

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No.283/2009

**Coram: Dr. Pramod Deo, Chairperson
Shri S.Jayaraman, Member
Shri V.S.Verma, Member
Shri M.Deena Dayalan, Member**

DATE OF HEARING: 15.6.2010

DATE OF ORDER: 18.8.2010

IN THE MATTER OF

Approval of tariff for Ratnagiri Gas and Power Private Ltd, for the period from 2009-10 to 2031-32

AND IN THE MATTER OF

Ratnagiri Gas and Power Pvt. Ltd, Uttar Pradesh
...Petitioner

Vs

Maharashtra State Electricity Distribution Company Ltd, Mumbai
....Respondent

The following were present:

1. Shri M.G.Ramachandran, Advocate, RGPPL
2. Shri Rohit Chhabra, RGPPL
3. Shri Prahlad Ramrakhiani, RGPPL
4. Shri K.C.Muralidharan, RGPPL

ORDER

This petition has been filed by the petitioner, Ratnagiri Gas and Power Private Ltd (RGPPL) under Sections 61, 62, 64 and 79 of the Electricity Act, 2003 (hereinafter referred to as "the Act") read with Chapter-V of the central Electricity Regulatory Commission (Conduct of

Business) Regulations, 1999, for approval of generation tariff of Ratnagiri Gas and Power Project (hereinafter referred to as “the generating station”) for the period from 2009-10 to 2031-32.

Background of the Generating Station

2. The Petitioner, a joint venture of NTPC Ltd, GAIL, MSEB Holding Company and ICICI, IDBI, SBI and Canara Bank, was established as a Special Purpose Vehicle to take over the assets of Dabhol Power Project which were owned by Dabhol Power Company Limited (hereinafter called ‘DPC’), a private company promoted and established by erstwhile Enron Group. The assets of DPC included a gas based combined cycle power project with an estimated net capacity of 2150 MW along with an integrated LNG Terminal of estimated capacity of 5 MMTPA and associated infrastructure facilities at P.O. Anjanwel, Taluka Guhagar, District Ratnagiri in the State of Maharashtra. The Dhabol Power Project consisted of three Blocks namely, Block I, Block II and Block III with each of them having two Gas turbines and one Steam Turbine and a common LNG Terminal. The Block-I of the Dhabol Power Project was established by the year 1999 and work on Blocks-II and III and LNG terminal was in progress in May 2001 when its operation was closed down. Maharashtra State Electricity Board (hereinafter referred to as ‘MSEB’) a board constituted in the State of Maharashtra under Section 5 of the Electricity

(Supply) Act, 1948 was the beneficiary of the entire power generated from the above project as per the Power Purchase Agreement and related agreements entered into between DPC and MSEB.

3. The petitioner has submitted that DPC and its promoter, Enron Group ran into serious financial and other difficulties and could not continue to operate the Dabhol Power Project. Consequently, DPC and MSEB also went into litigation. These litigations involved invocation of guarantees and counter guarantees given by the Government of Maharashtra and Government of India for the project. The operation in the Dabhol Power Project was eventually closed down in May 2001. Upon its closure, the Dabhol Power Project and all its assets were placed under the control of a Receiver appointed by the Hon'ble High Court of Bombay in Suit No 875 of 2002. The Dabhol Power Project was out of operation from May 2001 for almost 5 years during which time the assets were in the possession and under the control of court receiver.

4. The Government of India and the Government of Maharashtra were desirous of reviving the Dabhol Power Project, considering the huge investments made in the project, the possibility of generating 2150 MW power from the project to meet the shortage of electricity in the country, particularly in the State of Maharashtra and in the larger public interest.

After exploring several possibilities, it was finally decided that a Special Purpose Vehicle would be formed with shareholdings by NTPC Limited, GAIL (India) Ltd., Financial Institutions such as IDBI Limited, ICICI Bank Limited, State Bank of India, Canara Bank and the State Electricity Utility in the State of Maharashtra (MSEB Holding Company Ltd) and vested with the task of revival of the project. The Government of India finalized a comprehensive scheme with regard to the capital investments, project cost, transfer value, funding requirements, repayment to the banks and financial institutions, equity investment etc of the project after its takeover by the SPV.

5. In pursuance to the above decision, RGPPL was formed as a Special Purpose Vehicle to take over the assets of Dabhol Power Project along with the generating units, integrated LNG Terminal and associated infrastructure facilities for revival. On 22.9.2005, the Hon'ble High Court of Bombay recorded the consent terms for the above take over at a lump sum consideration of Rs 8485.45 crore as envisaged in the scheme worked out and approved by the Government of India. In terms of the order of the Hon'ble High Court and the approved financial scheme, the assets of Dabhol Power Project including the integrated LNG Terminal and associated infrastructure facilities were taken over by RGPPL from the Court Receiver on 6th October 2005 on "as is where is" basis.

6. The power project of the petitioner is an inter-state generating station having arrangement for sale of electricity in more than one State with 95% of its capacity allocated to the respondent, Maharashtra State Electricity Distribution Company Ltd., the successor of MSEB and the balance 5% as unallocated power at the disposal of the Government of India. Presently, the Govt. of India has allocated the unallocated share of power for 3 months each to Goa, Daman, Dadra & Nagar Haveli, and Madhya Pradesh. The generating station has been granted Mega Power Project status by the Ministry of Power, Govt. of India vide Notification No. F. No. C-436/2085-IPC dated March 14, 2006. The Petitioner executed a Power Purchase Agreement (PPA) with the respondent on 10.4.2007 containing the terms and conditions for supply of power consistent with the scheme finalized for revival of the Project.

Revival and commencement of operation of the generating station

7. The Petitioner has submitted that at the time of takeover and during the preliminary assessment for repair and rehabilitation of the generating station, the exact status of the various machines and their working condition etc. could not be fully ascertained. The plant and equipments of the generating station were amongst the first few advanced class machines and their repair, revival and operation and maintenance were unpredictable with no guarantee or warranty existing at the time of

takeover. The petitioner did not have support of the original contract with M/s GE Energy, the Original Equipment Manufacturer (OEM) to restart operation and maintenance as the OEM along with its principal agency, namely, M/s Bechtel who were responsible for balance work of the generating station (i.e. excluding scope of M/s GE Energy) had already been released from their contractual obligations with regard to the supply of gas turbines and steam turbines. The OEM was also not willing to provide any guarantee for ensuring the reliability and performance of the machines and equipments, despite efforts made by the Govt. of India.

8. The petitioner has submitted that after the takeover, it proceeded to undertake the repairs and connected works of the generating station in order to commence generation of electricity. Block II of the generating station was operated on liquid fuel from April 2006 to July 2007 and thereafter, on Regassified Liquefied Natural Gas (R-LNG) from August 2007, and Block III was operated on R-LNG from October 2007 before Block II and Block III of the generating station went into commercial operation with effect from 1.9.2007 and 21.11.2007 respectively.

9. The Petitioner has further submitted that during the course of the operation of the generating station, one of the gas turbine forming part of the block II failed on 19.1.2008 as a result of compressor distress.

Further, the steam turbine forming part of block III was shut down from 18.6.2008 to 1.10.2008 due to unusual failure of a Stelite Seal in HP control valve leading to turbine diaphragm damage. This resulted in complete outage of block III. On 8.11.2008, one of the gas turbine of block III failed as a result of compressor distress. Further, in another gas turbine 3B, cracks in compressor blades were found which resulted in the outage of block III from 19.11.2008 to 16.3.2009. The gas turbines having been supplied by OEM with specification namely “9FA” Advanced Class or F-Class were not comparable to other gas turbines functioning in the country and consequently, the petitioner had no other alternative except to approach the OEM afresh for various support activities for the revival, and operation and maintenance (O&M) of the generating station. The petitioner has been able to finalize a long term arrangement with the OEM for rehabilitation and support for O&M etc, in respect of the gas turbines and steam turbines, with certain assurances on performance and availability. After great deal of negotiations, the petitioner has signed on 20.6.2009 an availability guarantee-based long term contractual supply and service agreement with the OEM. The availability guarantee was applicable only when the petitioner stores mandatory spares worth USD 60 million at site. This was possible only through continuous efforts by the petitioner and the stakeholders with support of the Govt. of India and Govt. of Maharashtra and was in line with the action plan for financial

restructuring agreed and concluded by the stakeholders in March, 2009. The agreement with the OEM was considered absolutely necessary for the revival and sustained operation and maintenance of the generating station. Pursuant to the agreement, the petitioner has entrusted the restoration and rehabilitation of the failed gas turbine to the OEM. The work on the restoration of these machines are in progress.

