SCHEDULE 1

TARIFF, INDEXATION AND ADJUSTMENT

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PART I: GENERAL

1. INTRODUCTION

1.1 This Schedule 1 is attached to and constitutes an integral part of the Agreement (the "**Agreement**") dated [•] entered between Bin Qasim Power Station I **("Power Producer")** and Network Control Department **("Offtaker")**.

This Schedule 1 specifies the methods for calculating the invoices to be acknowledged to the Power Producer by the Offtaker or to the Offtaker by the Power Producer, as the case maybe, including but not limited to, under sections Section 9.1 (*Capacity Invoices*), Section 9.2 (*Energy Invoices*), Section 9.3 (*Unit Start-Up Charges*), Section 9.3 (*Pass-Through Item(s); Supplemental Tariffs*), Section 9.4 (*Liquidated Damages*), Section 9.5 (*Billing*), Article VIII (*Testing and Capacity Ratings*), Section 15.6 (*Restoration of the Complex; Additional Compensation)* and Section 15.8 (*Supplemental Tariffs)* of the Agreement. It also specifies the methods for making adjustments to such invoices for changes in Exchange Rate, Interest Rate, price indices, where applicable.

(a) The methods for calculating the regular monthly invoices to be made to the Power Producer by the Offtaker or by the Power Producer to the Offtaker, as the case maybe, under Section 9.1 (*Capacity Invoices*), Section 9.2 (*Energy Invoices*) and Section 9.4 (*Liquidated Damages*) of the Agreement and Billing Cycle / Take or Pay Energy Shortfall Invoice are set forth in Part II of Schedule 1.

(b) The method for calculating Supplemental Tariff Invoices to be made to the Power Producer by the Offtaker under Section 9.3 and Section 15.8 of the Agreement is set forth in Part III.

(c) The method for calculating additional invoices to be made to the Power Producer by the Offtaker or to the Offtaker by the Power Producer, as the case maybe, for the Pass-Through Item(s); Supplemental Tariff under Section 9.3, invoice for Net Electrical Output during testing under Article VIII, Unit Start-Up Charges and in case of occurrence a PPFME and CLFME that reduces the Power Producer's ability to declare Available Capacity under section 15.6 of the Agreement are set forth in Part IV.

(d) The timelines for the submission of Indices to be used for quarterly indexations (to be used in the formulae as mentioned in the Part II to this Schedule I) against the reference values are set forth in Part V.

(e) This Schedule 1 is in accordance with the Tariff Determination by NEPRA and in case of conflict, the Tariff Determination shall prevail.

1.2 The billing and invoice procedures as set forth in Article IX of the Agreement shall apply to all invoice obligations referred to in this Schedule 1, unless otherwise specified therein.

2. DEFINITIONS

Capitalized terms used but not defined in this Schedule 1 shall have the meaning given to them in the Agreement. Wherever the following terms appear in this Schedule 1, they shall have the meanings stated below:

"Actual Premium" Actual amount of insurance premium calculated at the start of the Year, supported by appropriate documentations.

"Adjusted Insurance Component" has the meaning which is formulated for AIC_h in Section 5.2.

"**Capacity Price**" has the meaning as formulated for Capacity $Price_h$ in Section 5.2 of this Schedule 1 as adjusted from time to time in accordance with the provisions thereof.

"**Change in Tax**" the adoption, enactment, promulgation, coming into effect, repeal, amendment, re-interpretation, change in application, change in interpretation or modification by any Public Sector Entity of any Law of Pakistan relating to any Tax or Taxes.

"**Cost of Working Capital**" has the meaning as formulated for Cost of Working $Capital_h$ in Section 5.2.

"Current Indices" means the Exchange Rate, Interest Rate, Pak-CPI (NCPI) and the US-CPI, as applicable, calculated for the Quarter as of the date immediately at the start of current Quarter, and applicable for the current Quarter.

"**Energy Price**" has meaning as formulated for Energy $Price_h$ in Section 6.3 of this Schedule 1 as adjusted from time to time in accordance with the provisions thereof.

"Exchange Rate" means the TT&OD selling rate for Dollar expressed in Rupees, as published by the National Bank of Pakistan prevailing on the last Business Day of the preceding Quarter.

"Fixed O&M Component" has the meaning as formulated for Fixed $O\&M_h$ in Section 5.2 of this Schedule-1.

"Fixed Foreign O&M Component" has the meaning as formulated for Fixed $O\&M_h$ in Section 5.2 of this Schedule-1.

"Fixed Local O&M Component" has the meaning as formulated for Fixed $O\&M_h$ in Section 5.2 of this Schedule-1.

"Free Start-Up" means the total number of start-ups that the Power Producer is required to perform in each Year as a result of complying with Offtaker's Despatch Instructions before receiving any compensation for additional start-ups, of which amount in Rupees is shown in Annex 1-B; Free Start-Ups shall not include any start-up that follows a Forced Outage or Partial Forced Outage (unless such Forced Outage or Partial Forced Outage is account of Grid System variations or an Emergency claimed by the Offtaker), Maintenance Outage, Scheduled Outage or a Force Majeure Event affecting the Power Producer.

"Fuel Cost Component" has the meaning as formulated for FCC_h in Section 6.3.

"Indices" means the collective name for Exchange Rate, Interest Rate, Pak-CPI (NCPI) and the US-CPI used in tariff indexations as per the provisions of this Schedule-I.

"Interest Rate" means KIBOR.

"National Consumer Price Index (NCPI) - General" means the consumer price index (General) as notified from time to time by the Federal Bureau of Statistics or any successor or replacement agency thereto.

"Pass Through Item(s)" Pass-Through Items shall be acknowledged by the Offtaker to the Power Producer on the basis of the actual costs reasonably incurred by the Power Producer to satisfy the requirements of the Agreement or to the extent the Offtaker is obligated pursuant to the Laws of Pakistan to make acknowledgement for such Pass-Through Item(s).

"Peak Period" The meaning ascribed thereto in Annex 2 of Schedule 1.

"Period Weighing Factor" or **"PWF"** means a factor set out in or otherwise determined in accordance with Section 5.2, which factor is applied in accordance with this Schedule 1 to the Capacity Price at specified times of the Day, Days of the Week and seasons of the Year as an incentive to make capacity available at times when it is most valuable to the Offtaker.

"Reference Capacity Price" means the reference components comprised of Fixed O&M Component (Foreign & Local), Adjusted Insurance Component, Cost of Working Capital, Return on Equity and RoRB Cost of Debt (RoRB CoD Local) as set out in Reference Tariff Table Annex 1-A.

"Reference Cost of Debt Component" means the component, in Rs./kW/h, payable to the Power Producer in relation to the cost of debt as set forth in Annex 1-A.

"Reference Cost of Working Capital" means the component, in Rs./kW/h, payable to the Power Producer for financing the cost of working capital, as set forth in Annex 3.

"Reference Depreciation Component" means the component, in Rs./kW/h, payable to the Power Producer for depreciation, as set forth in Annex 1-A.

"Reference Energy Price" means the components comprised of Fuel Cost Component, the Variable O&M Foreign Component and Variable O&M Local Component as set out in the Reference Tariff Table set in Annex 1-A.

"Reference Exchange Rate" With regards to Dollar means [287.10] Rupees to one (1) Dollar as notified in the Tariff Determination for K-Electric Limited Power Generation plants by NEPRA.

"Reference Fixed O&M Component" means the components comprised of Fixed O&M (Foreign) and Fixed O&M (Local), in Rs./kW/h, payable to the Power Producer for the fixed costs of operation and maintenance, as set forth in Annex 1-A.

"Reference Fixed O&M Foreign Component" means the component in Rs./kW/h, payable to the Power Producer for the foreign portion of fixed costs of operation and maintenance, as set forth in Annex 1-A.

"Reference Fixed O&M Local Component" means the component in Rs./kW/h, payable to the Power Producer for the local portion of fixed costs of operation and maintenance, as set forth in Annex 1-A.

"Reference Insurance Component" means the component, in Rs./kW/h, payable to the Power Producer in relation to the insurance as set forth in Annex 1-A.

"Reference NCPI" means the reference consumer price index (NCPI) (General) of 227.96 for the Month of May 2023 as per Tariff Determination.

"Reference Premium" which has the meaning ascribed in Section 5.2.

"Reference Gas Fuel Cost Component" means the component payable in Rs./kWh to the Power Producer for the cost of Gas, that is attributable to the generation of Net Electric Output (whether or not such component compensates the Power Producer for the actual cost of such Fuel) as set forth in Annex 1-A.

"Reference Gas Price" which has the meaning ascribed in Section 6.3.

"Reference HFO Fuel Cost Component" means the component payable in Rs./kWh to the Power Producer for the cost of HFO, that is attributable to the generation of Net Electric Output (whether or not such component compensates the Power Producer for the actual cost of such Fuel) as set forth in Annex 1-A.

"Reference HFO Price" which has the meaning ascribed in Section 6.3.

"Reference Return on Equity (ROE) Component" means the component, in Rs./kW/h, payable to the Power Producer in relation to the return on investment by equity holders as set forth in Annex 1-A.

"Reference RoRBCoD Component" means the component, in Rs./kW/h, payable to the Power Producer in relation to the return on loan as set forth in Annex 1-A.

"Reference Tariff" means the sum of the Reference Capacity Price and the Reference Energy Price as set forth in Annex 1-A

"Reference Variable O&M Component" means the components comprised of Variable O&M (Foreign) and Variable O&M (Local), in Rs./kWh, payable to the Power Producer for the variable costs of operation and maintenance that are attributable to the generation of Net Electrical Output, (whether or not such component compensates the Power Producer for actual cost of providing such Net Electrical Output), as set forth in Annex 1-A.

"Reference Variable O&M Foreign Component" means the tariff component payable in Rs./kWh to the Power Producer for the foreign portion of variable costs of operation and maintenance that are attributable to the generation of Net Electrical Output, (whether or not such component compensates the Power Producer for actual cost of providing such Net Electrical Output), as set forth in Annex 1-A .

"Reference Variable O&M Local Component" means the tariff component payable in Rs./kWh to the Power Producer for the local portion of variable costs of operation and maintenance that are attributable to the generation of Net Electrical Output, which component (whether or not such component compensates the Power Producer for actual cost of providing such Net Electrical Output) as set forth in Annex 1-A .

"Reference US-CPI" means the United State consumer price index (All Urban Consumers), of 304.13 for the Month of May 2023 as per Tariff Determination.

"Return on Equity Component (ROE)" which has the meaning ascribed in Section 5.2.

"RoRBCoD Local" which has the meaning ascribed in Section 5.2.

"Supplemental Tariff Invoices" which has the meaning ascribed in Section 8.1.

"Tariff" means the Tariff Determination by NEPRA vide its letter No. NEPRA/R/ADG(Trf)/TRF-596/15878-82 dated 22 October 2024 as attached as Annex 1-C and as amended or revised from time to time.

"Test Energy Invoice" has the meaning given to it in Section 9.

"Unit Hot Standby Charge" has the meaning given to it in Section 11.

"Unit Start-Up Charge" has the meaning given to it in Section 10.

"US-CPI" means the United States Consumer Price Index (All Urban Consumers) issued by US Bureau of Labor Statistics from time to time (or any successor or replacement agency thereto).

"Variable O&M Component" has the meaning given to it in Section 6.3.

"Variable O&M Foreign Component" has the meaning given to it in Section 6.3.

"Variable O&M Local Component" has the meaning given to it in Section 6.3.

3. CONSTRUCTION

3.1 This Schedule 1 (including the Annexes) shall be read in conjunction with and to be subject to Tariff Determination, Article VIII and Article IX of the Agreement. To the extent that any provision of this Schedule 1 is inconsistent with Tariff Determination, Article VIII or Article IX or any other article or section of the Agreement, the provisions of Tariff Determination, Article VIII or Article IX or the other relevant article or section of the Agreement, as the case may be, shall prevail unless otherwise specified.

3.2 References to Parts, Articles, and Sections in this Schedule 1 are to Parts, Articles, and Sections of this Schedule 1, unless indicated otherwise. References to Tables and Annexes in this Schedule 1 are to the Tables and Annexes of this Schedule 1, unless indicated otherwise. References to Articles and Sections of the Agreement are to articles and sections contained in the main text of the Agreement.

PART II: TARIFF ACKNOWLEDGEMENT

4. TARIFF INVOICE

The Offtaker shall, for each Month of part thereof, acknowledge to the Power Producer, Capacity Invoices, Energy Invoices and Billing Cycle / Take or Pay Energy Shortfall Invoice that shall be calculated in accordance with Sections 5 and 6, respectively.

5. CAPACITY INVOICES

5.1 The Offtaker shall acknowledge the Power Producer the Capacity Invoices, in accordance with the procedures specified in Section 9.6 of the Agreement, for the Available Capacity for each Month (or part-Month) in accordance with Section 9.1 of the Agreement.

5.2 The Capacity Invoice for the applicable Month shall be equal to the aggregate sum (for all of the hours in such Month) of Capacity Invoice earned for each hour of the Month, and shall be equal:

$$\textbf{Capacity Invoice}_M = \sum_{h=1}^{n} \textbf{Capacity Invoice}_h$$

Where:

Capacity Invoice$_M$ = Capacity Invoice, in Rupees, payable for the relevant Month;

Capacity Invoice$_h$ = the Capacity Invoice, in Rupees, paid for hour *h* of the Month; and

n = the number of hours in the relevant Month.

Capacity Invoice$_h$ = Capacity Price$_h$ * AvailCap$_h$

Where:

Capacity Invoice$_h$ = the Capacity Invoice, in Rupees, payable for hour *h* of the Month;

Capacity Price$_h$ = (Fixed O&M$_h$ + Cost of Working Capital$_h$ + AIC$_h$ + Return on Equity$_h$ + Depreciation$_h$ + RoRBCoD Local$_h$)* PWF$_h$

Where:

Fixed O&M$_h$ = Fixed Foreign O&M $_{(Rev)h}$ + Fixed Local O&M $_{(Rev)h}$

Where:

Fixed Foreign O&M $_{(Rev)h}$ = Fixed Foreign O&M $_{(Ref)h}$ * US CPI $_{(Rev)q}$ / US CPI $_{(Ref)}$ * ER $_{(Rev)q}$ / ER $_{(Ref)}$

Where:

Fixed Foreign O&M $_{(Ref)h}$ = Fixed Foreign O&M$_{(Ref)h}$ Rs./kW/h as per Annex 1-A;

US CPI $_{(Rev)q}$ = The revised US CPI (All Urban Consumers) at the beginning of the Quarter that includes hour h;

US CPI $_{(Ref)}$ = The Reference US CPI (All Urban Consumers) of 304.13 for May 2023;

ER $_{(Rev)q}$ = The revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan on the last day of the Quarter preceding the Quarter that includes hour; and

ER $_{(Ref)}$ = The Reference Exchange Rate of Rs. 287.10/US$.

Fixed Local O&M $_{(Rev)h}$ = Fixed Local O&M $_{(Ref)h}$ * NCPI $_{(Rev)q}$ / NCPI$_{(Ref)}$

Fixed Local O&M $_{(Ref)h}$ = Fixed Local O&M$_{(Ref)h}$ Rs./kW/h as per Annex 1-A;

NCPI $_{(Rev)}$ = The revised NCPI (General) at the beginning to the Quarter that includes hour h; and

NCPI $_{(Ref)}$ = The Reference NCPI (General) of 227.96 for May 2023.

Cost of Working Capital

Cost of Working Capital$_h$ = Cost of working capital$_{(Ref)h}$ Rs./kW/h as per Annex 3.

This cost shall be adjusted on a quarterly basis for the following variations:

- Fuel price
- Fuel inventory
- Load factor
- Receivable cycle
- Standby Letter of Credit (SBLC) amount
- SBLC charges
- Value of stores & spares
- KIBOR

The adjustment mechanism including indexation of the same for the components of the cost of working capital are set out in Annex – 3, in line with the Tariff Determination.

AIC_h = Insurance $_{(Ref)h}$ / P $_{(Ref)}$ * P $_{(Act)}$

Where:

Insurance $_{(Ref)h}$ = Insurance$_{(Ref)h}$ Rs./kW/h as per Annex 1-A;

P $_{(Ref)}$ = Following Reference Premium at Rs. 287.1/US$; and

P $_{(Act)}$ = Actual Premium or USD 2.387 million at Exchange Rate prevailing on the 1st day of the insurance coverage period whichever is lower.

Return on Equity $_{(Rev)h}$ = $ROE_{(Ref)h}$ * $ER_{(Rev)q}$ / $ER_{(Ref)}$

Where:

$ROE_{(Ref)h}$ = $ROE_{(ref)h}$ Rs./kW/h as per Annex 1-A;

$ER_{(Rev)q}$ = The revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan on the last day of the Quarter preceding the Quarter that includes hour; and

$ER_{(Ref)}$ = The Reference Exchange Rate of Rs. 287.10/US$.

Depreciation = Depreciation$_{(Ref)h}$ Rs./kW/h as per Annex 1-A.

$RoRBCoD\ Local_{(Rev)h}$ = $RoRBCoD\ Local_{(Ref)}$ x $CoD\ Local_{(Rev)}$ / $CoD\ Local_{(Ref)}$

Where:

$RoRBCoD\ Local_{(Ref)}$ = RoRBCoD Local $_{(Ref)h}$ Rs./kW/h as per Annex 1-A;

$CoD\ Local_{(Rev)}$ = Revised 3 Month KIBOR notified by State Bank of Pakistan at the beginning of the Quarter + 2.25% allowed spread; and

$CoD\ Local_{(Ref)}$ = The Reference KIBOR of 22.91% + 2.25% allowed spread.

PWF_h = the Period Weighing Factor applicable to hour h of the Month, as set out in Annex-2;

$AvailCap_h$ = the Available Capacity, in kW, for hour *h* of the relevant Month;

h = each hour in the Month for which a Capacity Invoice is being calculated; and

5.3 The Period Weighing Factors ("**PWFs**") for each period are as specified in Annex-2. The Offtaker shall have the right to unilaterally revise the PWFs specified in Annex-2 in accordance with Section 5.13 of the Agreement, subject to the following provisions:

a) the Offtaker shall give notice to the Power Producer of such revision in accordance with Section 5.13 of the Agreement;

b) the value of the PWF in any hour period shall not be greater than two and one-half (2.5); and the value of the PWF during each period during the Maintenance Months shall not be greater than one (1);

c) the time-weighted average of the PWFs in a Year shall be equal to one (1); and

d) there shall be no more than three (3) periods in any one (1) Day or more than five (5) periods in any two (2) Day period.

6. MONTHLY ENERGY INVOICE

6.1 The Offtaker shall acknowledge to the Power Producer the Reference Energy Price in accordance with the procedures specified in Section 9.6 for Despatched and Delivered Net Electrical Output for the relevant Month (or part-Month) in accordance with Section 9.2.

6.2 Energy Invoice for the relevant Month shall be equal to the aggregate sum (for all of the hours in such Month) of the Energy Invoice earned for each hour of the Month, and shall equal:

$$\textbf{Energy Invoice}_M = \sum_{h=1}^{n} \textbf{Energy Invoice}_h$$

Where:

Energy Invoice$_M$ = the Energy Invoice, in Rupees, payable for the relevant Month;

Energy Invoice$_h$ = the Energy Invoice for hour *h;* and

n = the number of hours in the relevant Month.

6.3 The Energy Invoice earned for each hour of a Month shall be calculated as follows:

$$\textbf{Energy Invoice}_h = \textbf{Energy Price}_h * \textbf{NEO}_h$$

Where:

$$\textbf{Energy Price}_h = \textbf{FCCG}_{(Rev)h} \textbf{ or } \textbf{FCCHFO}_{(Rev)h} \textbf{ (as applicable)} + \textbf{Variable O\&M}_h$$

$FCCG_{(Rev)h} = FCCG_{(Ref)h} * FPG_{(Rev)} / FPG_{(Ref)} * K_L$

Where:

$FCCG_{(Ref)h}$ = $FCCG_{(Ref)h}$ Rs./kWh as per Annex 1-A;

$FPG_{(Rev)}$ = the revised HHV Gas price in USD notified by the Oil and Gas Regulatory Authority (OGRA) converted to PKR at the invoiced exchange rate by the supplier, from time to time and notified by GOP, and billed by Gas Supplier, consumed during hour *h*, as applicable;

$FPG_{(Ref)}$ = The Reference HHV Gas Price for BQPS I is Rs. 3,717/MMBtu in case of RLNG and Rs. 857/MMBtu in case of indigenous gas;

K_L = the load correction factor for the units in hour h, as set forth in Annex 4.

$FCCHFO_{(Rev)h} = FCCHFO_{(Ref)h} \times FPHFO_{(Rev)} / FPHFO_{(Ref)} \times CalHFO_{(Ref)} / CalHFO_{(Rev)} * K_L$

Where:

$FCCHFO_{(Ref)h}$ = $FCCHFO_{(ref)h}$ Rs./kWh as per Annex 1-A;

$FPHFO_{(Ref)}$ = Reference HFO Price of Rs. 133,637 per ton;

$FPHFO_{(Rev)}$ = The revised net HHV HFO price in PKR / ton for the Month based on weighted average formula as illustrated below;

Furnace oil	Legend	Stock in Metric ton	Amount - PKR mn	Weighted average price
		i	ii	iii = ii / i x 10^6
Opening	A	26,943	3,991	
Purchases	B	27,617	3,521	
Available for consumption	C = A + B	54,559	7,513	137,701
Less: Consumption	D	(34,381)	(4,941)	
Closing	E = C - D	20,178	2,572	

K_L = the load correction factor for the units in hour h, as set forth in Annex 4;

$CalHFO_{(Ref)}$ = reference HFO HHV Calorific Value of Rs. 40,760.748 btu per kg; and

$CalHFO_{(Rev)}$ = revised HFO Calorific Value for the Month in btu per kg for the Month as illustrated below.

