

**National Electric Power Regulator Regulatory Authority
Registrar Office**

Urgent

No. NEPRA/R/TRF-304/1469

February 01, 2016


Subject: Motion for Review under Rule 16(6) of the NEPRA (Standards & Procedures) Rules, 1998, read with Regulation 3 of NEPRA Review (Procedure) Regulation, 2009, in Case No. NEPRA/TRF-304/NPGCL-2015-Northern Power Generation Company Limited.

Enclosed please find herewith a copy of subject Motion for Leave for Review submitted by Northern Power Company Limited (FPCL) vide letter dated 29.01.2016 (received on 01.02.2016) against the Authority's Determination of tariff of NPGCL for FY 2014-15 to 2016-17.

2. Senior Advisor (Technical), Senior Advisor (Tariff-I), Director (Licensing) and Legal Advisor (LLP) are requested to go through the enclosed Motion for Leave for Review and offer their comments that whether this Motion for Leave for Review merits for admission or otherwise.

3. Being time bound case, the comments shall reach by 03.02.2016.

Encl: As above


(Iftikhar Ali Khan)
Deputy Registrar

1. Senior Advisor (Tech)
2. Senior Advisor (Tariff-I)
3. Director (Licensing)
4. Legal Advisor (LLP)
5. Registrar
6. Assistant Registrar (Tariff) [to pursue]
7. Mr. Zain Ullah Shah, O.S. [to update the status]
8. Master File

CC:

1. Chairman
2. Vice Chairman/ Member (CA)
3. Member (Tariff)
4. Member (Licensing)
5. Member (M&E)

Senior Advisor Tariff-I
988
Date: 2-2-16





Registrar

By No. 1128

Dated 01-02-16

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**NORTHERN POWER GENERATION COMPANY LIMITED**

MEHMOOD KOT ROAD

TPS MUZAFFAR GARH

Phone# 066-9200165

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Office of the Chief Executive Officer

No: CEO/NPGCL/TRF/5637

Dated: 29/01/ 2016

The Registrar,
National Electric Power Regulatory Authority,
NEPRA Tower, Attaturk Avenue (East),
G-5/1, Islamabad.

Subject: - Motion for Leave to Review, under Rule 16(6) of the NEPRA (Standards & Procedures) Rules, 1998, read with Regulation 3 of NEPRA Review (Procedure) Regulations, 2009, in Case No NEPRA/TRF-304/NPGCL-2015 - Northern Power Generation Company Limited (NPGCL)

Reference: Determination of Authority conveyed vide letter No.NEPRA/TRF-304/NPGCL-2015/832-834 dated 22nd January, 2016, received on 25.01.2016.

Dear Sir,

Pursuant to Rule 16 (6) of the NEPRA (Tariff Standards and Procedures) Rules, 1998, we hereby submit our Motion for Leave to Review with respect to Authority's decision dated January 22, 2016 in Case No.NEPRA/TRF-304/NPGCL-2015 of Northern Power Generation Company Limited (NPGCL), for Determination of Tariff.

We request the Authority to grant this Leave for Review and accept the same in terms of the submissions. NPGCL will be pleased to provide assistance to the Authority in delivering an informed decision on NPGCL's review petition.

To avoid complications and to register our right to file Review Petition, subject motion for leave for Review is hereby submitted. The Petitioner further requests that it may submit any additional information / arguments required to substantiate its Leave for Review.

(Rukhsar Ahmed Qureshi)
Chief Executive Officer

NORTHERN POWER GENERATION COMPANY LIMITED



MOTION FOR LEAVE TO REVIEW

AGAINST NEPRA'S DETERMINATION
OF TARIFF OF NPGCL FOR FY 2014 - 15 to 2016 - 17

JANUARY 29, 2016

Counsels

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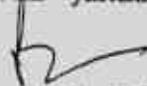
BEFORE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

*Motion for Leave to Review against the
Determination in Case # NEPRA/TRF-
304/NPGCL-2015 dated 22.01.2016 by NEPRA of
the Tariff of Northern Power Generation
Company Limited*

SECTION "A": REVIEW MOTION

I. Summary and Background

1. Northern Power Generation Company Limited (hereinafter referred as "NPGCL") is registered under the Companies Ordinance 1984 on 15.10.1998 and has been granted the Generation License (#GL/03/2002) by NEPRA on 01.07.2002.
2. For the first time, the Generation Tariff for NPGCL was determined by NEPRA through Determination dated 02.05.2006.
3. NPGCL has recently filed the Tariff Petition for Determination of its Tariff for FY 2014-15 (Case # NEPRA/TRF-304/NPGCL) on 4th March 2015 which was admitted on 19.03.2015. After the process due under the law, Public Hearing was conducted on 12.05.2015. The Authority determined the tariff for NPGCL by its Determination dated 22nd January 2016 (hereinafter called as "Impugned Determination") that was received to NPGCL on 25th January 2016 vide letter No.NEPRA/TRF-304/NPGCL-2015/832-834 dated 22nd January 2016.


**Chief Executive Officer
NPGCL (GENCO-III)
TBS Musaffargarh**



4. The NPGCL is aggrieved of the Impugned Determination, hence is filing this Motion for Leave to Review ("Review Motion") under the NEPRA Tariff (Standards & Procedure) Rules, 1998 ("Tariff Rules").
5. Being aggrieved by the impugned Determination of the Authority, NPGCL with approval of its Board of Directors and through authorized officer is filing, this Review Motion under Rule 16 (6) of Tariff Rules read with other enabling provisions of law.

Copy of the BoD Resolution is Appendix – A.

II. Legal Grounds

6. On the basis of its understanding of the impugned Determination, NPGCL is constrained to file the Review Motion for kind consideration of worthy Authority, inter alia, on the grounds as detailed hereinafter.
7. There are sufficient grounds, including non observance of Rule 17 (3) of Tariff Rules as shall be enlarged during hearing / proceedings, for review by Authority that may modify the earlier Determination on the points of:
 - a. **Reduction in Capacity Price** as detailed in this Motion for Leave to Review;
 - b. **Reduction in Energy Price** as detailed in this Motion for Leave to Review; and
 - c. **Miscellaneous** including: Isolation of Auxiliaries during Heat Rate Tests of TPS Muzaffargarh; retrospective application of Heat Rate Test; and consequential payments/ sustainability charges in view of Legacy Issues.



8. To ensure that NPGCL could improve its availability and survive in the upcoming competitive commercial power market, NEPRA may reconsider its impugned Determination, in light of the Ground Realities, Legacy Issues and Changed Legal & Regulatory Circumstances (as shall be submitted in detail hereinafter) and allow sufficient capital by revising Impugned Determination.

a. Ground Realities

The plants of NPGCL were already installed when the Generation License was granted. Due to this reason, there was no initial investment and issues regarding incurring liability of loan etc. The machines were state of art at relevant time and have given considerable performance. However, NEPRA has decommissioned the plant of Piranghaib while Shahdara was never included. On the other hand, the Independent Power Producers (IPPs) have entirely changed ground realities, circumstances and protections including that of Sovereign Guarantee that is absent in case of NPGCL.

b. Legacy Issues

Since its incorporation, pursuant to the Restructuring Plan approved by the Council of Common Interest in 1993, NPGCL has an in-built legacy of employees. The manpower transition under the Restructuring Plan continued within NPGCL during which the terms and conditions of the employees were secured by law. These employees have a legal and contractual safeguard to their employment at least till age of superannuation. Even the Decommissioning of plant cannot invalidate their appointment rather at the minimum, owing to the stated affairs, NPGCL has to



bear their cost and could neither enter into downsizing nor afford unwanted long litigation particularly when the numbers of working employees are far below the then sanctioned strength. On basis of the particular case, the manpower claimed by NPGCL is fully justified and prudent.

c. Changed Legal & Regulatory Circumstances

On restructuring of the power sector under the Government of Pakistan's policy response to the issues of power sector that was followed by the approval of Council of Common Interest, various corporate entities (including NPGCL) were incorporated and various agreements were also executed. Among those agreements, the Business Transfer Agreement, Supplementary Business Transfer Agreement and the Operation & Development Agreement between WAPDA and NPGCL; the Memorandum of Agreement between WAPDA and PEPCO; and the Power Purchase Agreement between NTDC through the CPPA and NPGCL were quite important as they laid down the operational arrangements. In its splendid efforts to create a competitive trade bilateral contract market, NEPRA has taken various measures. Various directions and regulatory instructions, issued from time to time by NEPRA, have helped a lot in growth of the power market of Pakistan.

NEPRA has been successful in bringing in various major changes. In 2015, CPPA has been carved out from NTDC and its functions have been handed over to Central Power Purchase Agency (Guarantee) Limited (CPPA-G) that was incorporated in 2009. NEPRA (Market Operator Registration, Standard & Procedures)



Rules, 2015 have been approved and notified whereby CPPA-G has been authorized to perform *market functions*. The "Commercial Code", submitted by CPPA-G, has also been approved and notified. Moreover, except in cases of direct sale and purchase of power, the CPPA-G shall act as the sole agent of DISCOs in procurement of power from Generation Companies.

In furtherance of the steps mentioned above, NPGCL has also executed the Power Purchase Agreement with CPPA-G.

NPGCL is conscious of the fact that the undertaken and upcoming legal and regulatory changes of the power market casts liability on the public sector companies to perform to the best possible extent and be fit to survive in the 'competitive market' while living with the Ground Realities and Legacy Issues.

The Ground Realities, Legacy Issues and Changed Legal and Regulatory Changes were not taken into consideration while arriving at the Impugned Determination. Under the NEPRA Act and the NEPRA Tariff (Standard and Procedures) Rules, 1998 the Licensee is allowed a depreciation charge and a rate of return on the capital investment of each licensee—commensurate to that earned by other investments of comparable risk—which promotes continued reasonable investment in equipment and facilities for improved and efficient service. The Tariff is to support Licensee in provision of stable operations and develop the predictability of customers. Since the Legal & Regulatory Changes evolved after the hearing therefore could not have been submitted earlier.



9. NEPRA has curtailed the cost / expenses for manpower while comparing NPGCL with IPP those have entirely different state of affairs and cannot be compared with GENCOS. On other hand, the sanctioned strength by WAPDA for NPGCL and current employment is far below to other GENCOs and compatible with the international market.
10. Para 21.3 (III) of the Order is inconsistent with Determination in Para.14.2 as the CV Value of Local Furnace Oil is not considered. This may require correction in the Para 21.3 (III) of the Order.
11. The impugned Determination causes discrimination between NPGCL and other GENCOs regarding the ROE owing to the arbitrary calculations based on assumptions those are not well founded. By such treatment NEPRA has not only disallowed the prudently incurred cost but also did not allow sufficient cost/ working capital for future growth and survival of NPGCL.
12. In absence of the Comments or Intervention, the Authority was required to determine in light of the material before it and could have asked for information for proper and well reasoned determination. Such information howsoever was required to be extended to NPGCL under Article 10-A of the Constitution of Pakistan as well as the applicable laws.
13. In addition to the above, grounds and contentions as mentioned in this Review Motion or those as shall be enlarged during presentation, shall find support from following assumptions:



- a. The Authority shall not disallow a legitimate and prudent cost merely on basis of non filing of tariff petition. In such a case, the licensee has a legal and natural right of indexation & adjustments. There can be no *estoppel* against law.
- b. The Authority, in light of the NEPRA Act and Rules, shall strike the balance between the right of purchasers & the service providers / generators.
- c. The Authority strictly follow the provisions of NEPRA Act, Rules, Regulations and the judgements, on question of law, of the High Courts and the Supreme of Court of Pakistan while issuing the Determinations.

III. Key Aims and Features

14. Review Motion is being filed with aim to:-

- a. Request the Authority to reconsider its Impugned Determination, after affording opportunity of hearing, on the issues raised in this Motion and review the impugned portions of the Determination as indicated in Section II hereof;
- b. Enable NPGCL to recover the justified cost incurred in meeting its demonstrated needs for the business;
- c. Enable NPGCL to recover, in future, the cost as shall be required for improving its performance and thereby to comply with the directions of the Authority;
- d. Further, pending decision of the Review Motion, operation of the Impugned Determination may please be kept suspended.



IV. Subject for Review

15. This Review Motion is on the issues as mentioned at Section II *ibid* and detailed hereinafter.

SECTION "B": ISSUES

16. The Authority has declined certain submissions made by NPGCL in its Tariff Petition despite the fact that those were totally based on its sheer requirements. The denial, as submitted before, shall adversely impact ability of NPGCL as per the requirements of future market as well as the reliable and persistent supply of electricity to its buyers and also to meet with the other regulatory instructions issued by NEPRA from time to time.
17. The Review Motion is limited in its scope to the extent as mentioned in 'Section A', hereinbefore and the grounds whereof are elaborated hereinafter:

I. Reduction in Capacity Price

a. Salaries & Wages

18. The Authority in para 18.3.4 of impugned Determination has denied inclusion of the cost of 66 employees at Shahdara and 290 in NGPS Multan for reason that the said plants are not part of the modified Generation License of NPGCL. For remaining 2160 employees, the Authority observed that 1.47 persons per Megawatt are on higher side as against IPPs.



