tariff for the period ending 31.3.2009 shall be considered.

(3) Any expenditure incurred or projected to be incurred on or after 1.4.2009 as may be admitted by the Commission as additional capital expenditure for determination of tariff, and renovation and modernization expenditure for life extension shall be serviced in the manner specified in clause (1) of this regulation.”

24. In terms of the above regulations, the debt equity ratio of 70:30 has been considered on the additional capital expenditure, after adjustment of the un-discharged liability, for the purpose of tariff.

Return on Equity

25. Regulation 15 of the 2009 Tariff Regulations provides as under:

“(1) Return on equity shall be computed in rupee terms, on the equity base determined in accordance with regulation 12.

(2) Return on equity shall be computed on pre-tax basis at the base rate of 15.5% to be grossed up as per clause (3) of this regulation.

Provided that in case of projects commissioned on or after 1st April, 2009, an additional return of 0.5% shall be allowed if such projects are completed within the timeline specified in Appendix-II.

Provided further that the additional return of 0.5% shall not be admissible if the project is not completed within the timeline specified above for reasons whatsoever.

(3) The rate of return on equity shall be computed by grossing up the base rate with the Minimum Alternate/Corporate Income Tax Rate for the year 2008-09, as per the Income Tax Act, 1961, as applicable to the concerned generating company or the transmission licensee, as the case may be.

(4) Rate of return on equity shall be rounded off to three decimal points and be computed as per the formula given below:

Rate of pre-tax return on equity = Base rate / (1-t)

Where t is the applicable tax rate in accordance with clause (3) of this regulation.

(5) The generating company or the transmission licensee, as the case may be, shall recover the shortfall or refund the excess Annual Fixed Charge on account of Return on Equity due to change in applicable Minimum Alternate/Corporate Income Tax Rate as per the Income Tax Act, 1961 (as amended from time to time) of the respective financial year directly without making any application before the Commission:

Provided further that Annual Fixed Charge with respect to the tax rate applicable to the generating company or the transmission licensee, as the case may be, in line with the provisions of the relevant Finance Acts of the respective year during the tariff period shall be trued up in accordance with Regulation 6 of these regulations.”

26. The petitioner has considered the rate of Return on Equity @ 18.674%, based on prevailing MAT rate (Basic rate of 15%+10% Surcharge+3% Education Cess=16.995%) for 2009-10.

27. Return on equity has been worked out @17.481% per annum on the normative equity, after accounting for the additional capital expenditure, considering the base rate of 15.5% and MAT rate of 11.33%. The computation of Return on Equity is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Notional equity	116876.01	117261.36	118012.18	118604.51	119194.31
Addition due to Additional capitalization	385.35	750.82	592.33	589.80	675.09
Closing Equity	117261.36	118012.18	118604.51	119194.31	119869.40
Average Equity	117068.68	117636.77	118308.34	118899.41	119531.85
Return on Equity (Base Rate)	15.500%	15.500%	15.500%	15.500%	15.500%
Tax rate for the year 2008-09	11.330%	11.330%	11.330%	11.330%	11.330%
Rate of Return on Equity	17.481%	17.481%	17.481%	17.481%	17.481%
Return on Equity	20464.24	20563.55	20680.94	20784.27	20894.82

Interest on loan

28. Regulation 16 of the 2009 Tariff Regulations provides as under:

(1) The loans arrived at in the manner indicated in regulation 12 shall be considered as gross normative loan for calculation of interest on loan.

(2) The normative loan outstanding as on 1.4.2009 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2009 from the gross normative loan.

3) The repayment for the year of the tariff period 2009-14 shall be deemed to be equal to the depreciation allowed for that year.

(4) Notwithstanding any moratorium period availed by the generating company or the transmission licensee, as the case may be the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.

(5) The rate of interest shall be the weighted average rate of interest calculated on the basis of the actual loan portfolio at the beginning of each year applicable to the project.

Provided that if there is no actual loan for a particular year but normative loan is still outstanding, the last available weighted average rate of interest shall be considered.

Provided further that if the generating station or the transmission system, as the case may be, does not have actual loan, then the weighted average rate of interest of the generating company or the transmission licensee as a whole shall be considered.

(6) The interest on loan shall be calculated on the normative average loan of the year by applying the weighted average rate of interest.