Description	Unit	Calculation	Amount	Source
Gross Calorific value	btu / lb	a	18,489	Actual GCV for the month as per test reports
Conversion factor	lb / kg	b	2.2046	Standard conversion factor
Gross Calorific value	btu / kg	c = a x b	40,761	Calculated
Conversion Factor	kg / M.ton	d	0.001	Standard conversion factor
Gross Calorific value	btu / M.ton	e = c x d	40.761	Calculated

Variable O&M$_h$ = Variable Local O&M $_{(Rev)h}$ + Variable Foreign O&M$_{(Rev)h}$

Where:

Variable Local O&M $_{(Rev)h}$ = Local Variable O&M $_{(Ref)h}$ * NCPI $_{(Rev)q}$ / NCPI$_{(Ref)}$

Where:

Variable Local O&M $_{(Ref)\ h}$ = Variable Local O&M $_{(Ref)\ h}$ Rs./kWh as per Annex 1-A;

NCPI $_{(Rev)q}$ = The revised NCPI (General) at the beginning of the Quarter which includes hour; and

NCPI $_{(Ref)}$ = The Reference NCPI (General) of 227.96 for May 2023.

Variable Foreign O&M $_{(Rev)h}$ = Fixed Variable O&M $_{(Ref)h}$ * US CPI $_{(Rev)q}$ / US CPI $_{(Ref)}$ * ER $_{(Rev)q}$ / ER $_{(Ref)}$

Where:

Variable Foreign O&M $_{(Ref)h}$ = Variable Foreign O&M $_{(Ref)\ h}$ Rs./kWh as per Annex 1-A;

US CPI $_{(Rev)q}$ = The revised US CPI (All Urban Consumers) at the beginning of the Quarter which includes hour;

US CPI $_{(Ref)}$ = The Reference US CPI (All Urban Consumers) of 304.13 for May 2023;

ER $_{(Rev)q}$ = The revised TT & OD selling rate of US Dollar notified by the National Bank of Pakistan on the last day of the Quarter preceding the Quarter that includes hour; and

ER $_{(Ref)}$ = The Reference Exchange Rate of Rs. 287.10/US$.

NEO$_h$ = Net Electrical Output of the Complex, in kWh, for hour *h* of the period on the respective Fuel (i.e. Gas or HFO).

6.4 For the purpose of NEO for any hour, in case of an interval (as agreed by the Operating Committee) having both electrical energy delivered as well as power imported by the Complex (based on the formula given below), recorded under electronic data recording system on the Interconnection Point, then:

(a) If the electric energy is delivered to Offtaker on net basis during that interval, the net electrical energy shall be included in NEO during that hour; and

(b) If the electric energy is imported from Offtaker on net basis during that interval, the net electrical energy shall be considered under billing of power imported from Offtaker during that hour.

Formula for calculation of NEO (Measurement of Units with common auxiliaries for each unit in the Complex):

NEO = KW2 - KW3

Where:

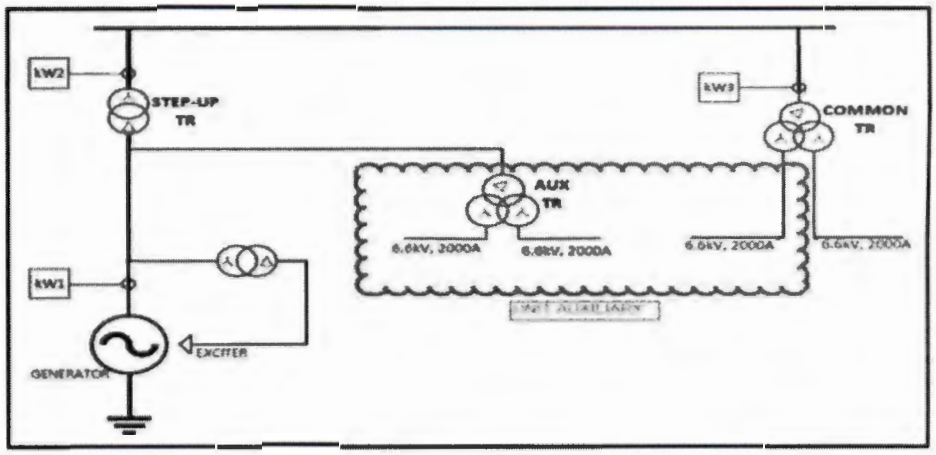
KW2 = Unit Measured net power output at step-up transformer high side, kWh

KW3 = Measured common auxiliary power consumption of 2 units, kWh. KW3 will be calculated separately for different operating scenarios. Common scenarios explained below:

1. Both units in operation: Each unit KW3*= KW3/2

2. 1 unit in operation:
   a. For Unit in operation: KW3* = (KW3 - standby unit aux consumption)/2
   b. For Unit in standby: KW3* = (KW3 - unit aux consumption)/2 + unit aux consumption

3. Both units standby: Each unit KW3* = (KW3 - both units aux consumption)/2 + unit aux consumption


kW2
STEP-UP TR
kW3
COMMON TR
AUX TR
6.6kV, 2000A
6.6kV, 2000A
6.6kV, 2000A
6.6kV, 2000A
kW1
EXCITER
GENERATOR

7. LIQUIDATED DAMAGES

a) Liquidated Damages

Pursuant to Section 9.4(b) of Agreement, the Power Producer shall pay liquidated damages (LDs) to the Offtaker provided that these liquidated damages shall apply and be payable by the Power Producer (only after the number of hours available to the Power Producer under Section 9.1 (c) and (d) have first been utilized) as formulated hereunder:

i) in the event, when Declared Available Capacity is revised between twelve (12) hours and four (4) hours prior to the beginning of an Operating Day.

LDs = 10% * [Declared Available Capacity or Revised Declared Available Capacity (or any Adjusted Declared Available Capacity related thereto), as applicable, prevailing twelve (12) hours before the start of the Operating Day - Revised Declared Available Capacity (or any Adjusted Declared Available Capacity related thereto), as applicable, prevailing four (4) hours before the start of the Operating Day] * Capacity Price for the relevant hour h. plus

ii) in the event, when Declared Available Capacity is revised within four (4) hours before the beginning of the Operating Day.

LDs = 20% * [Declared Available Capacity or Revised Declared Available Capacity (or any Adjusted Declared Available Capacity related thereto), as applicable, prevailing four (4) hours before the start of the Operating Day - Revised Declared Available Capacity (or any Adjusted Declared Available Capacity related thereto), as applicable, prevailing at the start of the Operating Day] * Capacity Price for the relevant hour, h. plus

iii) in the event, the Power Producer fails to Comply with Despatch Instructions:

LDs = 100% * [Declared Available Capacity or Revised Declared Available Capacity (or any Adjusted Declared Available Capacity related thereto), as applicable, at the start of the hour – the Available Capacity for that hour] * Capacity Price for the relevant hour, h.

Provided however, if the Power Producer revises its Available Capacity upwards after the Declaration Deadline, for reasons other than forecasted ambient conditions, and is eligible for Capacity Invoices for such upward revision, but after such upward revision, it fails to deliver such increased capacity when dispatched, then the liquidated damages amount

calculated in this subsection (iii) above shall be multiplied by two (2) for purposes of such unavailable capacity.

Provided further, if the Power Producer revises its declaration downward of its Available Capacity on account of unavailability during an Operating Day, the liquidated damages shall not be applicable as per 9.1(d) of the Agreement, unless total outage allowance for the Agreement Year has been utilized.

PART III: SUPPLEMENTAL TARIFFS

8. Supplemental Tariff Invoice for Pakistan Political Force Majeure Event (PPFME) or Change in Law Force Majeure Event (CLFME)

8.1 If, due to a Pakistan Political Force Majeure Event (PPFME) or a Change in Law Force Majeure Event (CLFME), a invoice is due and payable to the Power Producer from the Offtaker as provided in Sections 15.8(b) and 15.8(c) of the Agreement (**"Supplemental Tariff Invoice"**), the Offtaker shall, following the completion of the Restoration, pay to the Power Producer the Supplemental Tariff Invoice, until the recoverable costs of a Restoration have been received in full by the Power Producer from the Offtaker subject to NEPRA determination (which shall be structured to allow the Power Producer to recover the reasonable and necessary costs of a Restoration net of insurance proceeds, if any, over the remainder of the Term, as provided in this Article 8) shall be calculated in accordance with Section 8.2. Each Pakistan Political Force Majeure Event or Change in Law Force Majeure Event, that may be unrelated to each other, may lead to a separate Supplemental Tariff Invoice.

8.2 The Supplemental Tariff Invoice for a Month shall be equal to the aggregate sum of the Supplemental Tariff Invoice for each hour in such Month. The Supplemental Tariff Invoice for each hour of the Month shall be calculated as follows:

$$\mathbf{STP}_m = \sum_{h=1}^{n} \mathbf{STP}_h$$

$$\mathbf{STP}_h = \mathbf{RRR}_{\mathbf{fixed/h}} * \mathbf{AvailCap}_h$$

Where:

STP_h= the Supplemental Tariff Invoice for a Restoration, in Rupees, for hour *h* of the Month; and

$RRR_{fixed/h} = R_t/(TC_t * PIT_t)$

Where:

RRR_{fixed}= the Restoration recovery rate, in Rs./kW/h, which rate shall be calculated one (1) time following the agreement by the Parties on the Restoration costs, as determined by NEPRA, or as per the resolution of a dispute over such costs pursuant to Section 15.6 of the Agreement and shall remain fixed thereafter, and which rate for all hours h shall be equal to:

R_t = the total cost of the Restoration, as determined by NERPA, or in accordance with Section 15.6 of the Agreement, as applicable;

TC_t= the then-prevailing Tested Capacity at time *t,* expressed in kW;

PIT_t= the total number of hours remaining in the Term from time *t;*

t = following the Day the Parties agree on Restoration costs, to be recovered by the Power Producer or the resolution of a dispute over such costs pursuant to Section 15.6 of the Agreement and in each case, the date that the Complex returns to operation or if the Complex did not cease operation, the date on which the Restoration, is completed;

$AvailCap_h$ = the Available Capacity, in kW, for hour, *h* of the Month provided however that it shall include the period of deemed availability for which the Power Producer shall be paid Capacity Invoices as provided for in Article 9.1 (c) and 9.1 (d) of the Agreement; and

h = an hour in the Month for which a Supplemental Tariff Invoice is calculated pursuant to this Section 8.2.

8.3 Unless NEPRA approves an alternate cost of capital (including debt and equity), the Power Producer shall be entitled to receive in accordance with Section 15.8(d) of the Agreement a return equal to KIBOR plus percent (3%) per annum on the scheduled unpaid portion of the total cost of a Restoration through the period of cost recovery. The applicable KIBOR shall be the rate prevailing on the date that the Complex returns to operation or if the Complex did not cease operation, the date on which the Restoration is completed.

8.4 At any time after the first (1^{st}) Business Day of each Month, the Power Producer may submit an invoice to the Offtaker stated in Rupees for the Supplemental Tariff Invoice, inclusive of return thereon, for the previous Month, together with supporting information as may reasonably be necessary to substantiate the amounts claimed in the invoice.

8.5 The Offtaker may seek to verify the calculation of a Supplemental Tariff Invoice for a Restoration, inclusive of return thereon, and may require the Power Producer to provide to it copies of its calculations, with reasonable supporting information, which the Power Producer shall provide within [30] Days of such request. Within one (1) Year following the commencement of such payments, the Offtaker shall have the right to engage, at its own cost, an independent auditor to audit and examine the costs claimed by the Power Producer, and the Power Producer shall make all of its relevant books and records available to the Offtaker and its auditors in connection with such audit or examination, provided however, if such Restoration cost, is submitted to and approved by NEPRA, no such audit shall be conducted.

PART IV: ADDITIONAL PAYMENTS

9. Invoices for Net Electrical Output during Testing.

9.1 The Test Energy Invoice shall be equal to the aggregate sum of the Net Electrical Output delivered during each such hour multiplied by the Fuel Cost Component applicable to each hour in such Month. The Test Energy Invoice earned for each hour shall be calculated as follows:

$$\text{Test Energy Invoice}_M = \sum_{h=1}^{n} \text{Test Energy Invoice}_h,$$

Where:

Test Energy Invoice$_h$ = FCCG$_{(Rev)h}$ or FCCHFO$_{(Rev)h}$ * NEO$_h$

Where:

FCCG$_{(Rev)h}$ = as ascribed in Section 6.3 to this Schedule;

FCCHFO$_{(Rev)h}$ = as ascribed in Section 6.3 to this Schedule; and

NEO$_h$ = Net Electrical Output of the Complex, in kWh, for hour *h* of the period on the respective Fuel (i.e. Gas or HFO).

9.2 At any time on or after first (1st) Business Day of each Month and on the first (1st) Business Day falling after the fifteenth (15th) Day of each Month, the Power Producer may submit an invoice to the Offtaker stated in Rupees for the Net Electrical Output delivered during the tests carried out under Article VIII and the Offtaker shall acknowledge the Power Producer the Energy Price, Unit Start-Up Charges or any other charges in accordance with Section 9.6 to Agreement.

9.3 The Offtaker shall acknowledge claims if there occurs a PPFME or a CLFME that reduces the Power Producer's ability to declare Available Capacity subject to and in accordance with Section 15.6 of the Agreement.

10. Unit Start-Up Charges

10.1 For each start-up of a unit that (i) is required to comply with a Despatch Instruction or Revised Despatch Instruction, and (ii) does not follow a Forced or Partial Forced Outage (unless such Forced or Partial Forced Outage is on account of Grid System conditions or an Emergency claimed by the Offtaker), Maintenance Outage, Scheduled Outage, or Force Majeure Event affecting the Power Producer, the Offtaker shall pay to the Power Producer Unit Start-Up Charges as calculated in accordance with Section 10.2 (each such charge, a "Unit Start-Up Charge").

10.2 Unit Start-Up Charge = MDI Charge + Reference Unit Start-Up Charges.

a) MDI Charge: The MDI charge shall be based on maximum demand recorded during the relevant month at startup and shall be calculated based on the then applicable MDI rate in Rs/kW, from time to time,

b) Reference Unit Start-Up Charge: This cost will cover the consumables, Fuel and equivalent operating hours consumed for the start-ups.

The Unit Start-Up Charges for each start-up shall be indexed with relevant Indices, including Fuel prices for the Month and applicable degradation factors as of the start of each Month as requested below:

SC_M	=	**$MDIR_x$ x N1+(($SCPI_{Ref}$ x $SCFadjust_{PI}$)+(($SCFC_{Ref}$ x $SCFadjust_{FC}$)) x N2**
Where:		
SC_M	=	The Unit Start-Up Charges during the Month M
$MDIR_x$	=	Total fixed charges for the Month due to distributing segment during the relevant Month (based on MDI for the month and MDI charge) divided by the total number of start-ups performed during the Month.
N1	=	The number of start-ups to be claimed, unless any shutdowns claimed during the relevant Month in which case this will be considered as zero.
N2	=	The number of start-ups to be claimed.
$SC_{(Ref)}$	=	The Reference Unit Start-Up Charge as given below in Annex 1-B. Consists of the following two components:
$SCPI_{Ref}$	=	The Reference Unit Start-Up Charge for the power import from transmission system during Unit Startup till synchronization.
$SCFadjust_{PI}$	=	The Startup Charges Adjustment Factor for the hour h for the import of power from transmission network as per following formula: **$SCFadjust_{PI}$ = $WAVCT\text{-}C3_{(Rev)}$ / $WAVCT\text{-}B5_{(Ref)}$** where: **$WACT\text{-}C3_{(Rev)}$** = Weighted average of the latest notified variable consumer tariff for the Bulk Supply Consumer Category (C-3), or other category as notified, based on a weightage of 4:20 for Peak & Off-Peak Rates respectively. **$WACT\text{-}B5_{(Ref)}$** = Weighted average of the reference notified variable consumer tariff for the Industrial Consumer Category (B-5) based on a weightage of 4:20 for Peak & Off-Peak Rates (i.e. Rs. 30.33 per kWh & Rs. 23.55 per kWh) respectively **(i.e. Rs. 24.68 per kWh)**
$SCFC_{Ref}$	=	The Reference Unit Start-Up Charge for the Fuel consumed during Unit Startup till synchronization for the relevant Fuel. (i.e. Gas, HFO or LDO)
$SCFadjust_{FC}$	=	The Unit Start -Up Charges Adjustment Factor for the hour h for the consumption of Fuel as per the following formula:
		For Gas – $SCFadjust_{FC}$ = (FPG_{Rev} / FPG_{Ref}) For HFO – SCFadjustFC = $FPHFO_{(Rev)}$ / $FPHFO_{(Ref)}$ For LDO – SCFadjustFC = $FCCLDO_{(Rev)}$ / $FCCLDO_{(Ref)}$

		For above purpose: FPG_{Ref} = The Reference HHV Gas price for RLNG is Rs. 3,300.82 (for SSGC whereas for PLL it is Rs. 2929.79) based on RLNG price. In case co-mingled gas is provided by SSGC in a month then FPG_{Rev} shall be based on weighted average formula as illustrated below; **Weighted average cost = (E*D+C*F)/(E+F)** Where: C = RLNG price D = Indigenous Gas price E = Indigenous Gas actual volume billed for the month F = RLNG Gas actual volume billed for the month $FPHFO_{Ref}$ = The Reference HFO Price is Rs. 137,701 per Mton. $FPLDO_{Ref}$ = The Reference LDO Price is Rs. 81.32 per litre. $FPLDO_{Rev}$ = The Revised LDO Price in Rs. per litre calculated in the same manner as used for calculation of $FPHFO_{Rev}$ as illustrated in section 6.3 above

Subject to Section 10 start-up shall be counted as payable to the Power Producer by the Offtaker even if the requested start-up is subsequently cancelled as a result of a change in any Despatch Instruction or Revised Despatch Instruction prior to the synchronization to the Grid System unless the Offtaker issued a Revised Despatch Instruction sufficiently prior to the start-up to enable the Power Producer to cancel the start-up.

11. Unit Hot Standby Charges

The operational startup activity required to perform during warm/cold/ambient cold condition to keep unit on hot standby mode by achieving rated steam turbine speed with no load for a period as communicated by the Offtaker

Unit Hot Standby Charges are based on Reference Unit Hot Standby Charges indexed with relevant indices including Fuel prices for each month as requested below

The Unit Hot Standby Charges for each Unit Hot Standby Operation shall be calculated as follows:

HSCM	=	$(HSCRef_{AIC} \times HSCFadjusth_{AIC} + HSCRef_{FC} \times HSCFadjusth_{FC}) \times N$
Where:		
HSCM	=	the Unit Hot Standby Charges during the Month M;
HSCRef	=	the Reference Unit Hot Standby Charge as given below in Annex 1-B and consists of the following two components:
$HSCRef_{AIC}$	=	The Reference Unit Hot Standby Charge for auxiliary import.
$HSCFadjusth_{AIC}$	=	The Hot Standby Charges Adjustment Factor for the hour h for the import of power from transmission network as per following formula: **$HSCFadjust_{AIC}$ = WAVCT-C3$_{(Rev)}$ / WAVCT-B5$_{(Ref)}$** where: **WACT-C3$_{(Rev)}$** = Weighted average of the latest notified variable consumer tariff for the Bulk Supply Consumer Category (C-3), or other category as notified, based on a weightage of 4:20 for Peak & Off-Peak Rates respectively. **WACT-B5$_{(Ref)}$** = Weighted average of the reference notified variable consumer tariff for the Industrial Consumer Category (B-5) based on a weightage of 4:20 for Peak & Off-Peak Rates (i.e. Rs. 30.33 per kWh & Rs. 23.55 per kWh) respectively **(i.e. Rs. 24.68 per kWh)**
$HSCRef_{FC}$	=	The Reference Unit Hot Standby Charge for the Unit.
$HSCFadjusth_{FC}$	=	The Unit Hot Standby Charges Adjustment Factor for the hour h; where: For Gas – $HSCFadjust_{FC} = (FPG_{Rev} / FPG_{Ref})$ For HFO – $HSCFadjust_{FC} = FPHFO_{(Rev)} / FPHFO_{(Ref)}$ For LDO – $HSCFadjust_{FC} = FCCLDO_{(Rev)} / FCCLDO_{(Ref)}$ For above purpose: FPG_{Ref} = The Reference HHV Gas price for RLNG is Rs. 3,300.82 (for SSGC whereas for PLL it is Rs. 2929.79) based on RLNG price. In case co-mingled gas is provided by SSGC in a month then FPG_{Rev} shall be based on weighted average formula as illustrated below; **Weighted average cost = (E*D+C*F)/(E+F)** Where: C = RLNG price D = Indigenous Gas price E = Indigenous Gas actual volume billed for the month F = RLNG Gas actual volume billed for the month $FPHFO_{Ref}$ = The Reference HFO Price is Rs. 137,701 per

		Mton. $FPLDO_{Ref}$ = The Reference LDO Price is Rs. 81.32 per litre. $FPLDO_{Rev}$ = The Revised LDO Price in Rs. per litre calculated in the same manner as used for calculation of $FPHFO_{Rev}$ as illustrated in section 6.3 above
N	=	The number of Hot Standby to be claimed

Subject to Section 11 Unit Hot Standby Operation shall be counted as payable to the Power Producer by the Offtaker even if the requested Unit Hot Standby Operation is subsequently cancelled as a result of a change in any instruction prior to achieving rated steam turbine speed with no load of the relevant unit unless the Offtaker issued a instruction sufficiently prior to the Unit Hot Standby Operation to enable the Power Producer to cancel the Unit Hot Standby Operation.