19. The plant of Shahdara was not a part of the Generation License granted to NPGCL in 2002 while the NPGS Multan was decommissioned by NEPRA in recent past. However, the infrastructure, machinery and other facilities are still available and certain issues related to land etc are still pending. To keep the property in safe custody, NPGCL has deputed a minimum number of employees to said plants. The employees, as explained while contending the Legacy Issues, are the liability of NPGCL until they are retired. NEPRA has even allowed the pensions to retired employees of the legacy period. The decommissioning of a plant is not the winding up but only a commercial decision to avoid extra cost on basis of 'prudence'. In such a case, there is still a minimum consequential cost which is not only prudent but essentially required.
20. Regarding comparison of strength on per MW basis between GENCO and IPP, it is humbly stated that same is a discriminatory approach. In the Determinations for LPGCL, the Authority has allowed 6.11 persons/ megawatt. Even the sanctioned strength of NPGCL i.e. 3401 for 1472.52 MW means 2.31 persons/ megawatt, is compatible with the international standard, particularly in view of the Legacy Issues.
21. Notwithstanding to the above, the Authority in impugned Determination has allowed Rs.2,355 Million under the head of Salaries, Wages and Fringed Benefits. In the said cost only Rs.895.21 Million in respect of Free Medical, Free Electricity, Leave Encashment and Pension Fund for Retired Employees had been taken by the Petitioner at the time of submission of Tariff Petition with NEPRA. While as per **Actuarial Report** for the FY 2014-15 this amount is worked out as Rs.1,376.84 Million due to change in Actuarial Method as Project Unit



Credit (PUC) used for calculating the accounting entries for the FY 2014-15. This method is mandated under IAS-19 and this amount will be on increasing trend in coming years. The average of the last five years is tabulated below:

Rs. In Million

Description	2014-15	2013-14	2012-13	2011-12	2010-11	Total	Average
Free Medical	71.654	26.026	26.975	24.419	20.213	169.289	33.857
Free Electricity	266.019	132.528	179.842	145.482	79.869	803.741	160.748
Leave Encashment	175.482	174.846	-8.746	73.373	17.657	430.614	86.122
Pension Fund	868.289	561.807	740.482	518.013	504.417	3193.009	638.601
Total	1,379.444	895.209	938.553	761.289	622.158	4,596.653	919.331

Therefore, Authority is requested to review the Determination to extent of the strength of employees in NPGCL and allow reworking on basis thereof. In addition, impact of Rs.484.234 Million also be considered to revise the tariff component accordingly.

Copy of Actuarial Report is Appendix-B

b. Administrative Cost

22. On basis of the submissions made in Paras.18 to 21, it is requested to revise the tariff component accordingly.

c. Repair & Maintenance

23. It is mentioned in Para.18.5.2 of the Impugned Determination that the figures mentioned were for "previous years". This seems to be mere a clerical mistake as the figures mentioned there in were "projected".



24. The Authority in impugned Determination allowed Rs.24 Million only for fixed repair and maintenance on basis of previous years audited figures. It is apprised that the R&M expenditure in the financial statements have been presented at two places:-

- Cost of Sales and
- Administrative & General expenses

In doing so the Authority has considered the R&M mentioned under Administrative & General expenses but has not considered the R&M expenditures under cost of sales. As such, the Authority has actually determined R&M to the extent of Administrative & General expenses on the basis of 4% only of the total cost while the actual cost on repair & maintenance in average for 5 years is Rs.50.97 Million which may please be allowed.

Rs. In Million

Description	2010-11	2011-12	2012-13	2013-14	2014-15	AVG.	Remarks
R& M Civil Works	5.66	2.28	3.04	9.29	4.74	5.4	Only allowed by calculating 4% of 417.58 whereas over claim was 50.97
R& M General Plant	1.55	4.39	2.45	1.32	2.19	2.38	
R& M Property	17.14	39.04	46.07	36.19	77.48	43.18	
SUB TOTAL	24.35	45.71	51.56	46.8	84.41	50.97	
R& M Power Plant	274.63	185.21	261.89	321.96	789.36	366.61	Allowed in VOM.
TOTAL	298.98	230.92	315.45	368.76	873.77	417.58	

d. Insurance

25. In Para.18.6.1 of the Impugned Determination, the Authority has disallowed "insurance cost" for the Prianghaib Plant being decommissioned.



26. Fact of the matter is that the said infrastructure and other facilities are still available and NPGCL is custodian of the same. The equity is not adjusted to revaluation of assets. Further, as it has already been apprised in detail at paragraphs 68 & 69 of this petition that the decommissioned facility is being utilized for the purposes other than generation also. As such, property is to be safeguarded and insurance is mandatorily required under prudent practice. Therefore, NPGCL has got insured the assets of NGPS Multan under WAPDA Equipment Protection Scheme (WEPS) and is bearing the cost of Rs.1.61 Million per annum. Being a prudent cost, incurred irrespective of decommissioning, is therefore entitlement of NPGCL and the same be allowed.

e. Sustainability Charges

27. Submissions are made in detail under the head of "Miscellaneous" in this Motion.

f. Vehicle Expenses

28. In Para # 18.9, the Authority determined Vehicle Expenses and allowed Rs.9 Million against claimed Rs.79.6 Million on basis that the amount requested has not been properly justified through documentary evidence. The Petitioner Plant is the largest thermal power plant in the country and having 114 on road vehicles and 26 off road vehicles for smooth operation of the plants situated in different parts of the Punjab Province.

29. The average of the last five years is tabulated below:



Rs. in Million

Description	2014-15	2013-14	2012-13	2011-12	2010-11	Total	Average
Fuel and Oil	49.820	59.160	50.711	49.554	45.060	254.305	50.861
Repair & Maintenance	15.960	10.593	11.973	7.654	10.568	56.748	11.350
Licensing & Insurance	0.932	0.203	0.466	0.577	1.550	3.728	0.746
Total	66.712	69.956	63.149	57.781	57.178	314.781	62.956

30. The further documentary evidence is submitted for the kind consideration of the Authority and is firmly believed that on basis of the additional evidence, the tariff component will be revised by the Authority.
- g. **Other Income**
31. In Para # 18.10, the Authority determined Other Income after taking into account the average of previous four years. In doing so Authority has calculated the 'Miscellaneous Income' as part of Other Income.
32. It is apprised that the Miscellaneous Income is the income generated from the Central Turbine Workshop (CTW) that is independently managed by NPGCL and the cost of its employees and running of CTW is not claimed in the Tariff Petition. Therefore, the Miscellaneous Income cannot be added to Other Income being a separate activity. Further, while estimating the other income by the Authority, the exchange/ (loss) is booked at the close of financial years only to depict the true picture of liability as of the balance sheet date.
33. After considering the above facts, the average of Other Income for four years shall be PKR 86.68 Million on basis of following calculations:



Rs. In Million

	2010-11	2011-12	2012-13	2013-14	Average
Sale of scrap	5.76	24.67	1.411	26.25	14.523
Interest Income	44.17	13	69.68	161.8	72.16
Total	49.93	37.67	71.091	188.05	86.685

34. Therefore, Authority is requested for revision of tariff component accordingly.

h. Return on Equity

35. In Para # 18.13 of impugned Determination, the Authority has determined the ROE for period of 3 Years being the control period.
36. In view of the Ground Realities, Legacy Issues and Changed Legal & Regulatory Circumstances as well as the Tariff Rules and Regulations, it is submitted that the sufficient cash flow and working capital is required by NPGCL to meet its demonstrated need as well as to be "fit for competitive market". There is actually cash flow constraint.
37. The ROE calculated by NEPRA, while admitting CAPM as applicable, is on comparison with Distribution Companies instead of Generation Companies. The ROE of NPGCL has been reduced from 11.83% to 11.20% (despite changed value of assets) while the ROE to JPCL and LPGCL is 13.11%. The ROE values there are worked on basis of 10 years working.
38. Despite the different circumstances of NPGCL as compared to IPP, it is also a matter of concern that IPP have reasonably more incentive in form of the ROE. On the other hand, keeping in view the 13 years period, NPGCL worked its ROE as 15.95%; whereas, the Authority's



working is based on a period of three (03) years. Therefore, the factor of ROE may please be reconsidered.

II. Reduction in Energy Price

a. Transformation & Switchyard losses

39. In Para # 11, the Authority determined on issue of adjustment of transformation and switchyard losses and allowed 0.25% only as compared to the requested 1.84%.
40. In Para.11.5 thereof, the Authority relied upon Independent Engineer's Report as well referred to 'large transformers having highest efficiency' and observed that in Report the losses is 0.5% while of the stated Transformers the losses during transformation is 0.25%.
41. It is submitted that under Prudent Utility Practices as provided in applicable documents, manufacturer's documents cannot be ignored. Admittedly, the name plate loss capacity mentioned by manufacturer is 0.5% while the fact of matter is that actual loss at site is 1.84% that is endorsed by the Independent Engineer. Authority attributed remaining amount of loss i.e. 1.34% only to human errors and metering error. The worthy Authority has not considered that the losses are caused and adversely affected due to various technical reasons including the part load operation, cyclic operation and ambient site conditions. At the very least (without conceding) the amount of 0.5% is established even without the impact of technical reasons under Prudent Utility Practices still the determination is of 0.25% which is beyond understanding.



The reliance on some large transformers cannot be commented in absence of their specific model and specifications. It is however pointed out that such losses pertain to transformation only losses of switchyard are included therein. The record of 2013-14, as already has been provided that clearly shows 1.84% transformation and switchyard losses; i.e. the difference between the backup meters, where the heat rate test was carried out, and NIDC Net Meters. This difference even grew up to 2.43 % for the year 2014-15. This loss is being borne by NPGCL for years.

Working of T/F losses is **Appendix-C**

42. It is therefore requested to reconsider the same and allow the stated losses as per the sheets attached with this Motion for Leave to Review.

Conversion of T/F losses in BTU/kWh is **Appendix-D**

b. Partial Load Adjustment Factor

43. In Para # 12.6 of the Impugned Determination, the Authority allowed the adjustment of partial loading however, held that NPGCL will not be entitled for partial loading, if the units are dispatch on part load due to various maintenance issues or in-efficiency on the part of the Petitioner.
44. To add, such a clause will always remain a bone of contention between NPGCL and buyer who will make all efforts to deny adjustment while seeking refuge behind such instances irrespective that those are actually caused for reasons beyond control of NPGCL or for reasons those cannot be attributed to NPGCL. Therefore, the impugned portion of paragraph 12.6 may please be excluded from the Determination.



c. Revision of Fuel Cost Component

45. In Para # 13.3 of the Determination, the Authority allowed the heat rate as determined by the tests conducted by Independent Engineer.
46. The Calorific Value of fuel used for the calculations under the tests was different than from the value that has been used by NEPRA to calculate FCC in Para.21.3 of the impugned Determination.
47. This seems to be inadvertent only. However, it has serious affects and repercussions for NPGCL which is going during the control period of 3 years.
48. The effect thereof is shown in the chart below:

Unit No.	At the Time of Test			Used for FCC Calculation by NEPRA			Revised FCC (Rs/kWh)
	LHV Heat Rate Allowed (BTU/kWh)	LHV CV used for Heat Rate Calculation (BTU/kg)	SFC (Gram/kWh)	LHV CV used for FCC Calculation (BTU/kg)	SFC used for calculation of SFC by NEPRA (Gram/kWh)	Reference FCC Allowed by NEPRA (Rs/kWh)	
1	10491	38102.75	275.3345	38557.8	272.0850	10.6113	10.7380
2	10633	38276.87	277.7918	38557.8	275.7678	10.7549	10.8339
3	10265	38133.61	269.1851	38557.8	266.2237	10.3827	10.4982
4	10250	38107.16	268.9783	38557.8	265.8347	10.3676	10.4902
5	10914	38071.90	286.6681	38557.8	283.0556	11.0392	11.1801
6	11213	38292.30	292.8265	38557.8	290.8102	11.3416	11.4202

49. Authority is requested to reconsider and accordingly the reference values of Calorific Value may be corrected for calculation of FCC as mentioned in the above table.



d. Calorific Value

50. The conflict in determination is highlighted in Legal Grounds submitted in the Review Motion as elaborated in detail at Paragraph 10 hereinabove. The Authority is therefore requested to correct the Order and allow the CV of local fuel.

e. Use of System Charges of TPS Muzaffargarh

51. Authority has been kind enough to appreciate the submissions of NPGCL however directed to come in a separate proceedings.
52. The only issue for NPGCL is that will that separate proceedings be made part of the Tariff determination as this is a cost that needs to be recovered on basis of prudence.
53. The Public Hearing conducted by NEPRA was only after public advertisement. Had NTDC any issue, it should have appeared in the proceedings. The non appearance itself amounts to concurrence and consent.

f. Ambient Conditions Correction Factor

54. Authority has been kind enough to consider the submission of NPGCL and also acknowledged that the application of Ambient Condition Correction Factor is a standard practice and the methodology has also been shared with NEPRA on 06.05.2013. In this regard the documentary evidence of four units duly vetted by Independent Engineer was also provided to the Authority. However due to mere non availability of correction curves of two units, the Authority has not allowed to pass on the impact of ACCF.