10. The Petitioner has submitted that at the time of declaration of commercial operation of blocks II and III, both blocks were stable and sustained for considerable period and the petitioner could not have foreseen that the gas turbines and steam turbines, forming part of these blocks would not function properly on sustainable basis. Under the circumstances unique and peculiar to the generating station, the Petitioner undertook the task of revival of the project.

11. The Petitioner has submitted that Block-I of the generating station consisting of Gas Turbines GT#1A and GT#1B and Steam Turbine ST#1X was revived during January- March 2009. However, during stabilization of the machines, some abnormality was observed in GT#1B Compressor and Rotor of GT#1B which were got repaired by the OEM. After the repair, GT#1A, GT#1B and ST#1X have been stabilized and are operating

continuously. Block-I of the generating station was declared under commercial operation w.e.f. 19.5.2009.

12. The tariff of block-II and III of the generating station for the period from 1.9.2007 to 31.3.2009 was determined by the Commission in terms of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2004 by order dated 4.6.2009 in Petition No. 96/2007, considering the capital cost and the plant capacity as under:

Period	(Rs in lakh)		
	1.9.2007 to 20.11.2007	21.11.2007 to 31.3.2008	1.4.2008 to 31.3.2009
Plant Capacity (MW)	668.54 (Block II)	1337.08 (Block II & III)	
Capital Cost (Rs in lakh)	351832	564997	570624

13. The Petitioner has made the following prayers in the present petition:

“ a. Allow RGPPL, to bill Annual Capacity charges as worked out at form-1 and summarized at Annexure-Q of the Petition, which on per kWh basis works out as follows:

FINANCIAL YEAR	*Capacity charges (paise/kWh)
2009-10	265
2010-11	208
2011-12 to 2017-18	180
2018-19 to 2023-24	177
2024-25 to 2031-32	120

*Excluding Tax which shall be pass through. RoE w.e.f. 01.04.2014 to be reviewed as per the prevailing regulations.

b. Allow RGPPL, to bill above Capacity Charge on following target availability and generation (sent out during various FYs):

Financial Year	Target availability	Target Generation (sent out)
2009-10	45.49%	7500 MUs
2010-11	66.72%	11000 MUs
2011-12 onwards	80.00%	13188 MUs

c. Approve the gross capacity of respective blocks as follows subject to adjustment in capacity of power block-I based on capacity measurement test:

Power Block	Gross Capacity
Power Block-II	650 MW
Power Block-III	650 MW
Power Block-I	640 MW
Total Capacity	1940 MW

d. Approve the Gross station Heat Rate as follows:

Power Block	On Gas	On Naphtha
Power Block-I, II & III	1850 kCal/kWh	2000 I/kWh

e. Allow the relaxation sought for as detailed above.

f. Allow RGPPL, to bill energy charge, taxes, duties, levies etc. and give rebate etc. as per Power Purchase Agreement and Gas Sales Agreement.

g. Allow RGPPL, frequency correction in the scheduled generation.

h. To allow RGPPL to bill Fixed charge @ Rs. 2.65 per kWh w.e.f. 01.04.2009 for the FY 2009-10, pending final tariff determination by Hon'ble Commission under current petition, subject to adjustment, if any based on finally approved tariff.

- i. Pass such further order as may be considered just and proper to give complete relief mentioned above.”

14. The petition was heard on 13.5.2010, 25.5.2010, 10.6.2010 and 15.6.2010. None appeared on behalf of the respondent. None also appeared on behalf of the consumer groups empanelled by the Commission to represent the interest of the consumers.

15. The Commission in the Record of Proceedings for the hearing held on 13.05.2010 directed the petitioner to submit the following on affidavit:

- (a) Justification for relaxation of the relevant provisions of the 2009 regulations;
- (b) Necessity for carrying out the modification in all the six GTs under comprehensive service and rehabilitation agreement with M/s GE (OEM) and the details of the modifications carried out.

The petitioner has furnished the required information vide its affidavits dated 07.6.2010 and 30.6.2010.

Tariff Period

16. The Petitioner has claimed the annual fixed charges for the period from 1.4.2009 to 31.3.2032 (i.e up to the useful life of the generating

station) based on levelized calculations after considering a discount factor of 10.19%. Regulation 2 of the 2009 regulations provides that the regulations specified by the Commission shall be in force for a period of 5 years from 1.4.2009. The annual fixed charges claimed by the petitioner for a period up to 31.3.2032 are in deviation to the norms specified in the 2009 regulations. Regulation 38 of the 2009 regulations provides for determination of generation tariff in deviation of the norms specified in the 2009 regulations subject to the condition that the levelized tariff over the useful life of the project on the basis of norms in deviation does not exceed the levelized tariff calculated on the basis of norms specified in these regulations. The petitioner, in its petition, has not demonstrated the existence of the above condition warranting the consideration of levelled tariff over the useful life of the generating station by the Commission. Hence, the tariff for the generating station is determined for a period of five years from 1.4.2009 to 31.3.2014, based on the norms specified by the Commission in the 2009 regulations.

Plant Capacity of the Generating Station

17. The petitioner has sought approval of the gross capacity of blocks I to III as under, subject to adjustment in the capacity of power block-I, based on capacity measurement test:

Power Block	Gross Capacity
Power Block-II	650 MW
Power Block-III	650 MW
Power Block-I	640 MW
Total Capacity	1940

The de-rated capacity of the three blocks, as above, is stated to be based on actual operational experience of the power blocks and the performance test conducted by the Original Equipment Manufacturer (OEM) on Block-III.

18. In the order dated 4.6.2009 in Petition No.96/2007 approving the tariff of the generating station for the tariff period ending 31.3.2009, the Commission had relaxed the gross capacity of block III to 668.54 MW in consideration of the recommendations of Central Electricity Authority on the basis of the performance evaluation test conducted on block-III at site reference conditions i.e. at 27.2 °C ambient temperature, 60% humidity and 50 Hz frequency. Since, block-II had the same capacity as block-III, the capacity of the block-III was also considered as 668.54 MW. The original capacity of block-I which was 670 MW, was considered by the Commission, pending declaration of commercial operation. The plant capacity of the three blocks of the generating station fixed by the Commission for the purpose of tariff in the order dated 4.6.2009 as

against the capacity indicated in the restructuring plan of the generating station was as under:

	(In MW)	
Power Block/configuration	As per restructuring plan	Capacity relaxed in order dated 4.6.2009
Block-I (GT 2x215 +ST 1x240)	670.00	670.00
Block-II(GT 2x240 +ST 1x260)	740.00	668.54
Block-III(GT 2x240 +ST 1x260)	740.00	668.54
Total	2150.00	2007.08

19. The petitioner has submitted that the gross capacity of 668.54 MW for blocks II and III was evaluated under testing conditions of stretched operation and therefore, the same was not achievable on a sustained basis and hence should not be taken as the basis for fixing of gross capacity. However, the petitioner was directed by letter dated 25.3.2010, to submit the following information:

- (a) Actual daily MW capacity at the generator terminal during the last one year block-wise;
- (b) Standard correction curves for output, Heat Rate at site conditions over the guaranteed design performance; and
- (c) Daily average ambient temperature at the site for the last one year.

The petitioner vide affidavit dated 15.4.2010 has furnished the information as above, except for correction curves which was not available

to the petitioner, since M/s GE (OEM) had not provided any guaranteed parameters nor correction curves for the machines.

20. On examination of the daily MW generation for the period from April, 2009 to March, 2010 for blocks I, II and III, it is observed that blocks I and III have achieved a maximum generation of 631.9 MW and 663.8 MW respectively, though not on a sustained basis. It is further noticed that the average ambient temperatures for the years 2007, 2008 and 2009 are 27.33 °C, 28.55 °C and 28.35 °C respectively. The minimum temperature observed in January, 2010 is 26.12 °C and maximum temperature is 31.55 °C in May, 2009. The average yearly ambient temperature, as above, shows an upward trend in comparison to the design ambient temperature of 27.2 °C. It is also noticed from the standard correction curves of M/s GE Energy that the decrease in output is about 0.75% for each degree centigrade rise in the ambient temperature, which translates in degradation in the output of the turbine by about 5 MW.

