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No. NEPRA/R/SAT-I/PAR-142/11474-11476
August 03, 2015

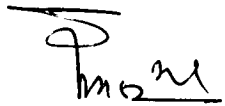
Subject: **Decision of the Authority in the matter of request for approval of Power Purchase Agreement containing tariff and terms and conditions for power procurement from 102-MW Gulpur Hydropower Project [No. NEPRA/R/SAT-I/PAR-142]**

Dear Sir,

Please find enclosed herewith the subject Decision of the Authority alongwith Annexure I, II, III & IV (30 pages) in Case no. No. NEPRA/R/SAT-I/PAR-142.

2. The decision is being intimated to the Federal Government for the purpose of notification in the Official Gazette in accordance with the provisions of Section 31 (4) of eh Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997.

Encl: As above


(Syed Safer Hussain)

Secretary
Ministry of Water & Power
'A' Block, Pak Secretariat
Islamabad

CC: 1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.

**NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
(NEPRA)**

Case No. NEPRA/R/SAT-I/PAR-142

Decision

of the

**Authority in the Matter of Request for
Approval of Power Purchase Agreement
Containing Tariff and Terms and
Conditions for Power Procurement
From 102 – MW
Gulpur Hydro Power Project**

Decision of the Authority in the matter of request for approval of Power Purchase Agreement containing tariff and terms and conditions for power procurement from 102-MW Gulpur Hydropower Project

1. Background

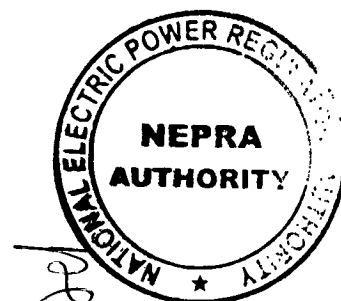
1.1 The sponsors of the project company (Mira Power Limited) were issued LOI by PPIB on March 12, 2005, for the development of approximately 120-MW Gulpur Hydropower Project. Subsequently, the Feasibility Study of 100 MW Gulpur Hydropower Project was approved by PPIB's appointed Panel of Experts on May 10, 2006. NTDC negotiated tariff of Rs. 4.2785/kWh (US cents 5.4158/kWh) with the sponsors based on estimated project costs as per feasibility of the project. As per NTDC, the PPIB issued Letter of Support ("LOS") to the Company on April 27, 2010 to achieve the Financial Closing of the Project. However, the company could not achieve the Financial Close in the stipulated period and the validity of the LOS has been extended multiple times since then. Meanwhile, a South Korean Consortium comprising of Korea South East Power Company, Sambu Construction Company ("Sambu"), Lotte Engineering & Construction ("Lotte") and STX Construction Company ("STX") (collectively called "Sponsors") expressed their desire to acquire Mira Power Limited and approached PPIB for such acquisition. As per NTDC, the PPIB also issued the "No Objection Letter" to the New Sponsors to acquire the Project with certain conditions including the satisfaction of pre-qualification criterion on December 19, 2012.

1.2 In terms of regulation 4(i) and(v) of IPPRs, NTDC filed a request with NEPRA for grant of permission for power procurement and approval of advance tariff under the NEPRA Interim Power Procurement (Standards and Procedure) Regulations 2005 (hereinafter referred to as "IPPRs"). On 10-2-2009 permission was granted to NTDC for power procurement from Gulpur Hydropower project at an approved advance tariff based on feasibility of Rs. 4.2785/kWh (US¢ 5.4158/kWh at reference exchange rate of PKR 79 per US dollar).

1.3 As per requirement of regulation 5 of IPPRs 2005, the National Transmission & Despatch Company (hereinafter referred to as "NTDC") filed a request for approval of power purchase agreement for power acquisition from 102-MW Gulpur Hydropower Project (the "Project") to be located in Kotli district of Azad Jammu & Kashmir about 5 KM south of Kotli Town on Poonch River under the NEPRA Interim Power (Procurement & Procedure) Regulations 2005. The project is being developed in the private sector under the Power Policy 2002 on BOOT basis for a period of 30 years from COD exclusive of 4 years of construction period.

2. Submissions of the Petitioner

2.1 In the draft PPA sought to be approved from NEPRA, the summary of the technical and financial information is as follows:



Technical Specifications

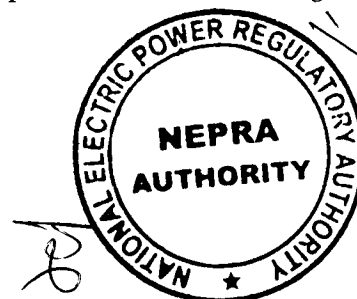
Capacity of Plant (Gross)	102 MW
Auxiliary Consumption	2 MW
Capacity of Plant (Net)	100 MW
Average Annual Net Generation	465 GWh
Plant Factor	53.3%
Turbine Type	Vertical Francis
Number of Units	3
Rated Flow	201 cumecs
Head (Rated)	56 meters

Financial Parameters

Cost Head	US\$ Million
EPC Cost	240.90
Custom Duty	4.00
Insurance during construction	4.82
Project Development	16.47
Engineering & Supervision	21.46
Lenders' Financing Fees and Charges	7.29
Environmental Cost	1.61
Resettlement & Rehabilitations Cost	3.96
Interest During Construction	23.31
Total Project Cost	323.82
Debt Equity Ratio	75:25
Debt Financing	Foreign
Interest Rate	6 Month LIBOR + 5.00%
Repayment Period	12 Years
Return on Equity (IRR based)	17%
Construction Period	48 months
Tariff Control Period	30 Years
Proposed Levelized Tariff (1-30 Years)	Rs. 9.6034/kWh (US cents 9.7994/kWh)
Proposed Tariff (1-12 Years)	Rs. 11.1703
Proposed Tariff (13-30 Years)	Rs. 5.5179
USD/PKR Exchange Rate	98

3. Proceedings

- 3.1 The request of NTDC was admitted on January 13, 2015 and it was also decided to conduct a hearing in the matter. The hearing was scheduled for March 17, 2015. for which notices were published in daily newspapers on February 26, 2015, highlighting thereby salient features of the case and the main issues to be discussed in the hearing. Further, separate notices to various stakeholders were also served for filing their comments, if any, regarding the request filed by NTDC. However, no comments were filed by any person.
- 3.2 The hearing in the matter was held as per schedule on March 17, 2015. During the hearing the Authority questioned the Petitioner on various financial and technical parameters of the project. The Authority was apprised about the change in



equipment (i.e. from three Francis turbines as proposed by the consultants in the approved feasibility study of the project to two Kaplan turbines) that has been proposed by the consultant of project sponsor in view of NTDC's requirement of installing European equipment. The Authority directed the Petitioner to furnish detailed justification regarding change in equipment. Based on proceedings of the case the following issues have been discussed for arriving at a just and informed decision.

- Whether the proposed Project Capacity and Energy is justified?
- Whether the claimed EPC Cost is justified?
- Whether negotiated and requested Non-EPC Costs are justified?
- Whether terms of debt and return on equity are justified?
- Whether the claimed Operational Costs are justified?

3.3 On the basis of pleadings, evidence/record produced and arguments raised during the hearing, issue wise findings are given hereunder;

4. **Whether the proposed Project Capacity and Energy is justified?**

4.1 The Feasibility Study envisaged a Run-of-River scheme, consisting of 45 meter high dam on River Poonch, diversion of the river flows through a 3 km length and 8 m diameter tunnel and power house with 3 Francis Turbine units (3x34 MW). With the aforementioned configuration, the power plant was expected to generate energy of 465 GWh annually at a plant factor of 53% on the basis of average hydrological flows in River Poonch.

4.2 The basic design of the project which was carried out subsequent to the tendering process was based on the configuration of machines proposed in the feasibility study, i.e. 3x34 Francis Turbines.

4.3 Subsequent to the hearing, the NTDC vide its letter no. GM/WPPO/CE-III/DH/4227-30 dated April 14, 2015 submitted clarifications related to the change in technology that has been suggested by the Owner's technical consultants. The NTDC has submitted the following opinion regarding change in technology from three (03) Francis turbines to two (02) Kaplan turbines:

"In our view the replacement of three (3) Francis Turbines with two (2) Kaplan Turbines is technically and operationally acceptable. However, the company's contention in their letter regarding increase in project cost due to the change is not supported. It is up to NEPRA to decide whether further reduction in the project cost due to change in the turbine type is possible. During discussion with NTDC, the Company was adamant that such reduction was not possible with European origin turbines."

4.4 The submissions of NTDC and the project company were examined by NEPRA Technical Section which agreed with the recommendation of NTDC about change in turbines.

4.5 It is pertinent to mention here that the effect of change in technology on the annual energy generation has not been explained by the NTDC or the project company through documentary evidences provided so far. However, our technical experts have assessed that net annual energy will increase with change of Kaplan turbines



from Francis turbines due to inherent advantage of Kaplan turbines over the Francis turbines. Accordingly the technical experts have proposed 474.996 GWh as net annual energy after taking into account 1% auxiliary consumption as against 2% proposed by the Petitioner.

4.6 The Authority after due consideration of all aspects has decided to approve net capacity of 100.98 MW (after accounting for 1% of auxiliary consumption) and net annual energy of 474.996 GWh for the project. The net capacity will be adjusted in tariff at COD in case it is found to be higher than 100.98 MW pursuant to IDC tests to be carried out by the project sponsors in accordance with the provisions of the standard Power Purchase Agreement for hydropower projects.

