ODISHA ELECTRICITY REGULATORY COMMISSION
BIDYUT NIYAMAK BHAWAN
UNIT-VIII, BHUBANESWAR - 751 012
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Present: **Shri S. P. Nanda, Chairperson**
Shri B. K. Misra, Member
Shri S. P. Swain, Member

Case No. 62 of 2013

OHPC Ltd. …… **Petitioner**
- Vrs. -
GRIDCO Ltd. & others …… **Respondents**

IN THE MATTER OF: An Application for approval to carry out Renovation &Modernization of Unit #3 (24MW) of Chiplima Hydro Electric Project, Chiplima as per Clause 10 of CERC (Terms & Conditions of Tariff) Regulations, 2009.

AND

Case No. 67/2013

OHPC Ltd. …… **Petitioner**
- Vrs. -
GRIDCO & others …… **Respondents**

IN THE MATTER OF: An Application for approval to carry out Renovation, Modernization and Uprating of 2x37.5 MW Units #5 & # 6 of Burla Power House as per direction of the Commission passed in Case No.09 of 2013.

AND

Case No. 68/2013

OHPC Ltd. …… **Petitioner**
- Vrs. -
GRIDCO Ltd. & others …… **Respondents**

IN THE MATTER OF: An Application for approval to carry out Renovation & Modernization of Units #1 to # 6 (60 MW each) of Balimela Hydro Electric Project as per Clause 10 of CERC (Terms & Conditions of Tariff) Regulations, 2009.

For the petitioner: Shri Sahadev Khatua, MD, OHPC and Shri Santosh Sahoo, Dir (Fin), OHPC.

For the respondents: Shri L R. Dash, GM, GRIDCO.

Nobody is present on behalf of WESCO, NESCO, SOUTHCO & CESU.

ORDER

Date of hearing: 21.02.2014 **Date of order:31.03.2014**

1. Odisha Hydro Power Corporation Ltd. (OHPC) has submitted three applications (i) to carry out the Renovation and Modernisation (R&M) of Unit-3 of Chiplima Hydro Electric Project

(CHEP) having installed capacity of 24 MW, which has been registered in Case No. 62 /2013, (ii) to carry out the Renovation and Modernisation & Up-rating (R, M & U) works of Units- 5 & 6 (2x 37.5 MW) of Hirakud Hydro Electric Project (HHEP) which has been registered in Case No. 67 /2013 and (iii) to carry out the Renovation and Modernisation (R&M) of Units – 1 to 6 of Balimela Hydro Electric Project (BHEP) having installed capacity of 60 MW each, which has been registered in Case No. 68 /2013. All the three cases are clubbed together and heard by the Commission.

R&M of Unit-3 of CHEP, Chiplima

2. OHPC has submitted that CHEP, Chiplima having three units of 24 MW each was in operation for more than 50 years, out of which the R&M works of Unit-1 & 2 have already been completed in 1998 and 2008 respectively. The Unit-3 (LNZ, Russia make Turbine and Electrosila, USSR - Generator) was commissioned on 01.02.1964 and outlived its service life. At present, the capacity and efficiency of this unit has been reduced drastically and showing frequent forced outage due to failure of TGB, oil leakage from runner header and blade, heavy leakage of water from turbine top cover through shaft seals and guide vane bushes. Further, there are frequent problems due to obsolete excitation and governing system and most of the critical spares are not available in the market. The machine is running within 10 to 15 MW and can't be loaded more than 15 MW due to rise in temperature. Further, the machine may completely stop at any time due to various problems on account of aging of machines. The maximum achievable generation of CHEP would be 63.5 MW instead of the install capacity of 72 MW due to design limitation of water flow in headrace channel. Thus, in case of complete shutdown of Unit-III the loss of generation would be 15.5 MW. As per the RLA & LE study made by M/s. Tata Power Ltd. in 2004, the overall efficiency of the machine is 70.01% against the designed efficiency of 86.14%. In the DPR prepared by M/s. MECON, it is proposed that

   Alternative-1- Refurbishment of turbine and generator with associated equipments and auxiliaries with the estimated cost of Rs.74.13 Crs. with extension of fair technical life of 25 years.

   Alternative-2 – R&M with new T & G and associated equipments with auxiliaries with an estimated cost of Rs.96.50 Cr. with extension of fair technical life of 35 years.

3. The DPR with alternative-2 in complete shape has been duly approved by OHPC Board on 27.08.2012 and accordingly OHPC had made in-house study of Techno-Commercial analysis in implementing the R&M of Unit-III of CHEP with new T&G. OHPC in its

submission has stated that the estimated project cost of the R&M works of Unit-III of CHEP including IDC comes to Rs.96.50 Cr. and the average tariff of CHEP for FY 2015-16 is computed at 93.38 paise per Kwh after completion of R&M works of Unit-III against the present approved tariff of 52.21 Paise per Kwh for FY 2013-14. The schedule time for R&M works with replacement of T&G is proposed to be about 20 months starting from 01.11.2014 subject to approval of the Commission and finalisation of tender.