21. In the light of our observation regarding the increase in average ambient temperature, we are of the view that the plant capacity of blocks II and III of the generating station could be reduced further by 5.0 MW each, as against the relaxation of 18.5 MW sought by the petitioner for

each of blocks II and III. In case of block-I, the de-rating of capacity sought by the petitioner is about 4.5 % of the capacity of 670 MW, as per the restructuring plan. Considering the degradation witnessed in blocks II and III of the generating station which is of the order of 10% from the capacity as per restructuring plan, the capacity of block I to 640 MW could also be relaxed. Accordingly, we have considered the capacity of block-I as 640 MW. In view of our decision as stated above, the installed capacities of blocks I to III of the generating station have been approved as under for the purpose of tariff for the period 2009-14:

			(MW)
Power Block/configuration	As per restructuring plan	Capacity from 1.4.2009 to 18.5.2009	Capacity with effect from 19.5.2009
Block-I (GT 2x215 +ST 1x240)	670.00	-	640.00
Block-II(GT 2x240 +ST 1x260)	740.00	663.54	663.54
Block-III(GT 2x240 +ST 1x260)	740.00	663.54	663.54
Total	2150.00	1327.08	1967.08

The relaxed capacity of 640 MW with effect from 19.5.2010 in respect of block I is subject to adjustments based on performance tests to be conducted within six months from the date of issue of this order and the relaxed capacity in respect of blocks II and III with effect from 19.5.2009 is also subject to adjustments based on the performance test to be conducted within six months of the refurbishment of the gas turbines of each of these blocks.

PLANT AVAILABILITY

22. Clause (i) of Regulation 26 of the 2009 regulations provides for the Normative Annual Plant Availability Factor (NAPAF) for combined cycle gas projects as 85%. The petitioner has submitted that in terms of the above regulation, it is not possible to achieve the target availability of 85% annually on a sustained basis. The petitioner has further submitted that failure of the gas turbines, for the reasons beyond its control, had severely affected the plant availability during the period 2007-09 and its impact would continue during the period 2009-11. The petitioner has also submitted that under the restructuring plan of the project, the target availability has been considered at 80% over the balance useful life of the generating station, excluding the years 2009-10 and 2010-11. The petitioner has prayed that for the viability and survival of the generating station, the NAPAF during different years of the tariff period be allowed as under:

Financial year	Net generation (MU)	Target Availability (%)
2009-10	7500	45.49
2010-11	11000	66.72
2011-12 onwards	13188	80.00

23. The Petitioner has submitted that it has entered into a Comprehensive Service and Rehabilitation Agreement with the OEM, M/s GE Energy. After completion of rehabilitation progressively by the year

2010-11, the generating station is expected to achieve an availability of 80% and accordingly, from the year 2011-12, the generation would be at 80% availability, on annual basis. The petitioner has further submitted that it will not claim incentive for the actual availability in the range of 80 to 85%.

24. The petitioner in its affidavit dated 7.6.2010 has clarified the necessity for carrying out modifications in all the gas turbines under comprehensive service and rehabilitation agreement as under:

(a) The compressors of the three Gas Turbines (GTs) at the generating station suffered catastrophic damage on account of failures of compressors blades of first three stages. In addition, cracks were found in two other machines during preventive inspection. These failures occurred after the machines were operated at stable load for time period varying from 2841 hours to 8045 hours. Further, no distress signal was observed in these machines before the failure.

(b) Root Cause Analysis (RCA) was carried out by OEM which revealed fretting wear marks on the dovetail pressure surfaces and on the adjoining pressure surfaces of the compressor wheel slots on the R2/R3 stage. The fretting wear occurs at the contact

area between two materials under load and subjected to relative motion caused by some force/load. Because of fretting wear, the material strength would decrease at the fretting area. The contributing factor that led to fretting damages was identified as off speed operations depending upon grid frequencies. At the places where there is reduced material strength the normal operating stresses may lead to further material degradation. Cracks develop if material degradation takes place beyond the material strength. During investigation, crack initiations were found at the dovetail neck radius which is stress concentrated area. Compressor aerofoil mode responses induces load at this location. Two modes namely 1F and 3T are identified which induces the load at this surface. Natural frequency crossings of engine orders (Stimulus that causes a blade to vibrate) causes vibratory response. From the analysis of R2 blades natural frequencies, it was found that 3T response at below and above operating speeds, which occurs during grid frequencies variations, which elevate blade stress and fretting damage potential. It was concluded that S0-46 vanes as stimulus.

- (c) Based on the Root Cause Analysis findings, the following major modifications/up-gradations *inter-alia*, as suggested by OEM

was agreed to after obtaining the expert opinions of the CEA and NTPC:

(i) Replacement of 46 count S0 vane configuration with 44 counts:

The replacement of 46 count S0 vanes with 44 counts was essential to remove the stimulus for R2 blades. This activity could only be done while the machine was in dismantled condition. As of now this activity has been completed on the machines.

(ii) Dovetail undercut in the Compressor blade: This modification was required to increase the vibratory stress margins that occur on account of grid fluctuation.

The Petitioner has submitted that In view of very uncertain behaviour and recurring failures of the machines, its decision to involve the OEM by entering into a comprehensive service and supply agreement is a prudent and correct approach in the given circumstances.

25. Going by the performance of the station so far, We would expect a more professional and prudent approach on the part of petitioner and would like them to ensure that the competency and skills of the operational personnel is enhanced adequately.

26. The Petitioner has now entered into a Comprehensive Service Agreement with the OEM effective from 20.6.2009 which provides that rehabilitation of all of the six gas turbines units shall be completed first and following the receipt of Rehabilitation completion certificates for all the Units, the OEM has given guarantee for achieving Average Equivalent Availability Factor (Average EAF) at 87% for all the units during the first four years, and thereafter at 89%.

27. We are of the view that with the long term support of the OEM under Comprehensive Service Agreement, the generating station is expected to provide reliable and sustained performance. The Petitioner has indicated that the refurbishment of the gas turbines would be completed by 2010-11. Since refurbishment of various gas turbines would require the shifting of rotor assembly to OEM workshop, it would result in low availability of the machines during the period of refurbishment. In the given circumstances, there appears to be no other alternative but to go for the refurbishment of the gas turbines necessarily through the OEM to achieve and ensure the desired availability of the machines in order to to make the generating station financially viable and for ensuring supply of electricity to the beneficiaries. The generating station has achieved an availability of 49.9% during the year 2009-10 only. The petitioner has sought to allow NPAF of 66.72% during 2010-11 due to refurbishing of

three more gas turbines. In the light of above facts and circumstances, we are of the view that the NAPAF norms as a special case for the viability of the project in the interest of the public at large during the period 2009-10 and 2010-11 could be relaxed as 49.9% and 66.72% respectively. As regards the period 2011-14, the Petitioner has asked for the NAPAF of 80% as against the norm of 85% as specified in the 2009 regulations. Considering the fact that NAPAF of gas based generating station has been increased to 85% in 2009 regulations from the target availability of 80% in 2004 regulations, the history of frequent failures of gas turbines of the generating station, and the need for stabilization of performance of the gas turbines after refurbishment, we are of the view that marginal relaxation in the NAPAF of the generating station is required during 2011-14 for achieving financial viability of the generating station and in the interest of the consumers.

28. Regulation 44 of 2009 regulations which vests powers in the Commission to relax any of the provisions of the regulations is extracted hereunder:

“44. Power to Relax. The Commission, for reasons to be recorded in writing, may relax any of the provisions of these regulations on its own motion or on an application made before it by an interested person.”

29. In view of our observations in para 25 above and in exercise of our power under Regulation 44 of 2009 regulations, we are relaxing the norms of NAPAF for gas based generating stations as specified under Regulation 26(i)(a) of 2009 regulations in respect of the generating station as a special one time dispensation and allow the following NAPAF for different years of the tariff period 2009-14, for the purpose of recovery of full annual fixed charges:

Financial year	Net generation (MU)	NAPAF(%)
2009-10	8227	49.90
2010-11	11000	66.72
2011-12 to 2013-14	13188	80.00

Further, relaxation in the NAPAF as allowed above, is subject to the condition that the generating station shall be entitled to incentive corresponding to 50% of the availability in excess of 85% till such time the shortfall in availability from the 80% availability during the years 2009-10 and 2010-11 is made good. We would also like to make it clear that relaxation in NAPAF is a onetime dispensation and no further request for relaxation shall be entertained and consequences of any shortfall in performance shall be borne by the Petitioner.

Cost of LNG Terminal

30. The Petitioner has considered the cost of LNG terminal and the expected revenues to be generated from the commercial use of the

terminal from the year 2010-11 onwards in a phased manner. The expenditure on LNG terminal as claimed by the petitioner has not been considered for the purpose of tariff for the reasons given as under:

(a) LNG terminal has not been put to use and is presently under construction. Even in the Books of Account prepared as per accounting principles, the petitioner cannot capitalize the said asset unless it is ready for use or put to use. Until the asset is ready to be put to use, it can only be accounted for as capital work in progress.