(7) The generating company or the transmission licensee, as the case may be, shall make every effort to re-finance the loan as long as it results in net savings on interest and in that event the costs associated with such re-financing shall be borne by the beneficiaries and the net savings shall be shared between the beneficiaries and the generating company or the transmission licensee, as the case may be, in the ratio of 2:1.

(8) The changes to the terms and conditions of the loans shall be reflected from the date of such re-financing.

(9) In case of dispute, any of the parties may make an application in accordance with the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999, as amended from time to time, including statutory re-enactment thereof for settlement of the dispute.

Provided that the beneficiary or the transmission customers shall not withhold any payment on account of the interest claimed by the generating company or the transmission licensee during the pendency of any dispute arising out of re-financing of loan."

29. Interest on loan has been worked out as mentioned below:

- (a) The opening gross normative loan as on 1.4.2009 has been arrived at in accordance with Regulation 16 of the 2009 Tariff Regulations.
- (b) The weighted average rate of interest has been worked out on the basis of the actual loan portfolio of respective year applicable to the project.
- (c) The repayment for the year of the tariff period 2009-14 has been considered equal to the depreciation allowed for that year.
- (d) The interest on loan has been calculated on the normative average loan of the year by applying the weighted average rate of interest and enclosed as Annexure-I to this order.

30. Interest on loan is worked out as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Normative loan	192575.54	193474.69	195226.60	196608.71	197984.91
Cumulative repayment up to previous year	39983.80	52985.10	66065.79	79240.34	92497.50
Net loan-opening	152591.74	140489.59	129160.81	117368.37	105487.41
Repayment during the year	13001.30	13080.69	13174.55	13257.15	13345.54
Additions due to Additional Capitalization	899.15	1751.91	1382.11	1376.20	1575.20
Net Loan-closing	140489.59	129160.81	117368.37	105487.41	93717.07
Average loan	146540.67	134825.20	123264.59	111427.89	99602.24
Weighted Average rate of Interest on Loan	8.4740%	9.1550%	9.1575%	9.1556%	9.1532%
Interest on Loan	12417.92	12343.31	11287.92	10201.94	9116.76

Depreciation

31. Regulation 17 of the 2009 Tariff Regulations provides as under:

“(1) The value base for the purpose of depreciation shall be the capital cost of the asset admitted by the Commission.

(2) The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset.

Provided that in case of hydro generating stations, the salvage value shall be as provided in the agreement signed by the developers with the State Government for creation of the site.

Provided further that the capital cost of the assets of the hydro generating station for the purpose of computation of depreciable value shall correspond to the percentage of sale of electricity under longterm power purchase agreement at regulated tariff.

(3) Land other than the land held under lease and the land for reservoir in case of hydro generating station shall not be a depreciable asset and its cost shall be excluded from the capital cost while computing depreciable value of the asset.

(4) Depreciation shall be calculated annually based on Straight Line Method and at rates specified in Appendix-III to these regulations for the assets of the generating station and transmission system.

Provided that, the remaining depreciable value as on 31st March of the year closing after a period of 12 years from date of commercial operation shall be spread over the balance useful life of the assets.

(5) In case of the existing projects, the balance depreciable value as on 1.4.2009 shall be worked out by deducting the cumulative depreciation including Advance against Depreciation as admitted by the Commission upto 31.3.2009 from the gross depreciable value of the assets.

(6) Depreciation shall be chargeable from the first year of commercial operation. In case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis.”

32. In terms of the above regulations, the weighted average rate of depreciation of 4.1927% has been considered for the calculation of depreciation. Therefore, assets amounting to ₹749.00 lakh has been de-capitalized during 2013-14. The amount of cumulative depreciation allowed in tariff against these de-capitalized assets has been calculated on *pro rata* basis and the same has been adjusted from the cumulative depreciation of the year of de-capitalization. Accordingly, depreciation has been worked out as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Block as on 31.3.2009	309451.55	310736.05	313238.78	315213.22	317179.22
Additional capital expenditure during 2009-14	1284.50	2502.73	1974.44	1966.00	2250.29
Closing gross block	310736.05	313238.78	315213.22	317179.22	319429.51
Average gross block	310093.80	311987.41	314226.00	316196.22	318304.36
Rate of Depreciation					
Depreciable Value	279084.42	280788.67	282803.40	284576.60	286473.93
Balance Useful life of the asset	31.4	30.4	29.4	28.4	27.4
Remaining Depreciable Value	239101.29	227804.25	216738.28	205336.93	193977.10
Depreciation	13001.30	13080.69	13174.55	13257.15	13345.54

