Before CENTRAL ELECTRICITY REGULATORY COMMISSION at NEW-DELHI

IN THE MATTER OF COMMENTS OF DVC ON DRAFT NOTIFICATION OF TARIFF REGULATIONS, 2019 FOR TARIFF PERIOD 2019-24

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DATED: 28.01.2019

PLACE: KOLKATA



DAMODAR VALLEY CORPORATION COMMERCIAL DAPARTMENT DVC TOWERS, VIP ROAD KOLKATA – 700 054. Tel.. No. + 91 33 2355 7931 / 6041 ; Fax No. + 91 33 2355 2129.

No. Coml / Tariff / CERC / 🦰 🐧

Dated:

2 5 JAN 2019

To The Secretary Central Electricity Regulatory Commission 3rd and 4th Floor, Chanderlok Building 36, Janpath, New Delhi – 110 001.

Sub : Comments on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019

Ref : Public Notice vide no. L-1/236/2018/CERC Dtd. 07.01.2019.

Dear Sir,

This has reference to the public notice dtd. 07.01.2019 on the above subject posted at CERC web site wherein comments/suggestions of the stakeholders were solicited.

Accordingly, the comments/suggestions in respect of DVC, on the Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2019, considering some special aspects conferred upon DVC are enclosed herewith as mentioned below for your kind perusal and consideration please:-

- 1. Appendix-I :-Slide Presentation of DVC Comments on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019
- 2. Appendix-II :- DVC Comments on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019
- 3. Appendix-III :- Supporting documents related to Appendix-II

As advised, the above soft copy of the above documents has been mailed to <u>tariff.regulation@cercind.gov.in</u> and the same also uploaded through SAUDAMINI Portal. It is our earnest hope and humble prayer that the Hon'ble Commission will recognize our concerns and make necessary modifications.

We also crave leave to submit at a future date further materials on the subject which may be available to us in the event we are of the opinion that the same would render meaningful assistance to the Hon'ble Commission in the matter.

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Thanking you,

Yours faithfully,

Executive Director (Commercial)

Enclosure: - As stated above

Appendix-I

Slide Presentation of DVC Comments on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019









5. Return on Equity [Regulation-17 (6) and 30(2)]

Justification by DVC:

In respect of reduction of equity for Gen. station /Transmission / Communication which has completed its useful life as on or after 1.4.2019, DVC humbly submits that this will lead to demotivation to run old Gen. Station /Transmission / Communication beyond its useful life.

For the Generating Station which has been set-up much earlier than 2019-24 regulation period , the deployment of Capital in the form of equity and Loan was envisaged without considering the present provision as proposed by CERC in this draft regulation. Moreover, any under recovery of ROE due to lower Plant availability factor will not get compensated in the course of time on achieving higher availability if the same provision of reduction in equity is done in such a fashion. This may lead to tendency of decommissioning of plant/Transmission asset after useful life , although it can still run, which is a national loss.

DVC proposes-

that Hon'ble Commission may please modify Regulation 17 (6) to that extent and to continue treatment of Equity after useful life same as per the existing Regulation, 2014

□ Draft Regulation - 30 (2) proposes to allow weighted average rate of interest instead of 15.5% in ROE in respect of Add. Cap after cut off date within or beyond the original scope.

DVC proposes-

For consideration of Additional Capitalization beyond the cut of date within or beyond the Original Scope, considering debt : equity in 70:30 ratio and allow ROE of 15.5% on equity component.

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6. Operation & Maintenance Expense (Regulation: 35)

Due to implementation of emission control system to meet revised emission norms there will be an increase in O&M expenses.

DVC proposes that O&M expenses due to the requirement of revised emission norms, may be provided over and above the normative O & M.

DVC also proposes-

- (a) 'Compensation Allowance' for old stations (age more than 10 years) may please be continued as is existing in 2014-19 regulation to meet expenses on new asset of capital nature not admissible under regulation for additional capital expenditure and
- (b) to allow ash evacuation & transportation expenses additionally in case of thermal power stations.
- (c) For consideration of Security Expenses to be allowed separately, all type of security namely CISF/DGR/ JISF etc to be included.

Further to above, O & M expenses for communication system on account of following may also kindly be considered:-

- (a) EMS/SCADA control centers & PMU Control Centre.
- (b) OPGW Communication equipment like SDH & PDH.
- (c) Power Line Carrier Communication equipment for Sub Stations and Power Stations.
- (d) Telephone Exchange for Inter-communication.
- (e) Auxiliary Equipments like UPS System, DC Power Supply System

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7. Computation of C	Capacity ([R	Charge fo egulation	r Therma 51]	I Genera	ting Station
(i) Relaxation in NQPAF due to '	Shortage	of Coal' :			
As per Draft Regulation 2019-24, NQPAF has been fixed as 83 % for almost all the therma stations. But nothing has been mentioned about loss of PAF due to shortage of coal fo calculation of NQPAF. Power generating company has no control over Coal Companies & Railways and almost every year thermal stations are losing considerable PAF (%) due to shortage of coal.					
Annual PAF loss due to shortag below:	ge of coal d	luring last f	ive years fa	aced by DV	C Plants are furnished
Year	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19 (till Dec'18)
PAF loss due to shortage of coal (in %)	9.7	6.5	NIL	8.7	20.2
DVC proposes: For considerat	ion of				
(a) 'loss of PAF due to short	age of coa	al' in recov	ery of fixe	d charge a	Ind
(b) Different 'Normative Ava considering the seasona	ilability' (i. I variation	e. NQPAF) of genera	be fixed f tion due to	rom Quart uncontro	er to Quarter lled factors.
(ii) Formula for capacity charge	does not	capture th	e following	g provisio	ns of the Regulation :
 (a) Permission for compensation of shortfall in availability during off peak period with increased availability during peak period in a quarter 					
(c) Exclusion of annual schedu	lled mainte	nance perio	od during o	calculation	of QPAF.
(d) Determination of PAFQ for of IC.	the IPP wh	nose PPA h	as been tie	ed up in MV	instead of percentage الا

	8. Norms of Operation for Thermal Generating Station [Regulation 59]						
	Relaxation in 'Heat Rate' [Station Heat Rate for 210 /250MW & 500 MW Units]:						
	As per draft regulation 2019-24, the relaxation of Heat Rate has been increased from 4.5 % to 5.0 % over designed Heat Rate for 500 MW Units. But, in case of some DVC Units, allowed Heat rate have been decreased as tabulated hereunder:						
	Station	Heat rate Approved in 2014-19	Heat rate as per 2019-24 Reg (Draft)				
	MTPS U-1,2,3& MTPS-4, MTPS-5,6 & CTPS-7,8	2450	2410				
	DSTPS U-1&2	2441	2374				
	As per Explanatory memorandum (Page-211, Table-55) while fixing up 'normative Heat Rate' of 500 MW Units, commission considered 7 nos. Units of NTPC which are having design heat rate in the range of 2260 – 2300 Kcal/Kwh. Whereas, in case of both DSTPS and KTPS units (500 MW) of DVC, designed heat rate is 2336 Kcal/Kwh which is much more than heat rate of above 7 nos. Units of NTPC considered as reference. Allowed heat Rate of DSTPS and KTPS is 2374 Kcal/Kwh (only 1.6 % higher than designed Heat rate) which is practically not possible to maintain						
	Justification - Details su	ubmitted separately.					
	DVC proposes that:						
((a) Either allow 5 % margin over the designed heat rate for both DSTPS and KTPS or at least keep the allowed heat rate of DSTPS what it was in 2014-19 regulation.						
(b) Keep normative stati both 210 MW & 250 M	on heat rate either 2450 kcal/k W units of DVC or at least keep	wh (same as 2014-19 period) for 2450 Kcal/Kwh for 210 MW Units. _{[8}				