55. This is quite interesting in itself. The Independent Engineer has worked out the ACCF and provided curves for three units to demonstrate the impact. Later on, the curves of 4th unit were also provided on demand. At the very minimum, the Authority could have allowed the ACCF to the extent of those 4 units. Moreover, provisionally the ACCF of remaining units could also have been allowed.
56. Instead of determining on basis of available data, the Authority directed to re-submit the point. The additional data (to extent of 2 units) shall be provided; however, in view of paucity of time for filing this Review Motion, the Authority is requested to convert its principal approval in financial terms so that NPGCL could avoid loss and could be benefited with ACCF.
- g. Variable O & M
57. In Para.17 of the impugned Determination, the Authority has determined the Variable O & M.
58. NPGCL is aggrieved of the determination for many reasons. On the outset it is pointed out that unlike the determination of ACCF (mentioned above), NEPRA opted to merge the values of all units despite fact that in Paras.17.1, 17.2 and 17.3 of the impugned Determination, the detailed charts are provided for each unit separately.
59. In Chart appearing at Para. 17.3, when compared with that at Para.17.2, it is obvious and clear that the component of Chemical and Fuel



Additives have not been taken into account. This is the error apparent on the face of record.

60. Regarding start ups it is submitted that there can be no final figure regarding numbers of start up each year. The Authority has determined the VO&M on basis of pervious trend. However, it has not been considered (rather indexation is denied which is also impugned herein) that the numbers of start up may vary due to reasons of (i) dispatch instructions, (ii) grid constraints, (iii) technical issues, (iv) plant issues. Therefore, it is suggested that bench mark rates of each start up may be determined and number of actual start ups be invoiced accordingly.
61. Regarding Repair & Maintenance, it is submitted that in Para.24 of this Review Motion that total repair and maintenance cost is allocated on 4% and 96% basis to 'administrative and general expenses' and 'cost of sale', respectively. For this reason, Authority is requested to revise the figures while accounting for the audited figures of FY 2014-15 also.
62. The indexation has been altogether denied while the record / audited figures reflect that the cost varies in each year. Therefore, NPGCL as well as the consumers should be provided with cushion against increase/ decrease.

III. Miscellaneous

a. Capacity Charge Calculation

63. In Para # 18.15.2, the Authority determined the capacity charge on basis of 100% plant availability that is not only impossible but also against the provisions of the PPA.



64. Admittedly the NPGCL has a cushion of 21% of time therefore the capacity charge is to be calculated on basis of 79% availability and 60% plant factor. This shall also bring equilibrium in between the other part of determination in this Paragraph where the capacity payment to NPGCL would be decreased in case it cannot make available itself upto 79% of time.
65. Moreover, there is no provision for arrangement of working capital to keep the plant in repaired and maintained condition and thereby to be "fit for competitive commercial market". This can affect the performance of the plant in longer run.
66. Authority is requested to reconsider these aspects and there is likelihood that the revision in this regard is likely to affect the total determination coupled with the review of the provisions of the PPA dealing with the availability of plants including charging of the liquidated damages thereto.
- b. **Open Cycle Tariff of GTPS Faisalabad (Block-IV)**
67. Unlike previous determination, in this impugned Determination, the NEPRA has not passed on the cost for operating on Open Cycle where the additional cost of about 1.5 times more as compared to operation on Combined Cycle is to be sustained.
- c. **Sustainability Charges**
68. The cost borne by NPGCL to maintain and protect the site, infrastructure and facilities available at sites where Shahdara Power Plant and NGPS Multan are erected is prudent as already contended above in this Review Motion.



69. In addition, the technical installations at site need to be kept in protective and alive conditions as being connected with National Grid. It is a matter of fact that due to non availability of the plants, the system is facing with voltage issues and if the grids are not protected it will destabilize the entire network that is already suffering with congestion.
70. To add, the Legacy Issues and Ground Realities as detailed in the Review Motion provide sufficient grounds for the cost.
71. Therefore, NEPRA is requested to reconsider and pass on the impact of such services by NPGCL is capacity of custodian which shall be in line with provisions of Contract Act, 1872.

d. Isolated Auxiliaries during Heat Rate Test

72. The units were supposed to be consuming full auxiliaries during the Heat Rate and CDC test carried out by PES, the IE, that are to be used in normal operation of the plant but due to one or other reasons some of the auxiliaries were not in service at the time of tests.
73. The impact of these auxiliaries when taken into test comes out to be addition of total auxiliary consumption at the unit, resulting in less Net Electrical Output, meaning thereby that actual net heat rate of the plant comes out to be on higher side than calculated in Heat Rate Test Report. The following Auxiliaries were taken out of service by the independent Engineer at the time of test:
- a. Auxiliary steam for Soot blowing of units.
 - b. Auxiliary steam for heating RFO storage Tanks.



- c. Auxiliary steam for heating decanting Lorries.
 - d. Auxiliary energy for RFO unloading pumps.
 - e. Auxiliary energy for RFO transfer pump.
 - f. Auxiliary energy for dirty oil pump.
 - g. Auxiliary energy for lighting load during night.
74. The above mentioned instances have been incorporated in its Report by the Independent Engineer, M/s PES. As for instance, the 'Isolation of Steam valves for heating of RFO for Unit No.1' is mentioned in Section 3.5.1 of CDC report.
75. The impact is shown as below:

Unit No	Loading MCR/50% MCR	Increase in Net Heat Rate (BTU/kWh)
1	MCR	220.73
	50 % MCR	395.70
2	MCR	229.69
	50 % MCR	411.97
3	MCR	226.17
	50 % MCR	392.35
4	MCR	164.85
	50 % MCR	281.09
5	MCR	231.48
	50 % MCR	404.95
6	MCR	245.37
	50 % MCR	401.54

Working of Isolated Auxiliaries is Appendix-E

76. Authority is requested to be kind enough and allow the impact of this Auxiliary Consumption, at par with Review Determination of JPCL-2015.



e. **Heat Rate Test, application**

77. Admittedly the Tariff Petition was filed after undergoing Heat Rate Test to comply the instructions of worthy Authority. Now the results are scrutinized by the Authority and have been allowed therefore the question is that since when the same shall be applicable.

78. NEPRA determined earlier tariff for NPGCL in 2006 on basis of the historical data and directed to have the heat rate tests that clearly shows that earlier determination of NEPRA was notional in nature. The tests could not have been carried out earlier due to various technical and financial issues. However, now the tests have been carried out and it is fully established that the EPP component was determined and therefore invoiced on lower side that, in view of the law and practice of NEPRA as well as market rules, is to be adjusted. More crucially when the earlier determination was on cost plus basis that did not allow NPGCL to recover the actual cost at relevant time. Hence, the impact of heat rate may please be allowed to be passed on and the energy invoices claimed on notional values be allowed to be adjusted and shown as a separate line item in NPGCL's tariff.

f. **Working Capital for Fuel**

79. As per the PPA, NPGCL has to maintain the fuel inventory of 15 days at site. This cause a huge cost for procurement of fuel and additives etc (supplementary). However, as detailed in Ground Realities, unlike the IPP the GENCOS (including NPGCL) has certain cash flow constraints and liquidity issues; therefore, Authority is requested to consider this aspect of the matter as well and allow a working capital to compensate such cost from own sources of NPGCL.



80. May it also be considered by Authority that payment of EPP invoices are only after a billing cycle that is of about 30 days after the Meter Reading (and 60 days from the first day) but due to late payments, there is always a dearth of cash flow. Therefore, the provision of sufficient capital to meet the demonstrated need of fuel arrangement (on basis of historical trend) may please be allowed.

g. Other Issues

81. NPGCL has made effort to submit all the requirements in detail to be "fit for a competitive trade market". However, it reserves right to enlarge submissions (if any) during the course of hearing of the Review Motion and also to submit the reply to the queries of Authority (if any).

SECTION "C": PRAYER / REQUEST

82. NPGCL, for reasons mentioned above and those to be enlarged during arguments, requests Authority:-
- a. To review Impugned Determination while considering the submissions made hereinabove;
 - b. Authority is further requested to review the impugned portions of the Determination as indicated in Section A hereof and detailed in Section B of the Review Motion;
 - c. It is prayed also that NPGCL be allowed to recover, in future, the cost as shall be required for improving its performance and thereby to comply with the directions of the Authority and to be fit for the competitive trade market.



- d. It is further prayed that pending decision of the Review Motion, the operation of impugned Determination may please be kept suspended and Federal Government be directed to refrain from notifying in Official Gazette.
- e. Any other relief that it is deemed necessary for equitable and legal disposal of the Review may also be granted.

Chief Executive Officer
Northern Power Generation Company Limited

**Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh**

Certificate:

It is certified that, in understanding of NPGCL, this Review Motion are on sufficient grounds those shall result in modification and withdrawal of impugned Determination.

Chief Executive Officer
Northern Power Generation Company Limited

**Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh**



BEFORE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

In re: Motion for Leave to Review by NPGCL

AFFIDAVIT

I, Rukhsar Ahmed Oureshi, Chief Executive Officer of NPGCL hereby undertakes on oath that:

1. This affidavit is being filed as the integral part of the Motion for Leave to Review being filed before the respected Authority (NEPRA)
2. The contents of the Review Motion are not repeated to avoid repetition
3. The contents of the Review Motion are true and correct to the best of my knowledge and belief and there is every likelihood that this Motion will result in review of the Impugned Determination of NEPRA
4. It is also verified that the contents of the Affidavit are verified to be true and correct to the best of my knowledge and belief


DEPONENT

Date: 29.01.2016

**Chief Executive Officer
NPGCL (GENCO-III)
TPS Munaffargarh**



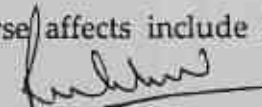
BEFORE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

In re: Motion for Leave to Review by NPGCL

APPLICATION FOR INTERIM RELIEF

Respectfully submitted,

1. The Review Motion against the Determination of worthy Authority for FY 2014 – 15 to FY 2016 – 17 for NPGCL is being filed on the grounds as mentioned in the said Motion.
2. That captioned Application is being filed as the integral part of the Review Motion therefore the contents of the said Motion may please be read as integral part of this application.
3. By this date of filing of the Review Motion, as per knowledge and intimation of NPGCL the Impugned Determination has not been notified and as such still not become effective. As such the balance of convenience tilts in favour of NPGCL.
4. For the reasons mentioned in Review Motion, NPGCL firmly believe that in *prima facie* it has a good arguable case with bright chances of the acceptance thereof.
5. For the humble submissions made in the Review Motion it is firmly believed by NPGCL that the Review Motion shall be accepted and the Impugned Determination will be materially changed. It is apprehended that if operation of the Impugned Determination is not suspended and if the tariff determined therein becomes effective it will render NPGCL unable to perform. The adverse affects include the


Chief Executive Officer



probable closure / shut down of the plant, increased maintenance issues and adverse affect on the policies of Government.

6. That the affidavit is attached in support of the application.

Prayer:

NPGCL, for reasons mentioned above and those to be enlarged during arguments, requests Authority to suspend the operation and thereby issuance of the Notification till determination of the Review Motion.

Any other relief that it is deemed necessary for equitable and legal disposal of the Review may also be granted.

Chief Executive Officer
Northern Power Generation Company Limited

**Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh**



(Application for Interim Relief)

ATTACHED
 [Signature]
 Date: 1/1/18
 22/16 48

APPENDIX-A

● **Copy of the BoD Resolution**



NORTHERN POWER GENERATION COMPANY LIMITED

Thermal Power Station, Mehmood Kot Road, Muzaffargarh, Punjab

Phone# 066-9200171 / 9200173, Fax # 066-9200172


Office of the Company Secretary

**EXTRACT OF RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF THE
COMPANY IN ITS 71ST MEETING HELD ON 23RD JANUARY 2016**

RESOLVED THAT Mr. Rukhsar Ahmed Qureshi, Chief Executive Officer and Mr. Nadeem Ahmad, Chief Engineer/ Technical Director of this company are hereby authorized to file the Motion for Leave to Review and represent NPGCL for filing of Leave for Review pursuant to Rule 16 (6) of the NEPRA (Tariff Standards and Procedures) Rule, 1998, with respect to the Authority's Decision date January 22, 2016 for Case No NEPRA/TRF-304/NPGCL-2015 of Northern Power Generation Company Limited (NPGCL), for Determination of its Generation Tariff and also to do or take all such necessary steps as may be required.

RESOLVED FURTHER THAT the above authorized officers are allowed to engage the services of financial, technical and legal advisors for preparation of the Review Motion and assistance in presentation before NEPRA.

The above resolution has been validly recorded on the Minutes Book of the Company.


Masood Ahmad
Company Secretary

Seal

APPENDIX-B

● **Copy of Actuarial Report**



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Ref. No.: L-2621/15

November 9th, 2015

Director Finance
Northern Power Generation Company Limited (NPGCL)
Thermal Power Station
Mehmood Kot Road
MUZAFFARGARH

Subject: IAS-19 Reporting for Pension Scheme as at 30.06.2015

Dear Sir,


The accounting entries for Northern Power Generation Company Limited Employees' Pension Scheme for the year 2014-2015 have been determined according to the International Accounting Standard 19 (2011) ("IAS 19R") and are presented in the following attached report.

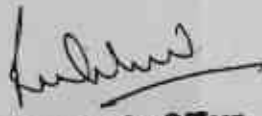
The results obtained from this report are as follows:

	Rupees
Charge to P&L, Account for the year 2014-2015	868,288,574
Balance Sheet Liability/(Asset) as at 30.06.2015	8,322,327,664

If there are any questions regarding the calculations or any other aspect of the report, please feel free to contact us and we would be glad to be of assistance.