Operation & Maintenance Expenses

33. Regulation 19(f)(iv) of the 2009 Tariff Regulations provides for normative operation and maintenance expenses for hydro generating stations as under:

"19(f) Hydro generating station

(i) Operation and maintenance expenses, for the existing generating stations which have been in operation for 5 years or more in the base year of 2007-08, shall be derived on the basis of actual operation and maintenance expenses for the years 2003-04 to 2007-08, based on the audited balance sheets, excluding abnormal operation and maintenance expenses, if any, after prudence check by the Commission.

(ii) The normalized operation and maintenance expenses after prudence check, for the years 2003-04 to 2007-08, shall be escalated at the rate of 5.17% to arrive at the normalized operation and maintenance expenses at the 2007-08 price level respectively and then averaged to arrive at normalized average operation and maintenance expenses for the 2003-04 to 2007-08 at

2007-08 price level. The average normalized operation and maintenance expenses at 2007-08 price level shall be escalated at the rate of 5.72% to arrive at the operation and maintenance expenses for year 2009-10:

Provided that operation and maintenance expenses for the year 2009-10 shall be further rationalized considering 50% increase in employee cost on account of pay revision of the employees of the Public Sector Undertakings to arrive at the permissible operation and maintenance expenses for the year 2009-10.

(iii) The operation and maintenance expenses for the year 2009-10 shall be escalated further at the rate of 5.72% per annum to arrive at permissible operation and maintenance expenses for the subsequent years of the tariff period.

(iv) In case of the hydro generating stations, which have not been in commercial operation for the period of five years as on 1.4.2009, operation and maintenance expenses shall be fixed at 2% of the original project cost (excluding cost of rehabilitation and resettlement works). Further, in such case, operation and maintenance expenses in first year of commercial operation shall be escalated @ 5.17% per annum up to the year 2007-08 and then averaged to arrive at the O & M expenses in respective year of the tariff period. [The impact of pay revision on employee cost for arriving at the operation and maintenance expenses for the year 2009-10 shall be considered in accordance with the procedure given in proviso to sub-clause (ii) of clause (f) of this regulation.]

34. The break-up of the O&M expenses claimed by the petitioner for 2009-14 as per provisions of the above regulations, is as under:

(₹ in lakh)					
	2009-10	2010-11	2011-12	2012-13	2013-14
O&M expenses	5291	5594	5914	6252	6609

35. The original project cost (excluding R&R) of the generating station as on the cut-off date (31.3.2007) claimed and considered is ₹1928.86 crore and based on the methodology specified under Regulation 19(f)(iv), O&M expenses have been calculated by the petitioner considering the weightage of employees cost as 35 % of O&M expenses.

36. The petitioner has submitted the details of employee cost and the net O&M expenses from 2003-04 to 2008-09. After considering the accounts from the first year of commercial operation (2005-06) to the base year i.e 2007-08, the percentage employee cost for the period 2009-14 is worked out as under:

(₹ in lakh)				
	2005-06	2006-07	2007-08	Average normalized at 2007-08 level
Total O&M	4339.4	5131.87	5788.86	5328.58
Total employee cost	737.2	888.25	1163.36	970.98
	Percentage employees cost			18.22%

37. Accordingly, O&M expenses allowed for the period 2009-14, based on the employee cost percentage of 18.22% is as under:

	<i>(₹ in lakh)</i>				
	2009-10	2010-11	2011-12	2012-13	2013-14
O&M allowed	4951.87	5235.12	5534.57	5851.14	6185.83

Normative Annual Plant Availability Factor (NAPAF)

38. The petitioner, in its petition has submitted that in terms of norms of operation of hydro power generating station notified by the Commission under Regulation 27 of the 2009 Tariff Regulations, a new concept of Plant Availability Factor (PAF) has been introduced in place of Capacity Index, prevalent under the 2004 Tariff Regulations (applicable for the period 2004-09). In the background of Regulation 22(2) pertaining to the recovery of capacity charges and Regulation 27(5) of the 2009 Tariff Regulations, specifying the NAPAF of the generating station as 85%, the petitioner has submitted as under:

- (a) For big reservoir level changes from maximum at the end of monsoon (somewhere in the month of October) to minimum at the beginning of next monsoon (somewhere in the end of June or first week of July). During post monsoon period (November to June), the Indira Sagar reservoir depletes gradually down from maximum to MDDL i.e. EL 243.23 M. Accordingly, the available head for power generation varies from maximum of 64 M to 46 M at MDDL.
- (b) The machines of Indira Sagar Project have been designed for 60 m water head and thus, the demonstration of rated installed capacity of 125 MW / machine is possible only when the reservoir level is at EL 255.0 m or above. Below EL 255.0 M, the machine rating gets reduced gradually in commensurate to the available head and it reduces even up to 85 MW against the rated nameplate capacity of 125 MW.
- (c) Taking the above facts into consideration, the month-wise peaking capability of Indira Sagar project for 90 % dependable year was defined in the Techno-economic clearance of CEA. Thus, the month-wise average peaking capabilities vis-à-vis the maximum annual average capacity (without outages) shall be as below:

Month	Peaking Capability (MW)	Annual Average capacity (MW)
April	922	952
May	852	
June	765	
July	912	
August	1000	
September	1000	
October	1000	
November	1000	
December	1000	
January	1000	
February	1000	
March	979	

As such, the maximum average (Ex-Bus) declared capacity could be 942.48 MW and accordingly, the maximum PAF of Indira Sagar Project could be achieved only upto 95.20% without any outages, which corresponds to a 100% Capacity Index (CI) as per the 2004 Tariff Regulations (i.e all 8 No. generating machines are available throughout the year).

(d) As per norms of operation specified for storage type power station in the 2004 Tariff Regulations, the normative Capacity Index was fixed as 85%, which implies that the generating machines could be taken for planned outages for a maximum of 15 % time period spread over the year, without loss of any fixed charges. Thus corresponding to this normative Capacity Index i.e. 85% , PAF as per new norms works out to 80.92% (=95.20 x0.85) during 90% dependable year. In case of failure of monsoon and in the eventuality of filling of reservoir less of failure of monsoon and in the eventuality of filling of reservoir less than EL 255.0 M, the probability of further lowering down of PAF below 80.92 % may not be ruled out, even if project demonstrates the machine availability of 85% or more, in terms of Capacity Index as per the 2004 Tariff Regulations.

(e) Taking into consideration the above facts related to Indira Sagar Project, the petitioner has been representing for modification in the formula of PAF by replacing the term 'Installed Capacity' with the term 'Peaking Capabilities' or to re-fix the NAPAF as 75 %, so that the Petitioner may not be deprived from recovery of 50 % of annual fixed charges in the form of capacity charges, for reasons beyond the control of generator such as partial filling of reservoir consequent to failure of monsoon.

(f) Regulation 22(6) of the 2009 Tariff Regulations, provide for making-up of Energy charges shortfall on a rolling basis, in the eventuality of generation being less than design energy, for

reasons beyond the control of generating company. However, no such provision has been made in Capacity Charges in the eventuality on non-achievement of NAPAF, for reasons beyond the control of generating company.

39. During the hearing on 11.10.2011, the petitioner submitted that NAPAF of the generating station may be re-fixed as 75% considering that the generating station is a big storage type station where water head for power generation varies from 65 M at FRL to 46 M at MDDL and consequently, the machine output varies from 125 MW at FRL to 85 MW at MDDL.

40. The NAPAF for various hydro generating stations specified by the Commission under Regulation 27(5) are based on the criteria laid down under the provisions of Regulation 27(1) of the 2009 Tariff Regulations.

41. As an example, the Commission while determining the NAPAF of 77% in respect of one of the hydro generating station, namely, THDC (4 x 250 MW) had considered the following;

Month	Expected Average of daily three hour Peaking Capability (MW)
April	701
May	448
June	497
July	544
August	990
September	1000
October	1000
November	1000
December	1000
January	1000
February	693
March	605

Weighted average of expected daily peaking capability=790 MW

[Peaking capacity is based on the assumption that one unit shall be under annual maintenance during month of May, July, February and March. Considering 2% allowance on plant capacity on account of forced outages during the year, expected average peaking capacity= 770 MW Thus, the NAPAF is 77% [770/1000]

42. If a similar exercise is undertaken in respect of this generating station, assuming two units each would be under annual maintenance during months of April, May, June and March respectively and considering 2% allowance on forced outage, the average peaking capacity

would be 88% (approx). Thus, the NAPAF for this generating station has been determined as 85% under Regulation 27(5) of the 2009 Tariff Regulations, which is considered for 2009-14. The prayer of the petitioner, is disposed of accordingly.