(b) The capacity of the LNG terminal is stated to be 5 Million Tonnes per Annum (MTPA) against the capacity of 2.1 MTPA required for the power block. The revenue to be generated from the commercial use of the balance capacity cannot be ascertained in specific terms.

(c) In view of the delay in the completion of LNG terminal and hardening of LNG prices internationally, the petitioner has tied up for domestic natural gas supply from the KG Basin (facilitated due to the intervention of Govt. of India) till March, 2014, i.e. till the end of the tariff period.

31. The generating station was commissioned on 19th May, 2009. The dates of commissioning of individual blocks of the generating station along with the plant capacity are indicated below:

Blocks (Units)	Date of Commercial operation	Original Capacity (MW)	Capacity (MW) Claimed by Petitioner	Capacity(MW) allowed in this order
Block – II	01.09.2007	740	650	663.54
Block – III	21.11.2007	740	650	663.54
Block – I	19.05.2009	670	640	640.00
Generating Station	19.05.2009	2150	1940	1967.08

CAPITAL COST

32. Regulation 7 of the 2009 Regulations provides as under:

‘(1) Capital cost of a project shall include:

(a) the expenditure incurred or projected to be incurred, including interest during construction and financing charges, any gain or loss on account of foreign exchange risk variation during construction on the loan – (i) being equal to 70% of the funds deployed, in the event of the actual equity in excess of 30% of the funds deployed, by treating the excess equity as normative loan, or (ii) being equal to the actual amount of loan in the event of the actual equity less than 30% of the funds deployed, - up to the date of commercial operation of the project, as admitted by the Commission, after prudence check;

(b) capitalized initial spares subject to the ceiling rates specified in regulation 8; and

(c) additional capital expenditure determined under regulation 9.

Provided that the assets forming part of the project, but not in use shall be taken out of the capital cost.

(2) The capital cost admitted by the Commission after prudence check shall form the basis for determination of tariff.

x x x x x x

Provided also that in case of the existing projects, the capital cost admitted by the Commission prior to 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.

33. In terms of the last proviso to Regulation 7 of 2009 regulations, the closing capital cost of Rs.570624 lakh as on 31.3.2009, admitted by the Commission vide order dated 4.6.2009 in respect of power blocks II and III, should form the opening capital cost as on 1.4.2009. However, the Petitioner has claimed Rs.571318.10 lakh as the opening capital cost as on 1.4.2009, in respect of power blocks II and III along with generating station facilities and common assets. The petitioner has clarified vide affidavit dated 1.2.2010 that the present claim as on 1.4.2009, in respect of power blocks II and III is based on audited accounts.

34. The opening capital cost as on 1.4.2009, in respect of power blocks II and III, based on audited accounts and after deduction of obsolete assets included in the gross block, considered for the purpose of tariff, is as under:

(Rs in lakh)

Particulars	Amount
Closing Capital Cost (Block-II and III) as on 31.3.2009	571318.10
Less: Obsolete assets	21.95
Opening Capital Cost (Block-II and III) as on 1.4.2009	571296.15

35. The petitioner vide its affidavit dated 30.6.2010 has submitted the details of the liabilities as on 1.4.2009, in Form 9A and 9B as specified under the 2009 regulations. From the details submitted, it is noticed that the actual capital expenditure (without un-discharged liabilities and initial spares) on power blocks I to III of the generating station along with station facilities and common assets is Rs. 873991.52 lakh. However, the said cost is inclusive of Rs.103730 lakh towards IDC in respect of the power blocks, based on completed financial restructuring. Considering the peculiar circumstances under which the project was taken over and the difficulties encountered during its revival, which took more time than anticipated, the IDC as claimed by the petitioner, after financial restructuring is allowed.

36. In terms of the provisions of the 2009 regulations, the actual capital cost (without un-discharged liabilities and initial spares) in respect of the generating station has been worked out as under:

(Rs in lakh)	
Particulars	Amount
Capital Cost up to the date of commercial operation of generating station	873991.52
Less: Obsolete assets	21.95
Capital Cost of generating station as on 19.5.2009	873969.57

Projected additional expenditure during 2009-14

37. Regulation 9 of the 2009 regulations provides as under:

“(1) The capital expenditure incurred or projected to be incurred, on 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) Undischarged 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 original estimates of expenditure, undischarged liabilities and the works deferred for execution shall be submitted along with the application for determination of tariff.”

38. The petitioner has projected an estimated additional capital expenditure of Rs. 25820 lakh for the tariff period 2009-14 for the following items of expenditure:

(Rs in lakh)

SI No	Items	Amount
1	Electrical capital items	4200
2	Mechanical capital items	11200
3	Control room for Power blocks	700
4	Plant boundary wall	3320
5	Construction of workshop building and purchase of workshop machines	500
6.	Equipment for Pollution Control	300
7.	Total	25820

39. The petitioner has submitted year-wise break-up of estimated additional capital expenditure vide its affidavit dated 30.6.2010 as under:

(Rs in lakh)

Year	2009-10	2010-11	2011-12	2012-13	2013-14
Additional Capital expenditure	-	35	19210	3855	2720

40. The additional capital expenditure mainly pertains to the construction of office buildings, control room, workshop and boundary wall around the generating station and for the purchase of mandatory spares. The generating station does not have the office buildings and boundary walls, which generally form part of the scope of the project for every power generating station. Moreover, the generating station does not have the stock of the mandatory spares, which is understandable keeping in view the circumstances under which the generating station was taken over and revived.

41. The date of commercial operation of the generating station is 19.5.2009. In terms of Regulation 9 of 2009 Regulations, additional capital expenditure incurred up to the cut-off date is permitted to be capitalized which in the instant case would be the end of the year 2011-12. Out of the total claim of Rs.35 lakh for 2010-11 and Rs.19210 lakh for 2011-12, the petitioner has claimed an amount of Rs.14200 lakh on mandatory spares during 2011-12 which works out to about 1.62% of the capital cost of 873990 lakh. Moreover, an expenditure of Rs. 300 lakh has been proposed to be made on equipments for pollution control and the balance expenditure on civil works relating to construction of office building. In view of the above, the expenditure of Rs. 35 lakh for 2010-11 and Rs. 19210 lakh for 2011-12 is allowed to be capitalized.

42. In terms of the provisions contained in clause (2) of regulation 9 of the 2009 regulations, capital expenditure incurred by a generating station after the cut-off date may be admitted by the Commission only in respect of the following:

- (a) Liabilities to meet the award of arbitration or for compliance of the order of decree of court;
- (b) Change in law;
- (c) Deferred works relating to ash pond or ash handling system in the original scope of work.

43. It is noticed that the additional capital expenditure claimed after the cut-off date (i.e. for 2012-13 and 2013-14) pertains to the construction of office building such as service building, electrical and C&I Lab, control rooms for power blocks, workshop, construction of drain and culverts, and construction of boundary wall. These construction works could not be undertaken earlier due to paucity of funds and major emphasis on revival of gas turbines. The proposed buildings are considered necessary for the smooth and successful operation of the generating station. However, expenditure under this head is not covered under Regulation 9(2) of 2009 Regulations. Therefore, in the light of historical background, we relax the provisions of Regulation 9(2) of the 2009 regulations by invoking our power under Regulation 44, and allow the additional capital expenditure claimed by the petitioner for the years 2012-13 and 2014-13, as these works, in our view, are essential for the smooth and successful operation the generating station.