12. Pass Through Item(s)

12.1 Pass-Through Items shall be payable by the Offtaker to the Power Producer on the basis of the actual costs reasonably incurred by the Power Producer to satisfy the requirements of the Agreement or to the extent the Power Producer is obligated pursuant to the Laws of Pakistan to make acknowledgement for such Pass-Through Item(s).

12.2 The Power Producer may present invoice(s) to the Offtaker for Pass-Through Items at any time on or after the first (1^{st}) Day of the Month following the Month in which the cost(s) was/were incurred by the Power Producer.

12.3 The following items shall be Pass-Through Items:

(a) Any unrecovered cost of outgoing MYT which may be allowed under pending end of term adjustment of the MYT.

(b) Gas Infrastructure Development Cess (GIDC) required to be paid by the Power Producer pertaining to prior periods based on court verdict, if any.

(c) In the case of any unbundling of the Company in future, one time adjustment for additional costs pursuant to unbundling.

(d) Any Tax that becomes applicable to the Power Producer, including but not limited to the corporate tax.

(e) WWF/WPPF being separately levied on the Power Producer.

Any other costs reasonably incurred by the Power Producer to satisfy the requirements of Agreement, and allowed by NEPRA

For avoidance of doubt, if a particular type of Tax is stated to be a Pass

Through item in this Section 12 then any Change in Tax rate for such Tax upwards or downwards shall be treated as a Pass Through Item.

12.4 The Power Producer shall invoice Offtaker in arrears for recovery of the expenditure made with the consent of Offtaker for any upgradation in the protective devices under Article VI or Metering System under Article VII of the Agreement.

PART V: INDEXATION

13.1 At the beginning of each Quarter, the Power Producer shall on the fifteenth (15th) Business Day following the end of a Quarter, deliver to the Offtaker the Current Indices and values as submitted to NEPRA for determination. Following the determination of the same by the NEPRA, the Power Producer shall provide the determined Indices and values, to the Offtaker along with the reasonable supporting information if any, within 7 Business Days of the determination by NEPRA.

13.2 If any index used herein ceases to be available, the Parties shall request NEPRA to determine an alternative index. Such determination when made available, shall be binding on the Parties for the purpose of such index hereunder. Pending the determination by NEPRA, the last available value of such index shall be used for all relevant purposes hereunder. Upon the determination of such index by NEPRA, either Party shall revise all acknowledgement made during the pendency of alternative index.

13.3 <u>One Time Adjustments</u>

Not Used.

ANNEX 1-A: REFERENCE TARIFF TABLE

Annex-I

K-Electric Limited
BQPS - I (Unit 2, 3, 5 & 6)
Reference Generation Tariff

Energy Purchase Price (Rs./kWh)					
Description	Fuel	Unit-1	Unit-2	Unit-5	Unit-6
Fuel Cost Component	Gas	9.6249	9.5496	9.2542	9.5982
	RLNG	41.7506	41.4241	40.1426	41.6347
	RFO	34.6414	34.5148	33.3197	33.9404
Variable O&M	Local	0.2959	0.2631	0.1039	0.1109
	Foreign	0.0385	0.0487	0.1452	0.2878
	Total	0.3344	0.3118	0.2490	0.3987

Year	Capacity Purchase Price (Rs./kW/h)								CPP @ 60 % Plant Factor	
	Fixed O&M		Insurance	Cost of Working Capital	RoRB		Depreciation	Total	Rs./kWh	Cents / kWh
	Local	Foreign			Cost of Debt	Cost of Equity				
1	0.5855	0.2042	0.0092	0.5905	0.3488	0.1920	0.5823	2.5125	4.1875	1.4585
2	0.5855	0.2042	0.0092	0.5461	0.3405	0.1874	0.3324	2.2053	3.6754	1.2802
3	0.5855	0.2042	0.0092	0.5461	0.2819	0.1552	0.3324	2.1145	3.5242	1.2275
4	0.5855	0.2042	0.0092	0.5302	0.3673	0.2022	0.4017	2.3003	3.8338	1.3353
5	0.5855	0.2042	0.0092	0.5195	0.3755	0.2067	0.4482	2.3488	3.9147	1.3635
6	0.5855	0.2042	0.0092	0.5195	0.2966	0.1633	0.4482	2.2264	3.7107	1.2925
7	0.5855	0.2042	0.0092	0.5195	0.2177	0.1198	0.4482	2.1041	3.5068	1.2214
8	0.5855	0.2042	0.0092	0.5195	0.1387	0.0764	0.4482	1.9817	3.3028	1.1504
9	0.5855	0.2042	0.0092	0.5195	0.0598	0.0329	0.4482	1.8593	3.0988	1.0793
10	0.5855	0.2042	0.0092	0.5195	0.0403	0.0222	0.4579	1.8388	3.0647	1.0675
Average Tariff										
1-10	0.5855	0.2042	0.0092	0.5330	0.2467	0.1358	0.4348	2.1492	3.5819	1.2476
Levelized Tariff										
1-10	0.5855	0.2042	0.0092	0.5380	0.2733	0.1504	0.4337	2.1943	3.6572	1.2738

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12.3. On the basis of approved heat rates and prevailing prices, the fuel cost component for different plants and fuels have been worked out and approved as provided hereunder:

Description	Combined Cycle Operation (Rs./kWh)				Open Cycle (Rs./kWh)	
	Gas	RLNG	RFO	HSD	Gas	RLNG
BQI Unit 1	9.6249	41.7506	34.6414	-	-	-
BQI Unit 2	9.5496	41.4241	34.5148	-	-	-
BQI Unit 5	9.2542	40.1426	33.3197	-	-	-
BQI Unit 6	9.5982	41.6347	33.9404	-	-	-
BQPS-II (2 Compressors)	7.0747	30.6886	-	-	10.5506	45.7659
BQPS-II (1 Compressor)	6.9546	30.1674	-	-	10.2890	44.6312
BQPS-II (No Compressor)	6.8385	29.6637	-	-	10.0400	43.5513
BQPS-III	-	20.6731	-	43.3356	-	-
KCCP (3 Compressor)	7.0088	30.4024	-	N/A	9.0822	39.3964
KCCP (No Compressor)	6.7622	29.3328	-	50.7461	8.6674	37.5977
KGTPS	7.7456	33.5986	-	-	8.4202	36.5247
SGTPS	7.7677	33.6946	-	-	8.4750	36.7623
Fuel Prices	857	3,717/ 3,262	133,637	232.52	857	3,717

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ANNEX 1-B: REFERENCE UNIT STARTUP CHARGES/ UNIT HOT STANDBY CHARGE

I. UNIT START-UP CHARGES:

In any Month following the startup by which start-ups exceed the allowable number of Free Start-Ups in any Agreement Year, the Power Producer shall be entitled to invoice the Offtaker for, and receive from the Offtaker, the charges ("Unit Start-Up Charges") as set forth in Table-1 of this Section for each start-up in excess of the number of requests shown in Table-2 of this section as Free Start-Ups in any Agreement Year. There shall be no Unit Start-Up Charges payable to the Power Producer pursuant to this Section for any start-up following a Forced Outage, or Partial Forced Outage (unless such forced or partial forced outage is on account of grid conditions or an Emergency claimed by the Offtaker), Maintenance Outage, Scheduled Outage or Force Majeure Event declared by the Power Producer.

If, at any time after (a) the Power Producer has notified the Control Centre that the Power Producer will initiate the starting sequence following a start-up order from the Offtaker, and (b) the Power Producer has actually initiated such sequence and the sequence is subsequently abandoned at the request of the Offtaker, then the initiation of such starting sequence shall be deemed to be a start-up; provided however, that a Startup shall not be deemed to have occurred if the Power Producer is able to act on such order prior to the initiation of the starting sequence. Any such start-up, prior to the Offtaker use of the allowable number of Free Start-Ups in any Agreement Year, shall be credited against such allowable number, and, after the Offtaker's use of the allowable number of Free Start-Ups in any Agreement Year, Unit Start-Up Charges for any such start-up shall be payable by the Offtaker.

Unit Start-Up Charges shall be indexed and adjusted over the Term as provided in Section- 10.

"Unit Start-Up Charge" shall consist of two components and is calculated as follows:

"Unit Start-Up Charge = MDI Charge+ Reference Start-Up"

a) MDI Charge.

The MDI charge shall be based on actual cost charged by the distribution company to the Complex for the maximum demand recorded during the relevant month at startups and shall be calculated based on the then applicable MDI rate in Rs/kW, from time to time, applied to the actual MDI in kW for such startup.

b) Reference Unit Start-Up Charge.

This cost will cover the consumables, Fuel and equivalent operating hours consumed for the start-ups. This cost will be based on the following table and shall escalate as per the formulas provided for in Section 10.

Table 1: Reference Startup Charges PKR [Gas (SSGC) Fuel]

Startup Cost Gas	BQPS-I (One Unit)											
Backfeed charges (Upto unit Synch)	Very Hot Startup		Hot Startup		Warm Startup		Cold Startup		Ambient Cold Startup		Coastdown Cold Startup	
Backfeed import duration	15	min	135	min	195	min	420	min	1320	min	1560	min
Power import	7.50	MW	7.48	MW	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Backfeed charges	46,252.68	PKR	414,398.52	PKR	383,987.43	PKR	869,676.87	PKR	2,730,801.33	PKR	3,219,558.06	PKR
Gas price (HHV)	1300.82	Rs/MMBtu	1300.82	Rs/MMBtu	1300.82	Rs/MMBtu	1300.82	Rs/MMBtu	1300.82	Rs/MMBtu	1300.82	Rs/MMBtu
GCV	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf
Gas flow used L (t)	2.375	Ton	9.875	Ton	12.5	Ton	17.8	Ton	108.5	Ton	134	Ton
Ton to mmScf Convertion	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	0.25	hr	2.25	hr	3.08	hr	7	hr	23	hr	26	hr
Gas consumed (MMCF)	0.1188	mmcf	0.4612	mmcf	0.5888	mmcf	1.2089	mmcf	5.1138	mmcf	5.3341	mmcf
Gas Consumption	111.49	MMBtu	463.55	MMBtu	586.77	MMBtu	1195.59	MMBtu	5140.11	MMBtu	5251.95	MMBtu
Fuel Cost (Gas)	367,996.41	PKR	1,530,080.33	PKR	1,936,823.20	PKR	4,276,585.63	PKR	16,966,571.27	PKR	17,463,827.62	PKR
Total Cost (Startup)	414,249.09	PKR	1,944,478.85	PKR	2,320,805.63	PKR	5,136,382.50	PKR	19,687,452.60	PKR	20,679,385.68	PKR

Note 1: Formula for start up charges is given in petition which includes MOI charge and Start up charge. Calculation of start up charge is given above

Note 2: Start up charge is to be indexed due to change in fuel prices and Per unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by the

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost.
Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case

Table 1.1: Reference Startup Charges PKR [Gas (PLL) Fuel]

Start-up Cost Gas	BQPS-I (One Unit)											
Backfeed charges (Upto unit Synch)	**Very Hot Startup**		**Hot Startup**		**Warm Startup**		**Cold Startup**		**Ambient Cold Startup**		**Overhaule Cold Startup**	
Backfeed import duration	15	min	191	min	185	min	420	min	1320	min	1540	min
Power import	7.50	MW	7.86	MW	5.05	MW	4.98	MW	5.03	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Backfeed charges	**46,252.66**	**PKR**	**414,368.52**	**PKR**	**383,982.43**	**PKR**	**859,876.87**	**PKR**	**2,720,881.32**	**PKR**	**3,215,554.06**	**PKR**
Gas price (HHV)	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu
GCV	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf
Gas flow used L (t)	2.375	Ton	9.875	Ton	12.5	Ton	27.6	Ton	109.5	Ton	134	Ton
Ton to mmScf Convertion	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	0.25	hr	2.25	hr	3.08	hr	7	hr	22	hr	26	hr
Gas consumed (MMCF)	0.1171	mmcf	0.4868	mmcf	0.6162	mmcf	1.3605	mmcf	5.3980	mmcf	5.6199	mmcf
Gas Consumption	125.28	MMBtu	520.89	MMBtu	659.35	MMBtu	1455.84	MMBtu	5775.89	MMBtu	6012.26	MMBtu
Fuel Cost (Gas)	**367,033.54**	**PKR**	**1,526,086.84**	**PKR**	**1,931,755.49**	**PKR**	**4,265,316.12**	**PKR**	**16,922,178.08**	**PKR**	**17,617,610.06**	**PKR**
Total Cost (Startup)	**413,286.22**	**PKR**	**1,940,475.35**	**PKR**	**2,315,737.91**	**PKR**	**5,125,193.00**	**PKR**	**19,643,059.41**	**PKR**	**20,833,164.12**	**PKR**

Note 1: Formula for start up charges is given in petition which includes M/Oil charge and Start up charge. Calculation of start up charge is given above

Note 2: Start up charge is to be indexed due to change in fuel prices and Var unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by Go

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost. Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case

Table 1.1: Reference Startup Charges PKR [HFO Fuel]

[illegible]	BQPS-I (Gas Unit)											
Backfeed charges (Upto unit Synch)	Very Hot Startup		Hot Startup		Warm Startup		Cold Startup		Ambient Cold Startup		Overhaule Cold Startup	
Backfeed import duration	19	min	195	min	185	min	420	min	1320	min	1566	min
Power import	7.92	MW	7.46	MW	5.05	MW	4.95	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/MWh	24.68	PKR/MWh	24.68	PKR/MWh	24.68	PKR/MWh	24.68	PKR/MWh	24.68	PKR/MWh
Backfeed charges	46,252.66	PKR	414,388.52	PKR	383,962.43	PKR	899,376.87	PKR	2,720,881.33	PKR	3,215,558.06	PKR
LDO price	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit
Density (kg/m3)	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3
LDO flow used (t)	0.80	Ton	1.84	Ton	1.27	Ton	14.72	Ton	21.26	Ton	24.58	Ton
Time	0.25	hr	2.25	hr	1.88	hr	7.83	hr	22.00	hr	26.00	hr
LDO Consumption	0.80	Lit	1777.17	Lit	1554.35	Lit	15994.57	Lit	23103.26	Lit	28857.83	Lit
HFO price/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt
HFO flow used (Mt)	2.06	Mt	7.26	Mt	6.23	Mt	13.08	Mt	78.09	Mt	79.80	Mt
Fuel Cost (LDO)	-	PKR	144,519.78	PKR	280,899.97	PKR	1,300,978.06	PKR	1,878,757.17	PKR	2,167,798.74	PKR
Fuel Cost (HFO)	283,434.66	PKR	999,479.74	PKR	1,133,499.55	PKR	1,798,113.00	PKR	10,748,679.00	PKR	10,919,680.30	PKR
Total Cost (Startup)	329,687.34	PKR	1,558,388.06	PKR	1,806,521.54	PKR	3,998,467.91	PKR	15,348,316.51	PKR	16,303,037.10	PKR

Note 1: Formula for start up charges is given in pattern which includes MDI charge and Start up charge. Calculation of start up charge is given above

Note 2: Start up charge is to be instead due to change in fuel prices and Per unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by Go

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost.
Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case

Table 2: Free Startups per Agreement Year

Free Start-Ups shall be nil.

Considering Complex has been allowed Fixed O&M Component within the Tariff Determination, linking with similar plant, no Free Start-Ups have been considered as the Benchmark Plant did not include impact of Free Start-ups.

II. UNIT HOT STANDBY CHARGES:

In any Month, the Power Producer shall be entitled to invoice the Offtaker for, and receive from the Offtaker, the charges ("Unit Hot Standby Charges") as set forth in Table-3 of this Section for each Unit Hot Standby Operation in any Agreement Year.

If, at any time after (a) the Power Producer has notified the Control Centre that the Power Producer will initiate the starting sequence following a Unit Hot Standby Operation order from the Offtaker, and (b) the Power Producer has actually initiated such sequence and the sequence is subsequently abandoned at the request of the Offtaker, then the initiation of such starting sequence shall be deemed to be a Unit Hot Standby Operation; provided however, that a Unit Hot Standby Operation shall not be deemed to have occurred if the Power Producer is able to act on such order prior to the initiation of the starting sequence.

Unit Hot Standby Charges shall be indexed and adjusted over the Term as provided in Section- 11.

" Unit Hot Standby Charge" shall consist of two components and is calculated as follows:

" Unit Hot Standby Charge = MDI Charge + Reference Unit Hot Standby Charge"

a) MDI Charge.

The MDI charge shall be based on actual cost charged by the distribution company to the Complex for the maximum demand recorded during the relevant month at startups and shall be calculated based on the then applicable MDI rate in Rs/kW, from time to time, applied to the actual MDI in kW for such startup. However, this cost shall be claimed unless the same has not been claimed in Unit Start-Up Charges subject to Section 10.

b) Reference Unit Hot Standby Charge.

This cost will cover the consumables, Fuel and equivalent operating hours consumed for the Unit Hot Standby Operation. This cost will be based on the following table and shall escalate as per the formulas provided for in Section 11.

Table 3.1: Reference Unit Hot Standby Charges PKR

Hot Standby Charge - Gas (PLL) BQPS-I (One Unit)								
	Warm mode		Cold mode		Ambient Cold mode		OverHaule Cold mode	
Aux. import charges								
Hot standby Operation duration	185	min	420	min	1320	min	1560	min
Aux. Import load	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Aux. import charges (HSCRefAIC)	**383,982.43**	**PKR**	**859,876.87**	**PKR**	**2,720,881.33**	**PKR**	**3,215,558.06**	**PKR**
Fuel charges								
Gas price (HHV)	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu
GCV	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf
Gas flow used L (t)	9.25	Ton	21	Ton	66	Ton	70.5	Ton
Ton to mmScf Converison	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	3.08	hr	7	hr	22	hr	26	hr
Gas consumed (MMCF)	0.4560	mmcf	1.0352	mmcf	3.2536	mmcf	3.4754	mmcf
Gas Consumption	487.92	MMBtu	1107.71	MMBtu	3481.36	MMBtu	3718.73	MMBtu
Fuel Cost (Gas) (HSCRefFC-PLL)	**1,429,499.06**	**PKR**	**3,245,349.22**	**PKR**	**10,199,668.98**	**PKR**	**10,895,100.96**	**PKR**
Total Cost of Hot Standby Operation	**1,813,481.49**	**PKR**	**4,105,226.09**	**PKR**	**12,920,550.31**	**PKR**	**14,110,659.02**	**PKR**

Table 3.2: Reference Unit Hot Standby Charges PKR

Hot Standby Charge - Gas (SSGC)								
BQPS-I (One Unit)								
	Warm mode		Cold mode		Ambient Cold mode		OverHaule Cold mode	
Aux. import charges								
Hot standby Operation duration	185	min	420	min	1320	min	1560	min
Aux. import load	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Aux. import charges (HSCRefAIC)	**383,982.43**	**PKR**	**859,876.87**	**PKR**	**2,720,881.33**	**PKR**	**3,215,558.06**	**PKR**
Fuel charges								
Gas price (HHV)	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu
GCV	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf
Gas flow used L (t)	9.25	Ton	21	Ton	66	Ton	70.5	Ton
Ton to mmScf Converison	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	3.08	hr	7	hr	22	hr	26	hr
Gas consumed (MMCF)	0.4320	mmcf	0.9808	mmcf	3.0824	mmcf	3.2925	mmcf
Gas Consumption	434.21	MMBtu	985.77	MMBtu	3098.15	MMBtu	3309.38	MMBtu
Fuel Cost (Gas) (HSCRefFC-SSGC)	**1,433,249.17**	**PKR**	**3,253,862.98**	**PKR**	**10,226,426.52**	**PKR**	**10,923,682.87**	**PKR**
Total Cost of Hot Standby Operation	**1,817,231.60**	**PKR**	**4,113,739.85**	**PKR**	**12,947,307.85**	**PKR**	**14,139,240.94**	**PKR**

Table 3.3: Reference Unit Hot Standby Charges PKR

Hot Standby Charge - LDO								
BQPS-I (One Unit)								
	Warm mode		Cold mode		Ambient Cold mode		OverHaule Cold mode	
Aux. import charges								
Hot standby Operation duration	185	min	420	min	1320	min	1560	min
Aux. import load	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Aux. import charges (HSCRefAIC)	**383,982.43**	**PKR**	**859,876.87**	**PKR**	**2,720,881.33**	**PKR**	**3,215,558.06**	**PKR**
Fuel charges								
LDO price	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit
Density (kg/m3)	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3
LDO flow used (t)	3.27	Ton	14.72	Ton	21.26	Ton	24.53	Ton
Time	3.08	hr	7.00	hr	22.00	hr	26.00	hr
LDO Consumption	3554.35	Lit	15994.57	Lit	23103.26	Lit	26657.61	Lit
HFO price/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt
HFO flow used (Mt)	5.42	Mt	6.50	Mt	40.30	Mt	41.60	Mt
Fuel Cost (LDO) (HSCRefFC-LDO)	**289,039.57**	**PKR**	**1,300,678.04**	**PKR**	**1,878,757.17**	**PKR**	**2,167,796.74**	**PKR**
Fuel Cost (HFO) (HSCRefFC-HFO)	**745,880.42**	**PKR**	**895,056.50**	**PKR**	**5,549,350.30**	**PKR**	**5,728,361.60**	**PKR**
Total Cost of Hot Standby Operation	**1,418,902.41**	**PKR**	**3,055,611.41**	**PKR**	**10,148,988.81**	**PKR**	**11,111,716.40**	**PKR**

ANNEX 2: PERIOD WEIGHTING FACTORS

The initial PWFs (subject to revision pursuant to Section 5.3 of the Agreement) are as follows:

Season	Day	Time	Period Weighting Factor
Summer	Weekend Days		
		Peak	1
		Off-Peak	1
	Weekdays		
		Peak	1
		Off-Peak	1
Winter	Weekend Days		
		Peak	1
		Off-Peak	1
	Weekdays		
		Peak	1
		Off-Peak	1

Periods are defined as:

Weekdays = 0000 hrs to 2400 hrs on Monday through Saturday
Weekend Days = 0000 hrs to 2400 hrs on Sunday
Peak Period =1200 hrs to 1700 hrs and 2200 hrs to 0100 hrs
Off -Peak Period = All hours that are not in the "Peak" Period

ANNEX 3: REFERENCE WORKING CAPITAL COMPONENT & INDEXATION MECHANISM

K- Electric Limited
Annexure C: Illustration for Indexation of Working Capital Component (WCC) for the Plant
For the Quarter .....