Interest on Working Capital

43. Regulation 18(1)(c) of the 2009 Tariff Regulations provides that the working capital for hydro generating stations shall cover:

- (i) Receivables equivalent to two months of fixed cost;*
- (ii) Maintenance spares @ 15% of operation and maintenance expenses specified in regulation 19;*
- (iii) Operation and maintenance expenses for one month.*

44. Clause (3) of Regulation 18 of the 2009 Tariff Regulations as amended on 21.6.2011 provides as under:

"Rate of interest on working capital shall be on normative basis and shall be considered as follows:

(i) SBI short-term Prime Lending Rate as on 01.04.2009 or on 1st April of the year in which the generating station or unit thereof or the transmission system, as the case may be, is declared under commercial operation, whichever is later, for the unit or station whose date of commercial operation falls on or before 30.06.2010.

(ii) SBI Base Rate plus 350 basis points as on 01.07.2010 or as on 1st April of the year in which the generating station or a unit thereof or the transmission system, as the case may be, is declared under commercial operation, whichever is later, for the units or station whose date of commercial operation lies between the period 01.07.2010 to 31.03.2014.

Provided that in cases where tariff has already been determined on the date of issue of this notification, the above provisions shall be given effect to at the time of truing up.

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

Maintenance Spares in working capital

46. In terms of the above provisions, maintenance spares considered for the purpose of tariff is as under:

	<i>(₹ in lakh)</i>				
	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	742.78	785.27	830.19	877.67	927.87

Receivables

47. Receivable component of the working capital has been worked out on the basis of two months of fixed cost as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Receivables	8673.22	8740.50	8649.29	8551.55	8459.34

O&M Expenses

48. O & M expenses for 1 month for the purpose of working capital is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
O & M for 1 month	412.66	436.26	461.21	487.60	515.49

49. SBI PLR of 12.25% as on 1.4.2009 has been considered. Necessary computations in support of calculation of interest on working capital are as under as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	742.78	785.27	830.19	877.67	927.87
O & M expenses	412.66	436.26	461.21	487.60	515.49
Receivables	8673.22	8740.50	8649.29	8551.55	8459.34
Total	9828.66	9962.03	9940.69	9916.82	9902.70
Rate of interest	12.25%	12.25%	12.25%	12.25%	12.25%
Interest on Working Capital	1204.01	1220.35	1217.73	1214.81	1213.08

Annual Fixed charges for 2009-14

50. The annual fixed charges for the period 2009-14 in respect of the generating station is summarized as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Return on Equity	20464.24	20563.55	20680.94	20784.27	20894.82
Interest on Loan	12417.92	12343.31	11287.92	10201.94	9116.76
Depreciation	13001.30	13080.69	13174.55	13257.15	13345.54
Interest on Working Capital	1204.01	1220.35	1217.73	1214.81	1213.08
O & M Expenses	4951.87	5235.12	5534.57	5851.14	6185.83
Total	52039.35	52443.02	51895.72	51309.31	50756.03

51. The recovery of the annual fixed charges shall be subject to truing up, in terms of Regulation 6 of the 2009 Tariff Regulations.

Design Energy (Stage-wise) and Commencement of Stage-II of the generating station

52. The petitioner has submitted that the Government of Madhya Pradesh (GoMP) is executing Unit-II (Canal) of this multipurpose project and depending upon the development of canal network and the irrigation command, the three Stages of power generation for 90% dependable year have been defined in the Techno-Economic Clearance of CEA for the generating station. Accordingly, in Petition No.119/2005 filed by the petitioner for determination of annual fixed charges for 2004-09 for the generating station, the Commission had admitted the Design Energy of 1980 MU in a 90% dependable year, with firm power of 226 MW during Stage-I of the project. The firm power during 90% dependable year for Stage-II & III of the project shall subsequently reduce to 125 MW and 100 MW, respectively and accordingly, the corresponding Design Energy during 90% dependable year for Stages-II & III shall be 1095 MU and 876 MU, respectively. The petitioner has further submitted that the current Design Energy of the generating station as approved by the Commission is 1980 MU, corresponding to Stage-I. The respondent No. 2 Narmada Valley Development Authority (NVDA) has already constructed substantial portion of main canal and has commenced drawing water for irrigation purposes from Indira Sagar Reservoir through canal head regulators. Accordingly, the generating station is now heading towards Stage-II from Stage-I. Taking into consideration the above factors, the petitioner, during the hearing on 11.10.2011, prayed that that the respondent No.2, NVDA, be directed to notify the date of termination of Stage-I and the commencement of Stage-II of the generating station. In reply, the respondent No.2 *vide* its affidavit dated 17.10.2011 has submitted as under:

"In the reservoir at present there is ample quantity of water available and full utilization of water for irrigation in Stage-I is under development by NVDA. Also the Generation achieved at the presently permitted filling level 260.0 M against FRL 262.13 M for financial year 2009-10 & year 2010-11 are 2118.33 MU & 2197.77 MU respectively. The generation during the financial year 2011-12 is expected to be more than 2500 MUs. Thus the generation is more than the said design Energy of phase-I i.e. 1980 MU. In view of this, Hon'ble CERC is requested to defer the notification regarding the date of termination of Stage-I of Canal Development and commencement of Stage-II, till full utilization of water for irrigation is made by NVDA".

53. In response, the petitioner by its affidavit dated 3.11.2011 has submitted that the water yields during monsoon 2009 and 2010 were much more than the water yields corresponding to

90% dependable year and had resulted in generation of extra energy. However, monsoon 2008 had resulted in water yields less than 90% dependable year and consequently generation during 2008-09 was less to an extent of 400 MU with respect to design energy. As such the submissions of the respondent that ample water is available in the reservoir and generating more than the design energy does not hold good. It has also submitted that as substantial length of main canal has been completed by respondent No.2, its Stage-II has already commenced. Accordingly, the design energy of the generating station for the period 2009-14 corresponding to Stage-II should be reckoned as 1095 MU.

54. Thereafter, by affidavit dated 10.1.2012 the petitioner has submitted as under;

"1.As per clause 3 of the Techno Economic Clearance, the power benefits from Indira Sagar Multi-purpose Project have been envisaged in three stages in commensurate to the development or irrigation command vis-à-vis consumptive utilization of water for irrigation by the state of Madhya Pradesh. Accordingly, the Firm Power from Power Component of this multi-purpose project was also fixed stage-wise as below:

Stage of Irrigation Development	Total Irrigation in Basin (BM ³) by Madhya Pradesh	Firm power (MW)
Stage – I (10 yrs from start of construction)	≤ 6.00	226
Stage- II (30 yrs from start of construction)	>6.00 ≤ 13.00	From 226 to 125
Stage – III (45 yrs from start of construction)	>13.00 ≥ 18.25	From 125 to 100
Final Stage	≥ 18.25	100

2. As per TEC, stage-I basically pertains to initial 10 years of construction of the multipurpose project and by that time the total Irrigation Utilization in Narmada Basin by MP was envisaged upto 6.00 BM³ and such, stage-I of Project was envisaged to be ceased as soon as the utilization of water in the basin by MP crosses the 6.00 BM³. Till such time the power benefits from this multi-purpose Project was envisaged with a Firm power of 226 MW and the corresponding annual design energy as 1980 MU.

3. Stage-II of the project was envisaged to be commenced as soon as the utilization of water in the basin by MP crosses the 6.00 BM³ and to be continued till such time, the water utilization by Madhya Pradesh attains a limit of 13 BM³. As per TEC, the state of Madhya Pradesh was to enhance the water utilization from 6.00 BM³ within a period of 20 years from the commencement of stage-II i.e. corresponding to 30 years from the start of construction of the multi-purpose project, with an average incremental value of 0.35 BM³ per annum.

Similarly, stage-III of project was envisaged to be commenced as soon as the utilization of water in the basin crosses the 13.00 BM³ and to be continued till such time the water utilization by Madhya Pradesh attains a limit of 18.25 BM³. As per TEC, the state of Madhya Pradesh was to enhance the water utilization from 13.00 BM³ to 18.25 BM³ within a period of 15 years from the commencement of stage-III i.e. corresponding to 45 years from the start of construction of the multi-purpose project, with an average incremental value of 0.35 BM³ per annum.