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10. 'Computation of Variable Cost ' [Regulation - 46 to 49] □ Computation of Gross Calorific Value [Regulation- 3(31) & Regulation-47]: Draft regulation, states that GCV is to be measured on "As received basis at Generating end" and tariff will be based on this GCV. Justification by DVC: All Power Gencos including DVC face trouble in collection of coal sample from wagon top due to high voltage OHE line at unloading end. Presently GCV testing method is mentioned on "As received basis" which lacks clarity. **DVC** proposes : (a) Consideration of the practical difficulty in measuring GCV from wagon top, allow collection of Rail borne coal sample after primary crusher at TPS end. Also, to consider GCV testing method to be adopted as on "Air dry basis". (b) Loss of GCV to be identified between "As Billed" and "As received " at the Generating station and the losses to be booked to Coal supplier or Railways and need to be taken care of in the light of provision of existing FSA. The quantum of GCV loss due to transit, handling etc required to be compensated adequately and to be increased from proposed 85 Kcal to more than 300 Kcal. Landed cost of Primary Fuel [Regulation- 47]: In draft regulation , Landed cost has been defined and cost components up to the delivery point of the Generating stations. Justification by DVC: By the definition 'Landed cost', cost incurred for deployment of Locos dozers and other heavy equipments are not covered. Also unloading cost of coal rakes, sampling cost at loading and unloading ends, Fuel lab cost etc need to be included in landed cost of coal. Provision is to be



Consideration of the unloading cost of coal rakes, sampling cost at loading & unloading ends and Fuel Lab set-up cost. (ii) Provision for inclusion of performance incentives, supplementary bill, interest bill etc. Proper modification and insertion of the heads in Form 15 is necessary.

11. Computation of Capacity & Energy Charge for Pumped Storage Hydro Station [Regulation 55(3)]

DVC proposes -

that the incentive in tariff for operation of PSP in generation mode during peak period, and relaxation in tariff for the energy utilised during pumping mode of operation in offpeak period, may be considered.

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12. 'Mining' [Regulation -3 and Regulation 36 to 45] DVC proposes the following: (i) Definition of 'Mine Developer and Operator(MDO)' may be included (ii) 'O&M Expenses' should also include payment to the Mine Developer and Operator as per Coal Mine Agreement executed between Generating company and the MDO (iii) Instead of determining the O & M expenses of the mine based on the original Project cost for first year and thereafter at escalated at rate of WPI, it should be taken as the project cost in the year when target capacity is achieved and may be considered at actual on year to year basis. Justification for sl no. (iii) by DVC: Unlike Generating Stations, O&M expenses for Coal Mines likely to vary year to year basis as per the production target achieved based on the mine plan. (iv) Instead of considering expenditure incurred after the date of commercial operation till date of achieving target capacity as Capital work in Progress (CWIP), Expenditure till date of achieving target capacity or 5 years from the date of COD, whichever is later, to be treated as CWIP Justification for sl no. (iv) by DVC: R & R activities like construction of R & R colony may take much more time due to involvement of land acquisition etc. (vi) In "Depreciation Schedule" Land related to Integrated Mine should be allowed to be depreciated/amortised over life of mine as per approved Mine Plan/as per Industry practice. (vii) Instead of determining the landed cost of primary fuel on Government notified price, it may be considered based on Coal India Limited notified price or any other Coal Price Regulatory Authority as declared by the GOI. (viii) Provision for information for agreement signed with Mine Developer and Operator(MDO) in Appendix-V (J) and information for payment to MDO in Appendix-V (k) is to be provided .



Pension Contribution separately in addition to existing normative O&M

DVC requires to maintain two types of Provident Fund viz., CPF & GPF. Whereas liability for contribution ceases with the superannuation or otherwise of the employee concerned covered under CPF, liability for pension for employees covered under GPF continues after the superannuation till the death of the employees and even thereafter for payment of family pension.

Normative O&M Expenses considered by the Central Commission is based on the liability for CPF contribution only. Central Commission as well as Appellate Tribunal gave due recognition to this fact in relation to the tariff determination of DVC for the period 2006-09 wherein contribution to P & G Fund created to meet the liability of the employees under pension scheme was allowed to DVC as a special case.

Even Supreme court in its judgement dated 23.07.2018 upheld the judgement of Appellate Tribunal in totality wherein payment of P & G contribution to DVC was one of the issues.

DVC therefore humbly submits that 'contribution towards Pension benefit' may be allowed to DVC separately over and above normative O&M that is mainly framed considering the CPF Scheme in general and not the Pension Scheme which is in existence in few organisations like DVC.

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Appendix-II

DVC Comments on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019

Comments of DVC on Draft Notification of Tariff Regulations, 2019 for Tariff period 2019-24

Preamble:-

DVC is a statutory body constituted under the DVC Act, 1948 with multifarious activities and in this regard DVC is distinct from other electricity utilities. DVC is engaged in activities related to electricity described as power (as an integrated entity in Generation, Transmission, Distribution and Retail supply of Electricity to the consumers , bulk supply of electricity to other procurers including states of West Bengal and Jharkhand utilities).

DVC has other multifarious functions in the Damodar Valley. DVC has the obligation to undertake development Valley, which falls in the provinces of West-Bengal and Jharkhand. The other functions of DVC include promotion and operation of schemes for irrigation, flood control, water supply and drainage and improvement of flow conditions in Hooghly river, navigation in the Damodar river and its tributaries and channels, afforestation and control of soil erosion in the Damodar valley and promotion of public health and agricultural, industrial, economic and general wellbeing in the Damodar valley under its areas of operation.

The three broad divisions of DVC namely power, irrigation and flood control. The other activities mentioned herein above are mostly socio development activities which doesnot earn any revenue to DVC. Under the provisions of the DVC Act, DVC has been authorized to undertake such subsidiary activities and cost of expenses relating to such subsidiary activities are being allowed to be charged to the activities of power, irrigation and flood control. Further, out of three activities of power, irrigation and flood control. Further, out of three activities of power, irrigation and flood control, for the past many years the power activities involving generation, transmission , bulk supply, distribution and retail supply constitute the main activities for earning money and also for engaging the employees and workmen.

In this regard reference to the decision of Hon'ble Appellate Tribunal in the order dated 23.11.2007 passed in Appeal No 271 etc. of 2007 in regard to the applicability of various provisions of DVC act which is not inconsistent with Electricity Act is worthmentioning:

DVC as a statutory body is required to maintain appropriate scheme for meeting terminal benefits. The terminal benefits of employees are the pension (wherever the appointment of employees is on pension basis), gratuity, contributory provident fund i.e. CPF (wherever the employment of the employees is on Provident Fund contribution basis instead of pension). In addition to the above the General Provident Fund (GPF) Scheme applicable to all who are under pension scheme.

The matters relating to terminal benefits had been duly placed by DVC before the CERC since very beginning regarding determination of tariff. The generation and transmission tariff of DVC is being determined by Central Commission in exercise of the powers under section 79 of the Electricity Act. The tariff so determined by the Central Commission becomes an input cost for deciding the distribution and retail supply revenue requirements and tariff design. The distribution and retail supply revenue requirements and tariff design are to be decided by the respective state commission, namely, JSERC and WBERC.

The Employees Provident Fund and Miscellaneous Provisions Act, 1952 provides for the manner in which the Provident Fund Scheme needs to be administered. As the above Act, DVC is maintaining the Provident Fund both CPF and GPF in respect of each of the employees with individual account of the employees duly reflecting (a) the contribution apportioned to such employees, (b) apportionment to such employees, apportionment of the interest earned on the money invested from the Provident Fund Scheme in approved securities and (c) also contribution made by the employees to the GPF. Such contributions are maintained in a separate account of each of the employees as per applicable scheme.

The contribution to the Pension and Gratuity Trust are made based on actuarial valuation undertaken from time to time by an actuaries appointed for the purpose.

In the light of the above preliminary submissions, comments of DVC against specific point wise on draft regulations 2019 are stated as under:

Chapter-1, Regulation-3 (66): Definitions - 'Date of Commercial Operation'

Proposed Provision in 2019-24 Regulation

'Start Date or Zero Date' means the date indicated in the Investment Approval for commencement of implementation of the project and where no date has been indicated, the date of investment approval shall be deemed to be Start Date or Zero Date;

Justification by DVC:

There is a considerable time gap between Investment Approval and actual Cap-Ex disbursement due to delay beyond the control of Project developer.