R, M & U of Units - 5 & 6 of HHEP, Burla

4. Earlier OHPC had submitted an application for R, M & U of Unit – 5 &6 (Hitachi, Japan make) of HHEP, Burla which was registered as Case No. 31/2011. The Commission vide its order dtd. 26.12.2012 passed in this case had observed the following:

> *"15. The Commission also observes that in tendering process of the aforesaid proposed RM & U project is almost like a single tender contract since all other participants are disqualified because of the non- availability of technical drawings which is only available with the Original Equipment Manufacturer(OEM). Such a position is not acceptable as it vitiates the extant competition Law of the Country. Therefore, it is advised that in future OHPC should invite offer in respect of 5 & 6 units of Burla Power Station for complete new units instead of Renovation and Modernization and life extension of the existing units with existing civil structure so that the tenderer can quote with its own design and capacity of the generating units. The tenders can be evaluated on cost per MW basis."*

5. Further, the Commission in its Order dtd. 02.07.2013 in Case No. 9/2013 passed in the review petition of OHPC against the aforesaid order dtd. 26.12.2012 had observed the following:

> *"7. Therefore, we do not find any reason to interfere with our Order dtd. 26.12.2012 and the findings of the Commission as per para 13 to 15 of the said Order stand. The Commission desires that OHPC should operate the Unit-5 & 6 in the current monsoon months at a flat load of reduced capacity, say 20 MW and simultaneously initiate action for retirement of the Unit-5 & 6 which are already more than 50 years old and if necessary go for the installation of complete new units instead of Renovation, Modernisation and Uprating."*

6. Accordingly, OHPC has prepared the DPR for R, M&U of Units- 5 & 6 of HHEP, Burla with complete replacement of Turbine and Generator equipments with related auxiliaries including cost estimate and techno-economic analysis on the basis of the inputs from the RLA and LE study conducted by M/s. Tata Power in 2004. In its application OHPC has submitted that both the Units – 5 & 6 of HHEP, Burla were commissioned way back in 1962 and 1964 respectively. They have been operating for more than 50 years and outlived their useful life. A lot of problems are being faced for operating these two units. The shaft sleeve of the stuffing box is badly worn out resulting in heavy leakage of water through turbine top cover and causing flood effect. Beyond 65% guide-vane opening the leakage is beyond

control and preventing the units from stopping with normal break application. The winding temperature is restricted to 80^0 C due to Class-B insulation which reaches when operated at 30 MW. The governing system and AVR are very old and obsolete. Hence governor response is sluggish and voltage Regulation is very poor. In view of the above, at present, both the units could run only at 10 to 15 MW load.

7. OHPC has submitted that R, M & U of both the Units – 5 & 6 of HHEP is very much essential due to aging of the units and non-availability of spares, frequent force outage and non-availability of machines, potential for improved performance, opportunity for plant automation and enhance the output capability of the machines. OHPC Board has also approved for R, M & U of these units with complete replacement of T & G as per the suggestion of the Commission in its earlier order. Accordingly, OHPC has also floated International Competitive Bidding for the R, M &U.

8. In the project report OHPC has indicated that both the Units 5 & 6 of HHEP, Burla with installed capacity of 37.5 MW each have de-rated and could be run at about 10 MW each. However, after R, M & U they can be up-rated to 43.6 MW each with the available head and without increasing water discharge. OHPC has estimated the project cost of Rs.325.96 Cr. for this R, M & U works of Units – 5 & 6 of HHEP including IDC and computed the average tariff at 189.70 paise per unit in the FY 2016-17 against the approved average tariff of 92.53 paise per unit for the FY 2013-14. After R&M (with new T&G) the units will be having extension of fair technical life of 35 years.

R & M of Units – 1 to 6 of BHEP, Balimela

9. OHPC has submitted that the Units 1 to 6 of BHEP, Balimela (60 MW each) are LMZ / Electrosila, Russia Make and commissioned during 1973 – 77. These units have already run for more than the normative life of 35 years. The major problems now faced by running these machines are heavy water leakage through guide-vanes, bushes etc., governing and excitation system operation is sluggish resulting in frequent isolation from Grid, frequent problems in thrust bearing causing frequent force outage, non-availability of spares of the old/ obsolete equipments, defective temperature sensors for measurement and monitoring of generator temperature. In addition, cooler leakage, clogging of filters, failure of power cables / switch gears / pumps, motorized problems / failure etc are also some of the causes which very often lead to forced outages. All these problems cause frequent forced outage resulting in non-availability of machines even during the peaking hours. Hence, OHPC engaged M/s. MECON for preparation of DPR for the R & M works of Units – 1 to 6 of

Balimela based on the RLA and LE study carried out by M/s. Power Machines in 2010. In the DPR prepared by M/s. MECON, it is proposed that

Alternative-1- Refurbishment of turbine and generator with associated equipments and auxiliaries with the estimated cost of Rs.551.94 Cr. with extension of fair technical life of 25 years.