4. The utilization of water by the state of Madhya Pradesh has not been in commensurate to the period (s) as envisaged in the TEC of Indira Sagar Multi-purpose project. Thus, the various stages of this multi-purpose project now needs to be ascertained depending on the actual water utilization for irrigation in the basin by the state of Madhya Pradesh and accordingly, the reducing power benefits i.e. firm power to be reckoned on pro-rata basis in commensurate to the increased and actual water utilization in the basin for irrigation by MP.

5. The Narmada Control Authority (NCA), regulatory body formed under NWDT Award is responsible for water accounting and notifying the utilization of water by beneficiary party states of Narmada water. As per the NCA's notification, the water utilization by Madhya Pradesh in Narmada basin was 5.971 BM³ during 2009-10 and was 6.624 BM³ during 2010-11 as declared provisionally, vide NCA letter no. MCA/MCC/GC/2011/03 dated 9.1.2012. As such, the Indira Sagar multi-purpose has already entered in stage-II and thus, reducing power benefit i.e. firm power during stage-II needs to be determined depending on actual water utilization being notified by NCA on annual basis.

6. Consequent upon crossing the limit of water utilization by the Madhya Pradesh in the basin beyond 6 BM³ during 2010-11, the stage-II of Indira Sagar Multi-purpose Project stands commenced from year 2010-11 and as stated at Para 42 above that stage-II shall be continued for such time till the water utilization in the basin by the Madhya Pradesh attains the level of 13 BM³. As per TEC, the Firm Power reduces from 226 MW to 125 MW during stage –II. Accordingly, the reducing power benefit i.e. Firm Power may be determined for respective intervening years of stage-II on pro-rata basis as per formula derived below:

$$FP \text{ (stage-II)} = 226 - \frac{(226-125)}{(13-6.00)} \times (Q-6.00)$$

OR

$$FP \text{ (stage-II)} = 226 - 14.429 (Q-6.00)$$

Where,

FP (stage-II) = Reducing power benefit i.e. Firm Power (in MW) on pro-rata basis during Stage-II period of Indira Sagar Multi-purpose Project

Q = Actual water utilization (in BM³) for irrigation by MP in the Narmada Basin to be notified by NCA for respective years.

7. With water utilization of 6.624 BM³ by Madhya Pradesh during year 2010-11, the firm power for the year 2010-11 work out to 217 MW as per above derived formula and accordingly, the annual design energy comes to 1901 MU and its month-wise break-up is given below:

2010-11 (Provisional)	
Month	Monthly Design energy(MU)
April	156
May	161
June	156
July	161
August	161
September	156
October	161
November	156
December	161
January	161
February	146

<i>March</i>	<i>161</i>
Annual Design Energy	1901

The Commission may adopt the formula as derived in par 6 above, for determination of reducing firm power of this multipurpose project during subsequent years of Stage-II, till the water utilization in Narmada basin by Madhya Pradesh attains limit of 13 BM³."

55. We have examined the submissions of the parties and are of the considered view that during 2009-10, the Design Energy of Stage-I shall be applicable. From 2010-11, Stage-II shall commence and the Design Energy of 1901 MU (as calculated in the above table) based on water utilization over 6.0 BM³ shall be applicable, provisionally. The Design Energy is subject to truing up at the end of the financial year, based on the actual water utilization during the year. Similarly, for the years 2011-12, 2012-13, and 2013,14 the Design Energy shall be calculated based on the water utilization certification by Narmada Control Authority (NCA) and shall be trued up at the end of each financial year, based on the actual water utilization, duly certified. The petitioner may approach NCA for certification of water utilization by Madhya Pradesh for respective years for the purpose of calculation of Design Energy and firm power.

Application fee and the publication expenses

56. The petitioner has sought approval for the reimbursement of fee of ₹1,00,00,000 /- (Rs one crore) for the period 2009-14, deposited towards filing of tariff petition and towards the expenses incurred for publication of notices in connection with the petition. The petitioner by its affidavit dated 30.7.2010 has submitted that an expenditure of ₹12,198/- has been incurred by it for publication of notice in the newspapers.

57. In terms of Regulation 42 of the 2009 Tariff Regulations and based on the decision of the commission in order dated 11.1.2010 in Petition No.109/2009 (pertaining to approval of tariff for SUGEN power plant for the period from DOCO to 31.3.2014) has decided that filing fees in respect of main petitions for determination of tariff and the expenses on publication of notices are to be reimbursed. Accordingly, the expenses incurred by the petitioner on petition filing fees

for the period 2009-14 and the expenses towards publication of notice shall be directly recovered from the beneficiaries, on *pro rata* basis on production of documentary proof.