DVC proposes that 'Start Date' to consider from the date of Cap-Ex disbursement in place of Investment approval.

Chapter-2, Regulation-5 (2): Date of Commercial Operation

Proposed Provision in 2019-24 Regulation

(2) In case the transmission system or element thereof executed by a transmission licensee is ready for commercial operation

Provided further that the transmission licensee seeking the approval of the date of commercial operation of the transmission system under this clause shall be required to submit the following documents along with the petition:

- (a) Energisation certificate issued by the Regional Electrical Inspector under Central Electricity Authority;
- (b)Trial operation certificate issued by the concerned RLDC for charging element with or without electrical load;

(C) Implementation Agreement, if any, executed by the parties;

- (d)Minutes of the coordination meetings or related correspondences regarding the monitoring of the progress of the generating station and transmission systems;
- (e)Notice issued by the transmission licensee as per the first proviso under this clause and the response;
- (f) Certificate of the CEO or MD of the company regarding the completion of the transmission system including associated communication system in all respects.

Justification by DVC:

Documents required to be submitted as per Sl. No. (a) to (f) may not be applicable for the Transmission System or part thereof which is not dependent on the COD of any interconnected Generating Station or any interconnected Transmission System.

DVC proposes that submission of documents as mandated to be required under Clause-5 (Date of Commercial operation) may please be exempted for any Transmission system, COD of which is not dependent on the COD of any interconnected Generating Station or any interconnected Transmission System.

Chapter-4, Regulation-16 (2): Variable Charges or Energy Charges

Proposed Provision in 2019-24 Regulation

'16. Variable Charges or Energy Charges: Energy charges shall be derived on the basis of the landed fuel cost (LFC) or variable cost of a generating station (excluding hydro) and shall consist of the following cost:

(a)Landed Fuel Cost of primary fuel; and(b)Cost of secondary fuel oil consumption:

Provided that any refund of taxes and duties along with any amount received on account of penalties from fuel supplier shall have to be adjusted in fuel cost.

Provided further that the methodology of determination of supplementary energy charges, if any on account of implementation of revised emission standards in case of a thermal generating station shall be determined separately by the Commission;'

DVC proposes that the supplementary energy charges on account of implementation of emission standard may not be considered for the purpose of ranking merit order dispatch; otherwise the units having FGD installed will suffer.

Chapter- 5, Regulation-17(6) : Return on Equity

Proposed Provision in 2019-24 Regulation

' (6) In case of generating station or a transmission system including communication system which has completed its useful life as on or after 1.4.2019, the accumulated depreciation as on the completion of the useful life less cumulative repayment of loan shall be utilized for reduction of the equity and depreciation admissible after the completion of useful life and the balance depreciation, if any, shall be first adjusted against the repayment of balance outstanding loan and thereafter shall be utilized for reduction of equity till the generating station continues to generate and supply electricity to the beneficiaries'

Justification by DVC:

In respect of reduction of equity for Gen. station /Transmission / Communication which has completed its useful life as on or after 1.4.2019, DVC humbly submits that this will lead to demotivation to run old Gen. Station /Transmission / Communication beyond its useful life.

For the Generating Station which has been set-up much earlier than 2019-24 regulation period, the deployment of Capital in the form of equity and Loan was envisaged without considering the present provision as proposed by CERC in this draft regulation. Moreover, any under recovery of ROE due to lower Plant availability factor will not get compensated in the course of time on achieving higher availability if the same provision of reduction in equity is done in such a fashion. This may lead to tendency of decommissioning of plant/Transmission asset after useful life, although it can still run, which is a national loss.

DVC proposes –

that Hon'ble Commission may please modify Regulation 17 (6) to that extent and to continue treatment of Equity after useful life same as per the existing Regulation, 2014

Chapter-6, Regulation-18 (3): Computation of Capital Cost: Capital Cost of an Existing Project

Proposed Provision in 2019-24 Regulation

The Capital cost of an existing project shall include the following:

- (a) Capital cost admitted by the Commission prior to 1.4.2019 duly trued up by excluding liability, if any, as on 1.4.2019;
- (b) additional capitalization and de-capitalization for the respective year of tariff as determined in accordance with these regulations; and
- (C) expenditure on account of renovation and modernisation as admitted by this Commission in accordance with these regulations;
- (d) capital expenditure on account of ash disposal including handling and transportation facility;
- *(e)* capital expenditure incurred towards railway infrastructure and its augmentation for transportation of coal upto the receiving end of generating station but does not include the transportation cost and any other appurtenant cost paid to the railway;
- (f) Capital cost incurred or projected to be incurred by a thermal generating station, on account of implementation of the norms under Perform, Achieve and Trade (PAT) scheme of

Government of India shall be considered by the Commission subject to sharing of benefits accrued under the PAT scheme with the beneficiaries.

DVC proposes:

(a) For inclusion of Capital expenditure on account of gypsum disposal/handling/transportation facility or acquisition of land towards disposal of gypsum, in order to meet revised emission control norms and

(b) For inclusion of Capital expenditure incurred towards augmentation of railway infrastructure for transportation of limestone up to receiving end of generating station, in order to meet revised emission control norms and

(c) For inclusion of Capital expenditure for emission control system.

Chapter-7, Regulation-25 : Additional capitalization beyond the original Scope

Proposed Provision in 2019-24 Regulation

'25. Additional Capitalisation beyond the original scope:

(1) The capital expenditure, in respect of existing generating station or the transmission system including communication system, incurred or projected to be incurred on the following counts beyond the original scope, may be admitted by the Commission, subject to prudence check:

(a) Liabilities to meet award of arbitration or for compliance of the order or directions in the order of any statutory authority, or order or decree of anycourt of law;

Change in law or compliance of any existing law;

Force Majeure Events;

Any capital expenditure to be incurred on account of need for higher security and safety of the plant as advised or directed by appropriate Indian Government Instrumentality or statutory authorities responsible for national or internal security;

Deferred works relating to ash pond or ash handling system in additional to the original scope of work, on case to case basis;

Provided also that if any expenditure has been claimed under Renovation and Modernisation (R&M) or repairs and maintenance under O&Mexpenses, same expenditure cannot be claimed under this Regulation.'

Justification by DVC:

In draft regulation , there is no provision for capital expenditure required for replacement of asset for efficient operation of Transmission System on the ground of up-gradation of capacity for the technical reason, obsolesce of technology etc. This provision was available under Regulation 14 (3) (vii) & (ix) of 2014-19

DVC T&D system undergoes capacity augmentation (transmission & transformation) program on a regular basis to meet up the demand of consumers. In absence of any specific regulation, augmentation of T&D System will suffer.

DVC proposes-

(a) For inclusion of the specific clauses available under sl no. 14 (3) (vii) & (ix) of 2014-19 regulation in 2019-24 regulation also.

(b) To consider expenditure due to the development/extension/augmentation/raising the height of existing Ash pond owing to technical requirement/ environmental compulsion through acquisition of adjacent land for the existing projects. The total additional capital cost, in this respect, may include the cost of R&R packages offered to the PAFs/ evictees including annuity etc. over and above the land cost

(c) Expenditure incurred in respect of Captive coal transportation mode (Closed conveyor System) as per directive of MOP.

Chapter-8, Regulation-30(2): Computation of Annual Fixed Cost

Proposed Provision in 2019-24 Regulation

'30. Return on Equity: (1) Return on equity shall be computed in rupee terms, on theequity base determined in accordance with Regulation 17 of these regulations.

(2) Return on equity shall be computed at the base rate of 15.50% for thermal

generating station, transmission system including communication system and run of the river hydro generating station, and at the base rate of 16.50% for the storage type hydro generating stations including pumped storage hydro generating stations and run of river generating station with pondage:

Provided that:

Return on equity in respect of additional capitalization after cut off date within or beyond the original scope shall be computed at the weighted average rate of interest on actual loan portfolio of the generating station or the transmission system;

DVC proposes-

For consideration of Additional Capitalization beyond the cut of date within or beyond the Original Scope, considering debt: equity in 70:30 ratio and allow ROE of 15.5% on equity component.