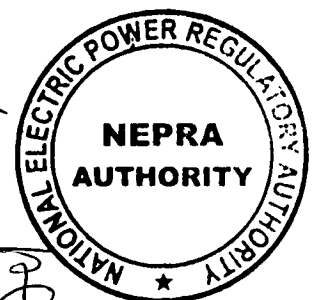
5. Whether the claimed EPC Cost is justified?

5.1 NTDC's proposal is based on EPC cost of US\$ 240.9 Million and total project cost of US\$ 323.82 Million. The NTDC has submitted that in the initial EPC stage proposal, the project company had claimed EPC cost of US\$ 250.9 Million and a total project cost of US\$ 335.22 Million, which was not accepted by the NTDC due to unreasonably high costs claimed by the project company under certain cost heads. Subsequently, after elaborate discussions with the representatives of the project company, the project costs were reduced, as summarized in the following table:

COST HEAD	Original Project Cost (US\$ Million)	Negotiated Project Cost (US\$ Million)
EPC Cost	250.90	240.90
Custom Duty	4.80	4.00
Insurance During Construction	5.02	4.82
Project Development Cost	15.28	16.47
Engineering & Supervision	20.51	21.46
Lender's Financing Fees & Charges	7.86	7.29
Environmental Cost	1.61	1.61
Resettlement & Rehabilitations Cost	5.11	3.96
Project Cost excluding IDC	311.09	300.51
Interest During Construction	24.13	23.31
Total Project Cost	335.22	323.82

5.2 NTDC has submitted that the project company appointed M/S Saman Engineering as a consultant to carry out the bid evaluation process and prepare a "Bid Evaluation Report. The Petitioner also submitted a signed copy of the bid evaluation report dated July 2012 as documentary evidence. As per the said bid evaluation report, the EPC bidding of the project was conducted on the feasibility design of the project and all bid prices offered by the bidders were based on the Feasibility study and Due Diligence Studies. As per the bid evaluation report, the eligibility of bidders was restricted to bidders based in Republic of Korea due to the fact that the project is expected to be financed by K-EXIM amongst other financial institutions. The following companies gave Expression of Interest in the bidding:

- i. SAMBU Construction Co., Ltd. Seoul, The Republic of Korea
- ii. DAELIM Industrial Co., Ltd. Seoul, The Republic of Korea



iii. DAEWOO E&C Co., Ltd. Seoul, The Republic of Korea

5.3 A Comparison of bid prices is given hereunder:

Sr. #	Description	SAMBU-LOTTE-STX JV	DAELIM	DAEWOO	SAMBU-LOTTE-STX JV (Revised)
A. Project Construction Cost					
1	General and Preparation Work	15,208,967	17,332,297	16,376,298	15,208,967
2	Diversion Work	4,568,401	4,634,900	4,793,421	1,958,832
3	Weir Structure-Barrage and Under sluices	50,773,193	46,773,410	55,753,268	50,773,193
4	Intake Structure	3,071,117	3,262,263	3,236,736	3,071,117
5	Power Tunnel (Up to Surge Tank)	39,383,031	45,037,968	43,690,981	39,383,031
6	Surge Tank (incl. Pressure Tunnel)	10,442,187	10,920,613	10,713,698	10,442,187
7	Powerhouse	13,633,594	12,345,701	14,828,949	13,633,594
8	Penstock	3,658,166	4,199,149	3,551,510	3,658,166
9	Road and Bridge	6,906,189	6,855,486	5,646,049	6,906,189
10	Switch Yard	1,229,724	1,224,985	1,209,487	1,229,724
Sub-Total (A)		148,874,569	152,586,772	159,800,396	146,265,000
B. Electrical & Mechanical Costs					
1	Weir Structure-Barrage and Under sluices	10,588,890	10,876,126	8,261,142	10,588,890
2	Intake Structure	2,559,641	2,714,230	2,562,666	2,559,641
3	Powerhouse	98,649,606	107,642,518	115,066,068	98,649,606
4	Penstock	2,210,299	2,197,894	2,895,449	2,210,299
5	Switch Yard	491,563	482,460	531,737	491,563
Sub-Total (B)		114,500,000	123,913,228	129,317,061	114,500,000
Total (A+B)		263,374,569	276,500,000	289,117,458	260,765,000

5.4 As per the bid evaluation report, SAMBU-LOTTE-STX JV submitted the lowest bid of US\$ 263,374,569, which was further reduced to US\$ 260,765,000 on the basis of the contractor's proposed modified design of diversion works. The bid evaluation report concludes that SAMBU-LOTTE-STX JV was ranked highest in terms of technical capability, whereas the bid price of SAMBU-LOTTE-STX JV was also the lowest. Moreover, the construction period proposed by SAMBU-LOTTE-STX JV was also the shortest, i.e. 45 months, as against 47 months proposed by DAELIM Industrial Co., Ltd, and 48 months proposed by DAEWOO E&C Co., Ltd which was the same as the construction period of 48 months proposed in the RFP.

5.5 However, it is pertinent to mention here that the EPC documents (Preliminary Agreement dated July 28, 2014 and detailed EPC Contract dated March 13, 2015) have eventually been executed between the project company and DAELIM-LOTTE JV. As per NTDC, Sambu withdrew from the consortium of SAMBU-LOTTE-STX JV due to its financial troubles and the configuration of the JV was thereby mutually



agreed with the inclusion of Daelim Industrial which was the second ranked bidder in the original tender process. Subsequently, bid price of US\$ 240.9 million was negotiated (excluding design cost of US\$ 9.1 Million), as opposed to 260.765 Million that was proposed by SAMBU-LOTTE-STX JV. The bid price of DAELIM-LOTTE JV however, is not based on the feasibility design but rather the revised Basic design which was carried out subsequent to the bidding process and deviates significantly from the feasibility design. As per the documentary evidence submitted by the petitioner, the design of the project was significantly changed from the feasibility study, in view of the fact that feasibility design was not fully optimized and Lenders' and Owner's Engineer asked the EPC Contractor to further optimize the design. As per NTDC, the following main reasons necessitated further optimization of the project design:

- i. Environmental Issues - As per the Petitioner, the Poonch River had been declared a National Park by the AJ&K Government subsequent to the completion of the project's Feasibility Study. Due to the presence of a critically endangered species of fish in the Poonch River, substantial ecological water flows were required to be released into the river which would negatively impact the financial viability of the project. This issue was not foreseen in the feasibility study as per the submissions of project company.
- ii. Social Issues - The design and location of the project envisaged in the Feasibility Study involved substantial resettlement/relocation costs.
- iii. Technical Issues - The location of the proposed Intake in the feasibility design 2 km upstream of the Weir site raised serious questions about the sedimentation control.

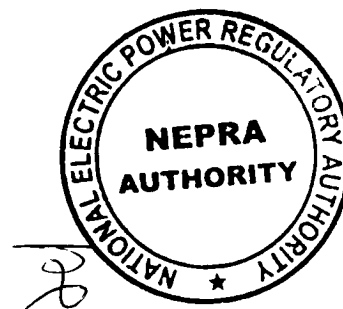
5.6 As mentioned in previous paragraphs, the bidding of the project was carried out on feasibility design, which was subsequently changed significantly in the basic design prepared by the selected EPC contractor. The price offered by the contractor is nevertheless lower than the lowest price offered in the bidding conducted on the feasibility design.

5.7 The EPC contract has been split into two main parts, i.e. the Offshore contract and the Onshore contract in the following manner:

	Amount
Offshore Supply Contract (excluding customs duties)	US\$ 79,664,858
Onshore Construction Contract (including applicable withholding tax)	US\$ 170,335,142
Total EPC Contract Price	US\$ 250,000,000

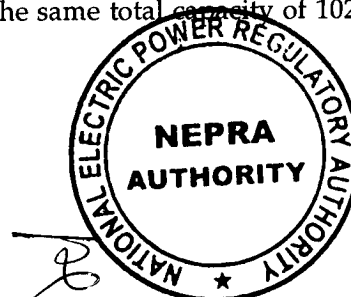
5.8 The Following component-wise breakup of the EPC contract price has been provided:

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Sr#	Description	Amount	
		US\$	%
1. Civil Works		150,201,946	60.08%
1	Diversion Work	18,945,101	7.58%
2	Weir	71,614,669	28.65%
3	Intake	4,873,225	1.95%
4	Waterway	5,666,489	2.27%
5	Powerhouse	26,358,667	10.54%
6	Road	11,121,685	4.45%
7	General Provisions	8,815,269	3.53%
8	Measuring Instrument	2,806,841	1.12%
2. Electrical & Mechanical Works		89,213,845	35.69%
1	Hydro Mechanical Works	34,341,337	13.74%
2	Electro Mechanical works	54,872,508	21.95%
3. Architecture Works		1,484,209	0.59%
4. Design Cost		9,100,000	3.64%
5. Total Amount		250,000,000	100.00%

- 5.9 The EPC contract price includes US\$ 9.1 Million as design cost (including Basic Design cost of US\$ 4.5 Million and, Detailed Design and Construction Design cost of US\$ 4.6 Million). The Design Cost has been claimed under the Non-EPC cost head of Engineering & Supervision by NTDC, whereas the remaining cost of US\$ 240.9 Million has been claimed as EPC cost and the same has been considered as EPC cost for tariff calculations.
- 5.10 The EPC cost claimed for this project is higher than the EPC cost allowed by the Authority to other medium to large scale hydropower projects. The petitioner while justifying its comparatively higher EPC cost has submitted that EPC cost in case of hydropower projects is mainly driven by the scope of civil works involved as per specific requirements of the project. In the case of Gulpur hydropower project the flood design of 17208 m³/s has been envisaged which is very high for its size and much higher than other hydropower projects such as 870 MW Suki Kinari (1500 m³/s) 150- MW Patrind hydropower (4061 m³/s) and 500-MW Chakothi Hattian Hydropower project (10000 m³/s). The Petitioner submitted that flood design of hydropower projects has a major impact on the civil works cost as it directly influences the size of dam, number of spillway gates, cost of diversion as well as handling of water flows during construction. Resultantly the dam and spillway size of the Gulpur hydropower project is much larger sized than other comparable hydropower projects. The petitioner further submitted that total civil works cost of Gulpur is US\$ 150 million out of which US\$ 90 million alone is the cost of Dam and diversion arrangements.
- 5.11 The NEPRA technical experts in their comments have accepted the justification provided by the petitioner with regard to its proposed civil works cost.
- 5.12 The Authority noted that the petitioner has not recommended reduction in cost of equipment cost due to change of two Kaplan turbines from earlier proposed three Francis turbines. In the Authority's opinion the cost of two Kaplan turbines should in principle be lower than three Francis turbine of the same total capacity of 102 MW.