Yours faithfully,


Jodat Javed
Manager


Chief Executive Officer
NPGCL (GENCO-III)
TTC Muzaffargarh

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NAUMAN ASSOCIATES
CONSULTING ACTUARIES

IAS-19 REPORTING FOR
NORTHERN POWER GENERATION COMPANY
LIMITED
EMPLOYEES' PENSION SCHEME AND POST
RETIREMENT FREE MEDICAL SCHEME
AS AT 30.06.2015

Date: November 9th, 2015


Chief Executive Officer
NPGCL (GENCO-III)
TBS Musaffargarh

HEAD OFFICE:
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Lahore, Pakistan.
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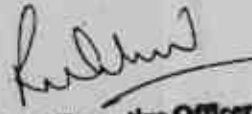
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Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



Main Report

Section 1

- **Purpose of the Report**

The purpose of this report is to assist the Company in preparing the financial statements for the year 2014-2015. The report shall focus on the calculation of accounting entries related to Northern Power Generation Company Limited Employees' Pension Scheme ("the Pension Scheme") required under IAS 19.

This Report and the disclosures provided therein are prepared for the use of the senior management, accounts department and auditors of the Company / Fund (if any), in respect of reflecting relevant liabilities in the financial statements.

This report is confidential. It should not be used for any other purpose and/or provided in whole or in part to any other party other than those mentioned above, without our prior written consent.

- **Date of Actuarial Valuation**

The actuarial valuation was conducted as at 30th June 2015.

- **Data Used for Valuation**

The data used for the actuarial valuation of the Pension Scheme was supplied by the Company. A summary of the data as at the valuation date is as follows:

- **Membership Data of the Pension Scheme as at 30.06.2015:**

Number of Members	2,626
Total Monthly Pensionable Salary (i.e. Basic Salary)	Rs. 47,583,801
Number of Pensioners	1,117
Total Monthly Pension	Rs. 19,423,650

Northern Power Generation Company Limited Employees' Pension Scheme Rules are similar to Punjab Government Pension Scheme Rules applicable as at 30.06.2014. A summary of the benefits payable under the Pension Scheme is given in the attached Appendix I.


Chief Executive Officer
NPGCL (PUNJAB GOVT.) LTD.



• Comments on Data

- Due to an absence of unique employee, it wasn't possible to match all the employees correctly. There were a total of 926 employees as shown in the table below.
- 306 individuals were removed due to them being duplicated entries
- 8 individuals were removed per company's instruction
- No employees from the following region were present in the dataset sent to us last year
 - Re-4 Muzaffargarh
 - CTW-Faisalabad
 - GTPS- Shahdra Lahore
- A total of 857 new employees had a past service greater than 2, this could either be due to the matching error or the regions not being included in last year datasets.
- The data for pensioners was compared to the one sent to us last year, the pensions of most of the pensioners had remain the same. On further enquiry, it was found that the data sent to us last year hadn't been collected properly. The data was then revised.
- The pension of a few employees in the revised data seemed unreasonable, these numbers were revised as per the company's instruction.
- The medical and pension payments couldn't be bifurcated as per the company so both the benefits have been evaluated together.
- The payments for both medical and electrical benefits are also understated, as the benefit for employees in different sub-divisions is paid by their respective heads such as LESCO, etc and the information isn't transferred to the company accurately.
- Overall, based on a number of revisions in the current dataset and the errors in the past one, it should be noted that the liability in this report is only as good as the data sent to us. The current collection system of the company seems to be very outdated which results in a number of inconsistencies and lack of reliability in the numbers presented in this report.

Year	Total Count	Un-matched	Matched	Average Age	Average PS	Average LBAL	Average Pay
2015	2,626	926	1,700	46	19.4	767	18,127


Chief Executive Officer
NPGCL (GENCO-III)
TTC, Muzaffargarh



Section 2

- **Actuarial Method Used**

Projected Unit Credit (PUC) Actuarial Cost Method was used for calculating the accounting entries in this report. This method is mandated under IAS 19.

- **Assumptions**

The principal and demographic assumptions used in the actuarial valuation are given in Section 3 and in Appendix II of the Report, respectively.

It is essential to elucidate here that:

In our opinion, the actuarial assumptions made in this report are unbiased and mutually compatible.

- **Discount Rate**

The duration of the liabilities is 12 years. Based on the weighted average duration of this plan and guidance from Pakistan Society of Actuaries ("PSOA"), the discount rate used for the calculations is 10.5% per annum.

Discount rate is determined by reference to market yields (at the balance sheet date) on government bonds, since the long term private sector bond market is not deep enough in Pakistan. The term of the assumed yield of the government bonds is consistent with the estimated term of the post-employment benefit obligations.

- **Rate of Increase in Eligible Salary**

Eligible Salary for the Pension benefits constitutes the Basic Salary. Its enhancement reflects the regular/special increments and any promotional increase. It has been assumed that the Eligible Salary will increase at a rate of 9.5% per annum in future.

It may be stated that the assumptions regarding the discount rate and the inflation rate are intimately connected. During periods of inflation, both tend to rise in conformity with each other. From an actuarial costing point of view, it is the difference between these two rates (i.e. discount rate and inflation rate) that matters, and not their individual values in isolation. Thus a difference of 1% between the discount rate (i.e. 10.5%) and the rate of increase in Eligible Salary (i.e. 9.5%) has been considered appropriate. This 1% difference is within the locally and internationally recognised norms.

Chief Executive Officer
NAUMAN ASSOCIATES



o Change in Assumptions

The discount rate used in the last actuarial valuation as on 30.06.2014 was 13.50%. However, in the current investment environment, where there is a downward trend in the interest rate structure, the discount rate has been decreased to 10.5%, in line with the specifications of the IAS-19.

Correspondingly, due to increase in inflationary expectations, the rate of expected long-term future salary increase has been decreased to 9.5% from 12.50% and the expected future rate of indexation has been decreased to be 5.5% from 8.5%.

o Expected Increase in Monthly Pensions

The amounts of monthly pensions are indexed as per Government orders issued from time to time. However, in determining the cost of pensioners after retirement, it has been assumed that monthly Pension amounts will increase at the rate of 5.5% per annum in future.

• Actuarial Gains & Losses Recognition Policy

The Actuarial Gains/Losses recognition policy is as per IAS 19 which requires all gains/losses arising during the year to be recognized in other comprehensive income of the Company.


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



Section 3

• **Accounting Entries for FY 2014, FY 2015 and Estimated Expense FY 2016**

Statement of Financial Position


	FY 2015 June 30, 2015	FY 2014 June 30, 2014
	Rs.	Rs.
Present value of defined benefit obligation plus payables	8,322,327,664	6,088,688,377
Balance sheet liability/(asset)	<u>8,322,327,664</u>	<u>6,088,688,377</u>

Changes in Present Value of Defined Benefit Obligations

	FY 2015 Jul 1 - Jun 30	FY 2014 Jul 1 - Jun 30
	Rs.	Rs.
Present value of defined benefit obligation	6,088,688,377	4,189,650,654
Current service cost	63,554,886	132,490,781
Interest cost on defined benefit obligation	804,733,688	429,316,224
Benefits due but not paid (payables)	-	-
Benefits paid	(255,396,198)	(201,849,424)
Gains and losses arising on plan settlements	-	-
Remeasurements:	-	-
Actuarial (gains)/losses from changes in demographic assumptions	-	474,624,866
Actuarial (gains)/losses from changes in financial assumptions	-	-
Experience adjustments	1,620,746,911	1,064,455,256
Present value of defined benefit obligation	<u>8,322,327,664</u>	<u>6,088,688,377</u>

Expenses to be Charged to P&L

	FY 2015 Jul 1 - Jun 30	FY 2014 Jul 1 - Jun 30
	Rs.	Rs.
Current service cost	63,554,886	132,490,781
Interest cost on defined benefit obligation	804,733,688	429,316,224
Expense chargeable to P&L	<u>868,288,574</u>	<u>561,807,005</u>


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Main Report
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Total Remeasurements Chargeable in Other Comprehensive Income

	FY 2015 Jul 1 - Jun 30 Rs.	FY 2014 Jul 1 - Jun 30 Rs.
<u>Remeasurement of plan obligation:</u>		
Actuarial (gains)/losses from changes in demographic assumptions	-	474,624,886
Actuarial (gains)/losses from changes in financial assumptions	-	-
Experience adjustments	1,620,746,911	1,084,455,258
Total remeasurements chargeable in other comprehensive income	1,620,746,911	1,539,080,142

Changes in Net Liability

	FY 2015 Jul 1 - Jun 30 Rs.	FY 2014 Jul 1 - Jun 30 Rs.
Balance Sheet Liability/(Asset)	6,088,688,377	4,189,850,654
Expense chargeable to P&L	868,288,574	581,807,005
Remeasurements chargeable in other comprehensive income	1,620,746,911	1,539,080,142
Benefits paid	(255,396,196)	(201,849,424)
Benefits payable transferred to short term liability	-	-
Balance Sheet Liability/(Asset)	8,322,327,664	6,088,688,377

Significant Actuarial Assumptions

	FY 2015	FY 2014
Discount rate used for Interest Cost in P&L Charge	13.50%	10.50%
Discount rate used for year end obligation	10.50%	13.50%
Salary increase used for year end obligation		
Salary Increase FY2015	N/A	12.50%
Salary Increase FY2016	9.50%	12.50%
Salary Increase FY2017	9.50%	12.50%
Salary Increase FY2018	9.50%	12.50%
Salary Increase FY2019	9.50%	12.50%
Salary Increase FY2020	9.50%	12.50%
Salary Increase FY2021 onward	9.50%	12.50%
Pension Indexation Rate	5.50%	6.50%
Next salary is increased at	01-Dec-15	01-Dec-14
Mortality Rates	SLIC 2001-2005 Setback 1 Year	SLIC 2001-2005 Setback 1 Year
Withdrawal Rates	Age-Based (per appendix)	Age-Based (per appendix)
Retirement Assumption	Age 60	Age 60

Estimated Expenses to be Charged to P&L in FY 2016

	FY 2015 Rs.
Current service cost	106,382,357
Interest cost on defined benefit obligation	860,436,104
Amount chargeable to P&L	966,818,461

Rubina
Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



Section 4

• Additional Disclosures

Sensitivity Analysis (± 100 bps)

	<u>Sensitivity Impact</u>	
	<u>Increase by 100 bps</u>	<u>Decrease by 100 bps</u>
	<u>Rs.</u>	<u>Rs.</u>
Discount Rate	(918,768,150)	1,120,025,019
Future Salary Increase	330,771,884	(300,923,948)
Future Pension Increase	834,718,309	(710,536,979)

The average duration of the defined benefit obligation is

12 Years

N. A. Cheema

NAUMAN A. CHEEMA
M.Sc., FSA

[Signature]

Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



Appendix-I

Summary of Benefits Payable

Under Northern Power Generation Company Limited
Employees' Pension Scheme

The Pension Scheme Members of Northern Power Generation Company Limited were entitled to the following pension benefits on normal and early retirement, death and disability as at June 30, 2014:

Normal Retirement Pension

The normal retirement age is 60 years.

If service is less than 5 years:

- Nil Benefit

If service is greater than 5 and less than 10 years:

- A lump sum gratuity is payable. The gratuity is calculated as per the following formula:

$$\text{Gratuity} = \text{Last Drawn Pensionable Salary} \times \text{Pensionable Service}$$

If service is greater than 10 years:

- The rate of pension at normal retirement age is 7/300 of the last drawn pensionable salary for each year of service subject to a maximum service period of 30 years. The maximum pension amount is thus limited to 70% of the last drawn pensionable salary

The employees can surrender upto a maximum of 35% of the gross pension in lieu of a lump sum-commuted value. The commuted value at age 60 shall be calculated as per the following formula:

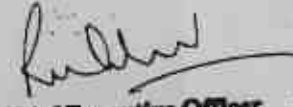
$$\text{Commuted Value} = 12.3719 \times \text{amount of pension surrendered} \times 12$$

Early Retirement Pension

Early retirement is applicable on the completion of 25 years of continuous service.

- The rate of pension at early retirement age is 7/300 of the last drawn pensionable salary for each year of service subject to a maximum service period of 30 years. The maximum pension amount is thus limited to 70% of the last drawn pensionable salary

The employees can surrender upto a maximum of 35% of the gross pension in lieu of a lump sum-commuted value.


Chief Executive Officer
NPGCL (GENCO-III)



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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Death in Service

If service is less than 5 years:

- Nil

If service is greater than 5 and less than 10 years:

- A lump sum gratuity is payable. The gratuity is calculated as per the following formula:

$$\text{Gratuity} = 1.5 \times \text{Last Drawn Pensionable Salary} \times \text{Service}$$

If service is greater than 10 years:

- The basic pension shall be 7/300 of the last drawn pensionable salary for each year of service subject to a maximum service period of 30 years

$$\text{Widow's Pension} = 75\% \times \text{basic pension}$$

Widow's pension is paid to eligible children in case of death of the widow. Eligible children are defined as legal male child under the age of 21 years and legal unmarried daughter

In addition to the above, the widow is entitled to 25% of the commuted value of gross pension. The age based commutation factors are set out in the table (later in the Appendix)

Death after Retirement

In case of death after retirement, the widow is entitled to receive 75% of the pension being received by the deceased retiree.