Description	Unit	Legend	FY 2024 1st Quarter (Reference)				Total	Indexations / Annualization
			BQ-I Unit 1	BQ-I Unit 2	BQ-I Unit 3	BQ-I Unit 4		
1 Cost of Borrowing								
Days applicable for the Quarter*	**days**	**A**	**92**	**92**	**366**	**366**		This will be updated based on actual days for the relevant quarter
Total Days in a year	**days**	**B**	**366**	**366**	**366**	**366**		Will be based on actual calendar days including impact of Leap Year where applicable
KIBOR	%	A1	22.91%	22.91%	22.91%	22.91%	22.91%	Will be indexed as per the Latest 3 - Month KIBOR published by SBP on the last Day of the previous Quarter
Spread for Short term borrowing	%	B1	2.00%	2.00%	2.00%	2.00%	2.00%	
Cost of Borrowing	%	**C = A1 + B1**	**24.91%**	**24.91%**	**24.91%**	**24.91%**	**24.91%**	
Net Capacity	MW	D	168	172	176	177	693	
Units on Net capacity for the Quarter	GWh	**E = D x A x 24 /1000**	372	379	1,341	1,353	**3,444**	Will be updated based on the applicable days of the quarter
2 Fuel cost receivable cycle								
Receivable days - All Units	days	F	30	30	30	30	30	Taken as 30 Days
W. Avg. payment days	**days**	**G**	**18**	**18**	**18**	**18**	**18**	Shall be updated as per W.Avg Days based on sent out of each Fuel Type in the preceeding quarter and their respective Payable Days individually.
Net days	**days**	**H = F - G**	**12**	**12**	**12**	**12**	**12**	
Outstanding fuel amount								
Load factor	%	I	23%	37%	47%	29%		Shall be updated as per W.Avg Dispatch Factor based on sent out of each Fuel Type in the preceding quarter.
Allowed Heat Rate for the Quarter - Net HHV	btu / kWh	J	10,506	10,327	10,163	10,352		W.Avg Heat Rate based on Sent out for the Heat Rates with applicable Degradation and Part Load of the previous quarter
Fuel price	PKR / mmbtu	K	3,279	3,279	3,279	3,279	3,279	W.Avg Fuel Price based on Sent out for the Fuel Prices as used in Fuel Price Indexation for the previous quarter
Fuel amount	PKR mn	L = E x I x J x K / 10^6	2,974	4,882	24,385	15,287	47,538	
Amount for outstanding days	PKR mn	M = L x H / A	388	636	795	506	2,327	
Sales tax at 18%	%	N = 18%	18%	18%	18%	18%	18%	Sales Tax will be updated as per applicable Laws
Amount for outstanding days with sales tax	PKR mn	O = M x (1+N)	458	733	840	568	2,745	
Cost of working capital on outstanding amount	PKR mn	**P = C x O x A/B**	**29**	**47**	**234**	**148**	**456**	

[illegible] Limited
Annexure C: Illustration for Indexation of Working Capital Component (WCC) for the Plant
For the Quarter ____________

Description	Unit	Legend	FY [illegible] Quarter [illegible]				Total	Indications / Justification
			[illegible]	[illegible]	[illegible]	[illegible]		
a Cost of HFO Inventory								
Maximum Allowed Inventory	M ton	Q	16,800	16,440	15,870	16,172	65,[illegible]	
Fuel price - FO	PKR/ M.ton	R	130,087	130,087	130,087	130,087	130,087	Will be updated based on the Closing Fuel Price as of Last day of previous quarter
Amount of Inventory - Maximum Allowed Inventory	PKR mn	S = Q x R	2,200	2,160	2,122	2,101	8,[illegible]	will be updated as per actual at the close of previous quarter
Actual Amount of Fuel Inventory	PKR mn	S (i)	2,206	2,116	2,122	2,101	8,[illegible]	
Lower of Actual or Maximum Allowed Fuel Inventory Levels	PKR mn	S (ii)	2,200	2,116	2,122	2,101	8,[illegible]	
Cost of working capital for Inventory	PKR mn	T = S (ii) x C x A/B	130	130	[illegible]	330	1,349	
b Cost of Other Inventory								
Inventory amount	PKR mn	U	400	400	400	400	1,600	Will be updated as per actual at the close of previous quarter
Cost	PKR mn	V = U x C x A/B	114	114	114	114	[illegible]	
c Cost of SBLC								
Cost of 60 days RLNG								
Heat rate - Gas - Net HHV	btu / kWh	W	11,221	11,140	10,700	11,200	-	Base Load Heat Rate (Gas Fuel) with applicable Degradation as of close of the previous quarter
Reference RLNG price	PKR / mmbtu	X	3,717	3,717	3,717	3,717	-	Latest Fuel Price (Gas Fuel) as of close of the previous quarter
RLNG amount - 60 days	PKR mn	Y = S x W x X x 60 / A / 10^6	10,120	10,217	10,540	10,397	-	-
Actual SBLC given	PKR mn	Z	0	0	1,026	1,030	2,056	Will be updated on actual cost of SBLC based on SBLC issued at close of previous quarter
SBLC Cost - 60 days or actual, whichever is lower	PKR mn	AA = MIN (Y , Z)	0	0	1,026	1,030	2,056	-
SBLC cost at 1%	%	AB	1.00%	1.00%	1.00%	1.00%	-	
Maximum Allowed Cost	PKR mn	AC	-	-	10	10	21	-
Actual Cost	PKR mn	AD	-	-	5	5	10	Will be updated on actual cost of SBLC based on SBLC issued at close of previous quarter
Lower of Maximum allowed or actual cost of SBCL	PKR mn	AE = MIN (AC , AD)	-		5	5	10	
Total cost of working capital	PKR mn	AF = P + T + V + AE	[illegible]	[illegible]	[illegible]	[illegible]	2,[illegible]	
Units at Net Capacity for the Quarter	GWh	AG	[illegible]	470	1,04[illegible]	1,0[illegible]	[illegible]	
Working capital Component	PKR / kWh	AH = AF / AG					0.[illegible]	

Note:
*The above calculation for reference component for Unit [illegible] is based on full year cost and capacity however this will be updated based on the applicable days of the quarter for future Indexation.

ANNEX 4: BQPS I PART LOAD TABLE – GAS & HFO

ANNEX 5: UNIT START-UP COST VERIFIED BY NESPAK – GAS & LDO

BIN QASIM THERMAL POWER STATION – 1

K-ELECTRIC LTD, KARACHI , PAKISTAN

SUBJECT : ESTIMATED PLANT PART LOAD PERFORMANCE

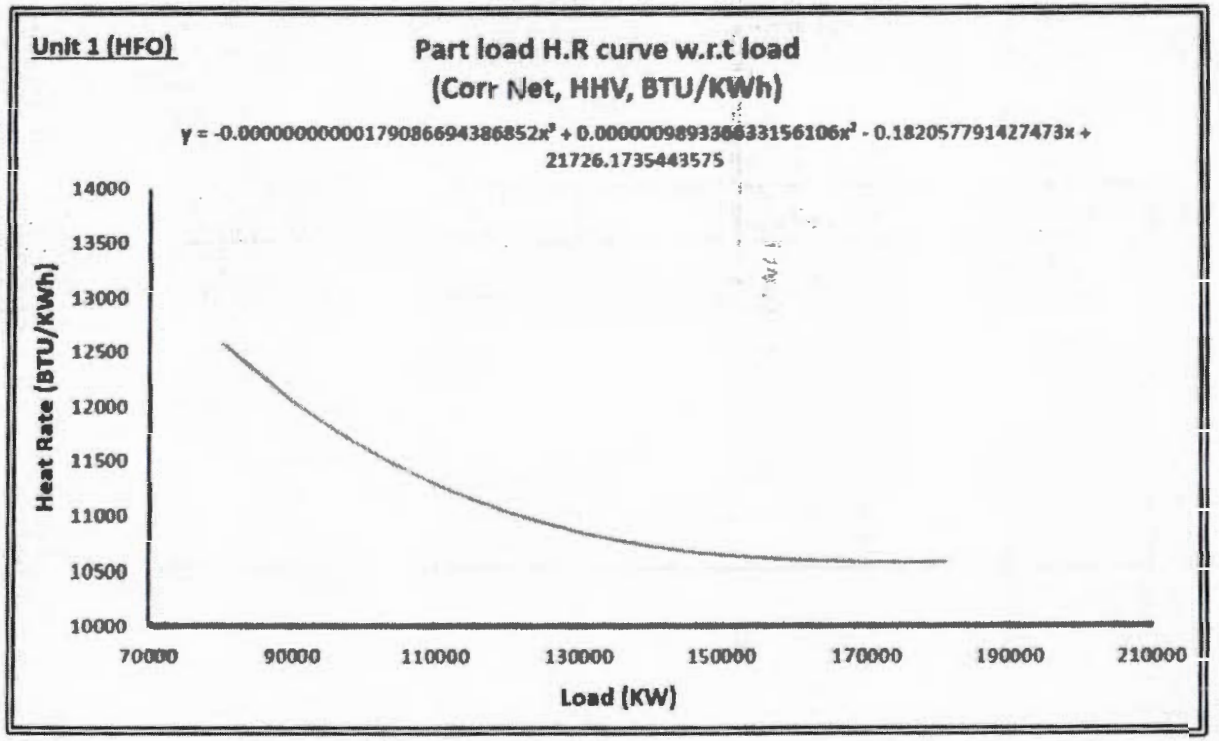
CONTRACTOR : KEPCO KPS

211, Munhwa-ro , Naju-si , Jeollanam-do , 58326,
Republic of Korea.

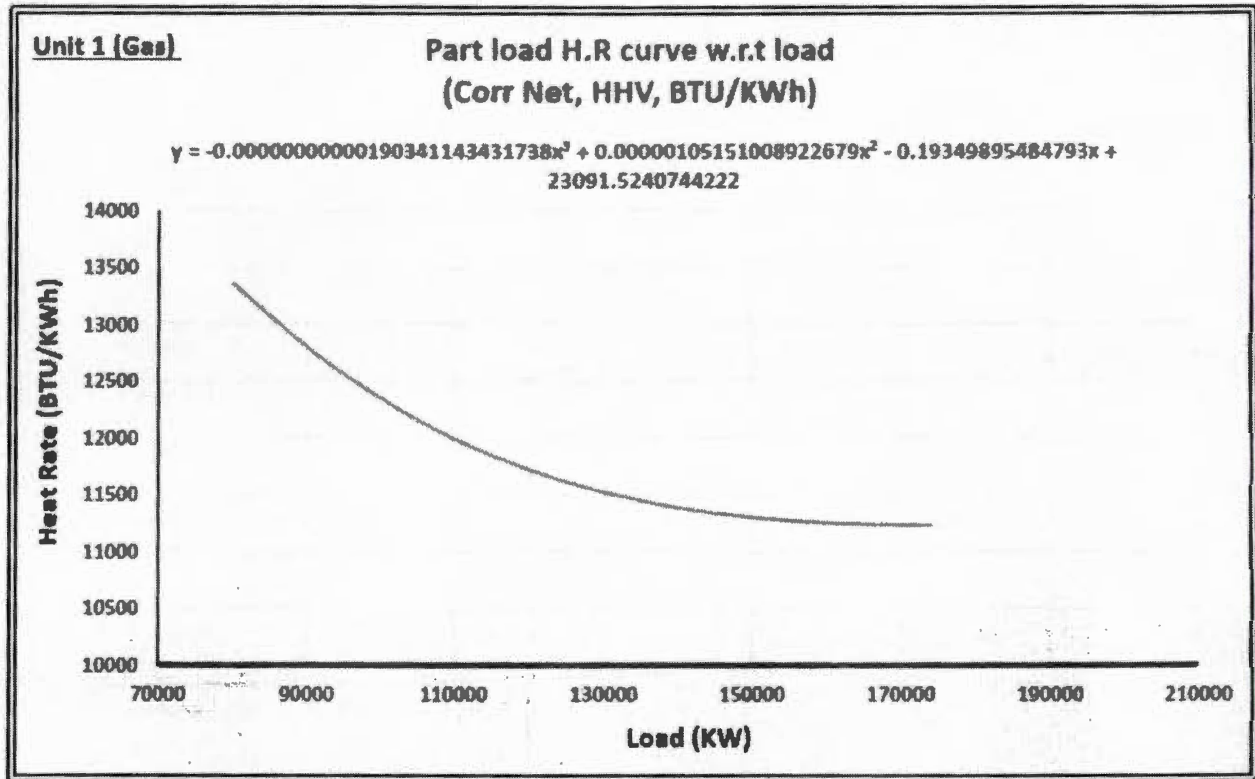
S. No	Date	Description	Prepared by	Reviewed by	Approved by
	19 JUL 2022	part Load correction curve			

KEPCO KPS

UNIT No. 1



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ★ VERIFIED


Unit 1 (Gas)
Part load H.R curve w.r.t load
(Corr Net, HHV, BTU/KWh)
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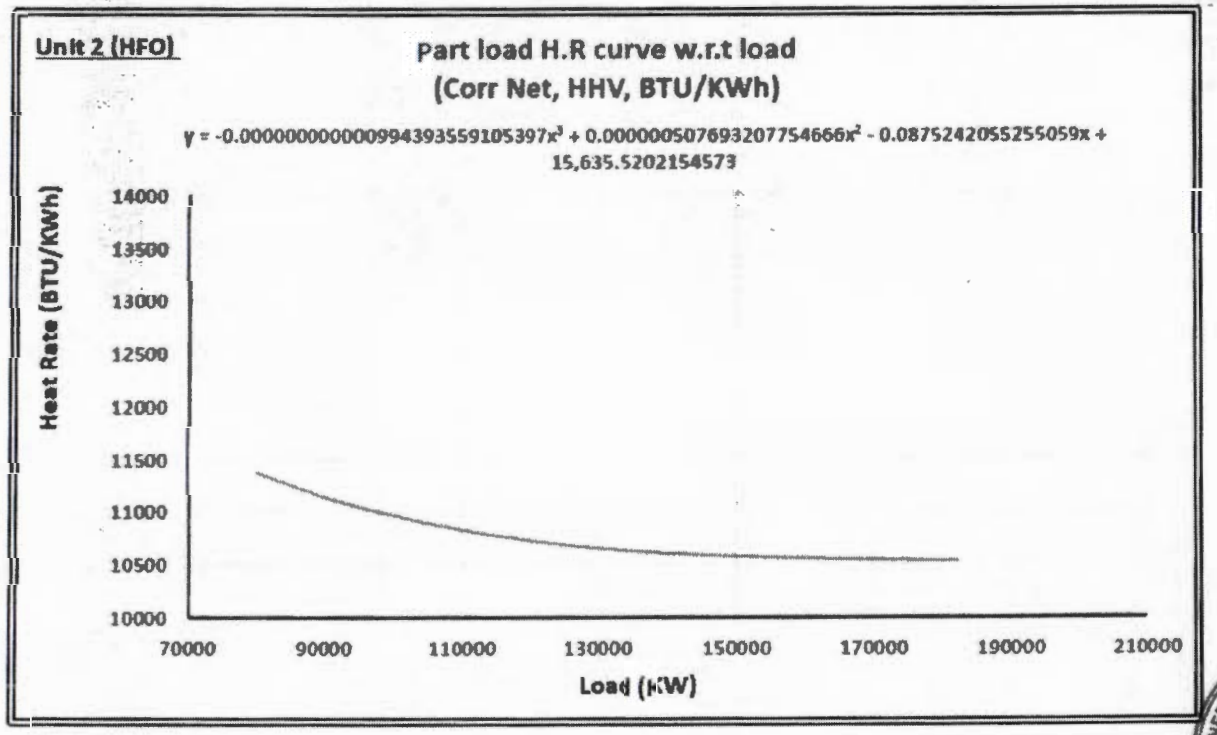
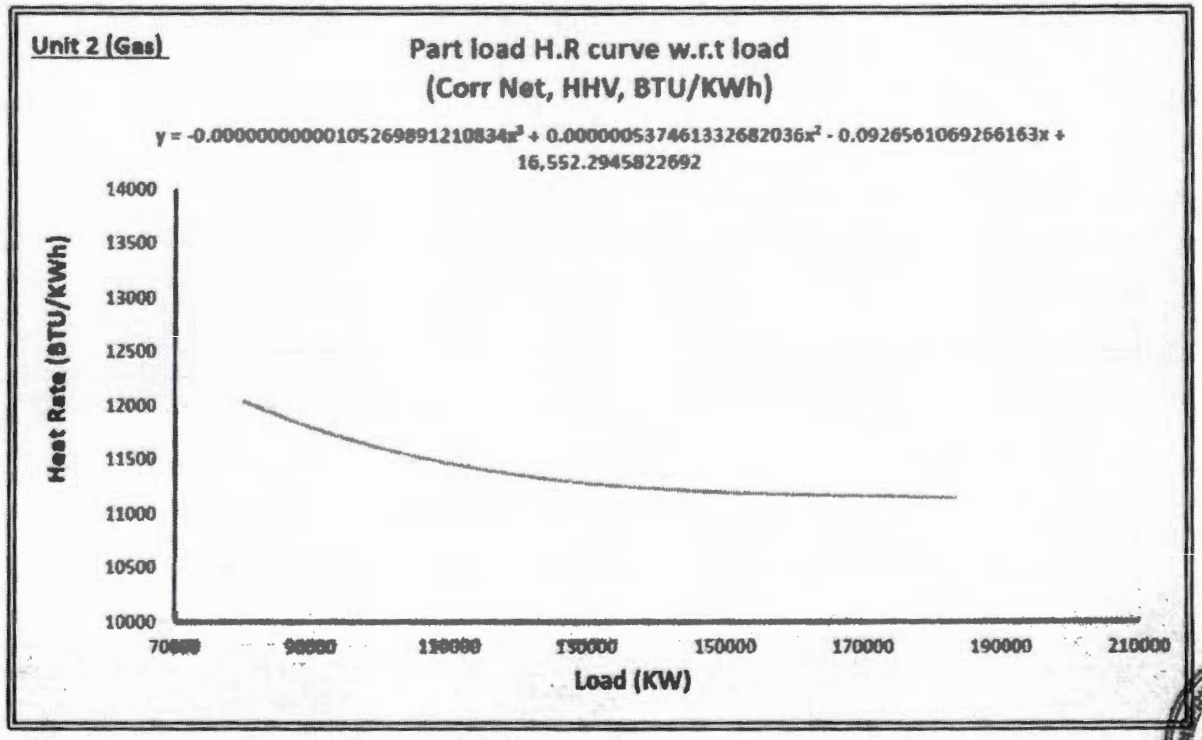
Heat Rate (BTU/KWh)
14000
13500
13000
12500
12000
11500
11000
10500
10000
70000
90000
110000
130000
150000
170000
190000
210000
Load (KW)

UNIT No. 2



Unit 2 (Gas)