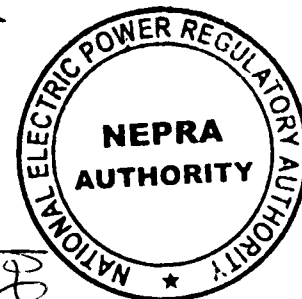
The Petitioner through its submissions has contended that any further reduction in already negotiated cost of equipment is not possible at this stage as the preliminary quotes obtained from equipment manufacturers show higher price than the already proposed cost of the equipment. It further submitted that final price of new proposed equipment will however be determined on the basis of bidding to be carried out by the project company.

- 5.13 In order to assess a reasonable price that may be allowed to the petitioner for its proposed equipment, our technical experts were directed by the Authority to give their recommendations. The technical experts in their presentation to the Authority suggested a possible reduction of US\$ 5 million in the equipment cost, subject to adjustment for increase of maximum US\$ 3 million in the equipment cost on the basis of documentary evidence to be provided by the petitioner at COD.
- 5.14 The Authority after due consideration on recommendations of its technical experts as well as information provided by the petitioner has decided to approve US\$ 84.214 million for the cost of electrical and mechanical equipment at this stage subject to adjustment of further US\$ 3 million on the basis of documentary evidence to be provided by the petitioner at COD.
- 5.15 In view of the foregoing, the Authority has approved total EPC cost of US\$ 235.900 million as per the following breakup.

EPC Cost	US\$ Million
Civil Works cost	150.202
Electrical & Mechanical Works	84.214
Architectural Works	1.484
Total EPC Cost	235.900

5.16 Adjustment of Civil Cost

- 5.16.1 The Petitioner has submitted that cost of specific items of civil works (i.e. Cement, Steel, Labour and Fuel) shall be adjustable during construction period of 4 years on account of variation in monthly prices of these items as per the Federal Bureau of Statistics Publications. The petitioner in this regard has provided break up of aforementioned reference materials cost comprising total civil works cost on monthly basis for adjustment at COD in accordance with the mechanism approved for hydropower projects.
- 5.16.2 Further the Petitioner has also requested for adjustment of cost of tunnels due to variation in geology of rock type in accordance with the mechanism for determination of tariff for hydropower projects already approved by the Authority in July 2008 (hereinafter referred to as "the Hydropower Mechanism"). The Authority has reviewed the proposed adjustment request of specific cost of materials as well as adjustment of cost of tunnels and found it to be in agreement with such adjustment approved for other hydropower projects by the Authority. The Authority has therefore approved adjustment of materials cost of civil works and adjustment of cost of tunnel due to variations in rock type at COD in accordance with the mechanism attached herewith as Annex-I & Annex-II.



6. Whether negotiated and requested Non-EPC Costs are justified

6.1 Insurance during Construction

6.1.1 NTDC has proposed US\$ 4.820 million (@ of 2% of the proposed EPC cost) for cost of Insurance during Construction period. NTDC has submitted that this cost may change as per actual and therefore should be capped at 2.5% of the EPC cost. NTDC has further submitted that the Authority has allowed insurance during construction at 2.4% of the EPC cost in the case of Karot Hydropower project, therefore the requested cost of US\$ 4.820 million for Gulpur hydropower project is found reasonable and is being endorsed.

6.1.2 The cost of insurance for Gulpur HPP is within the range of cost allowed by the Authority for hydropower projects in terms of percentage of EPC cost. NTDC in support of its claimed cost, has provided price quotes of insurance obtained by the project sponsors from Insurance broker (WILLIS) for the cost of insurance during construction phase amounting to US\$ 4.246 million, which is close to the estimated cost of insurance US\$ 4.820 million proposed by NTDC.

6.1.3 The Authority has therefore decided to allow US\$ 4.718 million based at 2.0% of the allowed EPC Cost subject to adjustment at actual with maximum cap of 2.0% of the approved EPC cost at COD upon provision of verifiable documentary evidence by the petitioner.

6.2 Land and Resettlement Cost

6.2.1 NTDC has submitted that the Company has claimed a cost of US\$ 3.960 million for land resettlement. The cost is a pass through item to be based on actual expenditure incurred on this account with the involvement of the AJK government. The cost estimate is for acquisition of required land for construction and operation of project as well as compensation for the loss of houses, commercial buildings, trees, raising and replacement of bridges & roads, rerouting of utilities and associated costs. The land acquisition area for project site is 6683 kanal. It has also been assessed that about 5 households, 1 water mill, 2 sand crushers in the reservoir area will need relocation. The land resettlement cost will be adjusted at COD stage subject to actual expenditure. NTDC submitted that above cost of land US\$ 3.960 million is recommended for land resettlement at EPC stage.

6.2.2 The cost of land acquisition and resettlement is adjustable at COD based on verifiable documentary evidence to be provided by the petitioner. The cost of land and resettlement US\$ 3.960 million is considered to be reasonable and allowed at this stage subject to adjustment on the basis of actual at COD upon provision of verifiable document evidence to be provided by the petitioner.

6.3 Custom Duty and Taxes

6.3.1 The petitioner has requested for approval of US\$ 4.00 million on account of estimated cost of custom duty on imported plant and equipment. The cost of custom duty and other applicable taxes is pass through cost as per the GOP Policy for Power Generation Projects 2002. The cost of custom duty has been reworked in view of the approved reduction in the equipment cost as US\$ 3.600 million and is allowed at this stage subject to adjustment on the basis of actual on production of verifiable documentary evidence at COD.



6.4 O&M Mobilization Cost

6.4.1 The Petitioner has claimed US\$ 2.500 million for O&M Mobilization cost. The Petitioner has submitted O&M Mobilization cost pertains to the mobilization of O&M contractor who shall mobilize at project site much earlier than COD for preparation of O&M manuals, training of O&M staff and preparation of environmental and safety plans during operation of the plant and participation in commissioning of the complex.

6.4.2 The Authority has considered the claimed cost of O&M Mobilization and decided to allow US\$ 2.240 million on comparable basis for such cost allowed to other hydropower projects.

6.5 Other Non-EPC Costs

6.5.1 The Petitioner has claimed further US\$ 37.037 million under various cost heads to fulfil requirements of the project as per the following breakup.

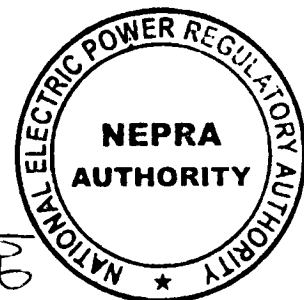
Cost component	US\$ Million
Feasibility & Technical studies	2.000
Project Advisors & Agents	4.727
Administration	7.240
Owner's Engineer	9.000
Engineering & Design Cost	9.100
Management Supervision	3.000
Re-opener verifier/independent Engineer	0.360
Environment mitigation cost	1.610
Total	37.037

6.5.2 The Petitioner has submitted that aforementioned costs have been agreed after extensive negotiations with the project company to bring them at reasonable level and therefore recommended for approval by the Authority. The Authority has considered the claimed costs under each head in comparison to such cost allowed by it for other hydropower projects. The Authority also reviewed the various contracts/agreements signed with different project consultants for specific scope of works /services to be provided for the project as well as statements of actual expenditure already made by the project sponsors to date under different cost heads and found to be acceptable. The Authority has therefore decided to approve US\$ 37.037 million as per claim of the petitioner under the above mentioned cost heads.

7. Whether terms of debt and return on equity are justified?

7.1 Financial Charges/ Financing Fee

7.1.1 NTDC has submitted that the project company has requested for front end fee @ 1.37% of the total debt amount as onetime payment, Loan working fee @ 0.175% of debt value of every year, Commitment fee @ 1.22% of undrawn debt value of every year and Monitoring/Waiver fee @ 0.023%. The amounts calculated on the basis of aforementioned percentages and respective debt amounts are US\$ 3.331 Front end fee, US\$ 0.424 million Loan working fee and US\$ 2.973 million Commitment fee. In aggregate the cost under the financial charges comes out to be US\$ 7.293 million (3.00% of the debt amount) which may be allowed.