Widow's pension is paid to eligible children in case of death of the widow. Eligible children are defined as legal male child under the age of 21 years and legal unmarried daughter. In the absence of widow and eligible children, the pension is payable to the dependents (such as parents, widow daughter etc.) for the remaining guaranteed period

Ill-health Pension

If service is less than 5 years:

- Nil

If service is greater than 5 and less than 10 years:

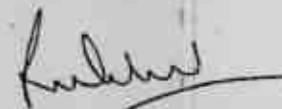
- A lump sum gratuity is payable. The gratuity is calculated as per the following formula:

$$\text{Gratuity} = 1.5 \times \text{Last Drawn Pensionable Salary} \times \text{Service}$$

If service is greater than 10 years:

- The basic pension is 7/300 of the last drawn pensionable salary for each year of service subject to a maximum service period of 30 years.

The employees can surrender upto a maximum of 35% of the gross pension in lieu of a lump sum-commuted value.


Chief Executive Officer
NPGCL (GENCO-III)
TB# Muzaffargarh




NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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Commutation

Following is the age – based commutation table showing commutation factors at ages 20 – 60.

Age	Commutation Factors	Age	Commutation Factors	Age	Commutation Factors
20	40.5043	36	28.3362	52	17.0050
21	39.7341	37	27.5908	53	16.3710
22	38.9653	38	26.8482	54	15.7517
23	38.1974	39	26.1009	55	15.1478
24	37.4307	40	25.3728	56	14.5602
25	36.6651	41	24.6406	57	13.9888
26	35.9006	42	23.9126	58	13.4340
27	35.1372	43	23.1840	59	12.8953
28	34.3750	44	22.4713	60	12.3719
29	33.6143	45	21.7592		
30	32.8071	46	21.0538		
31	32.0974	47	20.3555		
32	31.3412	48	19.6653		
33	30.5869	49	18.9841		
34	29.8343	50	18.3129		
35	29.0841	51	17.6526		


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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Demographic Assumptions

The following demographic assumptions have been used in the actuarial valuation.

Expected mortality for active Members

As per SLIC (2001-2005) Mortality Table
with One year Setback

Age	Death Rate	Withdrawal Rate
20	0.00094	0.12500
21	0.00096	0.08570
22	0.00097	0.09680
23	0.00099	0.06530
24	0.00101	0.04400
25	0.00103	0.02970
26	0.00106	0.04790
27	0.00108	0.03110
28	0.00112	0.02040
29	0.00115	0.01350
30	0.00119	0.00900
31	0.00124	0.00600
32	0.00129	0.01500
33	0.00135	0.00940
34	0.00141	0.00600
35	0.00149	0.00390
36	0.00158	0.00260
37	0.00168	0.00170
38	0.00179	0.00730
39	0.00192	0.00450
40	0.00208	0.00280
41	0.00225	0.00180
42	0.00245	0.00120
43	0.00267	0.00080
44	0.00293	0.00050
45	0.00322	0.01040
46	0.00355	0.01020
47	0.00393	0.01010
48	0.00436	0.01010
49	0.00484	0.01480
50	0.00538	0.01940
51	0.00599	0.02410
52	0.00667	0.02880
53	0.00742	0.03350
54	0.00824	0.03820
55	0.00915	0.04290
56	0.01013	0.04760
57	0.01120	0.05230
58	0.01234	0.05700
59	0.01354	0.06170
60	0.00000	0.00000


Chief Executive Officer
NPGCL (GENCO-III)



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Ref. No.: L-2665/15

November 9th, 2015

Director Finance
Northern Power Generation Company Limited
Office of the Finance Director
Thermal Power Station (WAPDA)
MUZAFFARGARH

**Subject: IAS-19 Reporting for Post Retirement Free Medical
Scheme as at 30.06.2015**

Dear Sir,


The accounting entries for Northern Power Generation Company Limited Employees' Post Retirement Free Medical Scheme for the year 2014-2015 have been determined according to the International Accounting Standard 19 (IAS 19) and are presented in the attached report.

A summary of the valuation results is as follows:

	Rupees
Charge to P&L Account for the year 2014-2015	71,654,256
Balance Sheet Liability/(Asset) as at 30.06.2015	760,057,111

If there are any questions regarding the calculations or any other aspect of the report, please feel free to contact us and we would be glad to be of assistance.

Yours faithfully,


Jodat Javed
Manager


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaflargarh

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NAUMAN ASSOCIATES
CONSULTING ACTUARIES


IAS-19 REPORTING FOR

**NORTHERN POWER GENERATION
COMPANY LIMITED**

**EMPLOYEES POST RETIREMENT
FREE MEDICAL SCHEME**

AS AT 30.06.2015

Date: November 9th, 2015


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh

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R. K. Singh
Chief Executive Officer
NPGCL (GENCO-III)
TNS Muzaffargarh



Main Report

Section I

• **Purpose of the Report**

The purpose of this report is to assist the Company in preparing the financial statements for the year 2014-2015. The report shall focus on the calculation of accounting entries related to Northern Power Generation Company Limited Employees' Post Retirement Free Medical Scheme as required under IAS - 19.

This Report and the disclosures provided therein are prepared for the use of the senior management, accounts department and auditors of the Company / Fund (if any), in respect of reflecting relevant liabilities in the financial statements.

This report is confidential. It should not be used for any other purpose and/or provided in whole or in part to any other party other than those mentioned above, without our prior written consent.

• **Date of Actuarial Valuation**

The actuarial valuation was conducted as at 30th June 2015.


• **Data Used for Valuation**

The data used for the actuarial valuation of the Northern Power Generation Company Limited Employees' Post Retirement Free Medical Scheme was supplied by the Company. A summary of the data as at the valuation date is as follows:

Number of Active Members	2,626
Number of Pensioners Entitled for Post Retirement Free Medical	1,117

• **Post Retirement Free Medical Scheme**

A summary of the benefits payable under the Post Retirement Free Medical Scheme is given in the attached Appendix I.


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



Section 2

• **Actuarial Method Used**

Projected Unit Credit (PUC) Actuarial Cost Method was used for calculating the accounting entries in this report. This method is mandated under IAS-19.

• **Assumptions**

The principal and demographic assumptions used in the actuarial valuation are given in Section 4 and in Appendix II of the Report, respectively.

It is essential to elucidate here that:

In our opinion, the actuarial assumptions made in this report are unbiased and mutually compatible.

○ **Discount Rate**

- The duration of the liabilities is 12 years. Based on the weighted average duration of this plan and guidance from Pakistan Society of Actuaries ("PSOA"), the discount rate used for the calculations is 10.5% per annum.

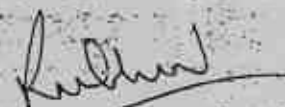
- Discount rate is determined by reference to market yields (at the balance sheet date) on government bonds, since the long term private sector bond market is not deep enough in Pakistan. The term of the assumed yield of the government bonds is consistent with the estimated term of the post-employment benefit obligations.

○ **Rate of Increase in Salary Increase**

- Eligible Salary for the Pension benefits constitutes the Basic Salary. Its enhancement reflects the regular/special increments and any promotional increase. It has been assumed that the Eligible Salary will increase at a rate of 9.5% per annum in future.

- It may be stated that the assumptions regarding the discount rate and the inflation rate are intimately connected. During periods of inflation, both tend to rise in conformity with each other. From an actuarial costing point of view, it is the difference between these two rates (i.e. discount rate and inflation rate) that matters, and not their individual values in isolation. Thus a difference of 1% between the discount rate (i.e. 10.5%) and the rate of increase in Eligible Salary (i.e. 9.5%) has been considered appropriate. This 1% difference is within the locally and internationally recognised norms.

○ **Rate of Increase in Medical Allowance**


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



- As per the company, all pensioners are paid a medical allowance as opposed to availing medical facility. Hence, it has been assumed that all employees will opt for a medical allowance.

- Mortality Rates

It has been assumed that the mortality of the employees in active service will be according to SLIC (2001-2005) Mortality Table with 1 year set-back.

The mortality of the pensioners has been assumed to correspond to the Mortality Table SLIC (2001-2005) with 1 year set-back

The mortality of the widow pensioners has been assumed to correspond to the Mortality Table SLIC (2001-2005) with 4 year set-back.

It has been assumed that the female spouse of a male employee is five years younger than her husband.

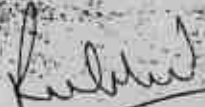
- Change in Assumptions

The discount rate used in the last actuarial valuation as on 30.06.2014 was 13.50%. However, in the current investment environment, where there is a downward trend in the interest rate structure, the discount rate has been decreased to 10.5%, in line with the specifications of the IAS-19.

Correspondingly, due to increase in inflationary expectations, the rate of expected long-term future salary increase has been decreased to 9.5% from 12.50%

- Actuarial Gain/Loss Recognition Policy

The Actuarial Gains/Losses recognition policy is as per IAS 19 which requires all gains/losses arising during the year to be recognized in other comprehensive income of the Company.


Chief Executive Officer
NPGCL (GENCO-III)
TPS Murshidgarh



Section 3

• **Accounting Entries for FY 2015, FY 2014 and Estimated Expense FY 2016**

Statement of Financial Position


	FY 2015	FY 2014
	June 30, 2015	June 30, 2014
	Rs.	Rs.
Present value of defined benefit obligation plus payables	8,322,327,664	6,088,688,377
Balance sheet liability/(asset)	<u>8,322,327,664</u>	<u>6,088,688,377</u>

Changes in Present Value of Defined Benefit Obligations

	FY 2015	FY 2014
	Jul 1 - Jun 30	Jul 1 - Jun 30
	Rs.	Rs.
Present value of defined benefit obligation	6,088,688,377	4,189,650,654
Current service cost	63,554,886	132,490,781
Interest cost on defined benefit obligation	804,768,045	429,316,224
Benefits due but not paid (payables)	-	-
Benefits paid	(254,887,201)	(201,849,424)
Gains and losses arising on plan settlements	-	-
Remeasurements:	-	-
Actuarial (gains)/losses from changes in demographic assumptions	-	474,624,866
Actuarial (gains)/losses from changes in financial assumptions	-	-
Experience adjustments	1,620,203,558	1,064,455,256
Present value of defined benefit obligation	<u>8,322,327,664</u>	<u>6,088,688,377</u>

Expenses to be Charged to P&L

	FY 2015	FY 2014
	Jul 1 - Jun 30	Jul 1 - Jun 30
	Rs.	Rs.
Current service cost	63,554,886	132,490,781
Interest cost on defined benefit obligation	804,768,045	429,316,224
Expense chargeable to P&L	<u>868,322,931</u>	<u>561,807,005</u>


Chief Executive Officer
NPGCL (GENCO-III)
TPO Munafgarh



NAUMAN ASSOCIATES CONSULTING ACTUARIES

Main Report
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Total Remeasurements Chargeable in Other Comprehensive Income

Remeasurement of plan obligation:

	FY 2015 Jul 1 - Jun 30 Rs.	FY 2014 Jul 1 - Jun 30 Rs.
Actuarial (gains)/losses from changes in demographic assumptions	-	474,824,886
Actuarial (gains)/losses from changes in financial assumptions	-	-
Experience adjustments	1,620,203,558	1,064,455,256
Total remeasurements chargeable in other comprehensive income	1,620,203,558	1,539,080,142

Changes in Net Liability


	FY 2015 Jul 1 - Jun 30 Rs.	FY 2014 Jul 1 - Jun 30 Rs.
Balance Sheet Liability/(Asset)	6,088,688,377	4,189,650,654
Expense chargeable to P&L	868,322,931	561,807,005
Remeasurements chargeable in other comprehensive income	1,620,203,558	1,539,080,142
Benefits paid	(254,887,201)	(201,849,424)
Benefits payable transferred to short term liability	-	-
Balance Sheet Liability/(Asset)	8,322,327,664	6,088,688,377

Significant Actuarial Assumptions

	FY 2015	FY 2014
Discount rate used for Interest Cost in P&L Charge	13.50%	10.50%
Discount rate used for year end obligation	10.50%	13.50%
Salary increase used for year end obligation		
Salary Increase FY2015	N/A	12.50%
Salary Increase FY2016	9.50%	12.50%
Salary Increase FY2017	9.50%	12.50%
Salary Increase FY2018	9.50%	12.50%
Salary Increase FY2019	9.50%	12.50%
Salary Increase FY2020	9.50%	12.50%
Salary Increase FY2021 onward	9.50%	12.50%
Pension Indexation Rate	5.50%	8.50%
Next salary is increased at	01-Dec-15	01-Dec-14
Mortality Rates	SLIC 2001-2005 Setback 1 Year	SLIC 2001-2005 Setback 1 Year
Withdrawal Rates	Age-Based (per appendix)	Age-Based (per appendix)
Retirement Assumption	Age 60	Age 60

Estimated Expenses to be Charged to P&L in FY 2016

	FY 2016 Rs.
Current service cost	106,362,357
Interest cost on defined benefit obligation	860,462,627
Amount chargeable to P&L	966,845,183


Chief Executive Officer
NPGCL (GENCO-III)
T.V. Muraffargah



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Main Report
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Section 4

• **Additional Disclosure Items**

Sensitivity Analysis (\pm 100 bps)

Discount Rate
Future Salary Increase
Future Pension Increase

Sensitivity Impact

Increase by 100 bps	Decrease by 100 bps
Rs. (918,768,150)	Rs. 1,120,025,019
330,771,884	(300,923,648)
834,718,309	(710,536,979)

The average duration of the defined benefit obligation is

12 Years

N. A. Cheema

NAUMAN A. CHEEMA
M.Sc., FSA

[Signature]

Chief Executive Officer
NPGCL (GENCO-III)
TRB Muzaffargarh



Appendix II

Summary of Benefits Payable

Under
Northern Power Generation Company Limited
Employees' Post Retirement Free Medical Scheme

The medical Allowance Scheme Members of Northern Power Generation Company Limited were entitled to the following pension benefits on normal and early retirement, death and disability as at June 30, 2015:

Medical Allowance on Normal Retirement

The normal retirement age is 60 years.