Chapter-8, Regulatio-35: Operation & Maintenance Expense

DVC proposes that –

O&M expenses due to the requirement of revised emission norms, may be provided over and above the normative O & M.

DVC also proposes that -

(a) 'Compensation Allowance' for old stations (age more than 10 years) may please be continued as is existing in 2014-19 regulation to meet expenses on new asset of capital nature not admissible under regulation for additional capital expenditure and

(b) to allow ash evacuation & transportation expenses additionally in case of thermal power stations.

(c) For consideration of Security Expenses to be allowed separately, all type of security namely CISF/DGR/ JISF etc to be included.

Further to above, O & M expenses for communication system on account of following may also kindly be considered:-

- (a) EMS/SCADA control centers & PMU Control Centre.
- (b) OPGW Communication equipment like SDH & PDH.
- (c) Power Line Carrier Communication equipment for Sub Stations and Power Stations.
- (d) Telephone Exchange for Inter-communication.
- (e) Auxiliary Equipment like UPS System, DC Power Supply System

Chapter-10, Regulatio-47: Component of Landed Cost of Primary Fuel

(i) Proposed Provision in 2019-24 Regulation

"

47. Components of Landed cost of Primary Fuel: The landed cost of primary fuel for any month shall include base price or input price of fuel corresponding to the grade and quality of fuel and inclusive of statutory charges as applicable, transportation cost by rail or road or any other means, and loading, unloading and handling charges.

Provided that procurement of fuel at a price other than Government notified prices may be considered, if based on competitive bidding through transparent process, for the purpose of landed fuel cost;

Provided further that landed cost of primary fuel shall be worked out based on the actual bill paid by the generating company including any adjustment on account of quantity and quality;

Provided also that in case of Coal or Lignite thermal generating station, the Gross Calorific Value shall be measured by third party sampling and the expenses towards the third party sampling facility shall be reimbursed by the beneficiaries.

..'

Justification by DVC:

By the definition 'Landed cost', cost incurred for deployment of Locos dozers and other heavy equipments are not covered. Also unloading cost of coal rakes, sampling cost at loading and unloading ends, Fuel lab cost etc need to be included in landed cost of coal. Provision is to be kept for inclusion of Performance Incentives, Supplementary Bills, Interest bill etc which are parts of coal cost.

DVC proposes that -

Consideration of the unloading cost of coal rakes, sampling cost at loading & unloading ends and Fuel Lab set-up cost. (ii) Provision for inclusion of performance incentives, supplementary bill, interest bill etc. Proper modification and insertion of the heads in Form 15 is necessary.

Chapter-10, Regulation-3 (31) & 49: Computation of Gross Colorific value

(ii)Proposed Provision in 2019-24 Regulation

'Definition of GCV

(31) 'GCV as received' means the GCV of coal or lignite as measured at the unloading point of the thermal generating station through collection, preparation and testing of samples from the loaded wagons, trucks, ropeways, Merry-Go-Round (MGR), belt conveyor and ship in accordance with the IS 436 (Part-1/ Section 1)- 1964:

Provided that the measurement of coal or lignite shall be carried out through Third party sampling to be appointed by the generating companies in accordance with the guidelines, if any, issued by Central Government;

Provided further that samples of coal or lignite shall be collected either manually or through hydraulic augur or through any other method considered suitable keeping in view the safety of personnel and equipment:

Provided also that the generating companies may adopt any advance technology for collection, preparation and testing of samples for measurement of GCV in a fair and transparent manner.

.....

....

49. Computation of Gross Calorific Value: (1) The gross calorific value for computation of energy charges as per Regulation 52 of these regulations shall be done in accordance with GCV on as received basis.

(2) The generating company shall provide to the beneficiaries of the generating station the details in respect of GCV and price of fuel i.e. domestic coal, imported coal, e-auction coal, lignite, natural gas, *RLNG*, liquid fuel etc. as per the forms prescribed at **Annexure-I** to these regulations:

Provided that the details of the weighted average GCV of the fuel on as received basis used for generation during the period, blending ratio of the imported coal with domestic coal, proportion of *e*-auction coal shall be provided separately, along with the bills of the respective month;

Provided further that copies of the bills and details of parameters of GCV and price of fuel i.e. domestic coal, imported coal, e-auction coal, lignite, natural gas, RLNG, liquid fuel etc., details of blending ratio of the imported coal with domestic coal, proportion of e-auction coal shall also be displayed on the website of the generating company.

Justification by DVC:

6

All Power Gencos including DVC face trouble in collection of coal sample from wagon top due to high voltage OHE line at unloading end. Presently GCV testing method is mentioned on "As received basis" which lacks clarity.

DVC proposes that-

(a) Consideration of the practical difficulty in measuring GCV from wagon top, allow collection of Rail borne coal sample after primary crusher at TPS end. Also, to consider GCV testing method to be adopted as on "Air dry basis".

(b) Loss of GCV to be identified between "As Billed" and "As received " at the Generating station and the losses to be booked to Coal supplier or Railways and need to be taken care of in the light of provision of existing FSA. The quantum of GCV loss due to transit, handling etc required to be compensated adequately and to be increased from proposed 85 Kcal to more than 300 Kcal.

<u>Chapter-10</u>, <u>Regulation-3(48)</u> and <u>Regulation 36 to 45</u>: <u>Computation of Capital Cost of</u> <u>Integrated Mine and Input Price</u>

Justification by DVC:

Unlike Generating Stations, O&M expenses for Coal Mines likely to vary year to year basis as per the production target achieved based on the mine plan.

R & R activities like construction of R & R colony may take much more time due to involvement of land acquisition etc.

DVC proposes the following:

- (i) 'Mine Developer and Operator(MDO)' may be included in definition in Regulation-3.
- (ii) 'O&M Expenses' should also include payment to the Mine Developer and Operator as per Coal Mine Agreement executed between Generating company and the MDO.
- (iii) Instead of determining the O & M expenses of the mine based on the original Project cost for first year and thereafter at escalated at rate of WPI, it should be taken as the project cost in the year when target capacity is achieved and may be considered at actual on year to year basis.
- (iv) Instead of considering expenditure incurred after the date of commercial operation till date of achieving target capacity as Capital work in Progress (CWIP), Expenditure till date of achieving target capacity or 5 years from the date of COD, whichever is later, to be treated as CWIP.
- (v) Interest on working Capital (IWC) should also include amount payable to MDO for one month's supply of coal as per target capacity.
- (vi) In "Depreciation Schedule" Land related to Integrated Mine should be allowed to be depreciated/amortised over life of mine as per approved Mine Plan/as per Industry practice.
- (vii) Instead of determining the landed cost of primary fuel on Government notified price, it may be considered based on Coal India Limited notified price or any other Coal Price Regulatory Authority as declared by the GOI.
- (viii) Provision for information for agreement signed with Mine Developer and Operator(MDO) in Appendix-V (J) and information for payment to MDO in Appendix-V (k) is to be provided .

<u>Chapter-11</u>, <u>Regulation-55(3)</u>: <u>Computation of Capacity & Energy Charge for Pumped</u> <u>Storage Hydro</u> Station

Proposed Provision in 2019-24 Regulation

'The energy charge shall be payable by every beneficiary for the total energy scheduled to be supplied to the beneficiary in excess of the design energy plus 75% of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir, at a flat rate equal to the average energy charge rate of 20 paise per kWh, excluding free energy, if any, during the calendar month, on ex power plant basis.'

DVC proposes that-

the incentive in tariff for operation of PSP in generation mode during peak period, and relaxation in tariff for the energy utilised during pumping mode of operation in off-peak period, may be considered.