7.1.2 The Authority in other such cases has allowed financial charges/fees on the basis of approved benchmark of 3.00% of the loan amount excluding the impact of IDC and financial charges. Accordingly, US\$ 6.468 million which is equivalent to 3.00% of the debt (excluding the impact of financial charges and IDC) is allowed to the Petitioner subject to adjustment at actual on the basis of approved debt amount (excluding the impact of financial charges and IDC) at COD on provision of verifiable documentary evidence by the petitioner.

7.2 Debt and Interest During Construction

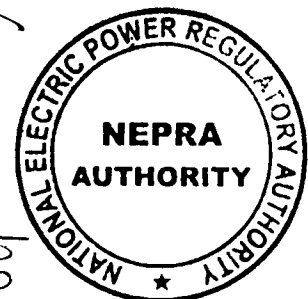
7.2.1 NTDC has submitted that the financing plan for project assumes 75:25 debt equity ratio. The entire debt has been assumed to be a foreign loan. The proposed rate of debt has been assumed as 5.35% based on 6-month LIBOR at 0.35% and spread of 5.00%. Based on the aforementioned proposed terms of debt and project construction period of 4 years, the Interest During construction (IDC) component has been worked out to be US\$ 23.310 million for approval which is adjustable at COD based on the then debt amount, interest rates and draw down of loan.

7.2.2 The Petitioner submitted that it has proposed premium of 5.00% (as spread) over LIBOR, which is on the higher side as compared to 4.75% allowed for other such projects (such as Patrind and Laraib). The Company has arranged foreign financing from Asian Development Bank (ADB), the Export-Import Bank of Korea (K-Exim) and International Finance Corporation (IFC) who have indicated 500 basis points as spread over LIBOR.

7.2.3 The Petitioner was asked to justify the higher proposed spread of 5.0%. The petitioner at the time of hearing as well as through submissions has submitted that 5.0% spread has been proposed on the basis of negotiations held with its foreign lenders which is consortium of Korea Exim Bank, Asian Development Bank (ADB) and International Finance Commission (IFC) based on their assessment of country's credit rating internationally. The Petitioner through its subsequent submission has provided a signed copy of agreed term sheet with its lenders as documentary evidence in support of its claimed spread of 5.0%.

7.2.4 The Authority observes that the spread of 5% being requested in the instant case is higher as compared to 4.75% allowed by it in the past to other hydropower projects (such as Patrind and Laraib) located in the same region. The Authority is however cognizant of the fact that in some other hydropower projects financed by foreign lenders (Chinese) have been allowed certain percentage of loan as Sinosure Insurance over and above spread of 4.75% as per demand of lenders. Nevertheless, the cost of debt to be procured at LIBOR plus 5% spread as claimed in the instant case is comparatively cheaper than those which have been allowed spread of 4.75% and additional Sinosure fee on debt. The Authority has therefore decided to approve spread of 5.0% over 6-monthly LIBOR proposed at 0.35% in the instant case.

7.2.5 In view of the above the Interest during construction (IDC) based on 4 years project construction period has been worked out as US\$ 23.704 million and approved at this stage, IDC is subject to adjustment at actual on the basis of variation in 6-month LIBOR, actual timing of loan drawn during the construction period not exceeding the amount of debt approved by the Authority at the time of COD.



7.3 Return on Equity

7.3.1 NTDC has proposed 17% return on Equity (IRR based) for the project which is in line with return allowed for such hydropower projects. NTDC has also proposed special return on equity for 3 years of pre-construction period as per relaxation allowed by GOP in the case of hydropower projects.

7.3.2 The Authority considers that return on equity at 17% (IRR based) as agreed and proposed by NTDC is in line with decision of the Authority in other such hydropower projects and therefore approved. With regard to special return on equity, the project company during discussions with the NEPRA technical experts on various issues of the petition, has indicated their desire to withdraw its claim for special return on equity in the best interest of consumers. In view hereof and based on recommendations of the technical experts the Authority has decided not to allow special return on equity in the instant case.

8. Whether the claimed Operational Costs are justified?

8.1 O&M Cost

8.1.1 NTDC has submitted that US\$ 4.934 million per annum has been requested for total average O&M cost based at 1.50% of the total project cost. Out of this US\$ 4.50 million has been proposed as Fixed O&M cost while US\$ 0.434 million has been proposed for Variable O&M cost. NTDC has submitted that these proposed costs are reasonable and are therefore recommended for approval.

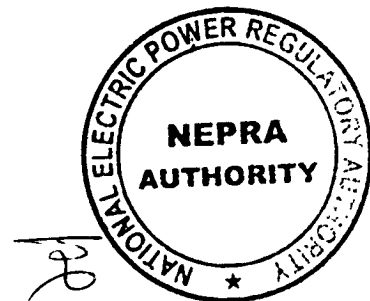
8.1.2 The Authority considers that per annum cost proposed by the Company and agreed by the NTDC is on higher side in comparison to other such hydropower projects located in the same vicinity. In opinion of the Authority the basis of 1.50% of the total project cost for the estimated per annum O&M cost as proposed and agreed by NTDC is not realistic and justified specially for hydropower projects at the EPC stage where the project company is required to firm such expenses based on actual requirements of its per annum cost for the project.

8.1.3 In view of the above, the Authority has assessed and approved US\$ 4.200 million per annum O&M cost for Gulpur hydropower project on comparable basis as per recommendations of its technical experts, with the following breakup in to Fixed and Variable component.

O&M Cost	Approved (US\$ M)
Fixed O&M	
Local component	1.800
Foreign Component	2.200
Sub-Total	4.000
Variable O&M	0.200
Total	4.200

8.2 Insurance during Operation

8.2.1 NTDC has submitted that Insurance during operation US\$ 1.81 million has been worked out at 0.75% of the EPC Cost and shall be capped at 1.0% of the EPC subject to adjustment on the basis of actual at COD.



8.2.2 The Authority observes that the claimed insurance during operation of US\$ 1.810 million at 0.75% of the EPC cost is based at preliminary quote obtained by the project company from potential insurance providers which is still to be confirmed at a later stage. During course of proceedings, the Authority has been provided with revised quote of the insurance provider (WILLIS) indicating per annum premium of insurance at about 0.65% of the EPC cost. The Authority notes that it has allowed insurance during operation in other hydropower projects at higher rate based on then prevailing market conditions, which does not remain the same. The Authority considers that the latest quote of insurance provider submitted by the project company is based on current market conditions and is therefore quite reasonable. The Authority has therefore decided to approve US\$ 1.533 million at 0.65% of the EPC as per annum cost of insurance based on latest quote of insurance provider submitted to the Authority. Since the per annum insurance is an estimated figure and may change at the time of actualization therefore the Authority has decided to adjust the per annum insurance expense on the basis of actual at maximum of 0.75% of the EPC cost at COD upon provision of documentary evidence by the petitioner.

8.3 Water Use Charge

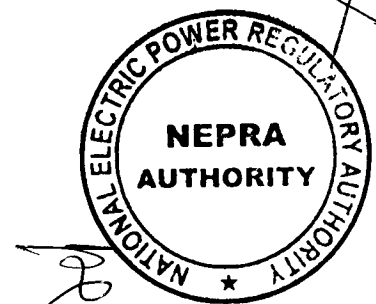
8.3.1 NTDC has requested Water Use Charge at Rs. 0.15/kWh in accordance with the GOP Policy for Power Generation Projects 2002 along with annual adjustment based on local CPI.

8.3.2 The Authority considers that Water Use Charge at Rs. 0.15/kWh as claimed by the petitioner is reasonable and in line with the GOP Policy 2002 hence approved. Water Use Charge will be adjusted based on local CPI (general) on annual basis. The first such adjustment will be allowed after one year of COD and thereafter on annual basis with changes in the local CPI (general) during a year.

9. Order:

Based on discussion in the preceding paragraphs, NTDC is allowed the following Tariff along with term and conditions for negotiating and incorporating the same in the draft power acquisition contract and filing the same in a prescribed manner for approval of the Authority.

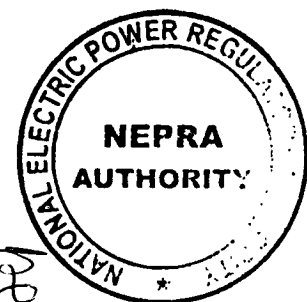
Tariff Components	Year 1-12	Year 13-30	Indexation
Variable Charge (Rs/kWh)			
Variable O&M – Local	0.0441	0.0441	CPI (Local)
Water Use Charge	0.1500	0.1500	CPI (Local)
Fixed Charge (Rs/kW/M)			
Fixed O&M – Local	155.7487	155.7487	CPI (Local)
Fixed O&M – Foreign	190.3595	190.3595	PKR/US\$, US CPI
Insurance	132.6762	132.6762	PKR/US\$
Debt Service	2349.8035	-	LIBOR
Return on Equity	1168.0420	1241.6011	PKR/US\$
Return on equity during construction (ROEDC)	267.1510	267.1510	PKR/US\$



- i. The reference tariff has been calculated on the basis of net contracted capacity of 100.980 MW and net annual energy production of 474.996 GWh.
- ii. In the above tariff, no adjustment for Carbon Emission Reduction receipts (CERs) has been accounted for. However, upon actual realization of CERs, the same shall be distributed between the Power Purchaser and the project company in accordance with the GOP Policy for Power Generation Projects 2002 as amended from time of time.
- iii. The above tariff is applicable for a period of thirty (30) years on BOOT basis commencing from Commercial Operation Date (COD).
- iv. Debt service will be paid in the first 12 years of commercial operation of plant after COD.
- v. Redemption of equity has been allowed after 12 years of commercial operation of the plant.
- vi. The reference PKR/Dollar rate has been assumed at 1 USD = 104.85 PKR.
- vii. The component wise tariff is indicated at Annex-III
- viii. Debt Servicing Schedule is attached as Annex-IV