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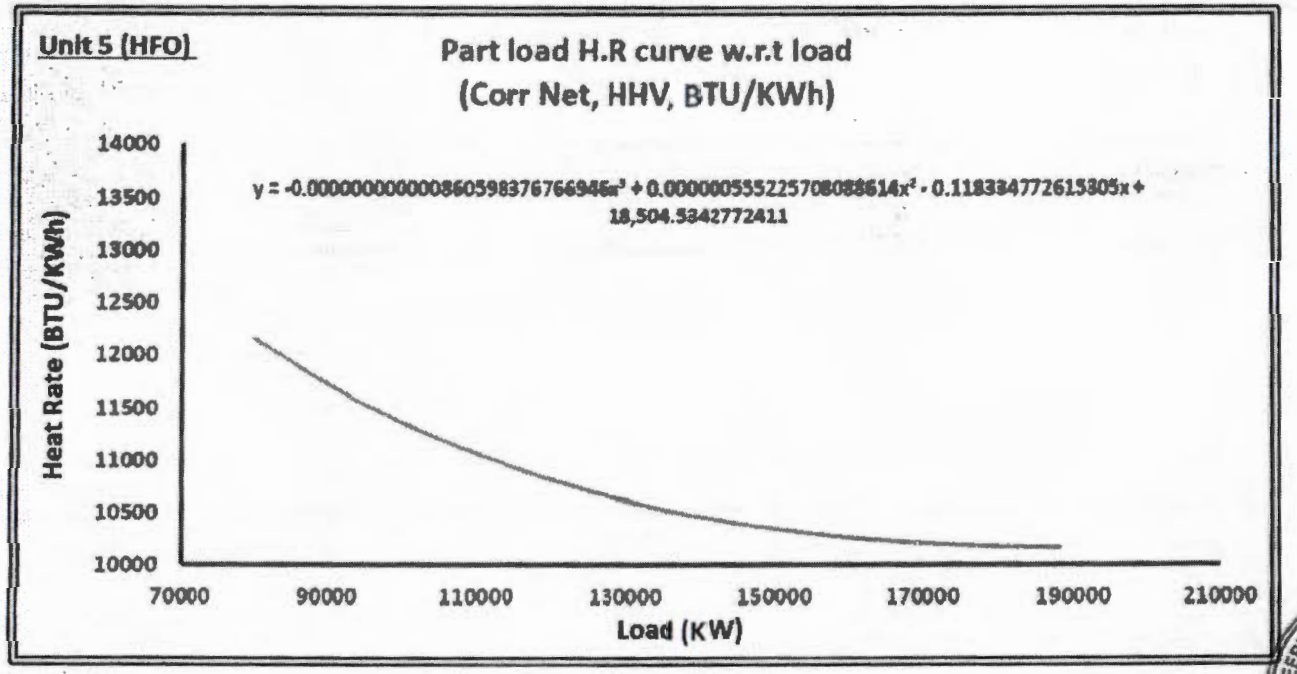
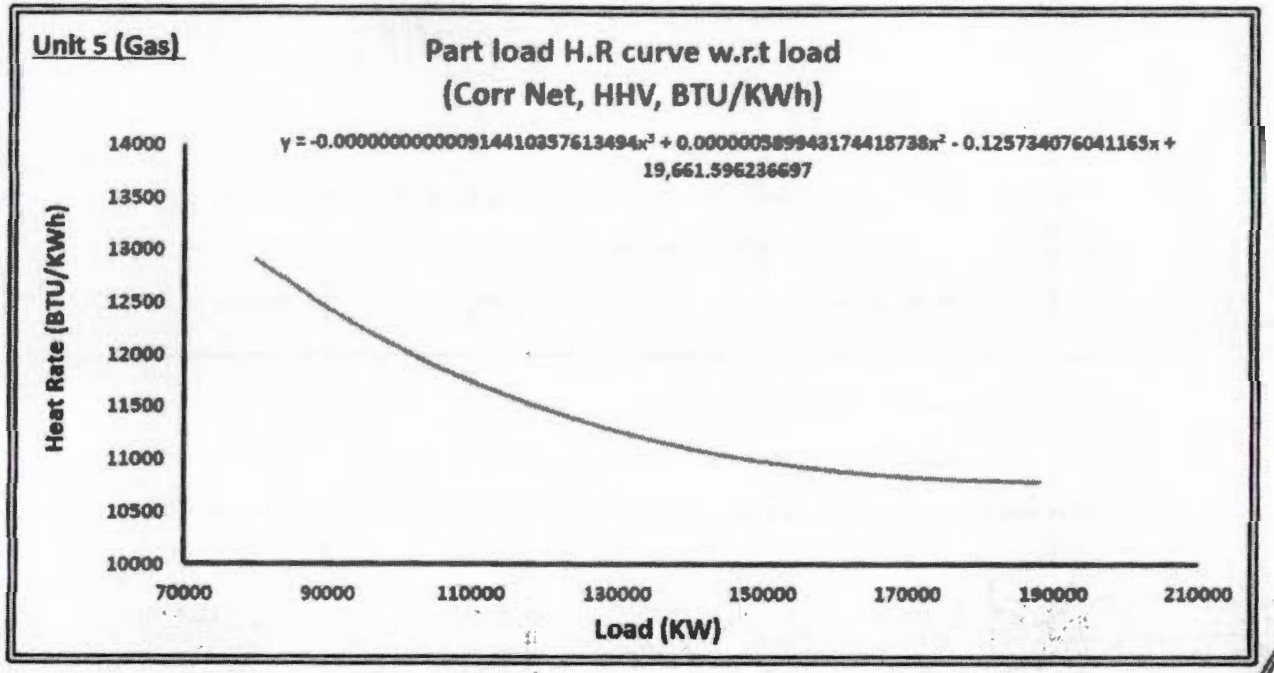
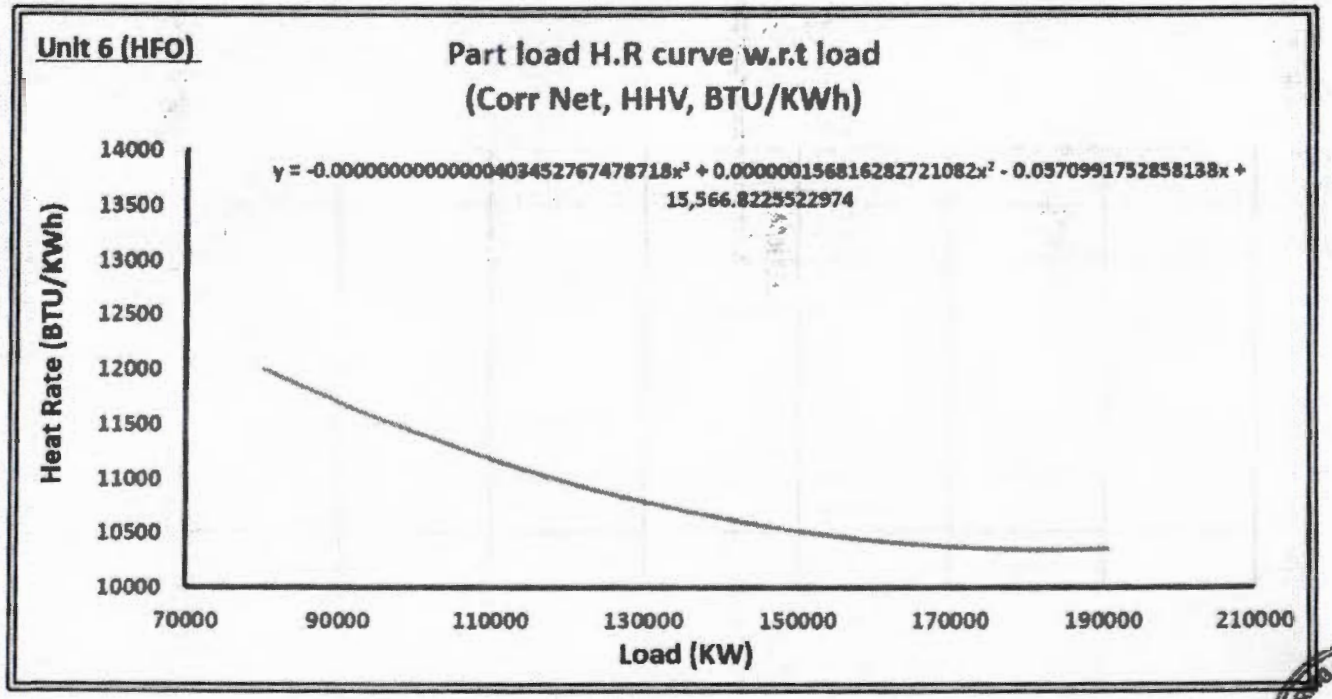


kepco kps

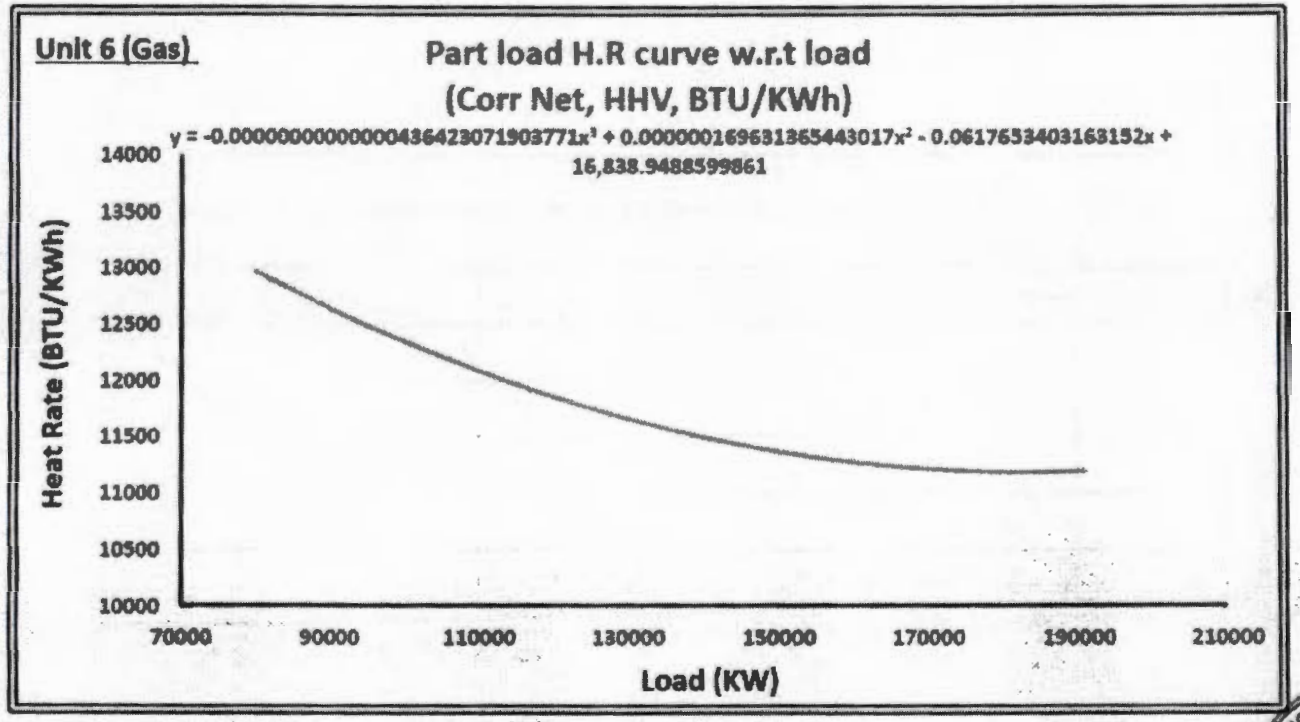


NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. VERIFIED

UNIT No. 6



VERIFIED



VERIFIED
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.

Start-up Cost-Gas	BQPS-I (One Unit)											
Backfeed charges (Upto unit Synch)	**Very Hot Startup**		**Hot Startup**		**Warm Startup**		**Cold Startup**		**Ambient Cold Startup**		**OverHaule Cold Startup**	
Backfeed import duration	15	min	135	min	185	min	420	min	1320	min	1560	min
Power import	7.50	MW	7.46	MW	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Backfeed charges	46,252.68	PKR	414,388.52	PKR	383,982.43	PKR	859,876.87	PKR	2,720,881.33	PKR	3,215,558.06	PKR
Gas price (HHV)	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu	2929.79	Rs/MMBtu
GCV	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf	1070	Btu/Scf
Gas flow used L (t)	2.375	Ton	9.875	Ton	12.5	Ton	27.6	Ton	109.5	Ton	114	Ton
Ton to mmScf Converison	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	0.25	hr	2.25	hr	3.08	hr	7	hr	22	hr	26	hr
Gas consumed (MMCF)	0.1171	mmcf	0.4868	mmcf	0.6162	mmcf	1.3606	mmcf	5.3980	mmcf	5.6199	mmcf
Gas Consumption	125.28	MMBtu	520.89	MMBtu	659.35	MMBtu	1455.84	MMBtu	5775.89	MMBtu	6013.26	MMBtu
Fuel Cost (Gas)	367,033.54	PKR	1,526,086.84	PKR	1,931,755.49	PKR	4,265,316.12	PKR	16,922,178.08	PKR	17,617,610.06	PKR
Total Cost (Startup)	413,286.22	PKR	1,940,475.35	PKR	2,315,737.91	PKR	5,125,192.99	PKR	19,643,059.41	PKR	20,833,168.12	PKR

Note 1: Formula for start up charges is given in petition which includes MDI charge and Start up charge. Calculation of start up charge is given abow

Note 2: Start up charge is to be indexed due to change in fuel prices and Per unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by Go

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost.
Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case

Startup Cost-Gas												
	BQPS-I (One Unit)											
Backfeed charges (Upto unit Synch)	**Very Hot Startup**		**Hot itartup**		**Warm Startup**		**Cold Startup**		**Ambient Cold Startup**		**OverHaule Cold Startup**	
Backfeed import duration	15	min	135	min	185	min	420	min	1320	min	1560	min
Power import	7.50	MW	7.46	MW	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Backfeed charges	46,252.68	PKR	414,388.52	PKR	383,982.43	PKR	859,876.87	PKR	2,720,881.33	PKR	3,215,558.06	PKR
Gas price (HHV)	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu	3300.82	Rs/MMBtu
GCV	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf	1005.12	Btu/Scf
Gas flow used L (t)	2.375	Ton	9.875	Ton	12.5	Ton	27.6	Ton	109.5	Ton	114	Ton
Ton to mmScf Converison	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton	0.05	mmScf/Ton
Time	0.25	hr	2.25	hr	3.08	hr	7	hr	22	hr	26	hr
Gas consumed (MMCF)	0.1109	mmcf	0.4612	mmcf	0.5838	mmcf	1.2890	mmcf	5.1139	mmcf	5.3241	mmcf
Gas Consumption	111.49	MMBtu	463.55	MMBtu	586.77	MMBtu	1295.59	MMBtu	5140.11	MMBtu	5351.35	MMBtu
Fuel Cost (Gas)	367,996.41	PKR	1,530,090.33	PKR	1,936,823.20	PKR	4,276,505.63	PKR	16,966,571.27	PKR	17,663,827.62	PKR
Total Cost (Startup)	414,249.09	PKR	1,944,478.85	PKR	2,320,805.63	PKR	5,136,382.50	PKR	19,687,452.60	PKR	20,879,385.69	PKR

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Note 2: Start up charge is to be indexed due to change in fuel prices and Per unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by Gol

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost. Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case

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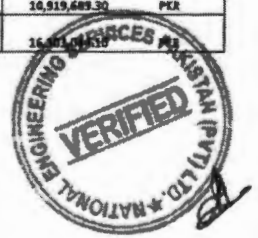
Start-up Cost (LDO)	BQPS-I (One Unit)											
Backfeed charges (Upto unit Synch)	Very Hot Startup		Hot Startup		Warm Startup		Cold Startup		Ambient Cold Startup		OverHaule Cold Startup	
Backfeed import duration	15	min	135	min	185	min	420	min	1320	min	1560	min
Power import	7.50	MW	7.46	MW	5.05	MW	4.98	MW	5.01	MW	5.01	MW
Power import rate	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh	24.68	PKR/kWh
Backfeed charges	46,252.68	PKR	414,388.52	PKR	383,982.43	PKR	859,876.87	PKR	2,720,881.33	PKR	3,215,558.06	PKR
LDO price	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit	81.32	Rs/lit
Density (kg/m3)	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3	920.00	kg/m3
LDO flow used (t)	0.00	Ton	1.64	Ton	3.27	Ton	14.72	Ton	21.26	Ton	24.53	Ton
Time	0.15	hr	2.25	hr	3.08	hr	7.00	hr	22.00	hr	26.00	hr
LDO Consumption	0.00	Lit	1777.17	Lit	3554.35	Lit	15994.57	Lit	23103.26	Lit	26657.61	Lit
HFO price/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt	137701.00	Rs/Mt
HFO flow used (Mt)	2.06	Mt	7.26	Mt	8.23	Mt	13.00	Mt	78.00	Mt	79.30	Mt
Fuel Cost (LDO)	-	PKR	144,519.78	PKR	289,039.57	PKR	1,300,678.04	PKR	1,878,757.17	PKR	2,167,796.74	PKR
Fuel Cost (HFO)	283,434.56	PKR	999,479.76	PKR	1,133,499.55	PKR	1,790,113.00	PKR	10,740,678.00	PKR	10,919,689.30	PKR
Total Cost (Startup)	329,687.24	PKR	1,556,388.06	PKR	1,806,521.54	PKR	3,950,667.91	PKR	15,340,316.51	PKR	16,303,044.10	PKR

Note 1: Formula for start up charges is given in petition which includes MDI charge and Start up charge. Calculation of start up charge is given above

Note 2: Start up charge is to be indexed due to change in fuel prices and Per unit charge for import based on latest applicable Consumer tariff rates and adjustments notified by Go

Note 3: If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost.
Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case



SCHEDULE 2

TECHNICAL SPECIFICATIONS

1. General

The Complex is thermal power plant and its design configuration consists of 4 Units with 4 "TCDF-26" Hitachi Steam Turbines with 4 water tube boilers (Babcock), 1 boiler installed with each Steam Turbine. The Power Plant is situated on PQA Mehran Highway Road, in the District of Malir, Karachi, Sindh Province.

1.1 Gross Dependable Capacity of the Complex

Unit 1: 181.2 MW
Unit 2: 183.41 MW
Unit 5: 188.28 MW
Unit 6: 191.03 MW
BQPS-I: 743.92 MW

2. Plant Reference Site Conditions

Reference Conditions at the Plant Site are as follows:

- Sea water temperature = 28 °C

2.1 Net Tested Capacity of the Complex at Reference Conditions

Unit 1: 168.32 MW
Unit 2: 171.62 MW
Unit 5: 175.90 MW
Unit 6: 177.24 MW
BQPS-I: 693.08 MW

3. Plant Characteristics

Description	Unit 1	Unit 2	Unit 5	Unit 6
Gross installed capacity at mean site conditions	210 MW	210 MW	210 MW	210 MW
Generation voltage	21 kV	21 kV	18 kV	18 kV
Grid voltage	220 kV	220 kV	220 kV	220 kV
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Power factor	Lead 0.95 / Lag 0.85	Lead 0.95 / Lag 0.85	Lead 0.95 / Lag 0.85	Lead 0.95 / Lag 0.85

Description	Unit 1	Unit 2	Unit 5	Unit 6
Ramp up rate of generators (per minute) *	1% 3% 5%	1% 3% 5%	1% 3% 5%	1% 3% 5%
Time required to reach base load (Synch to base load) – HH:MM	V. Hot: 01:25 Hot: 01:25 Warm: 01:25 Cold: 01:40 Amb. Cold: 01:50	V. Hot: 01:25 Hot: 01:25 Warm: 01:25 Cold: 01:40 Amb. Cold: 01:50	V. Hot: 01:25 Hot: 01:25 Warm: 01:25 Cold: 01:40 Amb. Cold: 01:50	V. Hot: 01:25 Hot: 01:25 Warm: 01:25 Cold: 01:40 Amb. Cold: 01:50

*3% and 5% ramp rate is only for emergency situations

Plant configuration

Description	Unit 1	Unit 2	Unit 5	Unit 6
Technology	Thermal	Thermal	Thermal	Thermal
Type of fuel	RFO/HFO, Natural Gas/RLNG	RFO/HFO, Natural Gas/RLNG	RFO/HFO, Natural Gas/RLNG	RFO/HFO, Natural Gas/RLNG
Equipment	Boiler, Turbo/Gen	Boiler, Turbo/Gen	Boiler, Turbo/Gen	Boiler, Turbo/Gen
Gross installed capacity at mean site conditions	210 MW	210 MW	210 MW	210 MW
Make	Boiler (Babcock, Hitachi, Japan), Turb0/Gen (Hitachi, Japan)	Boiler (Babcock, Hitachi, Japan), Turb0/Gen (Hitachi, Japan)	Boiler (Babcock, Hitachi, Japan), Turb0/Gen (Hitachi, Japan)	Boiler (Babcock, Hitachi, Japan), Turb0/Gen (Hitachi, Japan)
Type	"TCDF-26" steam turbines	"TCDF-26" steam turbines	"TCDF-26" steam turbines	"TCDF-26" steam turbines

Plant Startup time

PLANT	Start-Up Time (HH:MM)*						
	V. HOT (Boiler remains live)	HOT	WARM	COLD	AMBIENT COLD**	AMB COLD (Boiler wet preserved)	OVERHAUL COLD
BQPS-I Unit-1	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-2	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-5	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-6	00:15	02:15	03:05	07:00	22:00	30:00	26:00

* From Demand till Synch

** If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost. Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case.

4. Performance Curves

The Power Producer shall provide all performance and correction factors/curves for the Units including but not limited to the following:

- Output vs. Sea water temperature

5. Description of the Complex

BQPS-I operates on reheat, regenerative Rankine thermal cycle with 4 generators, 4 STs and 4 Boilers (each for single generating Unit x 4 Units).

BQPS-I has 220 kV Switchyard, 6.6 kV and 0.4 kV system and other major areas like, Reverse Osmosis (RO) plant, Water treatment plant, Demin water tank, fire water tank, Heavy Fuel Oil & Light Diesel Oil tanks, Wastewater treatment plant, Control Rooms (each for individual unit), Network Control Room (NCR) at Unit 1, Management Office building, security check post, Warehouse & workshop building, Emergency Diesel Generator, Firefighting pump house, Cooling water station (sea water intake) and Hydrogen generating plant.