Chapter-11, Regulation-51: Computation of Capacity Charge for Thermal Generating Station

Proposed Provision in 2019-24 Regulation

51. Computation and Payment of Capacity Charge for Thermal Generating Stations:

The fixed cost of a thermal generating station shall be computed on annual basis, based on norms specified under these regulations, and recovered on monthly basis under capacity charge. The total capacity charge payable for a generating station shall be shared by its beneficiaries as per their respective percentage share or allocation in the capacity of the generating station. Capacity Charge for the month shall be recovered in two parts viz., Capacity Charge for Peak period of the month and Capacity Charge for Off-Peak period of the month..... '

Justification by DVC:

6

Formula for capacity charge does not capture the following provisions of the Regulation:

- (a) Permission for compensation of shortfall in availability during off peak period with increased availability during peak period in a quarter
- (b) Exclusion of annual scheduled maintenance period during calculation of QPAF.
- (c) Determination of PAFQ for the IPP whose PPA has been tied up in MW instead of percentage of IC.

DVC therefore proposes –

- (a) For inclusion of those factors embedded in the formula meant for calculation for capacity charges and
- (b) any improved Plant availability over and above the normative availability in a quarter may be allowed to carry over to the next quarter

Chapter-12, Regulation-59: Norms of Operation for Thermal Generating Station

Proposed Provision in 2019-24 Regulation

'Norms of operation for thermal generating station

The norms of operation as given hereunder shall apply to thermal generating stations: (A) Normative Quarterly Plant Availability Factor (NQPAF)

(a) For all thermal generating stations, except those covered under clauses (b), (c), (d), & (e) - 83%

Provided that for the purpose of computation of Normative Quarterly Plant Availability Factor, annual scheduled plant maintenance shall not be considered.

As per Draft Regulation 2019-24, NQPAF has been fixed as 83 % for almost all the thermal stations. But nothing has been mentioned about loss of PAF due to shortage of coal for calculation of NQPAF. Power generating company has no control over Coal Companies & Railways and almost every year thermal stations are losing considerable PAF (%) due to shortage of coal.

Annual PAF loss due to shortage of coal during last five years faced by DVC Plants is furnished below:

Year	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19 (till Dec'18)
PAF loss due to shortage of coal (in %)	9.7	6.5	NIL	8.7	20.2

DVC proposes for consideration of -

6

(a) 'loss of PAF due to shortage of coal' in recovery of fixed charge and

(b) Different 'Normative Availability'(i.e. NQPAF) be fixed from Quarter to Quarter considering the seasonal variation of generation due to uncontrolled factors.

Chapter-12, Regulation-59: Norms of Operation for Thermal Generating Station

Proposed Provision in 2019-24 Regulation

'(C) Gross Station Heat Rate:

(a) Existing Thermal Generating Station

(i) For existing Coal-based Thermal Generating Stations, other than those covered under clauses (ii) and (iii) below:

200/210/250 MW Sets	500 MW Sets (Sub-critical)
2,410 kCal/kWh	2,375 kCal/kWh

Note 1

In respect of 500 MW and above units where the boiler feed pumps are electrically operated, the gross station heat rate shall be 40 kCal/kWh lower than the gross station heat rate specified above.

Note 2

For the generating stations having combination of 200/210/250 MW sets and 500 MW and above sets, the normative gross station heat rate shall be the weighted average gross station heat rate of the combinations.

Note 3

The normative gross station heat rate above is exclusive of the compensation specified in Regulation 6.3 B of the Grid Code. The generating company shall, based on unit loading factor, consider the compensation in addition to the normative gross heat rate above.

(ii) For following Thermal generating stations of NTPC Ltd:

Talcher TPS	2,830 kCal/kWh
Tanda TPS	2,750 kCal/kWh

(iii) For Thermal Generating Stations of Damodar Valley Corporation (DVC):

••••

(b) New Thermal Generating Station achieving COD on or after 1.4.2009:

(i) For Coal-based and lignite-fired Thermal Generating Stations:

1.05 X Design Heat Rate (kCal/kWh)

Where the Design Heat Rate of a generating unit means the unit heat rate guaranteed by the supplier at conditions of 100% MCR, zero percent make up, design coal and design cooling water temperature/back pressure.

Provided that the design heat rate shall not exceed the following maximum design unit heat rates depending upon the pressure and temperature ratings of the units:

Pressure Rating (Kg/cm2)	150	170	170
SHT/RHT (0C)	535/535	537/537	537/565
Type of BFP	Electrical Driven	Turbine Driven	Turbine Driven
Max Turbine Heat Rate (kCal/kWh)	1955	1950	1935

Min. Boiler Efficiency			
Sub-Bituminous Indian Coal	0.86	0.86	0.86
Bituminous Imported Coal	0.89	0.89	0.89
Sub-Bituminous Indian Coal	2273	2267	2250
Bituminous Imported Coal	2197	2191	2174

Pressure Rating (Kg/cm2)	247	247	270	270
SHT/RHT (0C)	537/565	565/593	593/593	600/ 600
Type of BFP	Turbine Driven	Turbine Driven	Turbine Driven	Turbine Driven
Max Turbine Heat Rate (kCal/kWh)	1900	1850	1810	1800
Min. Boiler Efficiency				
Sub-Bituminous Indian Coal	0.86	0.86	0.865	0.865
Bituminous Imported Coal	0.89	0.89	0.895	0.895
Sub-Bituminous Indian Coal	2222	2151	2105	2081
Bituminous Imported Coal	2135	2078	2034	2022

Provided further that in case pressure and temperature parameters of a unit are different from above ratings, the maximum design unit heat rate of the nearest class shall be taken:

Provided also that where unit heat rate has not been guaranteed but turbine cycle heat rate and boiler efficiency are guaranteed separately by the same supplier or different suppliers, the unit design heat rate shall be arrived at by using guaranteed turbine cycle heat rate and boiler efficiency:

Provided also that where the boiler efficiency is below 86% for Sub-bituminous Indian coal and 89% for bituminous imported coal, the same shall be considered as 86% and 89% respectively for Sub-bituminous Indian coal and bituminous imported coal for computation of station heat rate:

Provided also that maximum turbine cycle heat rate shall be adjusted for type of dry cooling system:

Provided also that if one or more generating units were declared under commercial operation prior to 1.4.2019, the heat rate norms for those generating units as well as generating units declared under commercial operation on or after 1.4.2019 shall be lower of the heat rate norms arrived at by above methodology and the norms as per the sub-clause (C)(a)(i) of this Regulation:

Provided also that in case of lignite-fired generating stations (including stations based on CFBC technology), maximum design heat rates shall be increased using factor formoisture content given in sub-clause (C)(a)(iv) of this Regulation:

Provided also that for Generating stations based on coal rejects, the Commission will approve the Design Heat Rate on case to case basis.

Note: In respect of generating units where the boiler feed pumps are electrically operated, the maximum design unit heat rate shall be 40 kCal/kWh lower than the maximum design unit heat rate specified above with turbine driven Boiler Feed Pump.'

Justification by DVC:

Relaxation in 'Heat Rate' [Station Heat Rate for 210 /250MW & 500 MW Units]:

As per draft regulation 2019-24, the relaxation of Heat Rate has been increased from 4.5 % to 5.0 % over designed Heat Rate for 500 MW Units. But, in case of some DVC Units, allowed Heat rate have been decreased as tabulated hereunder:

Station	Heat rate Approved in 2014-19	Heat rate as per 2019-24 Reg (Draft)
MTPS U-1,2,3 & MTPS U-4, MTPS U-5,6 & CTPS U-7,8	2450	2410
DSTPS U-1&2	2441	2374

Further, as per Explanatory memorandum (Page-211, Table-55) while fixing up 'normative Heat Rate' of 500 MW Units, commission considered 7 nos. Units of NTPC which are having design heat rate in the range of 2260 - 2300 Kcal/Kwh whereas, in case of both Durgapur Steel TPS and KTPS units (500 MW) of DVC, designed heat rate is 2336 Kcal/Kwh which is much more than heat rate of above 7 nos. Units of NTPC considered as reference.