I. One Time Adjustment

- a. The Principal repayment and the cost of debt will be adjusted at COD as per the actual borrowing composition and LIBOR at the relevant date.
- b. Interest During Construction (IDC) will be adjusted at COD on the basis of actual debt composition, debt drawdown (not exceeding the amount allowed by the Authority) and applicable 6-months LIBOR during the project construction period of 48 months (4 years) approved by the Authority.
- c. The specific items of project cost to be paid in foreign currency (i.e. US\$) will be adjusted at COD on account of actual variation in exchange rate over the reference PKR/US\$ exchange rate of Rs. 104.850 on production of verifiable documentary evidence to the satisfaction of the Authority.
- d. Duties and/or taxes, not being of refundable nature, imposed on the company up to the commencement of its commercial operations for the import of its plant, machinery and equipment will be adjusted on actual basis at COD, upon production of verifiable documentary evidence to the satisfaction of the Authority.
- e. The cost Electrical and Mechanical Works shall be adjusted on the basis of actual subject to the maximum of US\$ 3.00 million over the reference approved cost of US\$ 84.214 million on production of verifiable documentary evidence to the satisfaction of the Authority at COD.
- f. Civil Works Cost will be adjusted on account of variation in the price of construction material (Cement, Steel, Labour and Fuel) during the project construction period based on mechanism attached herewith as Annex-I.



- g. The cost of tunnels will be adjusted due to variation in rock type/classification in accordance with the mechanism attached herewith as Annex-II. However the maximum amount of variation on this account will be restricted to Rs.104.85 million.
- h. Cost of land and resettlement US\$ 3.960 million will be adjusted in accordance with the Hydropower Mechanism based on authentic documentary evidence at COD.
- i. Insurance during construction will be adjusted on the basis of actual subject to the maximum of 2.0% of the EPC Cost on production of verifiable documentary evidence.
- j. Financial charges will be adjusted at COD on the basis of actual subject to the maximum of 3% of the total debt allowed (excluding the impact of interest during construction and financial charges) on production of authentic documentary evidence.
- k. Return on Equity (ROE) and Return on Equity During Construction (ROEDC) will be adjusted at COD on the basis of actual equity injections and PKR/US\$ exchange rate variation (within the overall equity allowed by the Authority at COD) during the project construction period allowed by the Authority.
- l. The reference tariff table shall be revised at COD while taking in to account the above adjustments. The Petitioner shall submit its request to the Authority within 90 days of COD for necessary adjustments in tariff.

II. Pass-Through Items

No provision for income tax has been accounted for in the tariff. If the power producer is obligated to pay any tax, the exact amount paid by the power producer (the Company) shall be reimbursed by the Power Purchaser to the Company on production of original receipts. This payment should be considered as pass-through payment (Rs/kW/M) spread over a twelve (12) months period in addition to fixed charges in the Reference Tariff.

Withholding tax on dividends is also a pass through item just like other taxes as indicated in the government guidelines. Withholding tax shall be paid @ 7.5% of the return on equity (including return on equity during construction). The Power Purchaser shall make payment on account of withholding tax at the time of actual payment of dividend subject to maximum of 7.5% of 17% return on equity according to the following formula:

$$\text{Withholding Tax Payable} = \{[17\% * (E_{(Ref)} - E_{(Red)})] + \text{ROEDC}_{(Ref)}\} \times 7.5\%$$

Where:

$E_{(Ref)}$	=	Adjusted Reference Equity at COD
$E_{(Red)}$	=	Equity Redeemed
$\text{ROEDC}_{(Ref)}$	=	Adjusted Reference Return on Equity during Construction



In case the Company does not declare a dividend in any particular year or only declares a partial dividend, then the difference in the withholding tax amount (between what has been paid in that year and the total entitlement as per the Net Return on Equity) would be carried forward and accumulated so that the Company is able to recover the same as a pass through item from the Power Purchaser in future on the basis of the total dividend payout.

III. Hydrological Risk

Hydrological Risk shall be borne by the Power Purchaser in accordance with the GoP Policy for Power Generation Projects 2002.

IV. Indexation

The following indexation shall be applicable to the reference tariff:

i) Indexation applicable to O&M

The local component of O&M will be adjusted on account of local Inflation (CPI), whereas the foreign component of O&M will be adjusted on account of Rupee/Dollar exchange rate variation and US CPI. Quarterly adjustment for local inflation, foreign inflation and exchange rate variation will be made on 1st July, 1st October, 1st January & 1st April respectively on the basis of the latest available information with respect to local CPI general (notified by Federal Bureau of Statistics Pakistan), US CPI (notified by US bureau of labor statistics) and revised TT & OD Selling rate of US Dollar (notified by the National Bank of Pakistan). The mode of indexation will be as under:

a. Fixed O&M

$$F O\&M_{(LREV)} = O\&M_{(LREF)} * CPI_{(REV)} / 196.95$$

$$F O\&M_{(FRE)} = O\&M_{(FRE)} * USCPI_{(REV)} / 233.707 * ER_{(REV)} / 101.0$$

Where:

$F O\&M_{(LREV)}$ = The revised applicable Fixed O&M local component of tariff indexed with CPI (General).

$F O\&M_{(FRE)}$ = The revised applicable Fixed O&M foreign component of tariff indexed with US CPI and exchange rate variation.

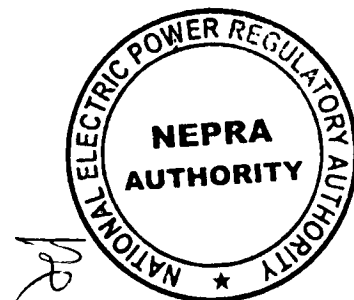
$O\&M_{(LREF)}$ = The reference fixed O&M local component of tariff for the relevant period.

$O\&M_{(FRE)}$ = The reference fixed O&M foreign component of tariff for the relevant period.

$CPI_{(REV)}$ = The Revised Consumer Price Index (General) for the relevant month.

$CPI_{(REF)}$ = The Consumer Price Index (General) of January 2015 notified by the Federal Bureau of Statistics, Pakistan.

$USCPI_{(REV)}$ = The Revised US Consumer Price Index (All Urban Consumers) notified by the US Bureau of Labor Statistics.



- US CPI_(REF) = Reference US CPI (All Urban Consumers) notified by the Bureau of Labor Statistics for the month of January 2015.
- ER_(REV) = The revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.

b. Variable O&M

$$V O\&M_{(LREV)} = O\&M_{(LREF)} * CPI_{(REV)} / 196.95$$

Where:

- V O&M_(LREV) = The revised applicable Variable O&M local component of tariff indexed with local CPI.
- O&M_(LREF) = The reference variable O&M local component of tariff for the relevant period.
- CPI_(REV) = The Revised Consumer Price Index (General) for the relevant month as notified by Federal Bureau of Statistics, Pakistan.
- CPI_(REF) = The Consumer Price Index (General) of January 2015 notified by the Federal Bureau of Statistics, Pakistan.
- ER_(REV) = The revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.

ii) Water Use Charges

Water Use Charge will be paid on units delivered basis and will be indexed with Consumer Price Index (General) annually from the date of COD. The first such adjustment shall be due after one year of commercial operation from COD, according to the formula:

$$WUC_{(REV)} = WUC_{(REF)} * CPI_{(REV)} / CPI_{(REF)}$$

Where;

- WUC_(REV) = The revised Water Use Charge component of tariff indexed with Consumer Price Index (CPI).
- WUC_(REF) = The reference Water Use Charge component of tariff for the relevant period.
- CPI_(REV) = The Revised Consumer Price Index (General) for the relevant month notified by Federal Bureau of Statistics, Pakistan.
- CPI_(REF) = The reference Consumer Price Index (General) of the month immediately preceding to the COD, notified by the Federal Bureau of Statistics Pakistan.

iii) Insurance

Insurance cost component of tariff, in case insurance is denominated in foreign currency, will be adjusted on account of PKR/US\$ exchange rate variation at COD and thereafter on an annual basis at actual subject to the maximum of 0.75% of the EPC cost on production of authentic documentary evidence by the Petitioner, according to the following formula:



$$\text{Ins}_{(REV)} = \text{Ins}_{(REF)} * \text{ER}_{(REV)}/\text{ER}_{(REF)}$$

Where;

$\text{Ins}_{(REV)}$ = Revised Insurance cost component of tariff adjusted with the exchange rate variation (PKR/US\$)

$\text{Ins}_{(REF)}$ = Reference insurance cost component of tariff for the relevant period.

$\text{ER}_{(REV)}$ = The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

$\text{ER}_{(REF)}$ = The reference TT & OD selling rate of US dollar as notified by the National Bank of Pakistan.

iv) Adjustment for LIBOR variation

The interest part of fixed charge component of foreign debt will remain unchanged throughout the term except for the adjustment due to exchange rate variation and variation in 6-months LIBOR, while spread of 5.00% on LIBOR remaining the same, according to the following formula:

$$\Delta I = P_{(REV)} * (\text{LIBOR}_{(REV)} - 0.35\%) / 2$$

Where;

ΔI = the variation in interest charges applicable corresponding to variation in six-month LIBOR. ΔI can be positive or negative depending upon whether $\text{LIBOR}_{(REV)} >$ or $< 0.35\%$. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each period under adjustment applicable on semi-annual basis.