44. Based on the above discussions, the additional capital expenditure allowed for the purpose of tariff, is as under:

Year	(Rs in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Additional Capital expenditure	-	35	19210	3855	2720

Capital cost for the period 2009-14

45. As stated above, the capital cost as on 1.4.2009, for Blocks II and III, is Rs 571296.15 lakh and for Block-I and the generating station, as on 19.5.2009 is Rs 873969.57 lakh. Accordingly, the capital cost, considered for the purpose of tariff for the period 2009-14, is as under:

Particulars	(Rs. in lakh)					
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010	2010-11	2011-12	2012-13	2013-14
Opening capital cost	571296.15	873969.6	873969.6	874004.1	893214.1	897069.1
Additional capital expenditure allowed	-	-	35.0	19210.0	3855.0	2720.0
Closing capital cost	571296.15	873969.6	874004.1	893214.1	897069.1	899789.1
Average capital cost	571296.15	873969.6	873986.8	883609.1	895141.6	898429.1

46. As indicated above, the admitted capital cost as on date of commercial operation of power block-I and the generating station is Rs. 873969.60 lakh, and the capital cost after accounting for the additional capital expenditure of Rs. 25819.50 lakh during 2010-14, is Rs. 899789.50 lakh, which works out to Rs. 4.18 crore/MW as per the original capacity of 2150 MW. The cost would work out to Rs.5.47 crore/MW with reference to the capacity now allowed (1967.08 MW). This cost of the generating station, in comparison to other contemporary

projects envisaged at that point of time, is reasonable for the following reasons:

- (a) The generating station was taken over on an “as is where is” basis. The cost at the time of takeover (as apportioned to the power blocks) was Rs. 714894 lakh. (Rs. 688394 lakh plus Rs. 26500 lakh), which works out to Rs 3.33 crore/MW on the original capacity of 2150 MW, which was a sunk cost. The differential amount of Rs. 0.85 crore/MW was on account of revival and IDC. The expenditure on revival was Rs. 184896 lakh of which a major portion was on account of IDC.
- (b) The cost per MW of some of the gas based private generating stations cleared by CEA during the year 1990 and “in-principle” approval granted by the Commission are as under:

Project	Capacity (MW)	Year of approval	Per MW cost (Rs. in crore)
M/s GVK (Jegurapadu)	216	1993-94	3.83
M/s Gujarat Torrent (Paguthan)	654.7	1993-94	3.51
M/s Spectrum Power (Godavari)	208	1993-94	3.60
M/s Torrent Power (Sugen)	1128	2006-07	2.70
M/s Essar Power (Hazira)	1500	2006-07	2.52

- (c) The capital cost of the generating station of the petitioner is marginally higher in comparison to the cost of other contemporary projects like Jegurapadu, Godavari and Paguthan at that time. The cost considered by the Commission is inclusive of the costs incurred towards the advanced class technology, the revival and preservation cost of the project.

(d) The lower cost in respect of other projects like Sugden and Hazira could not be compared with the other projects, as the same was on account of increased price of gas during 2006-07, resulting in reduced demand. In addition, these projects as mega power projects, were availing tax benefits.

Debt-Equity ratio

47. Regulation 12 of the 2009 Regulations 2009 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 utilised 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

modernisation expenditure for life extension shall be serviced in the manner specified in clause (1) of this regulation.

48. The Commission in its order dated 4.6.2009 had considered the debt-equity ratio of 75.22: 24.78 after considering the submission of the petitioner. It was also observed in para 22 of the said order that the debt-equity ratio considered, would undergo a change, since the generating station was taken over by making upfront payment and financial restructuring was in progress.

49. The petitioner has sought a debt-equity ratio of 83.46:16.54 as on 1.4.2009, considering the cost of the entire integrated project. The amount of equity infused in the project till 31.3.2009 is Rs. 2005 crore. It is, however noticed from the books of accounts of the petitioner that the equity, as on 31.3.2009 was Rs. 220000 lakh {Rs. 173500+ Rs. 26500 (for consideration other than cash) plus an amount of Rs. 20000 as advance against equity}.

50. The petitioner in its claim has submitted that in order to reduce IDC on revival loans, it has decided to infuse additional equity of Rs.120000 lakh, specifically for LNG terminal, progressively, matching with its

progress of work, which is expected to be completed by December 2012. We have, for reasons already recorded in para 29 of this order, decided not to consider at this stage the cost of LNG terminal in the capital cost of the generating station, for the purpose of tariff. Hence, the claim of the petitioner with regard to consideration of capital cost of LNG terminal has not been accepted.

51. Out of additional equity of Rs.120000 lakh specifically for LNG terminal, an amount of Rs.43500 lakh (including advance) has been infused till 31.3.2009. Accordingly, the total amount of equity infused on the power blocks, as on 31.3.2009 works out to Rs.176500 lakh (Rs.220000 lakh- Rs.43500 lakh). The petitioner in its submission and working has also considered the amount of Rs.176500 lakh towards equity deployment on the power blocks for the period from 1.4.2009 to 31.3.2014.

52. The takeover cost of the generating station for Rs. 848545 lakh (Rs. 688394 lakh for power blocks and Rs. 160151 lakh for LNG terminal) was financed by a loan amount of Rs. 701185 lakh and equity of Rs.150000 lakh, as on the date of takeover. In addition, non cash equity of Rs. 26500 lakh relate to the power blocks as on the date of takeover of the

generating station. Hence, the claim of the petitioner for Rs. 176500 lakh, towards equity of the power blocks, with effect from 19.5.2009, is reasonable since all the three power blocks were put under commercial operation.

53. Based on the above, the debt-equity ratio for the period from 1.4.2009 to 18.05.2009 has been worked out after taking into account the capital work in progress (CWIP) relating to the power block and the common assets /others as under:

Particulars	Amount (Rs in lakh)
Capitalized gross block for power blocks II & III	571318.10
CWIP of power blocks	223650.00
Total	794968.10
Equity	176500.00
Debt	618468.10
Debt-Equity Ratio	77.80:22.20

54. Accordingly, the debt equity ratio as on 1.4.2009 and 19.5.2009, approved for the purpose of tariff, is as under:

(Rs. in lakh)				
Particulars	Capital cost for the purpose of tariff	Equity	Debt	Debt-Equity ratio
As on 1.4.2009	571296	126840	444456	77.80:22.20
As on 19.5.2009	873970	176500	697470	79.80:20.20

55. However, in respect of the estimated additional capital expenditure for the period 2009-14, the debt-equity ratio of 70:30 has been considered, in terms of the provisions of the regulations, subject to the same truing up.

Return on Equity

56. Regulation 15 of the 2009 Regulations 2009 provides that:

“(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 normal tax rate for the year 2008-09 applicable to the concerned generating company or the transmission licensee as the case may be.

Provided that return on equity with respect to the actual 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 separately for each year of the tariff period along with the tariff petition filed for the next tariff period.

(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.

57. 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%.

Return on equity has been computed as under:

(Rs.in lakh)						
Particulars	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010	2010-11	2011-12	2012-13	2013-14
Opening equity	126840.02	176500.00	176500.00	176510.35	182273.35	183429.85
Equity addition due to additional capital expenditure	0.00	0.00	10.35	5763.00	1156.50	816.00
Closing equity	126840.02	176500.00	176510.35	182273.35	183429.85	184245.85
Average Equity	126840.02	176500.00	176505.18	179391.85	182851.60	183837.85
R.O.E.	22172.33	30853.16	30854.07	31358.67	31963.46	32135.86

Interest on loan:

58. Regulation 16 of the 2009 regulations provides that:

“(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.”

59. The interest on loan has been worked out as mentioned below:

- (a) The gross normative loan considered as on 31.3.2009, was Rs. 429209 lakh (corresponding to capital cost of Rs. 570623.75 lakh). The corresponding cumulative repayment of loan was Rs. 43052 lakh. Based on the admitted capital cost of Rs.571296.15 lakh, as on 1.4.2009, the gross normative loan is Rs. 444456.13 lakh. Accordingly, the net opening loan is revised to Rs. 401404.16 lakh, as on 1.4.2009.
- (b) By application of debt- equity ratio of 79.80:20.20 on the admitted capital cost as on 19.05.2009, the gross notional loan works out to Rs. 697469.57 lakh and the corresponding cumulative repayment is Rs.46943.86 lakh.
- (c) Actual loan portfolio (which includes unpaid interest of O&M amounting to Rs. 30910 lakh) considering the actual repayments and additions has been considered, to arrive at the weighted average rate of interest applicable on the average normative loan during each year of the tariff period. This would be subject to truing up.
- (d) Depreciation allowed during the period has been considered as repayment.

60. Based on the above, Interest on loan is computed as under:

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010				
Gross Notional Loan	444456.13	697469.57	697469.57	697493.72	710940.72	713639.22
Cumulative Repayment of Loan upto previous year	43051.96	46943.86	86526.51	132103.66	178182.59	224862.92
Net Opening Loan	401404.16	650525.71	610943.05	565390.06	532758.13	488776.30
Addition due to Additional Capitalization	0.00	0.00	24.15	13447.00	2698.50	1904.00
Repayment of Loan during the period	3891.89	39582.66	45577.14	46078.93	46680.33	46851.77
Net Closing Loan	397512.27	610943.05	565390.06	532758.13	488776.30	443828.53
Average Loan	399458.22	630734.38	588166.56	549074.10	510767.22	466302.41
Weighted Average Rate of Interest on loan	9.2253%	9.2253%	9.1775%	9.1251%	9.0848%	9.0621%
Interest on Loan	36851.29	58187.25	53978.78	50103.59	46402.37	42256.91

Depreciation

61. Regulation 17 of the 2009 regulations provides that:

“(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 long-term 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 3[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.”