In reference to above, allowed heat Rate of Durgapur Steel TPS and KTPS is 2374 Kcal/Kwh which is only**1.6 %** higher than designed Heat rate i.e. 2336 Kcal/KWH and is therefore practically not possible to maintain that allowed Heat Rate.

Details submitted separately in Appendix-III.

DVC proposes that

(a) Either allow 5 % margin over the designed heat rate for both DSTPS and KTPS or at least keep the allowed heat rate of DSTPS what it was in 2014-19 regulation.

(b) Keep normative station heat rate either 2450 kcal/kwh (same as 2014-19 period) for both 210 MW & 250 MW units of DVC or at least keep 2450 Kcal/Kwh for 210 MW Units.

•••••

Chapter-12, Regulation-59: Norms of Operation for Thermal Generating Station

Proposed Provision in 2019-24 Regulation

(E) Auxiliary Energy Consumption :

(a) For Coal-based generating stations except at (b) below:

S. No.	Generating Station	With tower tower	Natural or	Draft without	cooling cooling
(i)	200 MW series		8	3.50%	
(ii)	300/330/350/500 MW series				
	Steam driven boiler feed pumps		5	5.75%	
	Electrically driven boiler feed pumps		8	8.00%	
(;;;)	600 MW and above				
	Steam driven boiler feed pumps		5	5.75%	
	Electrically driven boiler feed pumps		8	3.00%	

Provided that for thermal generating stations with induced draft cooling towers and where tube type coal mill is used, the norms shall be further increased by 0.5% and 0.8% respectively:

Provided further that Additional Auxiliary Energy Consumption as follows may be allowed for plants with Dry Cooling Systems:

Type of Dry Cooling System	(% generation	of)	gross
Direct cooling air cooled condensers with mechanical draft fans		1.0%	
Indirect cooling system employing jet condensers with pressure recovery turbine and natural draft tower		0.5%	

,... '

Justification for relaxation for APC norms after implementaion of emmission control measures:

Draft Regulation 2019-24 does not specify about relaxation of APC norms after implementation of emission control measures (FGD, Low NOx burners, ESP augmentation, etc.) at Station.

Justification for relaxation for APC norms of MTPS U#1-4

Higher Auxiliary Power Consumption than Normative APC was observed even with best operating condition against CERC Normative PLF of 85 % for MTPS U#1-4. MTPS U#1-3 was designed and commissioned much before Regulatory Regime,2003. MTPS U#4 design stage was completed before Regulatory Regime, having lower energy efficient auxiliaries. As per Draft Regulation 2019-24, Normative APC for MTPS U#1-4 having induced draft cooling towers and tube coal mills is 9.8 %. But DVC submitted detailed justification through Consultation papers in July, 2018 that even with best operating condition APC can not be achieved below 10.5 %.

Justification for relaxation for APC norms for Stations having Single Unit

Comparatively higher Auxiliary Power Consumption is observed in stations having Single Unit like Bokaro TPS-A of DVC.

Details submitted separately in Appendix-III.

DVC proposes:

(a) Additional relaxation in APC norms over and above specified norms for the respective stations after implementation of emission control measures, &

(b) Relaxation of APC norms of MTPS U#1 to 4 as 10.5%, &

(c) Additional relaxation in APC norms for BTPS-A (Station having Single Unit).

Chapter-15, Regulation-82: Special Provision relating to Damodar Valley Corporation

Pension Contribution separately in addition to existing normative O&M

DVC requires to maintain two types of Provident Fund viz., CPF & GPF. Whereas liability for contribution ceases with the superannuation or otherwise of the employee concerned covered under CPF, liability for pension for employees covered under GPF continues after the superannuation till the death of the employees and even thereafter for payment of family pension.

Normative O&M Expenses considered by the Central Commission is based on the liability for CPF contribution only. Central Commission as well as Appellate Tribunal gave due recognition to this fact in relation to the tariff determination of DVC for the period 2006-09 wherein contribution to P & G Fund created to meet the liability of the employees under pension scheme was allowed to DVC as a special case.

Even Supreme court in its judgement dated 23.07.2018 upheld the judgement of Appellate Tribunal in totality wherein payment of P & G contribution to DVC was one of the issues.

DVC therefore humbly submits that 'contribution towards Pension benefit' may be allowed to DVC separately over and above normative O&M that is mainly framed considering the CPF Scheme in general and not the Pension Scheme which is in existence in few organisations like DVC.

Appendix-III

Supporting detail submission related to Appendix-II

Supporting detail submission related to Appendix-II in support to relaxation for norms (APC norms, Heat Rate) and O&M expenses

Comments of DVC against Regulation-59 (A) / (a):

Normative Quarterly Plant Availability Factor (NQPAF):

• As per Draft Regulation 2019-24, NQPAFis 83 % for all thermal stations except those covered under clauses (b), (c), (d), & (e). But nothing has been mentioned about loss of PAF due to shortage of coal for calculation of NQPAF. Power generating company has no control over Coal Companies & Railways and almost every year thermal stations are losing considerable PAF (%) due to shortage of coal. DVC's annual PAF loss due to shortage of coal during last five years are furnished below:

Year	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19 (till Dec'18)
PAF loss due to shortage of coal (%)	9.7	6.5	0	8.7	20.2

• Formula for capacity charge does not capture "Exclusion of planned maintenance period during calculation of QPAF".

DVC proposes for consideration of

(a) 'Loss of PAF due to shortage of coal' in recovery of fixed charge.

(b) 'Normative Availability' be fixed on quarterly basis (i.e. NQPAF) in varying percentile considering the seasonal variation of generation.

(c) Exclusion of planned maintenance period during calculation of QPAF in the formula given for determining the Capacity Charge.

Comments of DVC against Regulation-59 (C) / (a) / (i):

Station Heat Rate for 210 MW & 250 MW Units:

• Normative station heat rate for 210 & 250 MW units has been reduced from 2450 kcal/kwh to 2410 kcal/kwh. Actual station heat rate of MTPS U#1-4 (4x210 MW) and MTPS U#5&6 (2x250 MW) during last three years are furnished below:

Year	MTPS U#1-4 (4x210 MW)	MTPS U#5&6 (2x250 MW)
FY 2016-17	2465	2471
FY 2017-18	2494	2446
FY 2018-19 (till Nov'18)	2448	2437

• Moreover, design heat rate of 210 MW unit and 250 MW unit are not same. Design HR of 210 MW unit is more than that of 250 MW unit. Design heat rate of MTPS U#1-4 (4x210 MW) and MTPS U#5&6 (2x250 MW) 2267 kcal/kwh& 2256 kcal/kwh respectively. Accordingly, normative heat rate of 210 MW unit should be more than that of 250 MW unit.

In view of above, DVC proposes to keep normative station heat rate either same as earlier (2450 kcal/kwh) for both 210 MW & 250 MW units or at least for 210 MW units.

Appeal for relaxation of Heat rate norms for DSTPS (2x500 MW) & KTPS (2x500 MW):

- As per Draft Regulation 2019-24, Thermal Generating Stations achieving COD on or after 01.04.2009, normative heat rate will be 5 % more than design unit heat rate, but there are some restriction in maximum allowable design HR. In case of DSTPS & KTPS, maximum allowable design unit heat rate for deriving normative HRis much lower than actual design unit HR.
- Due to imposition of restriction in maximum allowable design heat rate for Thermal Generating Stations achieving COD on or after 01.04.2009, normative HR of DSTPS has been drastically reduced from 2441 kcal/kwh as per Regulation 2014-19 to 2374 kcal/kwh as per Draft Regulation 2019-24.
- As per Explanatory memorandum (Page-211, Table-55) while fixing up 'normative heat rate' of 500 MW units, Commission considered 7 nos. units of NTPC which are having design heat rate in the range of 2260 2300 Kcal/Kwh. Whereas, in case of DSTPS and KTPS units, designed heat rate is 2336 Kcal/Kwh which is far more than heat rate of above 7 nos. units of NTPC considered as reference.
- Restriction in maximum allowable design unit heat rate should be applicable for new upcoming units only. It should not be applicable to already commissioned units, like DSTPS & KTPS.