If service is less than 5 years:

- Nil Benefit

If service is greater than 5 and less than 10 years:

- Nil Medical Benefit

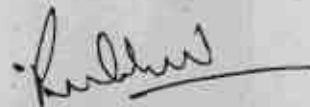
If service is greater than 10 years:

- The rate of Medical Allowance pension is 20% of the net monthly pension for individuals with Basic Pay Scales above 15 and 25% of net monthly pension of individuals with Basic Pay Scales below 15.

Early Retirement Pension

Early retirement is applicable on the completion of 25 years of continuous service.

- The rate of Medical Allowance pension is 20% of the net monthly pension for individuals with Basic Pay Scales above 15 and 25% of net monthly pension of individuals with basic Scales below 15.


Chief Executive Officer
NPGCL (GENCO-III)
TRB Muradpur



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Appendix-I
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Death In Service

If service is less than 5 years:

- Nil

If service is greater than 5 and less than 10 years:

- Nil

If service is greater than 10 years:

- The basic pension shall be $7/300$ of the last drawn pensionable salary for each year of service subject to a maximum service period of 30 years

Widow's Pension = $75\% \times$ basic pension

Widow's pension is paid to eligible children in case of death of the widow. Eligible children are defined as legal male child under the age of 21 years and legal unmarried daughter

- The rate of Medical Allowance pension is 20% of the net monthly pension for individuals with Basic Pay Scales above 15 and 25% of net monthly pension of individuals with basic Scales below 15.

Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



Appendix II

Demographic Assumptions

The following demographic assumptions have been used in the actuarial valuation.

Expected mortality for active Members	As per SLIC(2001-2005) with one year setback
---------------------------------------	--


Age	Death Rate	Withdrawal Rate
20	0.00094	0.12500
21	0.00096	0.08570
22	0.00099	0.09680
23	0.00101	0.06530
24	0.00103	0.04400
25	0.00106	0.02970
26	0.00108	0.04790
27	0.00112	0.03110
28	0.00115	0.02040
29	0.00119	0.01350
30	0.00124	0.00900
31	0.00129	0.00600
32	0.00135	0.01500
33	0.00141	0.00940
34	0.00149	0.00600
35	0.00158	0.00390
36	0.00168	0.00260
37	0.00179	0.00170
38	0.00192	0.00730
39	0.00208	0.00450
40	0.00225	0.00280
41	0.00245	0.00180
42	0.00267	0.00120
43	0.00293	0.00080
44	0.00322	0.00050
45	0.00355	0.01040
46	0.00393	0.01020
47	0.00436	0.01010
48	0.00484	0.01010



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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49	0.00538	0.01480
50	0.00599	0.01940
51	0.00667	0.02410
52	0.00742	0.02880
53	0.00824	0.03350
54	0.00915	0.03820
55	0.01013	0.04290
56	0.01120	0.04760
57	0.01234	0.05230
58	0.01354	0.05700
59	0.01481	0.06170
60	0.00000	1.00000


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

Ref. No.: L-2662/15

November 5th, 2015

Director Finance
Northern Power Generation Company Limited
Office of the Finance Director
Thermal Power Station (WAPDA)
MUZAFFARGARH

Subject: IAS-19 Reporting for Post Retirement Free Electricity Scheme as at 30.06.2015

Dear Sir,


The accounting entries for Northern Power Generation Company Limited Employees' Post Retirement Free Electricity Scheme for the year 2014-2015 have been determined according to the International Accounting Standard 19 (IAS 19) and are presented in the attached report.


A summary of the valuation results is as follows:

	Rupees
Charge to P&L Account for the year 2014-2015	266,019,220
Balance Sheet Liability/(Asset) as at 30.06.2015	1,731,495,726

If there are any questions regarding the calculations or any other aspect of the report, please feel free to contact us and we would be glad to be of assistance.

Yours faithfully,


Jodat Javed
Manager


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh

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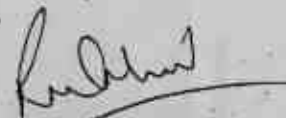
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NAUMAN ASSOCIATES
CONSULTING ACTUARIES

IAS-10 REPORTING FOR
NORTHERN POWER GENERATION
COMPANY LIMITED
EMPLOYEES' POST RETIREMENT
FIXED ELECTRICITY SCHEME
AS AT 30.06.2015

Date: November 5th, 2015


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh

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Chief Executive Officer
NPGCL (GENCO-III)
TPS Munafgarh



Main Report

Section I

- **Purpose of the Report**

The purpose of this report is to assist the Company in preparing the financial statements for the year 2014-2015. The report shall focus on the calculation of accounting entries related to Northern Power Generation Company Limited Employees' Post Retirement Free Electricity Scheme as required under IAS - 19.

This Report and the disclosures provided therein are prepared for the use of the senior management, accounts department and auditors of the Company / Fund (if any), in respect of reflecting relevant liabilities in the financial statements.

This report is confidential. It should not be used for any other purpose and/or provided in whole or in part to any other party other than those mentioned above, without our prior written consent.

- **Date of Actuarial Valuation**

The actuarial valuation was conducted as at 30th June 2015.


- **Data Used for Valuation**

The data used for the actuarial valuation of the Northern Power Generation Company - Limited Employees' Post Retirement Free Electricity Scheme was supplied by the Company. A summary of the data as at the valuation date is as follows:

Number of Active Members	2,626
Number of Pensioners Entitled for Post Retirement Free Electricity Benefits	1,117

- **Post Retirement Free Electricity Scheme**

A summary of the benefits payable under the Post Retirement Free Electricity Scheme is given in the attached Appendix I.


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



Section 2

• **Actuarial Method Used**

Projected Unit Credit (PUC) Actuarial Cost Method was used for calculating the accounting entries in this report. This method is mandated under IAS-19.

• **Assumptions**

The principal and demographic assumptions used in the actuarial valuation are given in Section 4 and in Appendix II of the Report, respectively.

It is essential to elucidate here that:

In our opinion, the actuarial assumptions made in this report are unbiased and mutually compatible.

○ **Discount Rate**

The duration of the liabilities is 19 years. Discount rate is determined by reference to market yields (at the balance sheet date) on government bonds, since the long term private sector bond market is not deep enough in Pakistan. The term of the assumed yield of the government bonds is consistent with the estimated term of the post-employment benefit obligations. The discount rate used for the calculations is 11.0% per annum.

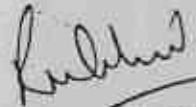
○ **Rate of Increase in Electricity Costs**

In view of the fact that the Electricity price increase rates are in excess of general inflation, it has been considered appropriate to assume that the average annual rate of Electricity cost increase of retirees will be 10% for each future year of age.

○ **Total Costs Incurred in 2014-2015 on the Provision of Electricity Benefits to Pensioners**

The retirees and their dependants are entitled to 50% of the free electricity facility as compared to the active employees.

The annual Electricity cost per retired Employees and their dependants used in the previous actuarial valuations as at 30.06.2014 was Rs.28,488/- This cost was based on the assumption that the annual cost for electricity benefit per retired family will be 50% of the average annual cost of per active employee's family.


Chief Executive Officer
NPGCL (GENCO-III)
TNS Muzaffargarh



The same basis has been used for determining the annual cost for electricity benefit per retired family. This cost works out to Rs. 27,600/- per annum for the year 2014-2015.

o Mortality Rates

It has been assumed that the mortality of the employees in active service will be according to SLIC (2001-2005) Mortality Table with T year set-back.

The mortality of the pensioners has been assumed to correspond to the Mortality Table SLIC (2001-2005) with 1 year set-back.

The mortality of the widow pensioners has been assumed to correspond to the Mortality Table SLIC (2001-2005) with 4 year set-back.

It has been assumed that the female spouse of a male employee is five years younger than her husband.

o Expected Rates of Withdrawal and Early Retirements

The rates of withdrawal used in the calculations are those based on the experience of WAPDA and other public-sector organizations in Pakistan.

o Change in Assumptions

The discount rate used in the last actuarial valuation as on 30.06.2014 was 13.75%, however, in the current investment environment, where there is an downward trend in the interest rate structure, the discount rate has been decreased to 11%, in line with the specifications of the IAS-19.

Correspondingly, due to increase in inflationary expectations, the long-term rate of expected increase in electricity cost has been decreased to 10% from 12.75%.

• Actuarial Gain/Loss Recognition Policy

The Actuarial Gains/Losses recognition policy is as per IAS 19 which requires all gains/losses arising during the year to be recognized in other comprehensive income of the Company.


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh



Section 3

Accounting Entries for FY 2015, FY 2014 and Estimated Expense FY 2016

Statement of Financial Position

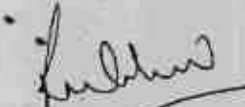
	FY 2015 June 30, 2015	FY 2014 June 30, 2014
	Rs.	Rs.
Present value of defined benefit obligation plus payables	1,731,495,726	1,518,965,278
Balance sheet liability/(asset)	<u>1,731,495,726</u>	<u>1,518,965,278</u>

Changes in Present Value of Defined Benefit Obligations

	FY 2015 Jul 1 - Jun 30	FY 2014 Jul 1 - Jun 30
	Rs.	Rs.
Present value of defined benefit obligation	1,518,965,278	930,876,946
Current service cost	57,195,620	34,790,399
Past service cost (credit)	-	-
Interest cost on defined benefit obligation	208,623,600	97,738,384
Benefits due but not paid (payables)	-	-
Benefits paid	(496,381)	(70,395)
Gains and losses arising on plan settlements	-	-
Remeasurements:	-	-
Actuarial (gains)/losses from changes in demographic assumptions	-	177,786,610
Actuarial (gains)/losses from changes in financial assumptions	-	-
Experience adjustments	(52,992,391)	277,843,334
Present value of defined benefit obligation	<u>1,731,495,726</u>	<u>1,518,965,278</u>

Expenses to be Charged to P&L

	FY 2015 Jul 1 - Jun 30	FY 2014 Jul 1 - Jun 30
	Rs.	Rs.
Current service cost	57,195,620	34,790,399
Past service cost (credit)	-	-
Gains and losses arising on plan settlements	-	-
Interest cost on defined benefit obligation	208,623,600	97,738,384
Expense chargeable to P&L	<u>265,819,220</u>	<u>132,528,783</u>


Chief Executive Officer
NPGL (GENCO-III)
TPS Musaffargarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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Total Remeasurements Chargeable in Other Comprehensive Income

Remeasurement of plan obligation:

Actuarial (gains)/losses from changes in demographic assumptions

Actuarial (gains)/losses from changes in financial assumptions

Experience adjustments

Total remeasurements chargeable in other comprehensive income

FY 2015	FY 2014
Jul 1 - Jun 30	Jul 1 - Jun 30
Rs.	Rs.
-	177,788,610
(52,992,391)	277,843,334
(52,992,391)	455,629,944

Changes in Net Liability

Balance Sheet Liability/(Asset)

Expense chargeable to P&L

Remeasurements chargeable in other comprehensive income

Benefits paid

Benefits payable transferred to short term liability

Balance Sheet Liability/(Asset)

FY 2015	FY 2014
Jul 1 - Jun 30	Jul 1 - Jun 30
Rs.	Rs.
1,518,965,278	930,876,946
268,019,220	132,528,783
(52,992,391)	455,629,944
(498,381)	(70,395)
1,731,495,726	1,518,965,278

Significant Actuarial Assumptions

Discount rate used for Interest Cost in P&L Charge

Discount rate used for year end obligation

Salary increase used for year end obligation

Future Rate of Increase in Electric Costs

Next salary is increased at

Mortality Rates

Withdrawal Rates

Retirement Assumption

FY 2015	FY 2014
13.75%	10.50%
11.00%	13.75%
10.00%	12.75%
01-Jan-16	01-Jan-15
SLIC 2001-2005	SLIC 2001-2005
Setback 1 Year	Setback 1 Year
Age-Based	Age-Based
(per appendix)	(per appendix)
Age 60	Age 60

Estimated Expenses to be Charged to P&L in FY 2016

Current service cost

Interest cost on defined benefit obligation

Amount chargeable to P&L

-FY 2016
Rs.
62,327,832
190,353,617
252,681,450

[Signature]
Chief Executive Officer
NPGCL (GENCO-III)
TPO Muzaffargarh



Section 4

• **Additional Disclosure Items**

Year End Sensitivity Analysis (\pm 100 bps) on Defined Benefit Obligation

	FY 2015 Jun 30 Rs.
Discount Rate + 100 bps	1,431,141,433
Discount Rate - 100 bps	2,100,175,497
Future Electric Cost Increase Rate + 100 bps	2,101,950,871
Future Electric Cost Increase Rate -100 bps	1,442,723,159

The average duration of the defined benefit obligation is

19 Years

N. A. Cheema

NAUMAN A. CHEEMA
M.Sc., FSA

[Signature]
Chief Executive Officer
NPGCL (GENCO-III)
Thiruvananthapuram



Appendix I

Summary of Benefits Payable

Under

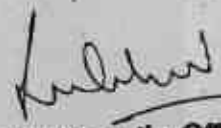
Northern Power Generation Company Limited
Employees' Post Retirement Free Electricity Scheme

The free electricity benefit to which a retired employee (or his/her spouse) of the Company is entitled depends upon the employee's Basic Pay Scale (BPS) at the time of leaving the Company's service.