62. The weighted average rate of depreciation approved by the Commission in its order dated 4.6.2009 was 5.05 %. Due to revision in the capital cost as on 1.4.2009 and the schedule of rates as per provisions of the 2009 regulations, the weighted average rate of depreciation has been calculated by applying the rate of depreciation as per Appendix-III to the 2009 regulations, which works out to 5.1803% as on 1.4.2009. Similarly, the weighted average rate of depreciation as on the date of commercial operation of the generating station works out to 5.2149%. This has been considered on the admitted capital cost to

compute depreciation. Further, the value of freehold land amounting to Rs.29.91 lakh, has been deducted, in order to calculate the balance depreciable value for the period. Accordingly, depreciation has been worked out as under:

(Rs. in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010				
Opening capital cost	571296	873970	873970	874004	893214	897069
Closing capital cost	571296	873970	874004	893214	897069	899789
Average capital cost	571296	873970	873987	883609	895142	898429
Depreciable value	514140	786546	786561	795221	805600	808559
Depreciation	3892	39583	45577	46079	46680	46852
Depreciation (Annualized)	29595	45576	45577	46079	46680	46852

O&M Expenses

63. Clause (c) of Regulation 19 of the 2009 regulations provides that in case of Open Cycle Gas Turbine/Combined Cycle generating stations (other than small gas turbine power generating stations) the normative O&M expenses allowable shall be as under:

(Rs. in lakh/MW)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Normative O&M expenses	14.80	15.65	16.54	17.49	18.49

64. As regards, O&M expenses, the petitioner has submitted as under:

'In the CERC Regulation 2009 the Hon'ble Commission has provided a set of norms for normative O&M expenses for gas turbine / combined cycle generating stations (other than small gas turbine power generating stations). These norms has been determined based

*on available data of O&M expenses of NTPC and NEEPCO generating stations which stations do not possess O&M experience of modern **F Class** (Advanced Class) gas turbine and whose data is based on a generation older technology. Hence normative O&M expenses as per clause 19 of the Regulations 2009 is relevant to gas turbine/combined cycle generating station (herein after called 'CCGT') with **E Class** or lower technology gas turbines and therefore it will be difficult to apply the norms to combined cycle generating stations having **Advanced F Class** gas turbines.*

65. The petitioner has claimed an average O&M cost of Rs. 25.69 lakh/MW/year. However, vide affidavit dated 1.2.2010, the petitioner has revised the average O&M cost to Rs. 26.91 lakh/MW/year, based on the actual expenditure incurred at site during combustion inspection of machine 3B as well as rehabilitation of machine 2A. The above O&M cost claimed by the petitioner is based on the long term comprehensive service and supply agreement with the OEM. The R&M cost calculated on the basis of this agreement was Rs. 22.27 lakh/MW/year. The expenditure includes yearly cost of spares for inspection, cost of works, consumables and also cost of steam turbine inspection. A detailed working of O&M cost has been submitted by the petitioner vide its affidavit dated 1.2.2010.

66. The estimated O&M expenses per year, for the generating station considered by the petitioner, is as under:

(Rs.in lakh)

Sl. No.	Particulars of expenditure	Amount
1	GT inspection cost for 6 year cycle	201412.7
2	Steam Turbine inspection cost for 6 year	10461.6
3	Total inspection cost (1+2) for 6 year cycle	211874.2
4	Per year machine maintenance cost	35312.4
5	Other R&M cost (estimated)	7900.0
6	Total R&M cost per year	43212.0
7	R&M Cost per MW	22.27
8	Estimated employee cost including station overhead	8998.0
9	Total O&M cost per year	52210.0
10	O&M expenses (Rs.in lakh /MW)	26.91

67. For the purpose of calculation, the petitioner has considered an exchange rate for 1USD @Rs.50, the cost of mandatory spares and consumable cost of works and the steam turbine inspection cost required for different inspections as per the 6 year cycle, with 5% escalation every year after 1.4.2011.

68. The petitioner has submitted that the 2009 regulations only provides O&M expenses for 'small gas turbines' and 'other than small gas turbines' but do not specifically provide O&M expenses for 'advanced class gas turbines' which extend efficiency advantage to the customers vis-à-vis other higher capacity machines like 'E class machines'. The petitioner has also submitted that 'F class machines' operate at about 1400⁰F necessitating more maintenance and hence a higher expenditure

for Operation & Maintenance. In addition, the capital cost of 'F class machines' was higher in comparison to 'E class machines' thereby leading to costlier parts/services for 'advanced F class machines' as compared to 'E class machines'. Further, there is considerable saving on Station Heat Rate (SHR) in 'F class machines' as compared to 'E class machines'. In this background, the petitioner has submitted that specific consideration may be given by the Commission to the above aspects while deciding on O&M expenses of 'advanced class gas turbines'.

69. The petitioner has further submitted that it had entered into a long term Comprehensive Service agreement with the OEM and had obtained exceptional discounts on the prices for parts/services/repairs. Moreover, the OEM (M/s GE) was the only source available for arranging the parts/services/repairs. The petitioner has submitted that it has estimated O&M expenses based on the maintenance cycle as recommended by OEM for 'advanced class gas turbines' at current prices and exceptional discounts extended by OEM in terms of the comprehensive service agreement.

70. The petitioner has submitted that in consideration of the circumstances under which the generating station was taken over, the

O&M expenses was likely to be higher. Accordingly, the petitioner has submitted that the normative O&M expenses specified under Regulation 19(c) was inadequate to meet the cost requirements of “advanced class machines’ installed in the generating station. It was also submitted that the higher O&M expenses were on account of periodic maintenance requirements as per guidelines of OEM and the prevailing prices and not on account of any imprudent act attributable to the petitioner. Moreover, the historical data for O&M expenses for operation of ‘advance class machines’ were not available in this country, except for the experience of the petitioner during the last 2 years, in respect of the generating station.

71. The petitioner has also submitted that it has estimated O&M expenses based on periodic maintenance requirements as per guidelines of OEM and prevailing prices, and taking in to consideration the exceptional discounts provided by OEM for the parts/services/ repairs. The estimated O&M expenses were crucial for viable operation of the generating station. It has been submitted that the petitioner would approach the Commission for fixation of O&M norms for advance class machines in the generating station with the data for actual O&M expenses, based on the consolidated operation & maintenance experience gained during the period 2009-14, during which time the rehabilitation of

all the machines would be completed. The petitioner has also submitted that in case the actual O & M expenses were less, than anticipated, then the difference would be passed on to the respondent.

72. The submissions of the petitioner, both oral and written, is examined as under, in order to ascertain as to whether there exists any sufficient ground to justify the claim of the petitioner for relaxation of O&M norms.

73. The main issue raised by the petitioner is that the normative O&M expenses specified by the Commission under Regulation 19(c) of the 2009 provides for O&M expenses for 'small gas turbines' and 'other than small gas turbines' and not for "advanced class gas turbines" for combined cycle gas turbine generating stations, which are subjected to much higher thermal stress and blade temperatures when compared to "E class machines".

74. We have been explained the circumstances under which the petitioner had to enter into a long term comprehensive service agreement with OEM for revival and sustainable operation of the gas turbines. From the submissions made, it is evident that the generating station was being revived and rehabilitated for generation of power for a term of 25 years

from the date of commercial operation. It is also noticed that since the start of the revival process, the machines had faced repeated failures and had become difficult to continue to operate, without any long term maintenance of the generating station. Thus, in order to stem the recurrent failures and to operate the generating station, the long term service agreement with the OEM appears to be the only viable option for the petitioner.

75. The gas turbines in the generating station are “advanced class 9FA machines” of GE make. As the technology is proprietary, the supply of spare parts and services of specialist, who possesses the requisite technical knowhow, is critical for maintaining the generating station. It is common practice throughout the world for users of advanced class (F-Class) gas turbines to avail long term supply and service from the OEMs of gas turbines which would cover monitoring and inspection of the machines, management of spares and components which require replacement, repairs and refurbishment.