Name of The Station	DSTPS (2x500 MW)	KTPS (2x500 MW)
COD	U#1: 15.05.2012, U#2: 05.03.2013	U#1: 18.07.2013, U#2: 14.06.2014
Design Turbine cycle heat rate (kcal/kwh)	1944.5	1944.5
Design Boiler Efficiency (%)	83.23	83.23
Actual Design Unit Heat Rate (kcal/kwh)	2336	2336
As per Draft Regulation 2019-24, maximum allowable design HR (kcal/kwh)	2261	2261
Normative HR as per Draft Regulation 2019-24	2374	2374
Margin in Normative HR over actual design HR	1.6 %	1.6 %
Normative HR as per Draft Regulation 2014-19	2441	2363

Design & Normative Heat rate are shown below:

• Asshown in the above table, Normative heat rate of DSTPS &KTPS are very stringent & very near to design value (only 1.6 % higher instead of 5 %), which is practically impossible to maintain throughout the year. This will result in huge under recovery in energy charge for both stations.

In view of above, DVC appeals CERC to allow normative heat rate of DSTPS &KTPS with 5% margin over actual design HR.

Comments of DVC against Regulation-59 (E) / (a) / (i):

Auxiliary Energy Consumption:

- Draft Regulation 2019-24 does not specify about relaxation of APC norms after implementation emission control measures (FGD, Low NOx burners, ESP augmentation, etc.). Additional realistic relaxation in APC norms over and above specified norms for each category of thermal units needs to be confirmed.
- As per Draft Regulation 2019-24, Normative APC for MTPS U#1-4 having induced draft cooling towers and tube coal mills is 9.8 %. But DVC submitted detailed justification through Consultation papers in July, 2018 that even with best operating condition APC can not be achieved below 10.5 %. The same justification is being again furnished below for kind perusal and appeals for relaxation of normative APC upto 10.5 %.

Justification for relaxation for APC norms of MTPS U#1-4

Higher Auxiliary Power Consumption than Normative APC was observed even with best operating condition against CERC Normative PLF of 85 % for MTPS U#1-4. MTPS U#1-3 was designed and commissioned much before Regulatory Regime, 2003. MTPS U#4 design stage was completed before Regulatory Regime, having lower energy efficient auxiliaries. Status of COD of MTPS U#1-4:

Station	Location	Unit	Capacity (MW)	COD
		U#1	210	December, 1997
MTPS	Dist – Bankura, West	U#2	210	March, 1999
Bengal	U#3	210	September, 1999	
		U#4	210	February, 2005

High APC of U#1-4

- MTPS U#1-3 was designed and commissioned much before Regulatory Regime of 2003. Even MTPS U#4 although commissioned in 2005, design stages was completed before Regulatory Regime. Units were commissioned with the technology having lower energy efficient auxiliaries compared to the current state of the art High Efficient Auxiliaries.
- Since inception, auxiliary power consumption of MTPS U#1-4 is much higher compared to CERC Benchmark. Unit-wise APC vs. PLF % data since last 5 years was plotted with the best operating condition & APC Norms curve was drawn against a PLF range from CERC Normative 83 % to 100 % PLF (Graph attached at Annexure-I&II).

Auxiliary Power Consumption in the range of 10.5 - 10.6 % was noted with best operating condition against CERC Normative PLF of 83 % for MTPS U#1-4.

Equipment wise performance was tracked against characteristic curve of major HT Drives which contributes almost 85 % of total Auxiliary Power. Power consumption of all HT drives at duty point as per HBD (100 % TMCR & 83 % TMCR) and OEM performance datasheet was tabulated. Common Auxiliary loading including CHP power consumption was taken from existing energy monitoring system (E-watch) at that operating range. It can be concluded that even with best operating conditions as per OEM condition curves, APC of these units cannot be achieved below 10.5 % at CERC Normative PLF of 83 %.

APC Norms curve of MTPC U#1-4 drawn from last 5 yrs. data almost converged with the derived value of APC as per OEM Condition curve at the duty point.

Therefore, average APC of MTPS U#1-4 cannot be brought below 10.5 % with the CERC Normative PLF of 83 % (Annexure-III).

Major areas of APC excursion of MTPS U#1-4 compared to CERC limit

- Tube Mills: These mills were selected with the consideration of less maintenance, more fineness, no rejects, high throughput even with varying and inferior coal quality & other technical advantages. Due to robustness, these mills consume high Power which is almost 900 KW high compared to Raymonds Bowl Mills (XRP -763 or XRP -803 popularly used in 210 MW units), leaving no operator's margin to improve upon APC at full load or even at part load condition.
- PA Fans: Hot PA Fans with IGV control at MTPS U#1-4 are less efficient (ranging from 33 60 % efficiency at different operating condition as per characteristic curve) compared to the high efficient (more than 75 %) current state of the art blade pitch control Cold PA Fans (as per characteristic curves).
- FD Fans: FD Fans with IGV control at MTPS U#1-4 are less efficient (45 50 %) compared to the blade pitch control FD Fans having efficiency more than 80 %. Moreover, hot PA system in U#1-4 causing additional power consumption in FD Fans due to handling of additional air.
- <u>CW Pps at U #1- 3</u>: Total Condenser Cooling Water requirement is 28000 Ton / Hr. SSW water requirement is 4000 Ton / Hr. taking water from CW System. Capacity of each CW Pump 12750 T / Hr. Hence, three CW Pumps are required to run to cater required CW Flow at TMCR for achieving design temperature drop across condenser after supplying SSW requirement. Additional pumping loss is to the tune of 5000 Ton / Hr. which corresponds to around additional power consumption to the tune of 440 KW (Annexure-IV).
- APC comparison of MTPS U # 1-4 has been done with NTPC Unchahar of same capacity (210 MW) having tube mills.

Major variance in Auxiliary Power as per Characteristic Curve of PA Fans, FD Fans, CW Pumps of MTPS U#1-4, NTPC Unchanhar, attached in **Annexure-IV&V**). Datasheet of the equipment is attached in **Annexure-VI**.

The following variance emerged out which is tabulated below:

Equipment Power consumption at TMCR Total (KW / Av. Amps.) Power Maior NTPC Remarks saving Equipment MTPS Unchanhar s in U#1-4 Stg II (210 KW (210 MW) MW) ✓ High efficient Blade Pitch control Cold PA Fans in NTPC Unchahar. PA fan 701 / 83 285/32 832 \checkmark Low Efficient IGV Hot PA in U#1-4. (Characteristic curve plotted in Annexure-V) High efficient Blade Pitch FD Fans in NTPC Unchahar. ✓ Low Efficient IGV Control FD in U#1-4. FD Fan 720/81 313/34 814 Moreover, hot PA system in MTPS U#1-4 causes additional power consumption in FD Fans. (Characteristic curve plotted in Annexure-V) High condenser surface area at NTPC Unchahar compared to MTPS, U#1-4. \checkmark Total CW Flow at MTPS, U#1- 3 is 37000 T/ Hr. (28000 CW Flow+4000 SSW Flow), while flow of individual CW pump is 12750 T / Hr. at MTPS CW Pump 3197 900 x 2 1397 U#1- 3. Hence, three CW Pumps is required to run to cater required CW Flow at TMCR for achieving design temperature drop across condenser. (Characteristic curve plotted in Annexure-IV) Total Power savings (KW) 3043 Installed Capacity (MW) 210 Total Power savings (MW) 3.043 1.45 Total APC Savings (%) Note: Power saving calculation based on considering (Ref: Annexure-VI) Total Power savings for two nos. PA Fans & two nos. FD Fans at 100 % TMCR. Average of Total power savings for three nos. CWPp (MTPS U#1-3) & two nos. CWPp (MTPS U#4) CW Pp Total Power cons. U#1-3 = 9918 KW CW Pp Total Power cons. U # 4 = 2868 KW

Variance Analysis of APC of MTPS U#1-4 (210 MW) with NTPC Unchanhar- Stage II (210 MW)

Av. CWPp Power Cons. / Unit = (9918+2868)/4 = 3197 KW

NTPC Unchanhar Condenser & CWPp datasheet, MTPS U # 1-4 Condenser datasheet attached in Annexure-VI.