$P_{(REV)}$ = the outstanding principal (as indicated in the attached debt service schedule to this order on a semi-annual basis at the relevant calculations dates.

v) Return on Equity

Return on equity (ROE) as well as Return on Equity during Construction (ROEDC) component of tariff shall be adjusted for variation in PKR/US\$ exchange rate according to the following formula:

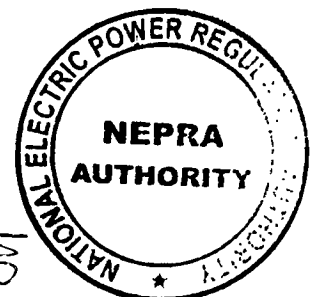
$$\text{ROE}_{(REV)} = \text{ROE}_{(REF)} * \text{ER}_{(REV)}/\text{ER}_{(REF)}$$

$$\text{ROEDC}_{(REV)} = \text{ROEDC}_{(REF)} * \text{ER}_{(REV)}/\text{ER}_{(REF)}$$

Where;

$\text{ROE}_{(REV)}$ = Revised Return on Equity component of tariff expressed in Rs/kW/M adjusted with exchange rate variation.

$\text{ROEDC}_{(REV)}$ = Revised Return on Equity during Construction component of tariff in Rs/kW/M adjusted with exchange rate variation.



- ROE_(REF) = Reference Return on Equity component of tariff expressed in Rs/kW/M for the relevant period.
- ROEDC_(REF) = Reference Return on Equity during Construction component of tariff expressed in Rs/kW/M for the relevant period.
- ER_(REV) = Revised TT and OD selling rate of US dollar as notified by the National Bank of Pakistan.
- ER_(REF) = Reference TT and OD selling rate of US dollar.

Note: -

Adjustment on account of inflation, foreign exchange rate variation and LIBOR variation will be approved by the Authority within fifteen working days after receipt of complete required information by the petitioner upon its request for adjustment in tariff in accordance with the requisite indexation mechanism stipulated hereinabove.

V. Other Terms and Conditions of Tariff

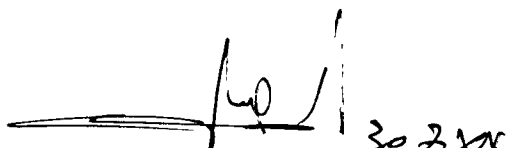
Design & Manufacturing Standards:

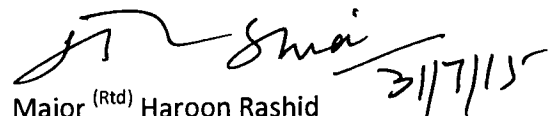
Hydel Power Generation system shall be designed, manufactured and tested in accordance with the latest IEC standards or other equivalent standards. All plant and equipment shall be new and of standard quality.

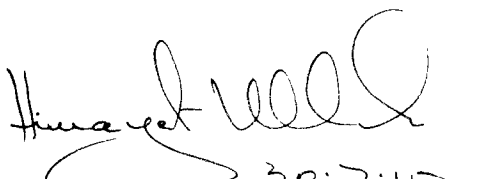
Power Curve of the Hydel Power Complex:


The power curve of the Hydel Power plant shall be verified by the Power Purchaser, as part of the Commissioning tests according to the latest IEC standards and shall be used to measure the performance of the hydel generating units.

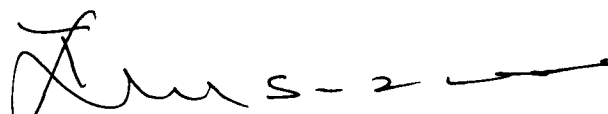
AUTHORITY

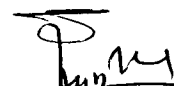

Khawaja Muhammad Naeem
Member

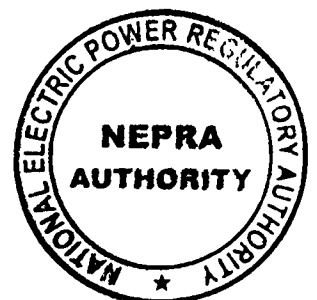

Major (Rtd) Haroon Rashid
Member


Himayat Ullah Khan
Member


Syed Masood ul Hassan Naqvi
Member


Brig (Rtd) Tariq Saddozai
Chairman


03.08.15



One Time Adjustment in Reference EPC Cost for Civil Works cost escalation

The cost of civil works will be adjusted due to variation in the prices/indices of a selected number of cost elements. The following formula ("Cost Escalation Formula"), calculates the amount of escalation allowed in the relevant month "n" of the construction period.

- a) $P_n = V_n * [(C_n - C_o) / C_o] + W_n * [(S_n - S_o) / S_o] + Y_n * [(F_n - F_o) / F_o] + Z_n * [(L_n - L_o) / L_o]$
b) $T_{fn} = T_n + P_n$

Where

P_n is the amount of escalation allowed in the relevant month "n" of the construction period;

V_n , W_n , Y_n and Z_n represent the reference Rupee amount, on which the escalation shall be calculated, of Cement, Steel, Fuel and Labour respectively in the relevant month "n" of the construction period, as shown in table 1 below.

C, S, F and L are the unit price indices for Cement, Steel, Fuel and Labour, where the subscript "n" refers to the relevant month "n" and the subscript "o" refers to the base date of February 2014. The sources of indices for cement, steel, labour and fuel shall be as follows:

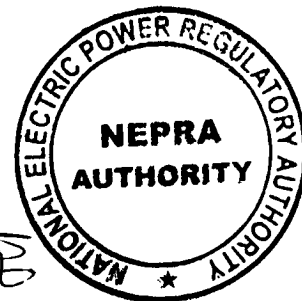
For labour (L), the index shall be the wages applicable for the "Mason (raj)" for the city of "Rawalpindi" as given under Intercity Consumer Prices, presently in Table 7.11, of the Monthly Bulletin of Statistics, published by the Pakistan Bureau of Statistics, Statistics Division, Government of Pakistan. The base index value (L_o) shall be 900 (as shown for [February 2014 in the aforementioned table]). For cement (C), the cost index shall be the index number applicable to "Cement" as given under Index Numbers of Wholesales Prices by Commodities – Other Transportable Goods, presently in Table 7.9, of the Monthly Bulletin of Statistics, published by the Pakistan Bureau of Statistics, Statistics Division, Government of Pakistan. The base index value (C_o) shall be 207.30 (as shown for February 2014 in the aforementioned table).

For fuel (F), the index shall be the index number applicable to "Diesel Oil" as given under Index Number of Wholesale Prices by Commodities – Other Transportable Goods, presently in Table 7.9, of the Monthly Bulletin of Statistics, published by the Statistics Division, Pakistan Bureau of Statistics, Government of Pakistan. The base index value (F_o) shall be 279.46 (as shown for February 2014 in the aforementioned table).

For steel (S), the cost index shall be the index number applicable to "Steel Bars & Sheets" as given under Index Numbers of Wholesales Prices by Commodities – Metal Product, Machinery & Equip, presently in Table 7.9, of the Monthly Bulletin of Statistics, published by the Statistics Division, Pakistan Bureau of Statistics, Government of Pakistan. The base index value (S_o) shall be 139.12 (as shown for February 2014 in the aforementioned table).

T_{fn} is the Total Final Amount for the relevant month n, after adding the Escalated Amount (P_n) to the Total Reference Amount (T_n) as provided in Table 1.

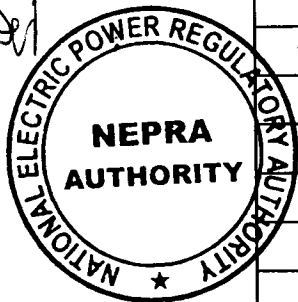
T_n is the Total Reference Amount for the relevant month "n" from Construction Start Date as given in Table 1.

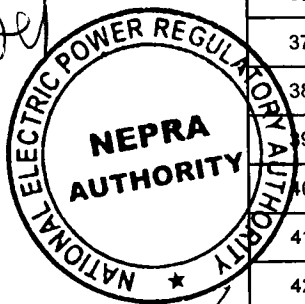


(Exchange Rate: 1 USD = 104.85 PKR)