The Plant utilizes sea water for cooling in open & closed system coolers and for condenser for steam condensation by lowering down its temperature. The sea water is drawn from sea water intake channel through circulating water pumps and is discharged in the outfall channel back into the sea.

The Generator terminal voltage of Units 1 & 2 is at 21 kV and Units 5 & 6 is 18 kV and is stepped up to 220 kV through dedicated step up transformers for each Unit, having nameplate capacity of 247 MVA for Unit 1 and Unit 2, and 250 MVA for Unit 5 and

Unit 6. All Unit step up transformers are equipped with On Load Tap Changers. The Power is supplied into Offtaker's 220 kV network through Gas Insulated Switchgear (GIS).

Units 1, Unit 5 and Unit 6 are controlled through a distributed control system (DCS). Unit 1 and Unit 5 use ABB Symphony Plus DCS, while Unit 6 uses ABB P14 Pro Control DCS. Unit 2 is controlled through ABB/BBC Procontrol Decontik K legacy hardwired control system.

6. Civil Structure Safety Design factor

Civil design is based on maximum earthquake design factor of 1/10 g to 1/20 g and the design wind speed of 9 m/s at a height of 61 meters.

7. Fuel Supply and Storage

The Units are designed to be operated on dual fuel; Natural gas and RLNG/RFO. The primary Fuel is natural gas, and the alternate Fuel is RLNG/RFO. SSGC is providing Natural gas/RLNG and alternatively RLNG is also supplied by Pakistan LNG Limited (PLL) through a dedicated RLNG supply pipeline to BQ Complex and the RLNG tariff metering installed at Custody Transfer Station (CTS) at PLL premises.

BQPS-I is procuring RFO from PSO/BYCO under the defined Fuel Supply Agreements. From March 2024, the plant has been equipped with alternate RLNG supply system for gas utilization from PLL. Furnace oil is transported to the site through oil tanker trucks and through direct filling fuel oil pipeline and is directed into the storage tanks. There are 8 running fuel oil supply pumps available at plant site to deliver fuel from storage tanks towards the boilers. The supply pump unit transfers Furnace oil from the storage tanks to the boiler going through heating system which heats the RFO to a temperature of approximately 110°C.

There are six (6) storage tanks (2 x 10,000 m^3 + 4 x 25000 m^3). Three (3) tanks are dedicated to fuel suppliers for storage of their inventory to be supplied to BQPS-I. RFO procured from local oil marketing companies is stored in 3 storage tanks having a cumulative capacity of around 65,000 Metric Ton located at the plant site to hold RFO.

HFO / RFO Tank #	Storage Capacity (m^3)	Custodian
1*	10,000	BYCO
2	10,000	BYCO
3	25,000	KE
4	25,000	KE
5	25,000	KE
6	25,000	PSO

**Planned to be used for HSD storage for BQ Complex*

SCHEDULE - 3

Power Producer and Offtaker Interconnection Works:

1. Interconnection and Transmission Facilities:

1.1 The interconnection between the Complex and the Offtaker Grid System is as stated below:

a) Interconnection 1: Connecting via T-off configuration, to overhead transmission line from BQPS-III Complex to Pipri West Grid Station (Circuit-1) having an approx. length of 8.61 km.

b) Interconnection 2: Connecting via T-off configuration, to overhead transmission line from BQPS-III Complex to Pipri West Grid Station (Circuit-2) having an approx. length of 8.61 km.

c) Interconnection 3: Connecting via T-off configuration, to overhead transmission line from BQPS-III Complex to Pipri West Grid Station (Circuit-3) having an approx. length of 8.51 km.

1.2 The transmission lines terminate in the substation of Complex and connect at bushings to line terminal gantries provided by the Power Producer. The boundary of responsibility between the Power Producer and the Offtaker are at the top of the bushings clamping terminal of the gantries (the "**Interconnection Point**").

1.3 The installed Metering System other than backup meters (including its equipment, CT / PT, remote terminal units, and electronic data recording system) which together with the transmission line referred to above within the Complex's boundary shall comprise the "Offtaker Interconnection Facilities". This equipment will remain the property of the Offtaker and shall be maintained thereafter by the Offtaker.

1.4 A carrier inter-tripping circuit for each 220kV transmission line, shall be provided between the line circuit breakers at the Complex owned by the Power Producer and the line circuit breakers at the adjacent 220kV substations.

2. Interconnection Works:

The Power Producer shall be responsible for maintaining all auxiliary and interconnecting equipment including Remote Terminal Unit (RTU) for SCADA, telemetry and tele-protection system of its side of the Interconnection Point and except for the Metering System, the Power Producer shall own all such auxiliary and interconnection equipment.

The Power Producer will be responsible for the provision of a set of Current and Voltage Transformers for the main Metering System. In addition, both the main and the Back-up Meter systems have an accuracy class of 0.2 for Unit 5 & 6, and 0.5 for Unit 1 & 2.

3. Modification of Protective Devices:

3.1 All protective devices are to be installed by the Power Producer at its own switch yard. The Offtaker may require the Power Producer to modify or expand the requirements for protective devices, subject to giving the Power Producer reasonable notice. Following approval by the Offtaker of the costs of such modification or expansion, the Power Producer shall perform such modification or expansion, and the Offtaker shall reimburse the Power Producer for the reasonable costs of such modification or expansion. Notwithstanding any provision of this Agreement to the contrary, the Power Producer shall not incur any liability to the Offtaker (including without limitation, any damages or penalties for Forced Outage or Partial Forced Outage) while undertaking any modification or expansion of the protective devices at the Offtaker's request and at such time or times approved in advance by the Offtaker. Such work shall be completed within a reasonable time under the circumstances. The Offtaker shall be notified in advance of, and shall have the right to observe all the work on the protective devices.

3.2 Together with an invoice for reimbursement, the Power Producer shall provide reasonable documentation of the expenses incurred in modifying or expanding the protective devices. Payments shall be due in thirty (30) Days after delivery of the invoice by the Power Producer; provided, however, that in case of any Dispute, the provisions of Section 9.7 of the Agreement shall apply.

3.3 The Power Producer shall notify the Offtaker in advance of any changes to either the Complex and the Offtaker shall notify the Power Producer in advance of any changes to the Grid System or interconnection facilities; in each case affecting the proper co-ordination of protective devices between the two systems connected through the Offtaker Interconnection Facilities. The Power Producer shall not in the case of the Complex make any such change without the approval of the Offtaker. The. Offtaker shall not in the case of the Grid System make any such changes, without the Power Producer's approval.

4. Design Data:

Below are the design data for the major components installed at the Complex.

4.1 Steam Turbine and Condenser:

UNIT 1, 2, 5 & 6	
Type/Model	TCDF-26, Hitachi impulse type (2) Casing Tandem Compound Double Flow Reheat Condensing Turbine
Manufacturer	Hitachi
ST designed rating	210 MW
ST rated speed	3000 RPM
Number of casings/stages	2 casings, 19 stages (HP:8, IP:6, LP:5x2)
Steam pressure at steam turbine inlet	140 Bar
Steam Temperature at steam turbine	525 °C

UNIT 1, 2, 5 & 6	
inlet	
Steam pressure at steam turbine outlet	0.07 Bar
Steam temperature at steam turbine outlet	-
Steam flow rate at ST inlet (Ton / hr)	U1 & 2: 646, U5 & 6: 636
Circulating water flow rate for condenser (Ton / hr)	U1: 35350, U2: 34725 U5: 33800, U6: 36795
Circulating water temperature at inlet of condenser	Design 28 °C Max 33 °C
Condenser working pressure	0.07 Bar(a)

4.2 Generators:

Specification	EU	Unit 1 & 2	Unit 5 & 6
Nameplate Rating	kVA	248,300	248,300
Rated voltage at generator terminal	kV	21	18
Number of Phases/poles	-	3 / 2	3 / 2
Frequency	Hz	50	50
Rated Speed	RPM	3000	3000
Power Factor	-	0.85 (Lagging) 0.95 (Leading)	0.85 (Lagging) 0.95 (Leading)
Insulation Class	-	Class F	Class F
Stator Winding Temperature Rise Limit	°C	75	65
Rotor Winding Temperature Rise Limit	°C	70	65
Type of cooling (Hydrogen/Air/Water Pressure PSIG)	-	Rotor: Hydrogen-cooled. Stator: Water-cooled	Stator & Rotor: Hydrogen-cooled
Continuous operating voltage limits per unit for continuous operation at rated kVA and power factor	-	± 5%	± 5%
Apparent power base in MVA	MVA	248.3	248.3
Voltage base in kV	kV	21	18
Direct axis synchronous reactance saturated, Xd	PU	1.85	1.87
Direct axis transient reactance saturated, Xd'	PU	0.276	0.22
Direct axis sub-transient saturated, Xd''	PU	-	0.19

4.3 Excitation System:

Specification	EU	Unit 1 & 2	Unit 5 & 6
Type / model	-	Hitachi Type CFS	ABB Unitrol 6000
Field current at rated load	A	2718	2440
Field voltage at rated load	V	440	350

4.4 Generator Characteristic Curves:

Specification	Unit 1 & 2	Unit 5 & 6
Generator Capability Curves	Annexure 1.1	Annexures 2.1 & 2.2
Generator V Curves	Annexure 1.2	Annexure 2.3
Generator Saturation & Sync Impedance Curves	Annexure 1.3	Annexure 2.4

4.5 Generator Main and Auxiliary Transformers:

4.5.1 Main Transformers (GSUT / BAT)

Parameter	Unit 1 & 2	Unit 5 & 6
Quantity	2	2
Manufacturer	Hitachi	Fuji Elect. Co.
Country of Origin	Japan	Japan
International Standard of Manufacture	IEC 76	IEC 76
Model/Type	Oil Immersed outdoor use	Oil Immersed outdoor use
Single / Three-phase	3-Ph	3-Ph
Maximum Continuous Rating (MVA)	247 MVA	250 MVA
HV/LV	220 kV / 21 kV	220 kV / 18 kV
Percentage Impedance Voltage on base MVA	14.47%	14.87%
Vector group	YNd1	YNd1
Tap	On load	On load
No. of taps	23	23
Cooling	ONAF/OFAF	ONAF/OFAF
Diagram of tap changer connections	Yes	Yes
Frequency	50 Hz	50 Hz
Oil Capacity	71000 L	59000 L

4.5.2 Auxiliary Transformers (UAT / BBT)

Parameter	Unit 1 & 2	Unit 5	Unit 6
Quantity	2	1	1
Manufacturer	Fuji Elect. Co.	Fuji Elect. Co.	Takoaka
Country of Origin	Japan	Japan	Japan

Parameter	Unit 1 & 2	Unit 5	Unit 6
International Standard of Manufacture	IEC	IEC	IEC
Model/Type	Oil Immersed outdoor use	Oil Immersed outdoor use	Oil Immersed outdoor use
Single / Three-phase	3-Ph	3-Ph	3-Ph
Maximum Continuous Rating (MVA)	36 MVA	36 MVA	36 MVA
HV/LV	21 KV / 6.6 kV	18 KV / 6.6 kV	18 KV / 6.6 kV
Percentage Impedance Voltage on base MVA	HV-LV1 9.47% HV-LV2 9.45%	HV-LV1 8.50% HV-LV2 9.60%	HV-LV1 14.0% HV-LV2 14.0%
Vector group	D y11 y11	D y11 y11	D y11 y11
Tap	Off load	Off load	Off load
No. of taps	5	5	5
Cooling	ONAN/ONAF	ONAN/ONAF	ONAN/ONAF
Diagram of tap changer connections	Yes	Yes	Yes
Frequency	50 Hz	50 Hz	50 Hz
Oil Capacity	11500 kg	13400 L	13200 L

4.5.3 Startup Transformers (SST / BCT)

Parameter	Unit 1 & 2 (SST-1)	Unit 5 & 6 (SST-3)
Quantity	1	1
Manufacturer	Hitachi	Fuji Elect. Co.
Country of Origin	Japan	Japan
International Standard of Manufacture	IEC	IEC
Model/Type	Oil Immersed outdoor use	Oil Immersed outdoor use
Single / Three-phase	3-Ph	3-Ph
Maximum Continuous Rating (MVA)	44 MVA	44 MVA
HV/LV	220 kV / 6.6 kV	220 kV / 6.6 kV
Percentage Impedance Voltage on base MVA	HV-LV1 10.15% HV-LV2 10.08%	HV-LV1 18.6% HV-LV2 17.2%
Vector group	YN y0 y0	YN y0 y0
Tap	On load	On load
No. of taps	23	23
Cooling	ONAN/ONAF	ONAN/ONAF
Diagram of tap changer connections	Yes	Yes
Frequency	50 Hz	50 Hz

4.6 Current Transformer Data:

	Unit 1 & 2	SST-1	Unit 5 & 6	SST-3
Rated Voltage / Operational Voltage	245 kV	245 kV	245 kV	245 kV
Rated normal primary current:				
Measuring core (1)	700A	125 A	700A	125 A
Protection core (2)	700A	200 A	700A	200 A
Protection core (3)	700A	200 A	700A	200 A
Protection core (4)	3000-1500A	3000-1500A	3000-1500A	3000-1500A
Rated secondary current	1A	1A	1A	1A
Rated secondary output:				
Measuring core (1)	30 VA	30 VA	30 VA	30 VA
Protection core (2)	30 VA	30 VA	30 VA	30 VA
Protection core (3)	30 VA	30 VA	30 VA	30 VA
Protection core (4)	30 VA	30 VA	30 VA	30 VA
Accuracy class:				
Measuring core	0.5	1	0.2	1
Protection core	5P20	5P20	5P20	5P20

4.7 Voltage Transformer Data:

	Unit 1, 2 & SST-1	Unit 5, 6 & SST-3
Rated Voltage primary Voltage phase to neutral	220/√3 kV	220/√3 kV
Rated normal secondary Voltage phase to neutral	100/√3 V	100/√3 V
Rated secondary output:		
Measuring core	120 VA	120 VA
Protection core	120 VA	120 VA
Accuracy class:		
Measuring core	0.5	0.2
Protection core	3P	3P
Voltage factor	1.5Un 30s	1.5Un 30s

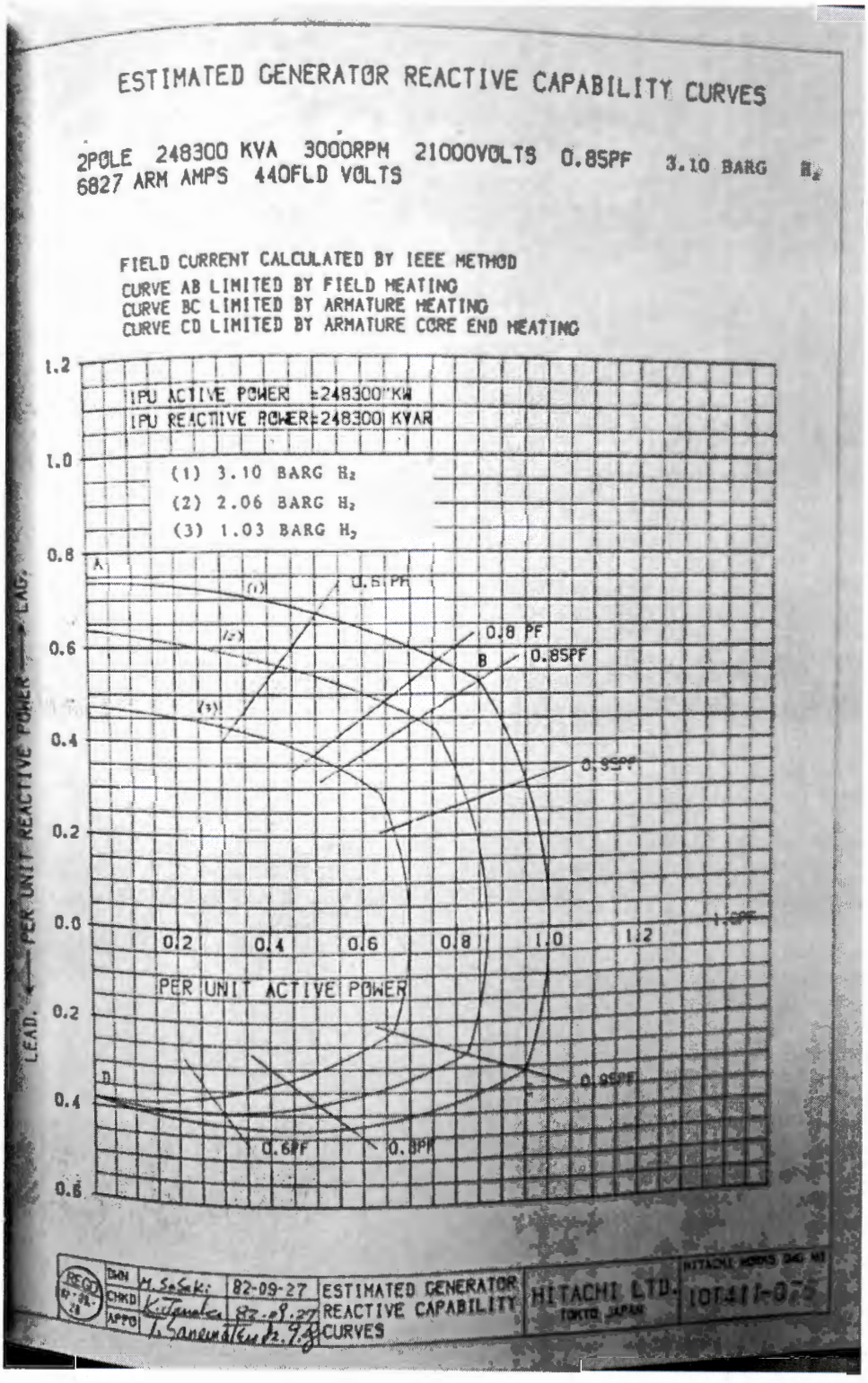
4.8 Circuit Breakers:

Manufacturer		Hitachi
Circuit - Breaker Type - Operating years		SF_6, 40+ operating years
Rated Voltage	kV_{rms}	245
Rated Normal Current	A	1250
Short - Circuit Breaking Current	kA	40

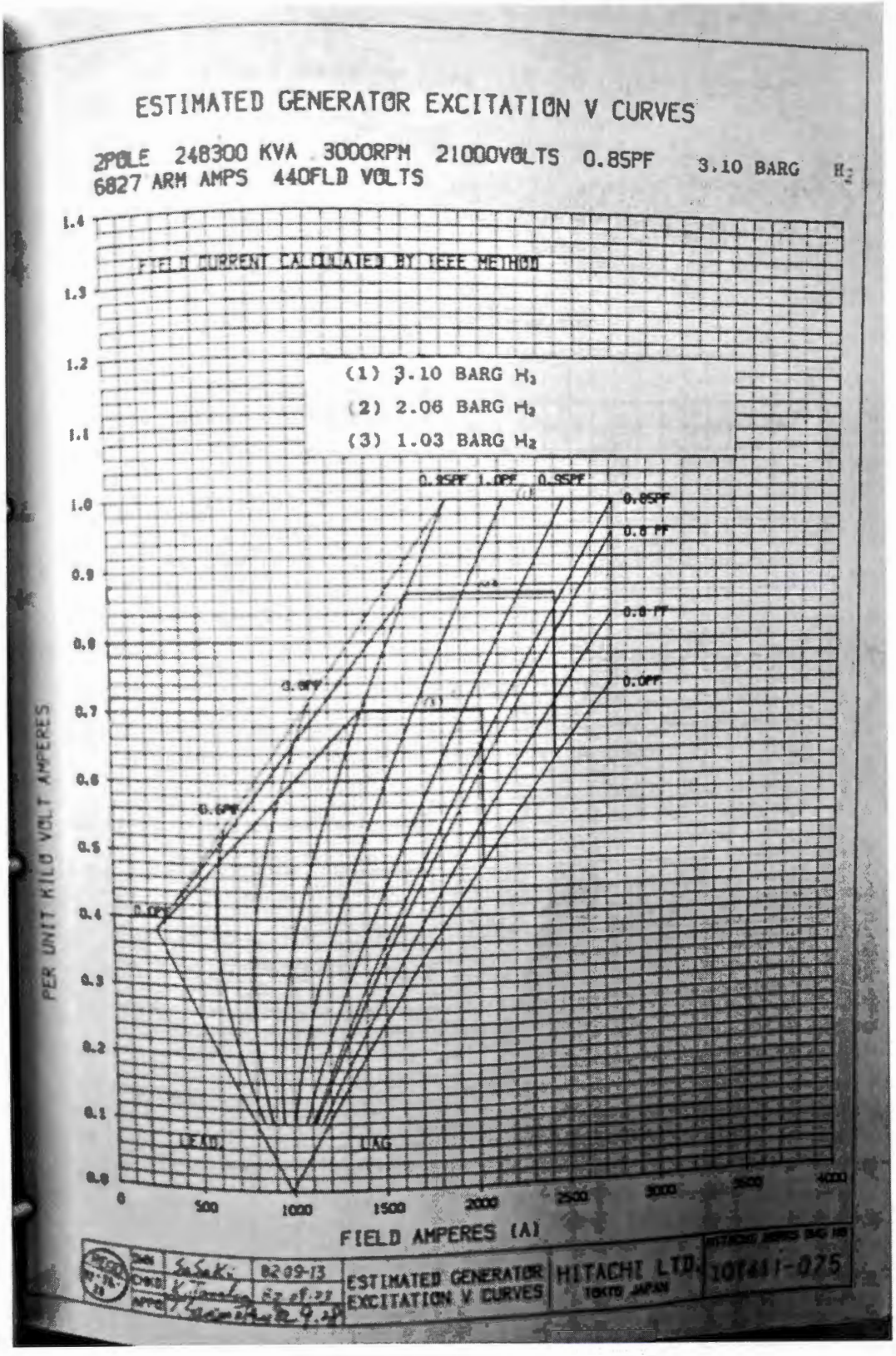
Rated lightning and switching impulse withstand voltage	kV_{peak}	900
Rated one minute power frequency test withstand Voltage	kV_{rms}	395
Operating Sequence		O-0.3S-CO-3M-CO
Rated normal current at 50 Hz And 50deg C not less than A_{rms} (Rated short – time withstand current)	kA_{rms}	40 for 1sec
Rated Opening Time	ms	27
Rated Closing Time	ms	150
SF6 Gas Pressure at 20 °C	barg	6
Rated Operating Air pressure	barg	15