76. The Commission in its order determining the tariff in respect of SUGEN combined cycle power project, (another generating station) for the period 2009-14, had relaxed O&M norms and allowed the said expenses,

considering the installation of advanced class gas turbines and the commensurate benefits accrued to the beneficiaries of the said generating station. In the instant case, the generating station has a peculiar historical background and is in the stage of revival. In view of this, and considering the fact that the long term service agreement by the petitioner with the OEM is likely to make the generating station viable for a smooth operation in the longer run, we feel that the petitioner's claim for relaxation of O&M norms for advanced class gas turbines in the generating station needs to be considered subject to prudence check. In view of rehabilitation of gas turbines which could be considered in the nature of major inspection, there appears to be no likelihood of any major inspection taking place during the tariff period except the combustion inspections (CI) and hot gas path inspections (HGPI). Accordingly, the number of rehabilitation of gas turbines, various combustion inspections and hot gas path inspections considered during the period is as under:

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
GT-IIA	Rehabilitation	CI	CI	HGPI	CI	MI
GT-IIB	CI	Rehabilitation	CI	CI	HGPI	CI
GT-IIIA	Rehabilitation	CI	CI	HGPI	CI	MI
GT-IIIB	CI	Rehabilitation	CI	CI	HGPI	CI
GT-IA	0	Rehabilitation	CI	CI	HGPI	CI
GT-IB	Rehabilitation	CI	CI	HGPI	CI	MI

77. Based on above, the O&M expenses have been worked out as under in terms of comprehensive service and supply agreement, including the cost of rehabilitation during the respective years, and considering the prevailing exchange rate of 1USD @ Rs. 46/-, cost of mandatory spares and consumables, cost of works and the steam turbine inspection cost required for different inspections, as per the 6 year cycle with 5% escalation every year, after 1.4.2011,:

(Rs.in lakh)

Sl.	Particulars of expenditure	Amount
1	GT inspection cost for 6 year cycle	200689
2	Steam Turbine inspection cost for 6	9624
3	Total inspection cost (1+2) for 6 year	210313
4	Per year machine maintenance cost	35052
5	Other R&M cost (estimated)	7900
6	Total R&M cost per year	42952
7	R&M Cost per MW	21.84
8	Estimated employee cost including station overhead	8998
9	Total O&M cost per year	51950
10	O&M expenses (Rs.in lakh /MW)	26.41

78. By invoking the provisions of Regulations 44 of the 2009 regulations, we relax the O&M norms in respect of the generating station as Rs. 26.41 lakh/MW/year for the period 2009-14, including the rehabilitation cost, for the generating station. Since the computations for O&M expenses had accounted for annual escalation, the year-wise escalation in the respective years has not been considered. This is in accordance with our decision in the case of SUGEN CCPP, where the

target availability norm was increased for the purpose of incentive. As stated earlier, the petitioner is entitled to avail incentive only beyond the availability of 85% and the incentive available should be shared with the respondent/beneficiaries in the ratio of 50:50, till such time the shortfall in availability during the years 2009-10 and 2010-11 was made good to the beneficiaries.

79. In terms of the O&M norms allowed by the Commission, as above, for the generating station, the O&M expenses considered for the purpose of tariff is as under:

(Rs. in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010				
O&M Expenses (annualized)	35048.18	51950.58	51950.58	51950.58	51950.58	51950.58

80. The petitioner is directed to maintain a detailed record of maintenance activities undertaken under long term comprehensive service and supply agreement and on other heads of the O&M on quarterly basis including details of EOH when CI, HGPI or major overhaul is under taken, the number of hours spent on these inspections/repairs, list of parts replaced /repaired, services provided by the OEM, the OEM personnel visiting the generating station, the duration of their stay, payments made etc. The above information shall be submitted to the

Commission, annually, in order to facilitate a decision on O&M norms for the advanced class machines in future.

Interest on Working Capital

81. Sub-clause (b) of clause(1) of Regulation 18 of the 2009 regulations provides as under:

- (a) Fuel cost for one month corresponding to the normative annual plant availability factor duly taking into account mode of operation of the generating station on gas fuel and liquid fuel;*
- (b) Liquid fuel stock for ½ month corresponding to the normative annual plant availability factor and in case of use of more than one liquid fuel cost of main liquid fuel;*
- (c) Maintenance spares @ 30% of operation and maintenance expenses specified in regulation 19;*
- (d) Receivables equivalent to two months of capacity charges and energy charges for sale of electricity calculated on the normative annual plant availability factor, duly taking into account mode of operation of the generating station on gas fuel and liquid fuel*
- (e) Operation and maintenance expenses for one month.*

82. Based on the above, Interest on Working Capital has been calculated as under:

- (a) **Fuel Cost:** cost of fuel has been worked out for one month consumption of gas based on mode of operation of the generating station in the last three months when the plant has operated only

on gas and on the basis of operational parameters and weighted average price of fuel, as under:

(Rs in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010				
Cost of Fuel for 1 month	1775.14	17377.04	26752.54	32165.27	32077.38	32077.38
Energy Charges for two months as receivables	26996.94	40016.53	53505.07	64330.53	64154.76	64154.76

(b) **Liquid Fuel Oil:** As the petitioner has not used any liquid fuel in the generation of electricity in the last three months thus the mode of operation is entirely on gas and hence the cost of liquid fuel has been considered as 'nil'.

(c) **Maintenance Spares:** Maintenance spares at 30% of the O&M expenses allowed by the Commission has been considered, as under:

(Rs in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010				
Maintenance spares	1382.72	13535.62	15585.17	15585.17	15585.17	15585.17

(d) **Receivables:** Receivables have been worked out as under, on the basis of two months of fixed and variable charges. For this purpose the operational parameters and weighted average price of fuel as above has been considered.

(Rs in lakh)

Receivables	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010	2010-11	2011-12	2012-13	2013-14
Variable Charges - 2 months	26996.94	40016.53	53505.07	64330.52	64154.75	64154.75
Fixed Charges - 2 months	22164.68	33408.73	33114.70	32965.04	32535.04	31888.23
Total	49161.62	73425.25	86619.76	97295.56	96689.79	96042.98

(e) **O&M Expenses:** O&M expenses for one month have been worked out on the O&M expenses allowed by the Commission, as under.

(Rs in lakh)

	1.4.2009 to 18.5.2009	19.5.2009 to 31.3.2010	2010-11	2011-12	2012-13	2013-14
O&M expenses	2920.68	4329.22	4329.22	4329.22	4329.22	4329.22

83. Clauses (3) and (4) of Regulation 18 of the 2009 regulations Under the 2004 regulations, the rate of interest on working capital shall be equal to the short-term Prime Lending Rate of State Bank of India as on 1.4.2009 or on 1st April of the year in which the generating station or a unit thereof is declared under commercial operation, whichever is later. Interest on working capital shall be payable on normative basis notwithstanding that the generating company has not taken working capital loan from any outside agency. Accordingly, SBI PLR of 12.25% has been considered in the computation of the interest on working capital.

84. The necessary details in support of calculation of interest on working capital are as under:

(Rs in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 - 18.5.2009	19.5.2009- 31. 3.2010				
Fuel Cost - 1 month	13498.47	20008.26	26752.53	32165.26	32077.38	32077.38
Maintenance Spares	10514.45	15585.17	15585.17	15585.17	15585.17	15585.17
O & M expenses - 1 months	2920.68	4329.22	4329.22	4329.22	4329.22	4329.22
Receivables - 2 months	49161.62	73425.25	86619.76	97295.56	96689.79	96042.98
Total Working Capital	76095.22	113347.91	133286.69	149375.21	148681.56	148034.75
Rate of interest	12.2500%	12.2500%	12.2500%	12.2500%	12.2500%	12.2500%
Interest on Working Capital	9321.66	13885.12	16327.62	18298.46	18213.49	18134.26

85. The NAPAF considered for the generating station allowed in terms of para 27 of this order is as under:

Particulars	1.4.2009- 18.5.2009	19.5.2009- 31.3.2010	2010-11	2011-12	2012-13	2013-14
Target Availability	49.90%	49.90%	66.72%	80%	80%	80%

Regulatory Assets

86. The petitioner, in this petition, has claimed Interest @ 12% on the regulatory asset of Rs. 42000 lakh, created out of tariff for prior period 2007-09 based on restructuring framework, to be recovered over a period of 10 years. The 2009 regulations specified by the Commission do not contain provisions for treatment of regulatory asset, as claimed by the petitioner. Therefore, in the absence of any statutory provision in the

2009 regulations, the claim of the petitioner for allowing the expenditure on regulatory assets has not been considered.

ANNUAL FIXED CHARGES

87. The annual fixed charges allowed for the period 2009-14, is summarized as under:

(Rs in lakh)

Particulars	2009-10		2010-11	2011-12	2012-13	2013-14
	1.4.2009 to 18.5.2009	19.5.2009 to 31. 3.2010				
Return on Equity	22172	30853	30854	31359	31963	32136
Interest on Loan	36851	58187	53979	50104	46402	42257
Depreciation	29595	45576	45577	46079	46680	46852
Interest on Working Capital	9322	13885	16328	18298	18213	18134
O&M Expenses	35048	51951	51951	51951	51951	51951
Total	132988	200452	198688	197790	195210	191329

Note: (1) All figures are on annualized basis.