The rate of the benefit is 50% of the number of units to which he/she was entitled during active service. The following table shows the BPS wise number of units allowed per month for a retiree of the Company:

BPS	Retired Employees	
	Technical Staff	Non-Technical Staff
1-4	150	50
5-10	300	75
11-15	300	100
16	300	150
17	325	225
18	350	300
19	500	350
20	550	550

Note: The benefit payment communicated to us seems low as compared to the nature of the benefit.


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh




Appendix II

Demographic Assumptions

The following demographic assumptions have been used in the actuarial valuation.

Expected mortality for active Members	As per SLIC(2001-2005) with one year setback
---------------------------------------	--

Age	Death Rate	Withdrawal Rate
20	0.00094	0.12500
21	0.00096	0.08570
22	0.00099	0.09680
23	0.00101	0.06530
24	0.00103	0.04400
25	0.00106	0.02970
26	0.00108	0.04790
27	0.00112	0.03110
28	0.00115	0.02040
29	0.00119	0.01350
30	0.00124	0.00900
31	0.00129	0.00600
32	0.00135	0.01500
33	0.00141	0.00940
34	0.00149	0.00600
35	0.00158	0.00390
36	0.00168	0.00260
37	0.00179	0.00170
38	0.00192	0.00730
39	0.00208	0.00450
40	0.00225	0.00280
41	0.00245	0.00180
42	0.00267	0.00120
43	0.00293	0.00080
44	0.00322	0.00050
45	0.00355	0.01040
46	0.00393	0.01020
47	0.00436	0.01010
48	0.00484	0.01010



Chief Executive Officer
NPGCL (GENCO-III)
TPS Musaffargarh



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49	0.00538	0.01480
50	0.00599	0.01940
51	0.00667	0.02410
52	0.00742	0.02880
53	0.00824	0.03350
54	0.00915	0.03820
55 —	0.01013	0.04290
56	0.01120	0.04760
57	0.01234	0.05230
58	0.01354	0.05700
59	0.01481	0.06170
60	0.00000	1.00000


Chief Executive Officer
NPGCL (GENCO-III)
TTS Musaffargarh

Ref. No.: L-2604/13

October 27th, 2015

Finance Director
Northern Power Generation Company Limited
Office of the Finance Director
Thermal Power Station (WAPDA)
MUZAFFARGARH

Subject: IAS-19 Reporting for Leave Encashment and LPR Facility as at 30.06.2015

Dear Sir,

The accounting entries for Leave Encashment and LPR Facility of Northern Power Generation Company Limited for the year 2014-2015 have been determined according to the International Accounting Standard 19 (IAS 19) and are presented in the attached report.


A summary of the valuation results is as follows:

	Rupees
Charge to P&L Account for the year 2014-2015	173,482,320
Balance Sheet Liability/(Asset) as on 30.06.2015	509,180,783

If there are any questions regarding the calculations or any other aspect of the report, please feel free to contact us. We would be glad to be of assistance.

Yours faithfully,


JODAT JAVED
Manager


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh

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NAUMAN ASSOCIATES
CONSULTING ACTUARIES

IAS-19 REPORTING FOR

**NORTHERN POWER GENERATION
COMPANY LIMITED**

LEAVE ENCASHMENT & LPR FACILITY

AS ON 30.06.2015

Date: October 27th, 2015


Chief Executive Officer
NPGCL (GENCO-III)
TPS Muzaffargarh

HEAD OFFICE:

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Gulberg II,
Lahore, Pakistan.

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E-Mail: info@naumanassociates.com and nauman02@lhr.comsats.net.pk



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Chief Executive Officer
NPGCL (GENCO-III)
TPO Muzaffargarh



Main Report

Section II

- **Purpose of the Report**

The purpose of this report is to assist the Company in preparing the financial statements for the year 2014-2015. The report shall focus on the calculation of accounting entries related to Northern Power Generation Company Limited Employees' Leave Encashment & LPR Facility ("the Leave Encashment & LPR Scheme") required under IAS - 19.

This Report and the disclosures provided therein are prepared for the use of the senior management, accounts department and auditors of the Company / Fund (if any), in respect of reflecting relevant liabilities in the financial statements.

This report is confidential. It should not be used for any other purpose and/or provided in whole or in part to any other party other than those mentioned above, without our prior written consent.

- **Date of Actuarial Valuation**

The actuarial valuation was conducted as on 30th June 2015.

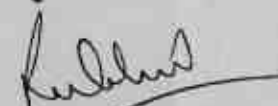
- **Data Used for Valuation**

The data used for the actuarial valuation of the Leave Encashment & LPR Facility was supplied by the Company. A summary of the data as on the valuation date is as follows:

Number of Members	2,626
Total Monthly Eligible Salary	Rs. 47,583,801

- **Leave Encashment & LPR Facility**

A summary of the benefits payable under the Leave Encashment & LPR Scheme is given in the attached Appendix I.


Chief Executive Officer
NPGCL (GENCO-III)
TRB Muzaffargarh



Section 2

- **Actuarial Method Used**

Projected Unit Credit (PUC) Actuarial Cost Method was used for calculating the accounting entries in this report. This method is mandated under IAS-19.

- **Assumptions**

The principal and demographic assumptions used in the actuarial valuation are given in Section 4 and in Appendix II of the Report, respectively.

It is essential to elucidate here that:

In our opinion, the actuarial assumptions made in this report are unbiased and mutually compatible.

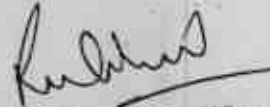
- **Discount Rate**

Discount rate is determined by reference to market yields (at the balance sheet date) on government bonds, since the long term private sector bond market is not deep enough in Pakistan. The term of the assumed yield of the government bonds is consistent with the estimated term of the post-employment benefit obligations. The discount rate used for the calculations is 9.75% per annum.

- **Rate of Increase in Eligible Salary**

Eligible Salary for the Leave Encashment benefits constitutes Basic Pay, Special Pay, Qualification Pay and Senior Post Allowance. Its enhancement reflects the regular/special increments and any promotional increase. It has been assumed that the Eligible Salary will increase at a rate of 8.75% per annum in future.

It may be stated that the assumption regarding the discount rate and the inflation rate are intimately connected. During periods of inflation, both tend to rise in conformity with each other. From an actuarial costing point of view, it is the difference between these two rates (i.e. discount rate and inflation rate) that matters, and not their individual values in isolation. Thus a difference of 1% between the discount rate (i.e. 9.75%) and the long-term rate of increase in Eligible Salary (i.e. 8.75%) has been considered appropriate. This 1% difference is within the locally and internationally recognised norms.


Chief Executive Officer
NPGCL (GENCO-III)
TRS Muzaffargarh



o Change in Assumptions

The discount rate used in the last actuarial valuation as on 30.06.2014 was 13.25%. However, in the current investment environment, where there is a downward trend in the interest rate structure, the discount rate has been decreased to 9.75%, in line with the specifications of the IAS-19.

Correspondingly, due to decrease in inflationary expectations, the rate of expected long-term future salary increase has been decreased to 8.75% from 12.25%.

Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



Section 3

• Accounting Entries for FY 2015 and FY 2014

Statement of Financial Position

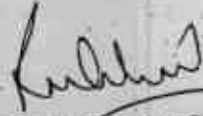
Present value of defined benefit obligation
plus payables
Balance sheet liability/(asset)

FY 2015	FY 2014
June 30, 2015	June 30, 2014
Rs.	Rs.
509,180,783	358,198,479
<u>509,180,783</u>	<u>358,198,479</u>

Changes in Present Value of Defined Benefit Obligations

Present value of defined benefit obligation
Current service cost
Past service cost (credit)
Interest cost on defined benefit obligation
Benefits due but not paid (payables)
Benefits paid
Gains and losses arising on plan settlements
Remeasurements:
Actuarial (gains)/losses from changes in demographic assumptions
Actuarial (gains)/losses from changes in financial assumptions
Experience adjustments
Present value of defined benefit obligation

FY 2015	FY 2014
Jul 1 - Jun 30	Jul 1 - Jun 30
Rs.	Rs.
358,198,479	206,893,772
3,304,246	3,039,732
124,850,320	173,626,704
45,970,672	20,487,889
(22,500,015)	(23,542,048)
-	-
-	5,271,300
(442,918)	(27,578,869)
<u>509,180,783</u>	<u>358,198,479</u>


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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Expenses to be Charged to P&L

Current service cost
Past service cost (credit)
Gains and losses arising on PVDBO
Interest cost on defined benefit obligation
Expense chargeable to P&L

FY 2015	FY 2014
Jul 1 - Jun 30	Jul 1 - Jun 30
Rs.	Rs.
3,304,246	3,039,732
124,650,320	173,626,704
(442,916)	(22,307,570)
45,970,672	20,487,889
<u>173,482,320</u>	<u>174,846,755</u>

Changes in Net Liability

Balance Sheet Liability/(Asset)
Expense chargeable to P&L
Remeasurements chargeable in other comprehensive income
Benefits paid
Benefits payable transferred to short term liability
Balance Sheet Liability/(Asset)

FY 2015	FY 2014
Jul 1 - Jun 30	Jul 1 - Jun 30
Rs.	Rs.
358,198,479	208,893,772
173,482,320	174,846,755
(22,500,015)	(23,542,048)
<u>509,180,783</u>	<u>358,198,479</u>

Significant Actuarial Assumptions

Discount rate used for Interest Cost in P&L Charge
Discount rate used for year end obligation
Salary increase used for year end obligation
Salary Increase FY2015
Salary Increase FY2016
Salary Increase FY2017
Salary Increase FY2018
Salary Increase FY2019
Salary Increase FY2020
Salary Increase FY2021 onward
Next salary is increased at
Mortality Rates
Withdrawal Rates
Retirement Assumption

FY 2015	FY 2014
13.25%	10.50%
9.75%	13.25%
N/A	12.25%
8.75%	12.25%
8.75%	12.25%
8.75%	12.25%
8.75%	12.25%
8.75%	12.25%
8.75%	12.25%
01-Jan-15	01-Jan-15
SLIC 2001-2005 Setback 1 Year	SLIC 2001-2005 Setback 1 Year
Age-Based	Age-Based
(per appendix)	(per appendix)
Age 60	Age 60

Chief Executive Officer
NPGCL (GENCO-III)
TBS Mirzaifargah



Section 4

• Additional Disclosure Items

Year End Sensitivity Analysis (\pm 100 bps) on Defined Benefit Obligation

Discount Rate + 100 bps
Discount Rate - 100 bps
Salary Increase + 100 bps
Salary Increase - 100 bps

FY 2015
Jun 30
Rs.
472,966,129
550,611,699
550,611,699
472,337,602

The average duration of the defined benefit obligation is

8 Years

N. A. Cheema

NAUMAN A. CHEEMA
M.Sc., FSA

[Signature]
Chief Executive Officer
NPGCL (GENCO-III)
TR-3 Muzaffargarh



Appendix II

Summary of Benefits Payable
Under
Northern Power Generation Company Limited
Leave Encashment & LPR Facility

Employees of Northern Power Generation Company Limited are entitled to take Earned Leave of 48 days per annum.


The unutilized Earned Leave can be accumulated upto a potentially unlimited amount, and can be utilised at any time subject to the approval of the Company.

Provided that the employee has a minimum leave balance of 365 days at the time of leaving service, upto 365 days of the accumulated leaves can be encashed at the time of Retirement; Death in Service or Disability Retirement. Employees are allowed to take LPR 365 days in case of Normal Retirement. We assume that at the time of retirement 20% employees opt for LPR while 80% opt for leave encashment for employees whose leave balance is greater than 365. It has been assumed that all employees with leave balance less than 365 will encash it at retirement.

We have been provided with the leave balances of the employees as at 30.06.2015. Based on the information provided, we have used the following basis to determine the leave encashment liabilities:

The salary used for LPR facility is the gross pay and the basic pay with enhancements as mentioned in the eligible salary section

Average Number of Leaves Utilized per annum by the Employees	25 days
Average Number of Leaves Accumulated per annum by the Employees	23 days


Chief Executive Officer
NPGCL (GENCO-III)
TPM Musaffargarh



Appendix II

Demographic Assumptions

The following demographic assumptions have been used in the actuarial valuation.