4.9 Annexures:

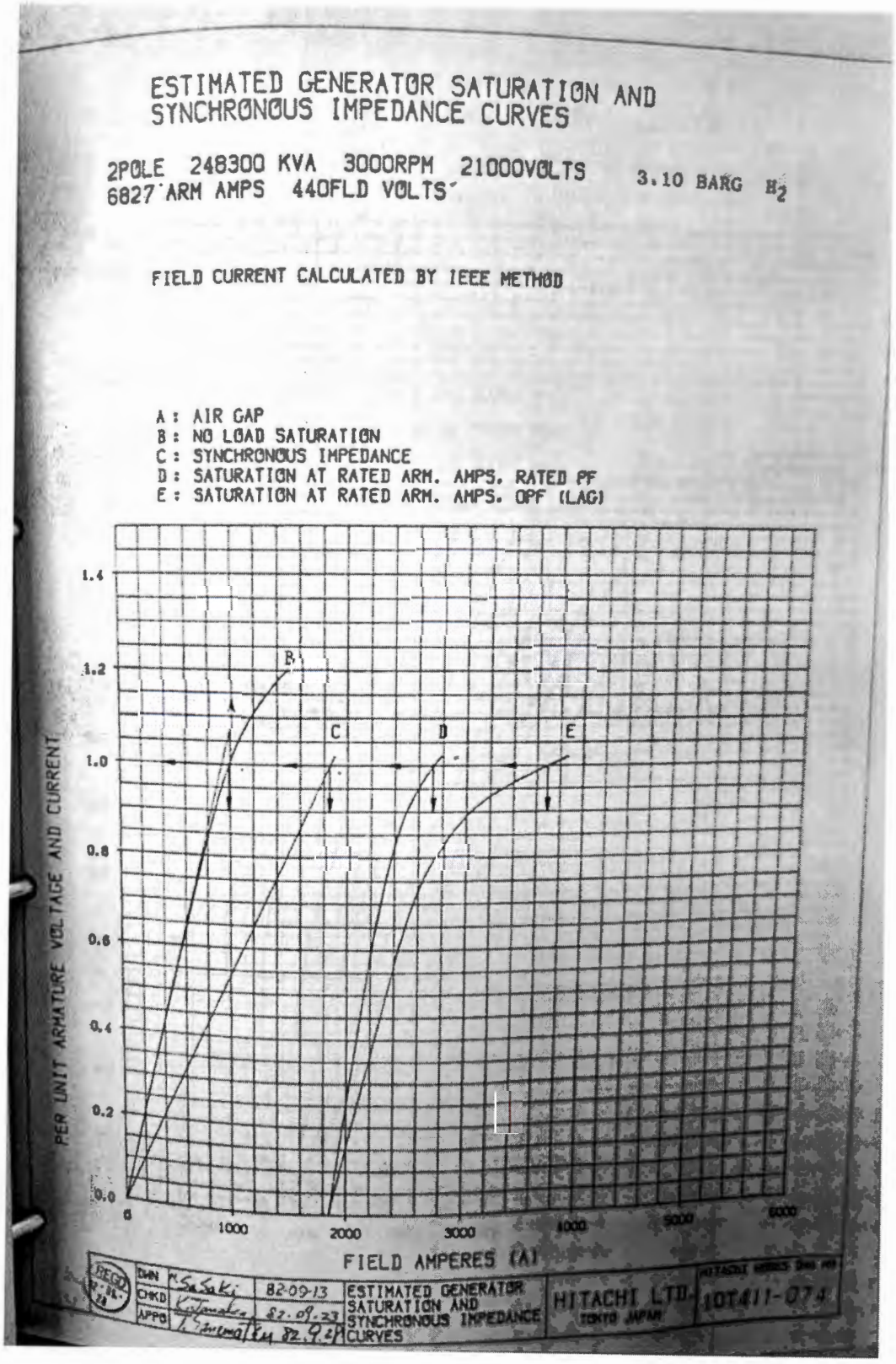
Annexure 1.1 – Unit-1 & 2 Generator Capability Curves



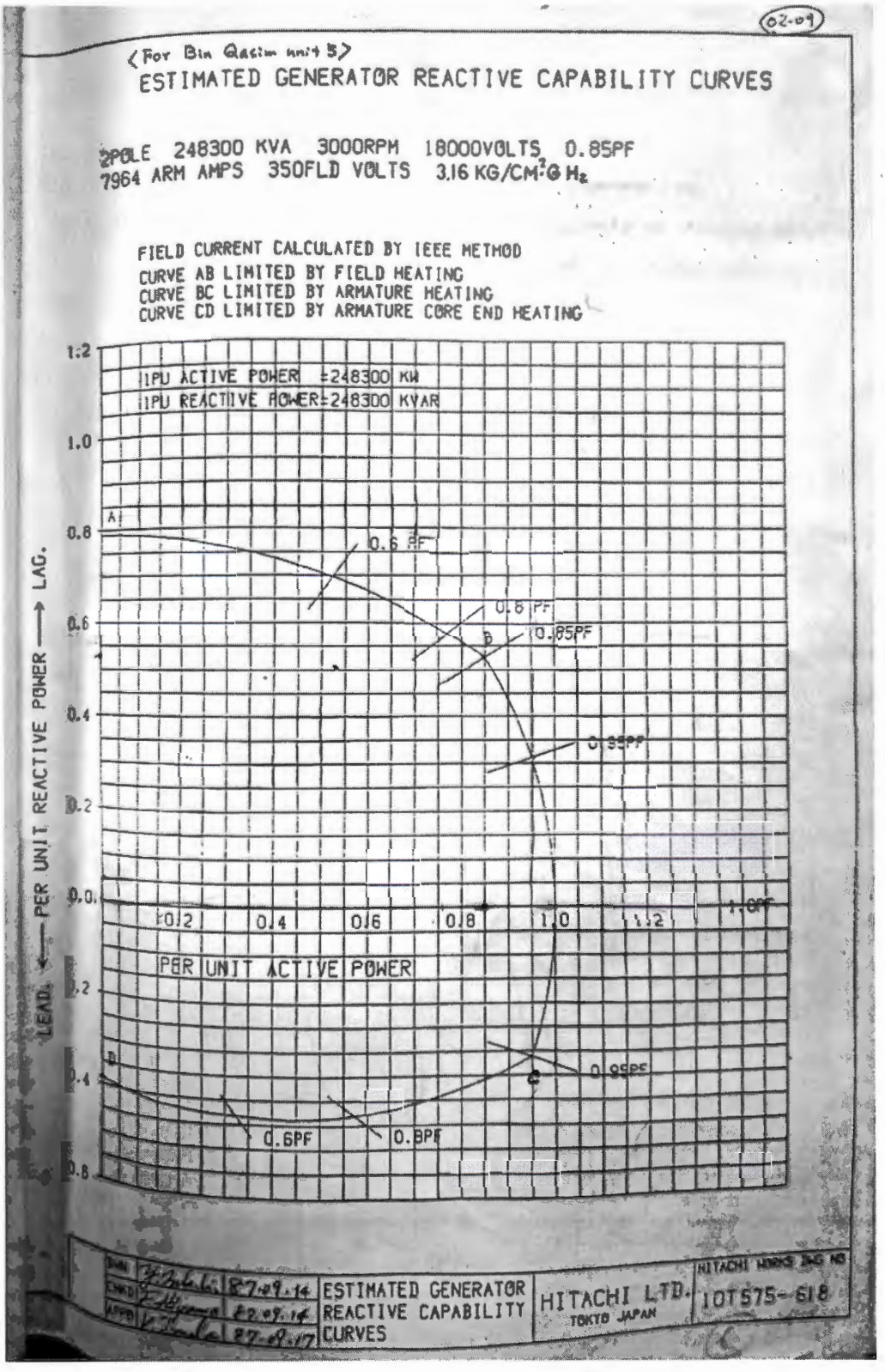
Annexure 1.2 - Unit-1 & 2 Generator V Curves



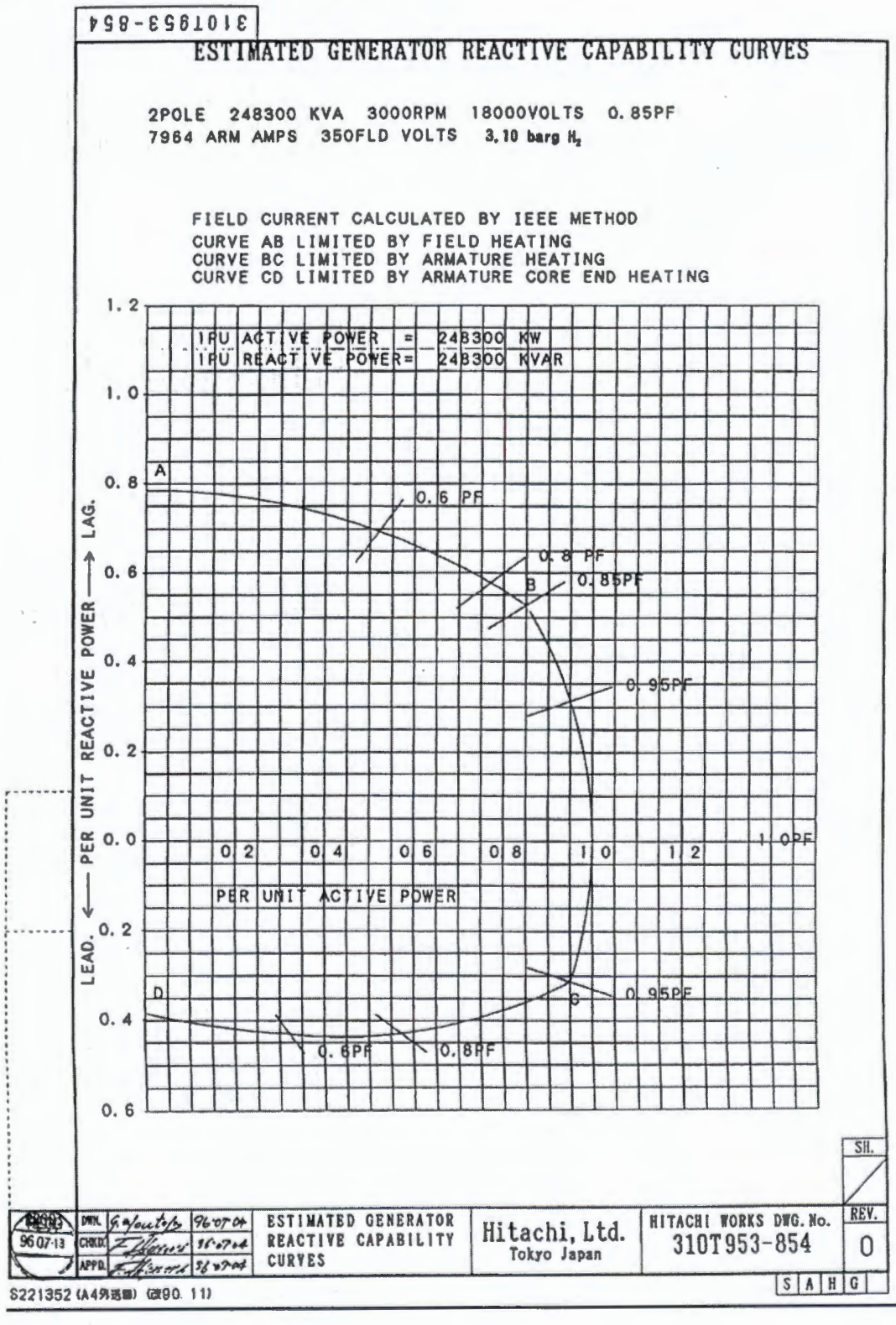
Annexure 1.3 - Unit-1 & 2 Generator Saturation & Sync Impedance Curves



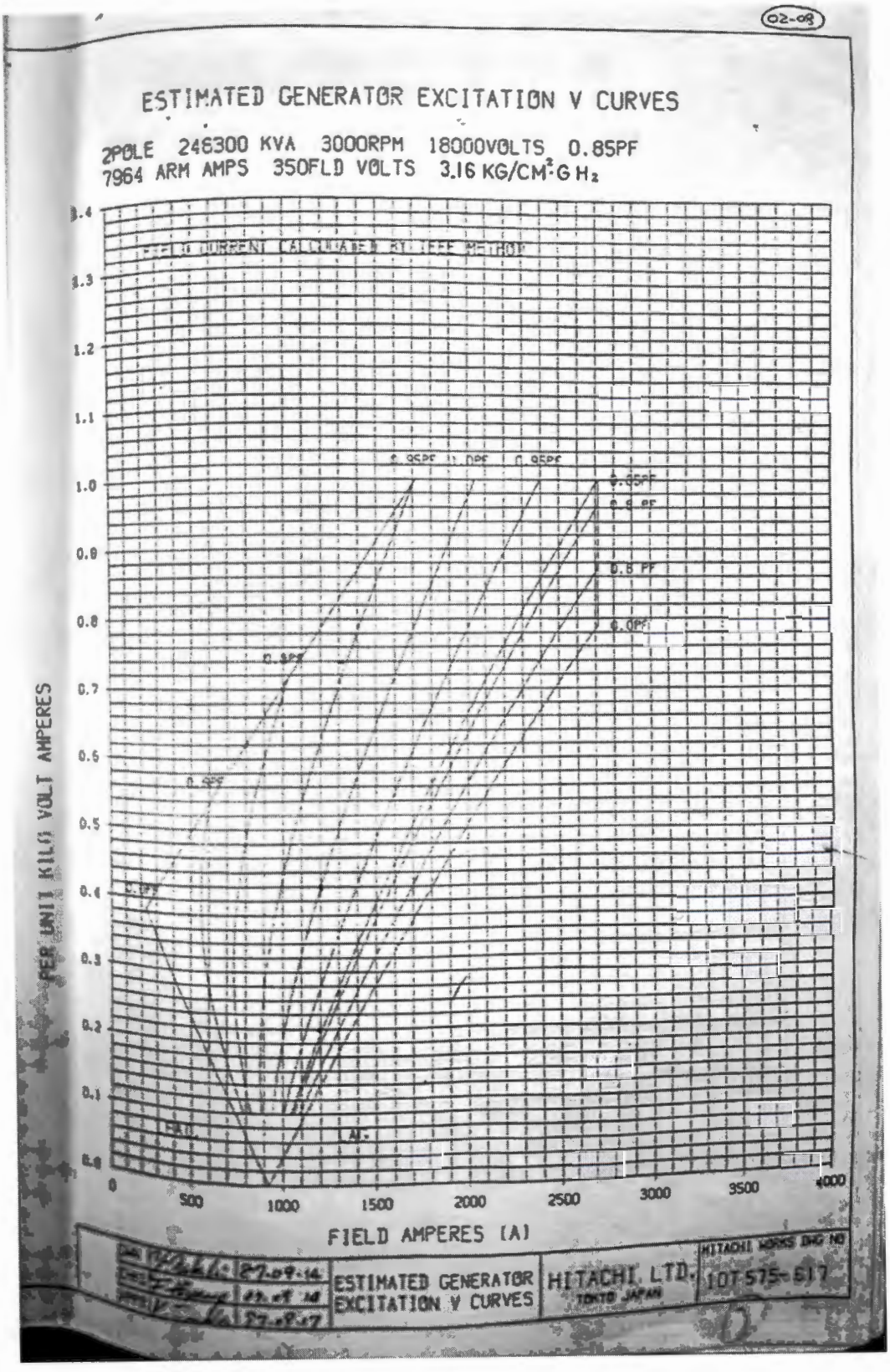
Annexure 2.1 – Unit-5 Generator Capability Curve



Annexure 2.2 – Unit-6 Generator Capability Curve



Annexure 2.3 - Unit-5 & 6 Generator V Curves



Annexure 2.4 - Unit-5 & 6 Generator Saturation & Sync Impedance Curves

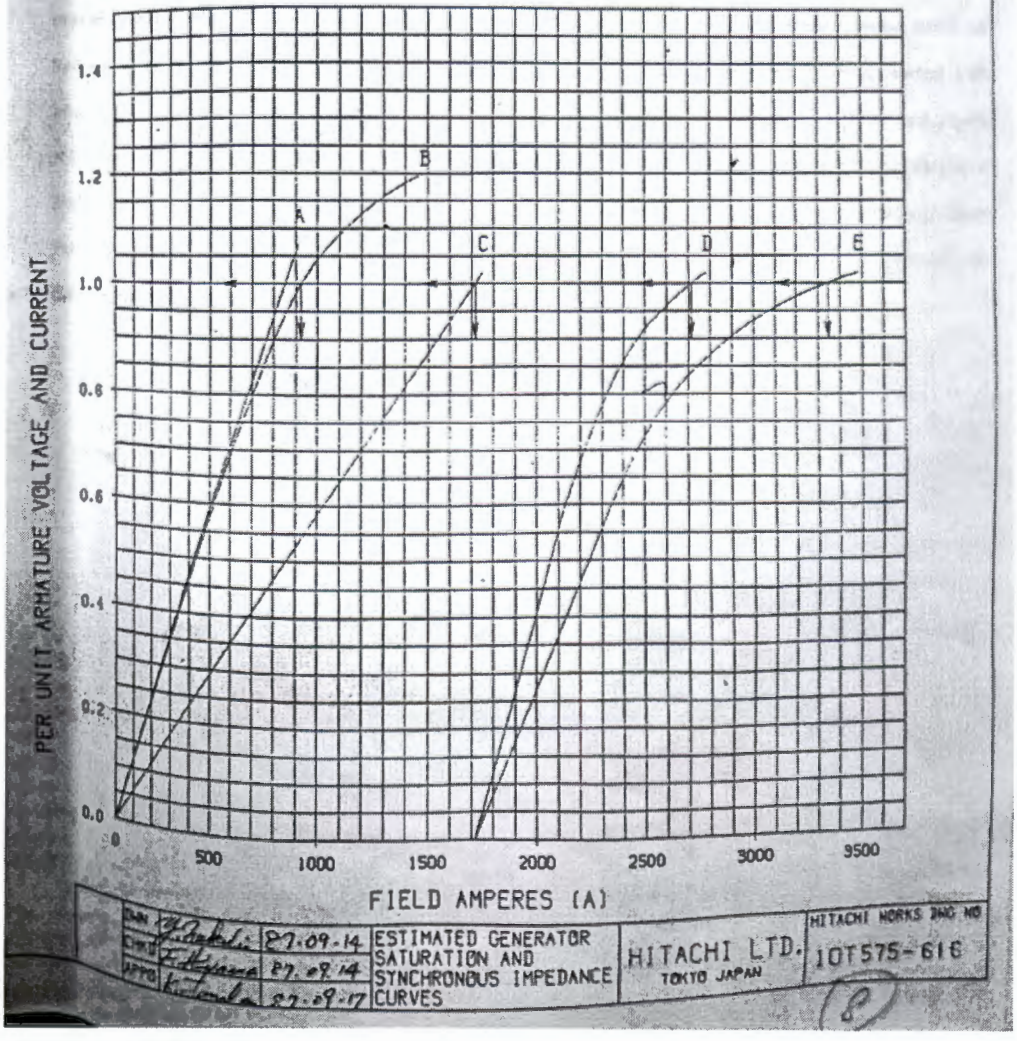
02-07

ESTIMATED GENERATOR SATURATION AND SYNCHRONOUS IMPEDANCE CURVES

2POLE 248300 KVA 3000RPM 18000VOLTS 0.85PF
7964 ARM AMPS 350FLD VOLTS 3.16 KG/CM²·G H_2

FIELD CURRENT CALCULATED BY IEEE METHOD

A : AIR GAP
B : NO LOAD SATURATION
C : SYNCHRONOUS IMPEDANCE
D : SATURATION AT RATED ARM. AMPS. RATED PF
E : SATURATION AT RATED ARM. AMPS. OPF (LAG)



DWN	87.09.14	ESTIMATED GENERATOR SATURATION AND SYNCHRONOUS IMPEDANCE CURVES	HITACHI LTD. TOKYO JAPAN	HITACHI WORKS DWG NO 10T575-616
CHKD	87.09.14			
APPD	87.09.17			

8

SCHEDULE – 5

BQPS-I TECHNICAL LIMITS:

5.1. Technical Limits:

PLANT	Gas / HFO Pr (min) bar	Gas / HFO Pr (max) bar	Gas(min) mmcfd / HFO(min) t/h	Gas(max) mmcfd / HFO(max) t/h	Gross Load (min) MW	Net Load (min) MW	Gross Load (max) MW	Net Load (max) MW	PF	
									LEADING	LAGGING
BQPS-I Unit-1	3.2 / 12	5.2 / 18	25 / 21.7	44 / 46	90	80.50	181.2	166.43	0.95	0.85
BQPS-I Unit-2			25 / 21.7	44 / 46	90	80.50	183.41	169.33	0.95	0.85
BQPS-I Unit-5			25 / 21.7	47 / 47	90	81	188.28	173.49	0.95	0.85
BQPS-I Unit-6			25 / 21.7	47 / 47	90	81	191.03	174.41	0.95	0.85

PLANT	Start-Up Time (HH:MM)* (Ref : startup curves)						
	V.HOT (Boiler remains live)	HOT	WARM	COLD	AMBIENT COLD**	AMBIENT COLD (Boiler wet preserved)	OVERHAUL COLD
BQPS-I Unit-1	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-2	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-5	00:15	02:15	03:05	07:00	22:00	30:00	26:00
BQPS-I Unit-6	00:15	02:15	03:05	07:00	22:00	30:00	26:00
Time from Synch to Baseload (all Units)	01:25	01:25	01:25	01:40	01:50	01:50	01:50

* From Demand till Synch

** If boiler is wet preserved after being in ambient cold start mode, additional 8 hours will be required for boiler draining and flushing of chemical. Hence synch notice period will increase by 8 hrs with no change in startup cost. Startup mode will be treated as "Ambient Cold (Boiler wet preserved)" in this case.