With the above back drop, considering that there is no possibility for achieving existing APC Norms as per CERC even with best operating conditions. It is kindly requested for relaxation of APC Norms of MTPS U#1-4 upto 10.5 %.

Annexure-I



Annexure-II



U # 1-4 Operating data:

		U#1	U#2	U#3	U#4	Av. U#1-4	
Parameters	UOM	Rated value at 83 % TMCR (CERC Normative) as per HBD & performance curve					
Load	MW	174	174	174	174	174	
Total Air Flow	T/Hr.	705	578	578	578	610	
PA flow	T/Hr.	197	197	197	197	197	
PA Header Pr.	M / WC	660	660	660	660	660	
MS Temp.	°C	535	535	535	535	535	
CRH Temp.	°С	334	334	334	334	334	
MS Flow	T/Hr.	514	514	514	514	514	
CRH Flow	T/Hr.	464	464	464	464	464	
Condensate Flow	T/Hr.	429	429	429	429	429	
Feed Flow	T/Hr.	514	514	514	514	514	
FD Fan Power Con. (A)	KW	574	574	574	574	574	
FD Fan Power Con. (B)	KW	574	574	574	574	574	
ID Fan Power Con. (A)	KW	1000	1000	1000	1000	1000	
ID Fan Power Con. (B)	KW	1000	1000	1000	1000	1000	
ID Fan Power Con. (C)	KW						
PA Fan Power Con. (A)	KW	600	600	600	600	600	
PA Fan Power Con. (B)	KW	600	600	600	600	600	
PA Fan Power Con. (C)	KW						
BFP Power Con. (A)	KW	2266	2266	2266	2266	2266	
BFP Power Con. (B)	KW	2266	2266	2266	2266	2266	
BFP Power Con. (C)	KW					0	
CEP Power Con. (A)	KW	365	365	365	365	365	
CEP Power Con. (B)	KW						
CW Power Con. (A)	KW	1106	1106	1106	1438		
CW Power Con. (B)	KW	1106	1106	1106	1438	3208	
CW Power Con. (C)	KW	1106	1106	1106			
CT Fan Power Con.	KW	480	480	480	480	480	
Coal Mill Power Con. (A)	KW	1220	1220	1220	1220	1220	
Coal Mill Power Con. (B)	KW	1220	1220	1220	1220	1220	
Coal Mill Power Con. (C)	KW						
Other Auxiliary (LT Loading) including CHP & BOP	KW	2800	2800	2800	2800	2800	
Total Power Consumption (KW)	KW	18285	18285	18285	17842	18174	
Load (MW) - 83 % TMCR	KW	172200	172200	172200	172200	172200	
APC % at 83 % TMCR		10.62	10.62	10.62	10.36	10.55	

Annexure-IV

Power calculation Module	e by Flow	matching with	Characteristic	Curve:
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MTPS U#1-3 CW Pump				
Parameter	UOM	Value		
Density	Kg/M^3	1000		
Flow (Input)	Ton/ Hr.	12750		
Flow (calculated)	M3 / Sec	3.54		
Header Pr.	M / WC	25.5		
Work Done / S	KW	886		
Efficiency	Dimensionless	0.855		
Losses	KW	0		
Input shaft Power	KW	1036		
Motor Efficiency	Dimensionless	0.94		
Input Motor Power	KW	1102		
Input Voltage	KV	6.6		
Power Factor	Dimensionless	0.78		
Input Current	Amps	123.6		

WIPS 0 # 4 Cvv Pullip					
Parameter	UOM	Value			
Density	Kg/M^3	1000			
Flow (Input)	Ton/ Hr.	15500			
Flow (calculated)	M3 / Sec	4.31			
Header Pr.	M / WC	27			
Work Done / S	KW	1140			
Efficiency	Dimensionless	0.855			
Losses	KW	0			
Input shaft Power	KW	1333			
Motor Efficiency	Dimensionless	0.93			
Input Motor Power	KW	1434			
Input Voltage	KV	6.6			
Power Factor	Dimensionless	0.76			
Input Current	Amps	165.0			

MTPS U # 4 CW Pump

Annexure-V

Power calculation Module by Flow matching with Characteristic Curve:

MTPS U#1-4				
PA Fans	with IGV (210 M	W)		
Parameter	UOM	Value		
Density	Kg/M ³	0.72		
Flow (Input)	Ton/ Hr.	124		
Flow (coloulated)	M ³ / Sec	47.6		
Header Pr.	mm / WC	620		
Work Done	NM / Kg	8445		
Fan Efficiency	Dimensionless	0.455		
Losses	KW	12		
Input shaft Power	KW	649		
Motor Efficiency	Dimensionless	0.93		
Input Motor Power	KW	701		
Input Voltage	KV	6.6		
Input Current	Amps	83		

NTPC Unchanhar Stg. II (210 MW)						
Cold PA Fans	Cold PA Fans with Blade Pitch Control					
Parameter	UOM	Value				
Density	Kg/M^3	1.09				
Flow (Input)	Ton/ Hr.	124				
Flow	M^3/S_{00}	31.60				
(calculated)	M / Sec	51.00				
Header Pr.	mm / WC	588				
Work Done	NM / Kg	5290				
Fan Efficiency	Dimensionless	0.71				
Losses	KW	8.00				
Input shaft	KW	265				
Power	IX VV	205				
Motor	Dimensionless	0.03				
Efficiency	Dimensioniess	0.75				
Input Motor	KW	285				
Power	17 44	205				
Input Voltage	KV	6.6				
Input Current	Amps	32				

NTPC Unchanhar Stg. II (210 MW), Fan Model- APII- 17/ 12

	MTPS U#1-4		NTPC Uncha	anhar Stg. II (210) MW)
FD Fans with IGV		FD Fan	FD Fans with Blade Pitch		
Parameter	UOM	Value	Parameter	UOM	Value
Density	Kg/M ³	1.092	Density	Kg/M ³	1.09
Flow (Input)	Ton/ Hr.	430	Flow (Input)	Ton/ Hr.	300
Flow (calculated)	M ³ / Sec	109.4	Flow (calculated)	M ³ / Sec	76.5
Header Pr.	mm / WC	260	Header Pr.	mm / WC	310
Work Done	NM / Kg	2335	Work Done	NM / Kg	2789
Fan Efficiency	Dimensionless	0.43	Fan Efficiency	Dimensionless	0.817
Losses	KW	12	Losses	KW	8.00
Input shaft Power	KW	668	Input shaft Power	KW	292
Motor Efficiency	Dimensionless	0.93	Motor Efficiency	Dimensionless	0.94
Input Motor Power	KW	720	Input Motor Power	KW	313
Input Voltage	KV	6.6	Input Voltage	KV	6.6
Input Current	Amps	81	Input Current	Amps	34.2

NTPC Unchanhar Stg. II (210 MW), FD Fan Model- AP I - 18 /11

Annexure-VI

Area of diff.	MTPS U # 1-4	NTPC Unchanhar	
Condenser			
No. of Pass	Two	Two	
No. of tubes	19218	16653	
Cooling Water req. (T / Hr.)	28000	22500	
Tube length (mm)	7500	11280	
CW Pp			
Power Cons.(KW) at duty point	1100 x 6 KW (U#1-3), 1434 x 2 KW U#4	900 x 2 KW	
CW Pp Capacity (Ton / Hr.)	12750 x 03 Nos. (U#1-3), 15500 x 02 Nos. (U#4)	12750 x 02 Nos.	

Comments of DVC against Regulation-35:

Operation and Maintenance Expenses:

• Draft Regulation 2019-24 does not specify additional O&M expenses after implementation of emission control measures (FGD, Low NOx burners, ESP augmentation, etc.). Additional O&M expenses over and above specified norms for each category of thermal units needs to be confirmed.