58. The petitioner is provisionally billing the respondents in accordance with the Commission's order dated 19.4.2011 in Petition No. 207/2010. The provisional billing of annual fixed charges shall be adjusted in terms of the proviso to Regulation 5 (3) of the 2009 Tariff Regulations.

59. This disposes of Petition No. 154/2010.

Sd/-
[M. Deena Dayalan]
Member

Sd/-
[V.S. Verma]
Member

Sd/-
[S. Jayaraman]
Member

Annexure-I**Calculation of Weighted Average Rate of Interest on Loan***(₹ in lakh)*

Sl. no.	Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
	Loan-1: Short Term Loan (STL)					
	Gross loan - Opening	111102	168997	168997	168997	168997
	Cumulative repayments of Loans upto previous year	19435	168997	168997	168997	168997
	Net loan - Opening	91667	0	0	0	0
	Add: Drawal(s) during the Year	57895	0	0	0	0
	Less: Repayment (s) of Loans during the year	149562	0	0	0	0
	Net loan - Closing	0	0	0	0	0
	Average Net Loan	45833	0	0	0	0
	Rate of Interest on Loan	7.91%	0	0	0	0
	Interest on loan	3627	0	0	0	0
	Loan-2: Long Term Loan (LTL) Rs.1690 crore					
	Gross loan - Opening	169000	6500	6500	6500	6500
	Cumulative repayments of Loans upto previous year	119833	1625	3167	3583	4000
	Net loan - Opening	49167	4875	3333	2917	2500
	Add: Drawal(s) during the Year	0	0	0	0	0
	Less: Repayment (s) of Loans during the year	44291.67	1541.67	416.67	416.67	416.67
	Net loan - Closing	4875	3333	2917	2500	2083
	Average Net Loan	27021	4104	3125	2708	2292
	Rate of Interest on Loan	7.67%	7.67%	7.67%	7.67%	7.67%
	Interest on loan	2074	315	240	208	176
	Loan-3: Long Term Loan (LTL) Rs.1013.74 crore					
	Gross loan - Opening	0	101374	101374	101374	101374
	Cumulative repayments of Loans upto previous year	0	10137	20275	30412	40550
	Net loan - Opening	0	91237	81099	70962	60824
	Add: Drawal(s) during the Year	101374	0	0	0	0
	Less: Repayment (s) of Loans during the year	10137.4	10137.4	10137.4	10137.4	10137.4
	Net loan - Closing	91237	81099	70962	60824	50687
	Average Net Loan	45618	86168	76031	65893	55756
	Rate of Interest on Loan	9.50%	9.50%	9.50%	9.50%	9.50%
	Interest on loan	4334	8186	7223	6260	5297
	Loan-4: Long Term Loan (LTL) Rs.450 crore					
	Gross loan - Opening	0	39583	40708	40708	40708
	Cumulative repayments of Loans upto previous year	0	1979	6106	10177	14248
	Net loan - Opening	0	37604	34602	30531	26460
	Add: Drawal(s) during the Year	39583	1125	0	0	0
	Less: Repayment (s) of Loans during the year	1979.15	4127.05	4070.8	4070.8	4070.8
	Net loan - Closing	37604	34602	30531	26460	22389
	Average Net Loan	18802	36103	32566	28496	24425
	Rate of Interest on Loan	8.50%	8.50%	8.50%	8.50%	8.50%
	Interest on loan	1598	3069	2768	2422	2076
	Total Loan					
	Gross loan - Opening	280102	316454	317579	317579	317579

	Cumulative repayments of Loans upto previous year	139268	182739	198545	213170	227794
	Net loan - Opening	140834	133715	119034	104409	89784
	Add: Drawal(s) during the Year	198852	1125	0	0	0
	Less: Repayment (s) of Loans during the year	205970	15806	14625	14625	14625
	Net loan - Closing	133715	119034	104409	89784	75159
	Average Net Loan	137275	126375	111721	97097	82472
	Interest on loan	11633	11570	10231	8890	7549
	Weighted Average Rate of Interest on Loans	8.4740%	9.1550%	9.1575%	9.1556%	9.1532%