Alternative-2 – R&M with new T & G and associated equipments with auxiliaries with an estimated cost of Rs.664.76 Cr. with extension of fair technical life of 35 years.

10. The DPR with alternative-2 in complete shape has been duly approved by OHPC Board and accordingly OHPC had made in-house study of Techno-Commercial analysis in implementing the R&M works with new T&G with estimated cost of Rs.664.76 Cr. including IDC. OHPC has proposed to take up the R & M works of Units – 1 to 6 of Balimela in a phased manner between 01.11.2014 and 30.04.2019, considering two units with an investment of Rs.221.59 Cr. in each phase. Accordingly, OHPC has computed an average tariff of BHEP at 111.51 paise per unit in 2016-17, 145.33 paise per unit in 2017-18 and 177.43 paise per unit in 2018-19 after completion of first, second and third phase respectively.

11. GRIDCO in its submission has stated that the R&M works of the generating units of CHEP, Chiplima, HHEP, Burla and BHEP, Balimela as proposed by OHPC may be approved by the Commission with due evaluation of tenders on cost per MW basis so that the consumers of the State are not deprived of the cheap power from these stations. OHPC should ensure that the Units will be able to perform satisfactorily after the R&M works. Further, all the units of HHEP, CHEP and BHEP which need R&M works as proposed by OHPC should not be allowed for shutdown simultaneously in order to avoid for meeting the peaking demand of the State.

Commission's Observations

12. Heard the parties at length. The Commission observed that all the generating units for which OHPC has proposed for Renovation and Modernisation (R&M) works have run more than their normative life of 35 years and needs R&M works for further life extension. Since Chiplima Power House is base load plant and operate using discharge of Burla Power House, all of its generating units should be available for maximum generation. Otherwise there will be spillage of water to the river. Therefore, R&M works of Unit- 3 of Chiplima is essential which should be taken up on priority basis. Presently for establishing a new power project is very much difficult due to R&R problems, hence R&M of the existing large hydro

electric project is required to meet the demand and provide cheap power to the consumer of the State. Therefore, the Commission considers it proper to take up the proposed R&M works of the generating units at HHEP, Burla and BHEP, Balimela those have completed their useful life and running at de-rated capacity and also prone to frequent forced outage due to various operating problems. The proposed schedule to take up the R&M works with complete replacement of Turbine and Generator (T&G) of different generating units as submitted by OHPC is as follows:

Power Stations	Unit	Zero Date	Tentative Date of Commercial Operation	Total Duration of Shut Down for R&M Works	MW Available in different power stations during R&M of proposed generating units
CHEP, Chiplima	**3**	**01.11.2014**	**30.06.2016**	**20 Months**	48MW from 01.11.14 to 30.06.2016
HHEP,Burla	**5**	**01.11.2014**	**31.07.2016**	**21Months**	1)210.5MW from 01.11.2014 to 01.11.2015 2)200.5MW from 01.11.2015 to 31.07.2016 3)244.1MW from 01.08.2016 to 30.04.2017 4)287.7MW from 30.04.2017 after commissioning
	6	**01.11.2015**	**31.04.2017**	**18 Months**	
BHEP, Balimela	**1**	**01.11.2014**	**30.04.2017**	**30Months**	1) 450MW from 01.11.2014 to 31.10.2015 2)390MW from 01.11.2015 to 31.10.2016 3)270MW from 01.11.2016 to 30.04.2017 4)390MW from 31.04.2017 to 31.10.2017 5)270MW from 01.11.2017 to 30.04.2018 6)390MW from 01.06.2018 to 30.04.2019
	2	**01.11.2015**	**30.04.2017**	**18 Months**	
	3	**01.11.2016**	**30.04.2018**	**18Months**	
	4	**01.11.2016**	**30.04.2018**	**18Months**	
	5	**01.11.2017**	**30.04.2019**	**18Months**	
	6	**01.11.2017**	**30.04.2019**	**18Months**	

13. In view of the above, the Commission accord in principle approval to carry out the R&M works of the generating units of various hydro electric projects of the State as proposed by OHPC. However, OHPC should take care of the fact that the R&M works should be completed as per the schedule without any cost over-run. The tariff proposed by OHPC for various power stations after the R&M works appears to be at higher side, which will be determined by the Commission based on the OERC Regulation for Determination of Tariff after completion of the works.

14. Accordingly, these cases are disposed of.

Sd/-	Sd/-	Sd/-
(S. P. Swain)	**(B. K. Misra)**	**(S. P. Nanda)**
Member	**Member**	**Chairperson**