TABLE 1

Month	Amounts (PKR)						Coefficients					
	Fixed	Cement	Steel	Fuel	Labour	Total	Fixed	Cement	Steel	Fuel	Labour	Total
	PKR	PKR	PKR	PKR	PKR	PKR	a	B	C	d	E	
1	472,610,907	4,420,548	3,809,588	21,520,757	9,838,213	512,200,013	0.92	0.01	0.01	0.04	0.02	1.00
2	98,437,957	10,734,440	9,250,844	52,258,972	23,890,188	194,572,401	0.50	0.06	0.05	0.27	0.12	1.00
3	113,718,235	12,400,720	10,686,829	60,371,002	27,598,601	224,775,387	0.50	0.06	0.05	0.27	0.12	1.00
4	162,171,120	17,684,399	15,240,256	86,093,782	39,357,769	320,547,326	0.50	0.06	0.05	0.27	0.12	1.00
5	165,601,686	18,058,494	15,562,649	87,915,009	40,190,343	327,328,181	0.50	0.06	0.05	0.27	0.12	1.00
6	217,633,212	23,732,416	20,452,384	115,537,627	52,818,022	430,173,661	0.50	0.06	0.05	0.27	0.12	1.00
7	211,196,472	26,645,268	32,740,969	108,899,543	56,386,576	435,868,828	0.48	0.06	0.08	0.25	0.13	1.00
8	222,621,701	30,060,021	41,550,764	113,032,436	62,237,821	469,502,743	0.48	0.06	0.09	0.24	0.13	1.00
9	213,613,320	29,077,677	40,704,189	108,250,045	60,051,551	451,696,782	0.47	0.07	0.09	0.24	0.13	1.00
10	247,835,852	45,347,321	56,900,324	114,672,410	78,425,380	543,181,287	0.46	0.08	0.11	0.21	0.14	1.00
11	221,134,236	49,703,183	61,749,798	93,707,463	77,494,979	503,789,659	0.44	0.10	0.12	0.19	0.15	1.00
12	644,705,491	48,776,067	60,950,818	89,193,939	75,431,623	919,057,938	0.70	0.05	0.07	0.10	0.08	1.00
13	188,176,204	42,665,131	48,770,329	79,432,835	63,962,526	423,007,025	0.44	0.10	0.12	0.19	0.15	1.00
14	154,065,100	34,533,864	29,696,404	59,570,022	49,311,449	327,176,839	0.47	0.11	0.09	0.18	0.15	1.00
15	106,947,279	29,746,495	25,531,921	33,045,191	38,610,061	233,880,947	0.46	0.13	0.11	0.14	0.16	1.00
16	139,071,806	46,235,703	39,813,155	31,610,179	52,075,552	308,806,395	0.45	0.15	0.13	0.10	0.17	1.00
17	117,962,843	37,799,899	32,494,098	25,697,197	43,685,594	257,639,631	0.46	0.14	0.13	0.10	0.17	1.00
18	119,295,547	37,799,899	32,494,098	25,697,197	43,685,594	258,972,335	0.46	0.14	0.13	0.10	0.17	1.00
19	119,295,547	37,799,899	32,494,098	25,697,197	43,685,594	258,972,335	0.46	0.14	0.13	0.10	0.17	1.00
20	117,488,274	37,427,458	32,192,517	25,493,154	42,880,096	255,481,499	0.46	0.15	0.12	0.10	0.17	1.00

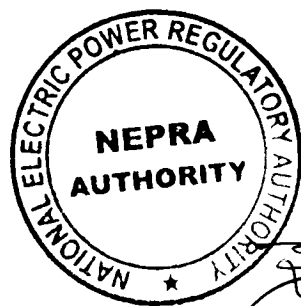




21	110,525,722	35,937,693	30,986,193	24,676,982	39,658,107	241,784,697	0.46	0.15	0.13	0.10	0.16	1.00
22	129,819,766	39,913,793	34,205,804	26,855,299	48,257,416	279,052,078	0.47	0.14	0.12	0.10	0.17	1.00
23	129,606,834	39,869,913	34,170,273	26,831,259	48,162,514	278,640,793	0.47	0.14	0.12	0.10	0.17	1.00
24	129,819,766	39,913,793	34,205,804	26,855,299	48,257,416	279,052,078	0.47	0.14	0.12	0.10	0.17	1.00
25	133,448,637	40,256,424	43,197,240	31,444,640	46,854,379	295,201,320	0.45	0.14	0.14	0.11	0.16	1.00
26	140,777,954	41,934,508	45,087,421	32,700,470	49,314,476	309,814,829	0.45	0.13	0.15	0.11	0.16	1.00
27	159,937,797	46,513,510	55,593,303	38,819,037	57,520,794	358,384,441	0.45	0.13	0.15	0.11	0.16	1.00
28	185,327,712	46,513,510	55,593,303	38,819,037	57,520,794	383,774,356	0.48	0.12	0.15	0.10	0.15	1.00
29	202,310,965	51,080,801	66,874,543	45,415,674	65,496,544	431,178,527	0.47	0.12	0.15	0.11	0.15	1.00
30	201,802,346	50,175,643	66,089,210	44,781,213	64,596,304	427,444,716	0.47	0.12	0.15	0.11	0.15	1.00
31	229,332,803	50,550,395	67,416,993	45,569,968	65,145,667	458,015,826	0.50	0.11	0.15	0.10	0.14	1.00
32	219,318,537	49,004,544	65,207,295	44,327,230	62,025,951	439,883,557	0.50	0.11	0.15	0.10	0.14	1.00
33	195,659,268	44,003,949	56,475,063	39,332,189	52,348,006	387,818,475	0.50	0.11	0.15	0.10	0.14	1.00
34	231,930,576	44,003,949	56,475,063	39,332,189	52,348,006	424,089,783	0.55	0.11	0.13	0.09	0.12	1.00
35	223,438,949	41,720,303	50,834,443	36,033,870	48,360,131	400,387,696	0.56	0.10	0.13	0.09	0.12	1.00
36	212,291,017	41,720,303	50,834,443	36,033,870	48,360,131	389,239,764	0.55	0.11	0.13	0.09	0.12	1.00
37	201,079,043	39,436,657	45,193,823	32,735,552	44,372,256	362,817,331	0.55	0.11	0.13	0.09	0.12	1.00
38	192,011,216	39,436,657	45,193,823	32,735,552	44,372,256	353,749,504	0.54	0.11	0.13	0.09	0.13	1.00
39	176,216,141	37,914,226	41,433,410	30,536,673	41,713,671	327,814,121	0.54	0.11	0.13	0.09	0.13	1.00
40	174,111,625	39,930,225	46,412,939	33,448,422	45,234,162	339,137,373	0.51	0.12	0.14	0.10	0.13	1.00
41	161,624,681	41,521,008	50,342,183	35,746,025	48,012,108	337,246,005	0.48	0.12	0.15	0.11	0.14	1.00
42	144,027,548	41,521,008	50,342,183	35,746,025	48,012,108	319,648,872	0.45	0.13	0.16	0.11	0.15	1.00
43	112,534,990	33,806,409	39,989,570	28,640,940	38,622,793	253,594,702	0.45	0.13	0.16	0.11	0.15	1.00

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44	58,825,489	6,793,567	12,229,029	19,501,819	13,219,792	110,569,696	0.53	0.06	0.11	0.18	0.12	1.00
45	37,180,331	2,472,310	2,130,614	12,036,059	5,502,286	59,321,600	0.63	0.04	0.04	0.20	0.09	1.00
46	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	8,146,542,502	1,606,594,000	1,789,600,000	2,196,651,250	2,164,905,600	15,904,293,352	51.222%	10.102%	11.252%	13.812%	13.612%	1.00



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Adjustment in the cost of Tunneling Works due to Geological Conditions

- a. Subject to the verification of the Re-opener Verifier, cost variation due to geological conditions related to tunneling works (Head Race Tunnel) will be allowed at Commercial Operation Date.
- b. The cost of the Head Race Tunnel shall be allowed to vary depending on the category of rock encountered during construction of Head Race Tunnel. The increase or decrease in the cost shall be subject to the baseline conditions given in Table 1 of this Annex.
- c. In each month of construction of Head Race Tunnel, the actual length of tunneling works for each rock type shall be measured. The actual cost of tunneling works, for each month of such construction, shall be calculated by multiplying the length of excavation of each rock type by its corresponding unit rate given in Table 2.
 - (i) The unit rates shall not vary during the construction phase.
 - (ii) On Commercial Operation Date, the EPC Cost shall be adjusted to reflect the actual cost of tunneling works.
 - (iii) The criteria for Category I, II, III, IV and V is given in Table 3 of this Annex.
 - (iv) The RMR values shall be calculated using Table 4 of this Annex.

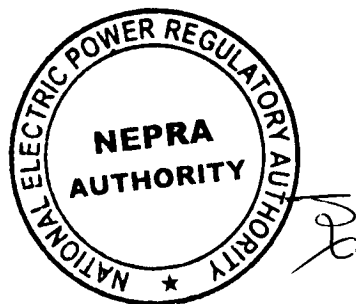
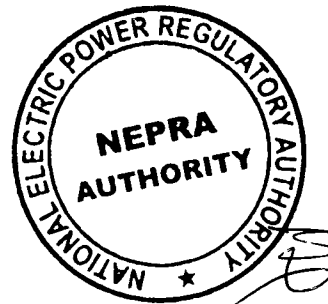


TABLE- 1

Rock Classification		Quantity (meter)	Unit Rate (PKR/meter)	Cost of Construction in PKR according to EPC contract
Horizontal	Class III	37.00	1,164,846.66	43,099,326
	Class IV	12.00	1,398,865.01	16,786,380
	Class V	-	2,675,772.00	-
	Bend	39.27	2,153,718.32	84,576,519
	Class IV (Inlet)	21.00	2,881,857.17	60,519,001
Vertical	Class III	29.30	476,870.68	13,972,311
	Class IV	162.00	585,610.55	94,868,909
	Class V	-	1,167,452.33	-
	Class III (Outlet)	20.00	830,752.76	16,615,055
Total		320.57		330,437,501

(Exchange Rate: 1 USD = 104.85 PKR)