(2) All the figures under each head have been rounded. The figure in total column in each year is also rounded. Because of rounding of each figure the total may not be arithmetic sum of individual items in columns.

Gross Station Heat Rate

88. The petitioner had considered Gross Station Heat Rate (GSHR) on gas as 1850 Kcal/kWh for blocks II and III during the tariff period 2004-09. The petitioner has submitted that power block-I was originally completed and run by the erstwhile Dabhol Power Company in 1999 and same was being revived by the petitioner. The petitioner has considered

the Gross Station Heat Rate on gas as 1850 Kcal/kWh, for all the three power blocks. However, the petitioner has sought GSHR for Naphtha fuel as 2000Kcal/kWh.

89. The 2009 regulations do not specify the GSHR norms for existing blocks II and III. The date of commercial operation of block-I is 19.5.2009, and accordingly in terms of the 2009 regulations, the GSHR for new units, shall be as under:

GSHR=1.05 X Design Heat Rate of the unit/ block for Natural gas.

90. The petitioner has submitted that no guarantee was available for the revived gas turbines. Since, all the three blocks consists of advanced class machines, the heat rate of these machines were more or less equal due to turbo-machinery and metallurgical similarity. In view of this, we consider the same Station Heat Rate for of 1850 kCal/kWh, as considered by the Commission in its order dated 4.6.2009 in Petition No. 96/2007, for all the three blocks, for the period 2009-14.

91. As regards Heat rate of Naphtha to be considered, it is noticed that the petitioner is presently availing R-LNG or the KG basin gas as fuel for the generating station. In the event R-LNG was not available for firing, the

likely alternate fuel was LNG from its LNG terminal. Hence, firing on Naptha was a remote possibility. In this backdrop, there is no need to specify a separate Heat Rate on Naptha.

Frequency correction in the scheduled generation

92. The petitioner has prayed for consideration of correction in the scheduled generation in terms of 2009 regulations, considering the gross capacity of the generating station as 1940 MW. In our view, the prayer of the petitioner cannot be considered, as frequency correction is applied on the schedule of generation given by the respective Regional Load Despatch Centre (RLDC) based on the declaration submitted by the petitioner and do not depend on the capacity of the generating station.

Operational Norms

93. The following operational norms are considered for the computation of Energy charge rate and fuel component in working capital in terms of the 2009 regulations.

Description	Units	Norm
NAPAF for recovery of fixed charges		
2009-10	%	49.90
2010-11	%	66.72
2011-12 to 2013-14	%	80.00
Gross Station Heat	kCal / kWh	1850.00
Auxiliary Energy Consumption	%	3.00

ENERGY CHARGES

94. Sub-clause (b) of clause (6) of Regulation 21 of the 2009 regulations provides that the Energy Charge rate (ECR) in Rupees per kWh on ex-power plant basis shall be determined to three decimal places in accordance with the formulae as under:

(b) For gas and liquid fuel based stations

$$\text{ECR} = \text{GHR} \times \text{LPPF} \times 100 / \{ \text{CVPF} \times (100 - \text{AUX}) \}$$

Where,

AUX = Normative auxiliary energy consumption in percentage.

CVPF = Gross calorific value of primary fuel as fired, in kCal per kg, per litre or per standard cubic metre, as applicable.

CVSF = Calorific value of secondary fuel, in kCal per ml.

ECR = Energy charge rate, in Rupees per kWh sent out.

GHR = Gross station heat rate, in kCal per kWh.

LC = Normative limestone consumption in kg per kWh.

LPL = Weighted average landed price of limestone in Rupees per kg.

LPPF = Weighted average landed price of primary fuel, in Rupees per kg, per litre or per standard cubic metre, as applicable, during the month.

SFC = Specific fuel oil consumption, in ml per kWh.

95. The petitioner has submitted that as per the Gas Supply Agreement (GSA) with GAS & Oil Companies valid up to 30.9.2009 the weighted average price & GCV as received and fired basis of R-LNG for preceding three months from the start of tariff period i.e. Jan, Feb & March, 2009 have been considered for generation till 30.9.2009. For the period from 1.10.2009 onwards, the Price & GCV of Gas have been considered as Rs. 11275/000 SCM & 9600 Kcal/SCM respectively, as per the New Gas Sales & Purchase Agreement (GSPA)/ Gas Transportation Agreement (GTA).

96. The weighted average price and GCV of gas for the preceding three months of Jan, Feb and March, 2009 as submitted by the petitioner and as approved by the Commission is as under:

Description	As submitted by the petitioner	As approved by Commission
Gas price (Rs./1000 SCM)	14856.00	14850.33
Gas GCV (kcal/SCM)	9838.84	9838.84

97. In accordance with the 2009 regulations, the base energy charge for the period 2009-14 has been worked out as per the following computations:

Description	1.4.2009 to 18.5.2009 (Block- II&III)	19.5.2009 to 30.9.2009 (Blocks I to III)	1.10.2009 to 31.3.2010	1.4.2010 to 31.3.2011	1.4.2011 to 31.3.2014
Capacity (MW)	1327.080	1967.080	1967.080	1967.080	1967.080
Normative PLF/Availability (Hours/kW/year)	4371.24	4371.24	4371.24	5844.67	7008.00
Gross Station Heat Rate corresponding to GCV (kCal/kWh)	1850.00	1850.00	1850.00	1850.00	1850.00
Aux. Energy Consumption (%)	3.00	3.00	3.00	3.00	3.00
Weighted average GCV of Gas (kCal/SCM)	9838.84	9838.84	9838.84	9838.84	9838.84
Weighted average Price of Gas (Rs./1000 SCM)	14850.334	14850.334	14850.334	14850.334	14850.334
Rate of Energy Charge from Gas (Paise/kWh)	279.23	279.23	279.23	279.23	279.23
Rate of Energy Charge ex-bus per kWh Sent on Gas (Paise/kWh)	287.87	287.87	287.87	287.87	287.87

Scheduling and Despatch of the Station

98. Though the 2009 regulations provide for scheduling and despatch for central generating stations in terms of the provisions contained in Indian Electricity Grid Code (IEGC), the generating station has not been following the IEGC, in respect of the scheduling and despatch from the station. In view of this, all the concerned stakeholders, namely the State Load Despatch Centre (SLDC)/Western Regional Load Despatch Centre (WRLDC), including the petitioner and

respondent herein, are directed to follow the scheduling and dispatch procedure, as laid down in IEGC, with immediate effect.

99. The petitioner shall be entitled to compute and recover the annual fixed charges and energy charges in accordance with Regulation 21 of the 2009 regulations.

100. However, energy charge on month to month basis will be billed by the petitioner as per Regulation 21 (5) of the 2009 regulations which is extracted below:

“21 (5) The energy charge shall cover the primary fuel cost and limestone consumption cost (where applicable), and shall be payable by every beneficiary for the total energy scheduled to be supplied to such beneficiary during the calendar month on ex-power plant basis, at the energy charge rate of the month (with fuel and limestone price adjustment). Total Energy charge payable to the generating company for a month shall be:

(Energy charge rate in Rs /kWh) x {Scheduled energy (ex-bus) for the month in kWh.}”

Application fee and the publication expenses

101. The petitioner vide affidavit dated 13.7.2010 has sought approval for the reimbursement of fee of Rs. 38.80 lakh each, paid by it for the period 2009-10 and 2010-11 respectively, for filing of the petition and the

expenses of Rs.5,40,301/-incurred towards publication of notices in connection with the petition.

102. Regulation 42 of the 2009 regulations provides as under:

“The application filing fee and the expenses incurred on publication of notices in the application for approval of tariff, may in the discretion of the Commission, be allowed to be recovered by the generating company or the transmission licensee, as the case may be, directly from the beneficiaries or the transmission customers, as the case may be.”

103. The Commission in its 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) had decided that filing fees in respect of main petitions for determination of tariff and the expenses on publication of notice are to be reimbursed.

104. Accordingly, the above expenses incurred by the petitioner in respect of application filing fees and publication of notices in connection with the present petition shall be directly recovered from the beneficiaries on pro-rata basis.

105. This order disposes of Petition No.283/2009.

Sd/- (M. DEENA DAYALAN) MEMBER	sd/- (V.S.VERMA) MEMBER	sd/- (S.JAYARAMAN) MEMBER	sd/- (DR.PRAMOD DEO) CHAIRPERSON
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