Expected mortality for active Members	As per SLIC(2001-2005) Mortality Table with 1 year setback
---------------------------------------	--

Age	Death Rate	Withdrawal Rate
20	0.00094	0.12500
21	0.00096	0.08570
22	0.00099	0.09680
23	0.00101	0.06530
24	0.00103	0.04400
25	0.00106	0.02970
26	0.00108	0.04790
27	0.00112	0.03110
28	0.00115	0.02040
29	0.00119	0.01350
30	0.00124	0.00900
31	0.00129	0.00600
32	0.00135	0.01500
33	0.00141	0.00940
34	0.00149	0.00600
35	0.00158	0.00390
36	0.00168	0.00260
37	0.00179	0.00170
38	0.00192	0.00730
39	0.00208	0.00450
40	0.00225	0.00280
41	0.00245	0.00180
42	0.00267	0.00120
43	0.00293	0.00080
44	0.00322	0.00050
45	0.00355	0.01040
46	0.00393	0.01020
47	0.00436	0.01010
48	0.00484	0.01010


Kuldeep
Chief Executive Officer
NPGCL (GENCO-III)
TRR Muradnagarh



NAUMAN ASSOCIATES
CONSULTING ACTUARIES

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49	0.00538	0.01480
50	0.00599	0.01940
51	0.00667	0.02410
52	0.00742	0.02880
53	0.00824	0.03350
54	0.00915	0.03820
55	0.01013	0.04290
56	0.01120	0.04760
57	0.01234	0.05230
58	0.01354	0.05700
59	0.01481	0.06170
60	0.00000	1.00000


Chief Executive Officer
NPGCL (GENCO-III)
TBS Muzaffargarh

APPENDIX-C

Working of T/F losses

Appendix-C

Back Up Meter Readings at Generator Terminal and NTDC Meter Reading at Swithyard (Transformer Losses) In Respect of TPS Muzaffargarh for 2014-2015

Month	Back Up Energy Meter Reading (KWh)			NTDC Energy Meters Reading (KWh)		Difference in Net Generation in KWh (Loss)	Percentage Difference /Loss
	Gross Generation	Auxiliary	Net Generation	Auxiliary	Net Generation		
July-14	699,380,120	64,851,642	634,528,478	686,166,665	621,315,023	13,213,455	2.08
August-14	614,105,780	59,845,560	554,260,220	601,605,118	541,759,558	12,500,662	2.26
September-14	288,068,180	32,251,748	255,816,432	272,588,969	240,337,221	15,479,211	6.05
October-14	333,728,920	31,264,362	302,464,558	323,741,553	292,477,191	9,987,367	3.30
November-14	43,110,000	5,057,098	38,052,902	36,991,052	31,933,954	6,118,948	16.08
December-14	264,575,660	23,826,215	240,749,445	251,962,527	228,136,312	12,613,133	5.24
January-15	427,421,460	33,413,994	394,007,466	424,861,580	391,447,586	2,559,880	0.65
February-15	187,347,820	16,330,472	171,017,348	183,644,687	167,314,215	3,703,133	2.17
March-15	297,291,420	26,919,276	270,372,144	293,308,204	266,388,928	3,983,216	1.47
April-15	562,639,620	48,642,693	513,996,927	555,641,201	506,998,508	6,998,419	1.36
May-15	604,938,180	52,828,115	552,110,065	595,817,310	542,989,195	8,120,870	1.65
June-15	540,458,360	49,340,141	491,118,219	529,563,618	480,223,477	10,894,742	2.22
Total	4,863,065,520	444,571,316	4,418,494,204	4,755,892,484	4,311,321,168	107,173,036	2.43


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APPENDIX-D

Conversion of T/F losses in
BTU/kWh

Break Up of Transformer Losses to BTU conversion:**At 100 % MCR**

Unit No	Annex of Test Report	Net Output (KWh)	BTUs Consumed	1.84 % Transformer & Other Losses (KWh)	Net Output Less Transformer Losses (KWh)	Net Heat Rate Before Transformer (LHV)	Net Heat Rate After Transformer (LHV)	Difference in Net Heat Rate (LHV)
		kWh	BTU	kWh	kWh	BTU/ kWh	BTU/ kWh	BTU/ kWh
1	D (3)	175810	1839834873.47	3234.90	172575.10	10464.90	10661.07	196.16
2	E (3)	169108	1793682877.59	3111.60	165997.00	10606.69	10805.51	198.82
3	F (3)	171352	1754623503.20	3152.88	168199.37	10239.86	10431.81	191.95
4	G (3)	247200	2527535562.01	4548.48	242651.52	10224.66	10416.32	191.66
5	H (3)	168091	1830043023.52	3092.89	164998.96	10887.16	11091.24	204.08
6	I (3)	158878	1777054712.96	2923.36	155954.74	11185.02	11394.68	209.66

At 50 % MCR

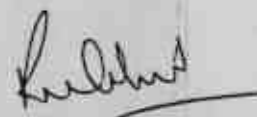
Unit No	Annex of Test Report	Net Output	BTUs Consumed	1.84 % Transformer and other Losses	Net Output Less Transformer Losses	Net Heat Rate Before Transformer (LHV)	Net Heat Rate After Transformer (LHV)	Difference in Net Heat Rate (LHV)
		kWh	BTU	kWh	kWh	BTU/ kWh	BTU/ kWh	BTU/ kWh
1	D (3)	98696.00	1118029459.00	1816.01	96879.99	11328.01	11540.35	212.34
2	E (3)	95100.20	1125607986.00	1749.84	93350.36	11836.02	12057.89	221.87
3	F (3)	99350.10	1094732490.00	1828.04	97522.06	11018.94	11225.49	206.55
4	G (3)	145350.00	1662496245.00	2674.44	142675.56	11437.88	11652.28	214.40
5	H (3)	97040.36	1197687090.00	1785.54	95254.82	12342.15	12573.51	231.35
6	I (3)	97749.11	1187690754.00	1798.58	95950.53	12150.40	12378.16	227.76


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Appendix-D

At 50 % MCR

Unit No.	Annex of Test Report	Gross Output (KWh)	Net Output (KWh)	Auxiliary Cons. (KWh)	%age Auxiliary Cons. Excluding transformer and switchyard losses (%)	Aux. Consumption with Transformer and Switchyard Losses (KWh)	%age Auxiliary Cons. Including transformer and switchyard losses (%)
	1	2	3	4	5	6	7
1	D (3)	111500.00	98696.00	12804.00	11.48	14620.01	13.11
2	E (3)	107000.00	95100.20	11899.80	11.12	13649.64	12.76
3	F (3)	110000.00	99350.10	10649.90	9.68	12477.94	11.34
4	G (3)	162050.00	145350.00	16700.00	10.31	19374.44	11.96
5	H (3)	107730.00	97040.36	10689.64	9.92	12475.18	11.58
6	I (3)	109620.00	97749.11	11870.89	10.83	13669.47	12.47


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APPENDIX-E

Working of Isolated Auxiliaries

Appendix-E

The supported working for calculation of Heat Rate due to isolation of auxiliaries is described below,

Steam Consumption for Unit No. 1,2,3,5,6

1- Soot Blowing Steam System

Flow (Kg/h)	Temp (°C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
5,000.00	330.00	28.00	3,070.93	15,354,650	14,553,400	(i) APH = 06 (ii) Boiler = 03	130,980,601.27	5,457,525.05

2- Heating Steam to RFO Storage Tanks

Flow (Kg/h)	Temp (°C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
10,000.00	272.00	9.00	2,991.90	29,919,000.00	28,357,740.41	24 Hrs	680,585,769.92	28,357,740.41


3- Heating Steam to Unloading Lorries

RFO Required per unit per day (Kg)	RFO Received per Lorry (Kg)	Lorries per day (Average Nos.)	Steam Required per Lorry (Kg)	Steam Required per day (Kg)	Average Steam per Hour (Kg/Hr)
1,176,000.00	38,500.00	31.00	670.00	20,770.00	865.42

Flow (Kg/h)	Temp (°C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
865.42	272.00	9 kg	2,991.90	2,589,250.10	2,454,135.57	24 Hrs	58,899,253.70	2,454,135.57

Total Energy Per Day Per Unit	45,365,276.13	BTU/hr	870,465,624.89	36,269,401.04
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<http://www.tlv.com/global/TI/calculator/superheated-steam-table.html>


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Unit Auxiliary Consumption to be Compensated For Unit No 1,2,3,5,6

S.No	Name of Auxiliary	Rating of Auxiliary (Kw)	Operating Hrs per day (Hrs)	Energy Per Day (Kwh/day)	Energy Per Hr (Kwh/hr)
1	Receiving/Unload RFO pump	75	24	1800	75
2	Transfer RFO Pump	160	24	3840	160
3	Night Lighting Load	5	12	60	2.5
Total				5700	237.5

Steam Consumption for Unit No.4,TPS,Muzaffargarh

1- Soot Blowing Steam System

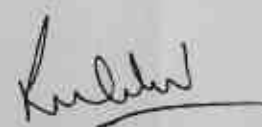
Flow (Kg/h)	Temp (* C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
13,000.00	380.00	20.39	3,201.61	41,620,930.00	39,449,030.00	(i) APH = 2hr (ii) Boiler = 3 hr	197,245,150.02	8,218,547.92

2- Heating Steam to RFO Storage Tanks

Flow (Kg/h)	Temp (* C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
10,000.00	280.00	5.10	3,020.10	30,201,000.00	28,625,024.84	24 Hrs	687,000,596.19	28,625,024.84

3- Heating Steam to Unloading Lorries

RFO Required per unit per day (Kg)	RFO Received per Lorry (Kg)	Lorries per day (Average Nos.)	Steam Required per Lorry (Kg)	Steam Required per day (Kg)	Average Steam per Hour (Kg/Hr)
1,500,000.00	38,500.00	39.00	670.00	26,130.00	1,088.75


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Appendix-E

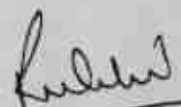
Flow (Kg/h)	Temp (* C)	Pressure (Kg/cm ²)	Enthalpy (KJ/Kg)	Energy (KJ/Hr)	Energy (BTU/Hr)	Operation Time per day (Hrs)	Energy (BTU/day)	Energy (BTU/Hr)
1,088.75	272.00	9.00	2,991.90	3,257,431.13	3,087,448.99	24 Hrs	74,098,775.70	3,087,448.99

Total Energy Per Day Per Unit	71,161,503.83	BTU/hr	958,344,521.91	39,931,021.75
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<http://www.tlv.com/global/TI/calculator/superheated-steam-table.html>

Unit Auxiliary Consumption to be Compensated For Unit No.4,TPS,Muzaffargarh

S.No	Name of Auxiliary	Rating of Auxiliary (Kw)	Operating Hrs per day (Hrs)	Energy Per Day (Kwh/day)	Energy Per Hr (Kwh/hr)
1	Receiving/Unload RFO pump	1.5	24	36	1.5
2	Transfer RFO Pump	75	24	1800	75
3	Night Lighting Load	5	12	60	2.5
Total				1896	79


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Appendix-E

Impact of Isolated Auxiliaries (Both Steam and Electrical Cons.) on Net Heat Rate (LHV)

At 100 % MCR (Hourly Average)											
Unit No.	Annex of Test Report	Gross Out put (KWh)	Net Output (KWh)	BTUs Consumed	BTUs to be consumed by Isolated Auxiliaries	New BTUs after deduction of Isolated Aux.	kWh to be consumed by Isolated Auxiliaries	Net Output Less Electrical Auxiliaries (kWh)	Net Heat Rate Before Isolated Auxiliaries BTU/KWh	Net Heat Rate After Isolated Auxiliaries (LHV) BTU/KWh	Difference in Net Heat Rate (LHV) BTU/KWh
	1	2	3	4	5	6	7	8	9	10	11
1	D (3)	190,000.00	175,810.00	1,839,834,873.47	36,269,401.04	1,876,104,274.51	237.50	175,572.50	10,464.90	10,585.64	220.73
2	E (3)	182,500.00	169,108.60	1,793,682,877.59	36,269,401.04	1,829,952,278.63	237.50	168,871.10	10,606.69	10,836.39	229.69
3	F (3)	183,500.00	171,352.25	1,754,623,503.20	36,269,401.04	1,790,892,904.24	237.50	171,114.75	10,239.86	10,466.03	226.17
4	G (3)	172,200.00	167,200.00	1,757,535,562.01	39,931,021.75	2,567,466,583.76	79.00	247,121.00	10,224.66	10,389.51	164.85
5	H (3)	181,440.00	168,091.85	1,830,043,023.52	36,269,401.04	1,866,312,424.56	237.50	167,854.35	10,887.16	11,118.64	231.48
6	I (3)	173,880.00	158,878.10	1,777,054,712.96	36,269,401.04	1,813,324,114.00	237.50	158,640.60	11,185.02	11,430.39	245.37

At 50 % MCR (Hourly Average)											
Unit No.	Annex of Test Report	Gross Out put (KWh)	Net Output (KWh)	BTUs Consumed	BTUs to be consumed by Isolated Auxiliaries	New BTUs after deduction of Isolated Aux.	kWh to be consumed by Isolated Auxiliaries	Net Output Less Electrical Auxiliaries (kWh)	Net Heat Rate Before Isolated Auxiliaries BTU/KWh	Net Heat Rate After Isolated Auxiliaries (LHV) BTU/KWh	Difference in Net Heat Rate (LHV) BTU/KWh
	1	2	3	4	5	6	7	8	9	10	11
1	D (3)	111500.00	98896.00	1118029459.00	36,269,401.04	1154298860.04	237.50	98458.50	11328.01	11723.71	395.70
2	E (3)	107000.00	95100.20	1125607986.00	36,269,401.04	1161877387.04	237.50	94862.70	11836.02	12247.99	411.97
3	F (3)	110000.00	99350.10	1094732450.00	36,269,401.04	1131001891.04	237.50	99112.60	11018.94	11411.28	392.35
4	G (3)	162050.00	145350.00	1662496245.00	39,931,021.75	1702472266.75	79.00	145271.00	11437.88	11718.98	281.09
5	H (3)	107300.00	97040.36	1197687090.00	36,269,401.04	1233956491.04	237.50	96802.86	12342.15	12747.11	404.95
6	I (3)	109620.00	97749.11	1187630754.00	36,269,401.04	1223960155.04	237.50	97511.61	12150.40	12551.94	401.54

[Signature]

Chief Executive Officer
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TBS Muzaffarpur

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