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TABLE- 2

Monthly Payment Schedule of Tunneling Works

Rock Classification		Class III	Class IV	Class V	Bend	Class III (Outlet)	Class IV (Inlet)					
Vertical	Unit Rate (PKR/meter)	1,164,846.66	1,398,865.01	2,675,772.00	2,153,718.32	-	2,881,857.17					
Horizontal	Unit Rate (PKR/meter)	476,870.68	585,610.55	1,167,452.33	-	830,752.76						
Month after Commencement Date	Length (m)						Amount (PKR)					
	Class III	Class IV	Bend	Class III (Outlet)	Class IV (Inlet)	Total	Class III	Class IV	Bend	Class III (Outlet)	Class IV (Inlet)	Total
18 (Vertical)	-	2.50	-	-	10.50	13.00	-	3,497,163	-	-	30,259,500	33,756,663
19 (Vertical)	18.50	3.50	19.64	-	-	41.64	21,549,663	4,896,028	42,288,259	-	-	68,733,950
20 (Horizontal)	29.30	60.70	-	20.00	-	110.00	13,972,311	35,546,560	-	16,615,055	-	66,133,927
21 (Horizontal)	-	101.30	-	-	-	101.30	-	59,322,349	-	-	-	59,322,349
22 (Vertical)	18.50	6.00	8.64	-	10.50	43.64	21,549,663	8,393,190	18,597,358	-	30,259,500	78,799,711
23 (Vertical)	-	-	11.00	-	-	11.00	-	-	23,690,902	-	-	23,690,902
Total	66.30	174.00	39.27	20.00	21.00	320.57	57,071,637	111,655,289	84,576,519	16,615,055	60,519,001	330,437,501

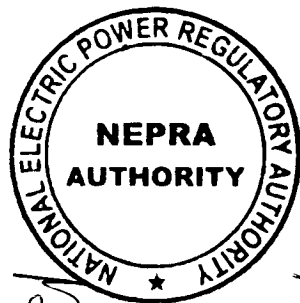
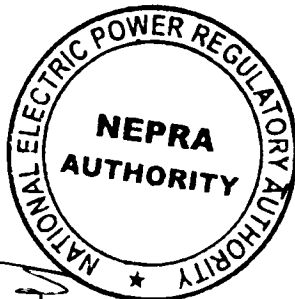


TABLE -3

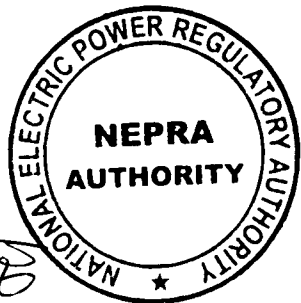
Division	Class I	Class II	Class III	Class IV	Class V
RMR Value	100 ~ 81	80 ~ 61	60 ~ 41	40 ~ 21	< 20

TABLE -4

Parameter		Ranges of values							
①	Strength of intact rock material	Point load strength index	>10 MPa	4-10 MPa	2-4 MPa	1-2MPa	For this low range uniaxial compressive test is preferred		
		uniaxial compressive strength	>250MPa	100-250 MPa	50-100 MPa	25-50 MPa	5-25 MPa	1-5 MPa	<1 MPa
	Rating	15	12	7	4	2	1	0	
②	RQD (%)		90-100%	75-90%	50-75%	25-50%	< 25%		
	Rating		20	17	13	8	3		
③	Spacing of joints		>2m	0.6-2m	0.2-.0.6m	60-200mm	<60mm		
	Rating		20	15	10	8	5		
④	Condition of joints	Persistence(m)	1m <	1-3m	3-10m	10-20m	> 20m		
		Rating	6	4	2	1	0		
	Condition of joints	Aperture(mm)	No separation	<0.1mm	0.1-1.0mm	1-5mm	> 5mm		
		Rating	6	5	4	1	0		



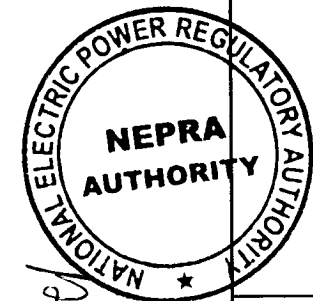
	Roughness	Very rough	Rough	Slightly rough	Smooth	Slickenside	
	Rating	6	5	3	1	0	
	Infilling(gauge)	None	Hard material		Soft material		
			<5mm	>5mm	<5mm	>5mm	
	Rating	6	4	2	2	0	
	Wall rock Weathering	Unweathered	Slightly weathered	Moderately weathered	Highly weathered	Decomposed	
	Rating	6	5	3	1	0	
⑤	Ground-Water	Inflow per 10m tunnel lengths	None	<10ℓ/min	19-25ℓ/min	25-125ℓ/min	>125ℓ/min
		Ratio(joint water pressure/major principal stress)	0	<0.1	0.1-0.2	0.2-0.5	>0.5
		General conditions	Completely Dry	Damp	Wet	Dripping	Flowing
	Rating	15	10	7	4	0	
⑥	Strike & dip of joints	Very favorable	Favorable	Fair	Unfavorable	Very unfavorable	
	Rating(Tunnel)	0	-2	-5	-10	-12	



**MIRA POWER LIMITED (Gulpur Hydropower Project)
REFERENCE TARIFF**

Year	Variable O&M Local	Water Use Charge	Fixed O&M Local	Fixed O & M Foreign	Insurance	Return on Equity	ROE During Construction	Loan Repayment	Interest Charges	Total Tariff
	Rs./kWh	Rs./kWh	Rs. / kW/M	Rs. / kW/M	Rs. / kW/M	Rs. / kW/M	Rs. / kW/M	Rs. / kW/M	Rs./kW/M	Rs. / kWh
1	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,263.7136	1,086.0899	11.0715
2	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,332.2266	1,017.5770	11.0715
3	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,404.4540	945.3496	11.0715
4	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,480.5972	869.2063	11.0715
5	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,560.8686	788.9349	11.0715
6	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,645.4920	704.3115	11.0715
7	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,734.7033	615.1003	11.0715
8	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,828.7512	521.0523	11.0715
9	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	1,927.8980	421.9056	11.0715
10	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	2,032.4201	317.3835	11.0715
11	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	2,142.6089	207.1947	11.0715
12	0.0441	0.1500	155.7487	190.3595	132.6762	1,168.0420	267.1510	2,258.7716	91.0320	11.0715
13	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
14	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
15	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
16	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
17	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
18	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
19	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
20	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
21	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
22	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
23	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
24	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
25	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
26	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
27	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
28	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
29	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
30	0.0441	0.1500	155.7487	190.3595	132.6762	1,241.6011	267.1510	-	-	5.2645
Levelized Tariff	0.0441	0.1500	155.7487	190.3595	132.6762	1,188.4332	267.1510	1,170.0016	528.4160	9.4617

Levelized Tariff (1-30 years) discounted at 10% per annum = US Cents 9.0241/kWh at reference exchange rate of 1US\$=Rupees 104.85.



MIRA POWER LIMITED (Gulpur Hydropower Project)

Debt Servicing Schedule

Period	Foreign Debt					Annual Principal Repayment Million US\$	Annual Interest Million US\$	Annual Debt Servicing Million US\$	Annual Principal Repayment Rs./kW/M	Annual Interest Rs./kW/M	Annual Debt Servicing Rs./kW/M
	Principal Million \$	Repayment Million \$	Mark-Up Million \$	Balance Million \$	Debt Service Millin \$						
1	238.2204	7.2060	6.3724	231.0144	13.5784	14.6048	12.5520	27.1569	1,263.7136	1,086.0899	2,349.8035
	231.0144	7.3988	6.1796	223.6156	13.5784						
2	223.6156	7.5967	5.9817	216.0188	13.5784	15.3967	11.7602	27.1569	1,332.2266	1,017.5770	2,349.8035
	216.0188	7.7999	5.7785	208.2189	13.5784						
3	208.2189	8.0086	5.5699	200.2103	13.5784	16.2314	10.9255	27.1569	1,404.4540	945.3496	2,349.8035
	200.2103	8.2228	5.3556	191.9875	13.5784						
4	191.9875	8.4428	5.1357	183.5448	13.5784	17.1114	10.0455	27.1569	1,480.5972	869.2063	2,349.8035
	183.5448	8.6686	4.9098	174.8761	13.5784						
5	174.8761	8.9005	4.6779	165.9756	13.5784	18.0391	9.1178	27.1569	1,560.8686	788.9349	2,349.8035
	165.9756	9.1386	4.4398	156.8371	13.5784						
6	156.8371	9.3830	4.1954	147.4540	13.5784	19.0171	8.1398	27.1569	1,645.4920	704.3115	2,349.8035
	147.4540	9.6340	3.9444	137.8200	13.5784						
7	137.8200	9.8918	3.6867	127.9282	13.5784	20.0481	7.1088	27.1569	1,734.7033	615.1003	2,349.8035
	127.9282	10.1564	3.4221	117.7719	13.5784						
8	117.7719	10.4280	3.1504	107.3438	13.5784	21.1350	6.0218	27.1569	1,828.7512	521.0523	2,349.8035
	107.3438	10.7070	2.8714	96.6368	13.5784						
9	96.6368	10.9934	2.5850	85.6434	13.5784	22.2809	4.8760	27.1569	1,927.8980	421.9056	2,349.8035
	85.6434	11.2875	2.2910	74.3560	13.5784						
10	74.3560	11.5894	1.9890	62.7665	13.5784	23.4888	3.6680	27.1569	2,032.4201	317.3835	2,349.8035
	62.7665	11.8994	1.6790	50.8671	13.5784						
11	50.8671	12.2177	1.3607	38.6494	13.5784	24.7623	2.3946	27.1569	2,142.6089	207.1947	2,349.8035
	38.6494	12.5446	1.0339	26.1048	13.5784						
12	26.1048	12.8801	0.6983	13.2247	13.5784	26.1048	1.0521	27.1569	2,258.7716	91.0320	2,349.8035
	13.2247	13.2247	0.3538	(0.0000)	13.5784						