Above Synch timings are maximum and units can be synchronized earlier with the permission of Offtaker.

5.2. Over Frequency / Under Frequency:

Unit	Under Freq	Time delay	Over Freq
BQPS-I Unit - 1	48.5Hz	1s (Alarm)	N/A
	47Hz	1s (Trip)	
BQPS-I Unit - 2	48.5Hz	1s (Alarm)	
	47Hz	1s (Trip)	
BQPS-I Unit - 5	48.5Hz	1s (Island)	
	47Hz	1s (Trip)	
BQPS-I Unit - 6	47Hz	0.5s (Alarm)	
	47Hz	1.5s (Island)	
	47Hz	2.0s (Trip)	

5.3. Island Mode Operation:

Unit	Install capacity	Under Frequency	Time delay	Over frequency
BQPS-I Unit - 1	210 MW	N/A		
BQPS-I Unit - 2	210 MW	N/A		
BQPS-I Unit - 5	210 MW	48.5Hz	1s (Island)	N/A
		47Hz	1s (Trip)	N/A
BQPS-I Unit - 6	210 MW	47Hz	0.5s (Alarm)	N/A
		47Hz	1.5s (Island)	N/A
		47Hz	2.0s (Trip)	N/A

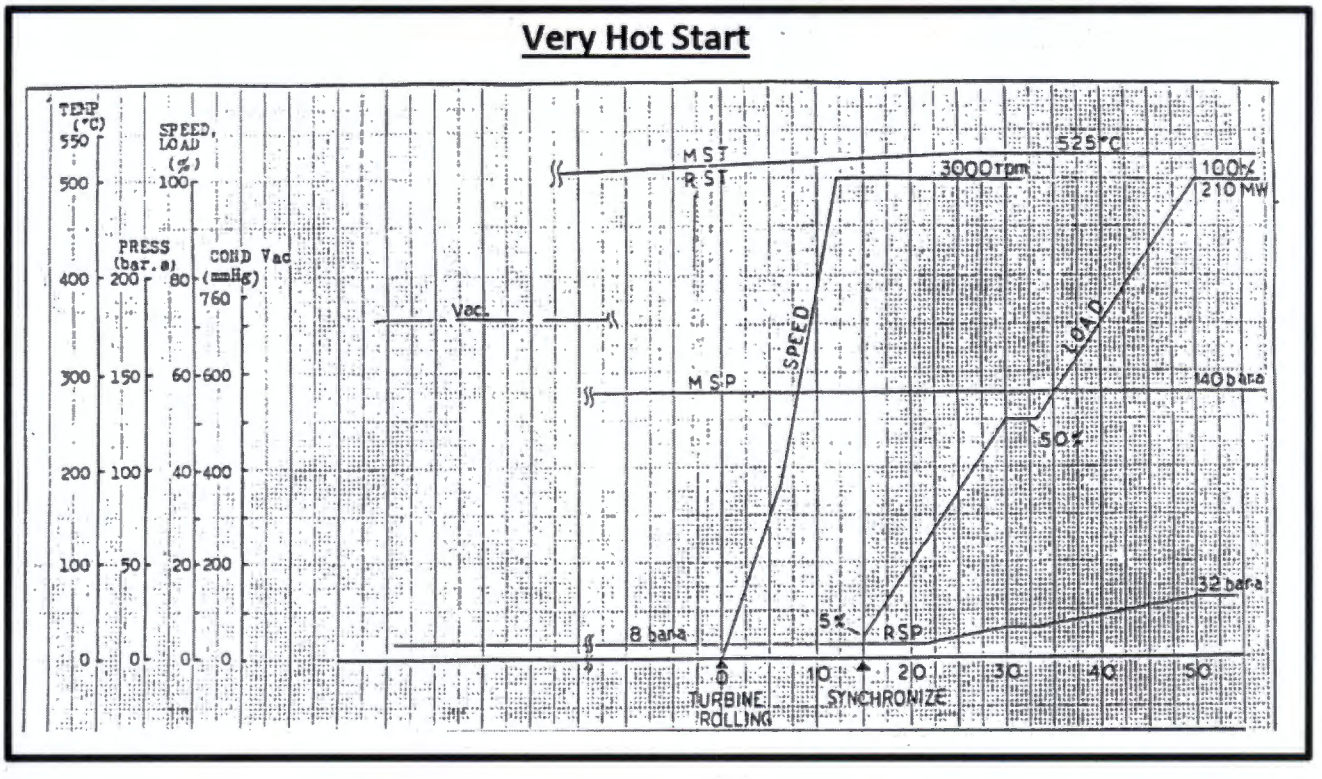
5.4. Unit Operating Limits:

Description	Unit	Limits
Unit Min Load (Gross)	MW	90
System Voltage	kV	209 - 231
Operating Frequency Range	Hz	49.5 – 50.5

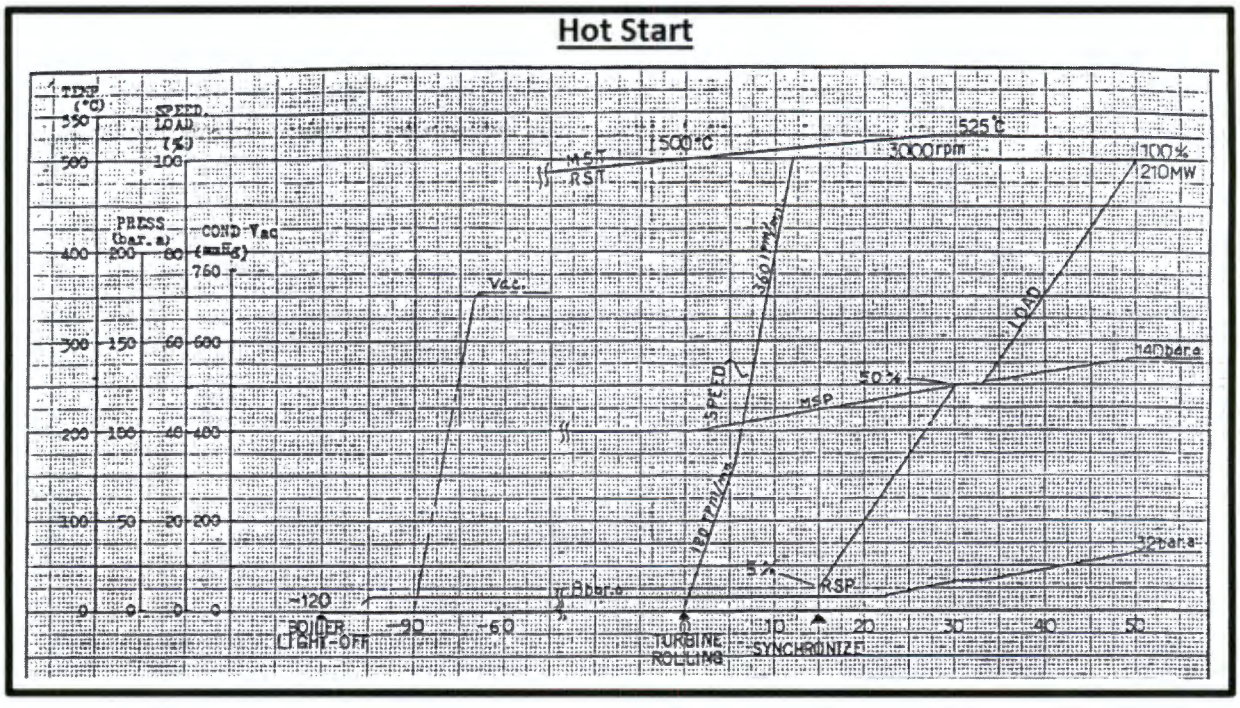
5.5. Unit Start-up Duration (Synch to base load)

There are 07 start-up modes of each Unit calculated from Steam Turbine synchronization till unit full load. The start-up time depends upon duration/length of shutdown.

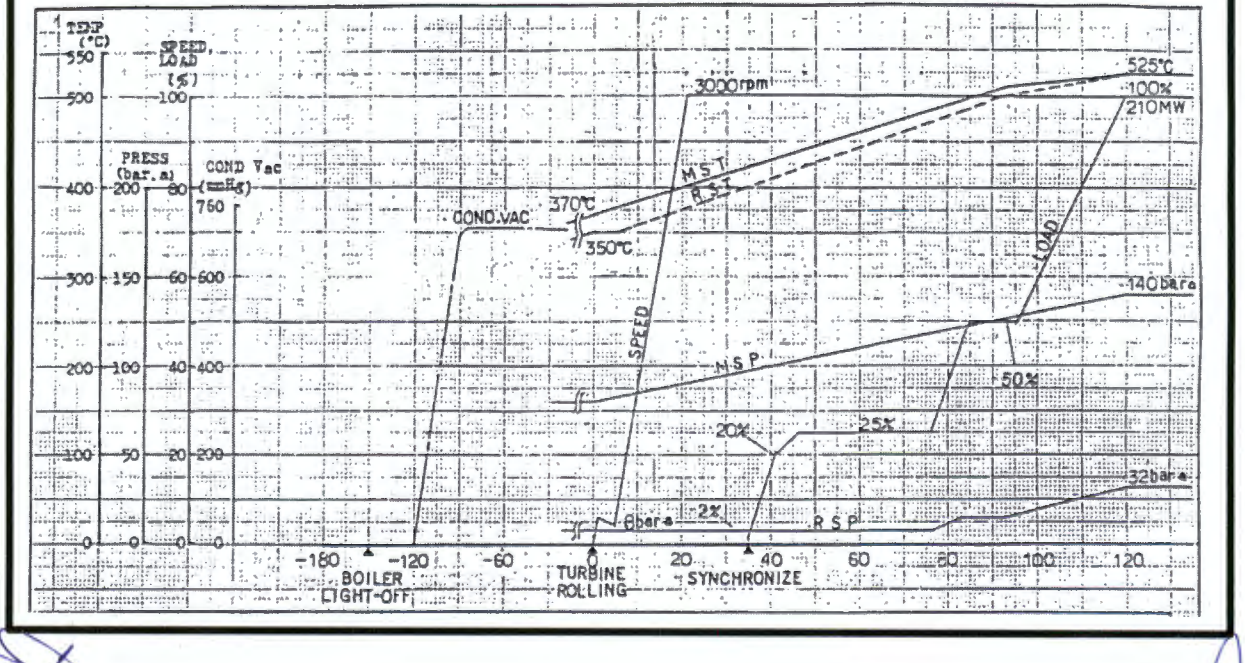
State	Length of Shutdown	Time from Boiler firing till synch
Very Hot	00 - 01 Hrs.	15 min
Hot	01 - 11 Hrs.	02 Hrs.15 min
Warm	11 - 21 Hrs.	03 Hrs.05 min
Cold	21 - 75 Hrs.	07 Hrs.
Ambient Cold	75 Hrs - onwards	22 Hrs.
Ambient Cold with Boiler wet preserved	75 Hrs - onwards	22+8 Hrs (Additional 8 hours required for boiler drainage and flushing of chemical)
Overhauled Cold	--	26 Hrs.



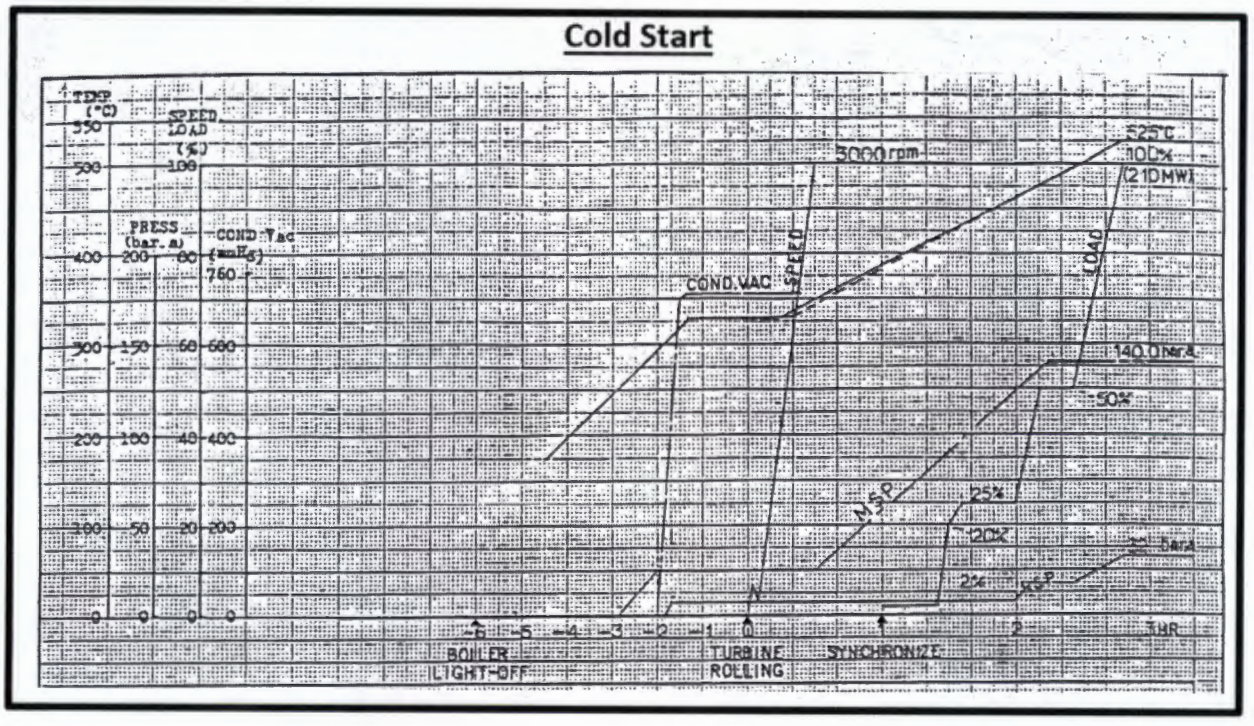
Hot Start



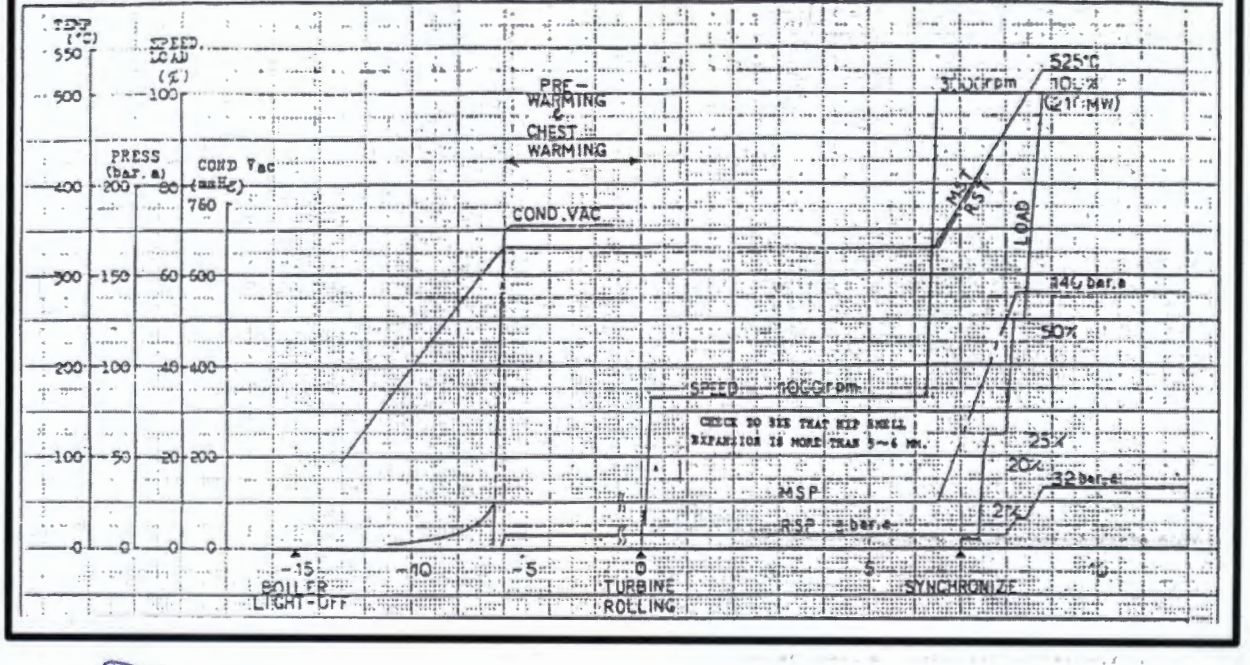
Warm Start

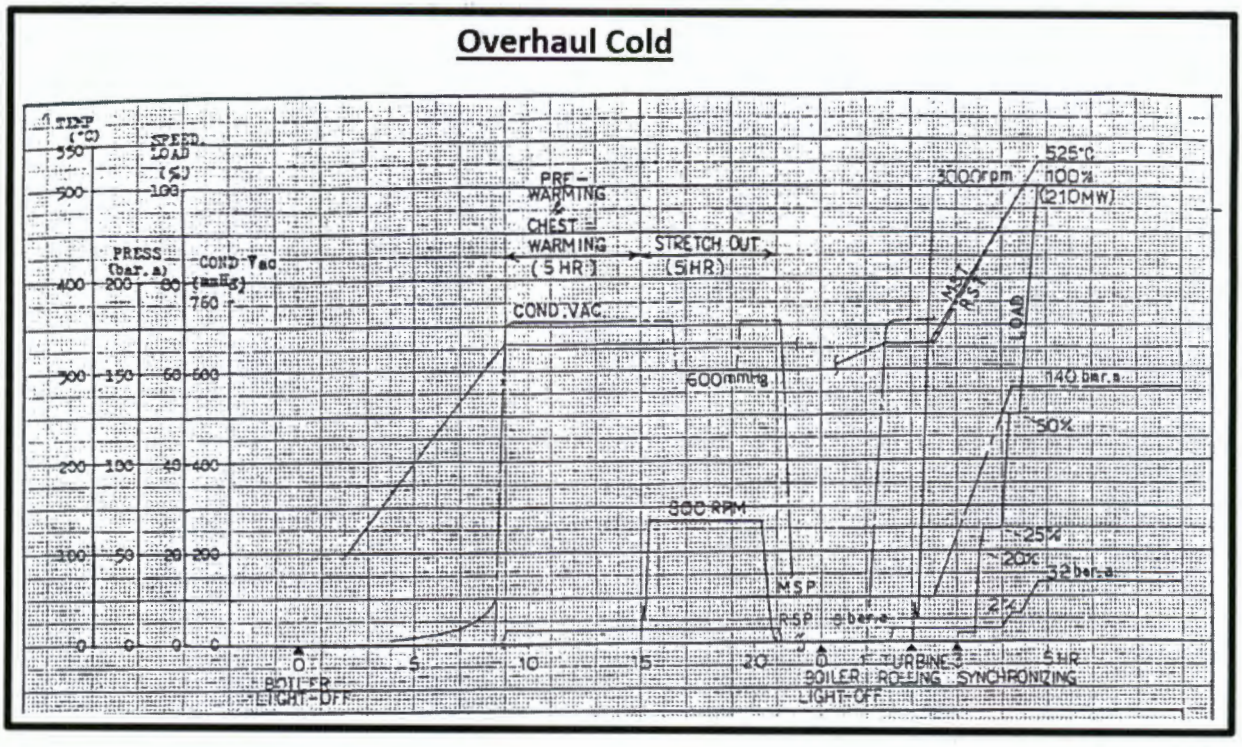


Cold Start



Ambient Cold Start





5.6. Unit Load Gradient:

PLANT	Load Ramping Rate (MW/min)		
	1%	3%*	5%*
BQPS-I Unit-1	2.1	6.3	10.5
BQPS-I Unit-2	2.1	6.3	10.5
BQPS-I Unit-5	2.1	6.3	10.5
BQPS-I Unit-6	2.1	6.3	10.5

*3% and 5% ramp rate is only for emergency situations

5.7. Outage Duration:

There are 2 major maintenance events at BQPS-I units according to Unit shutdowns:

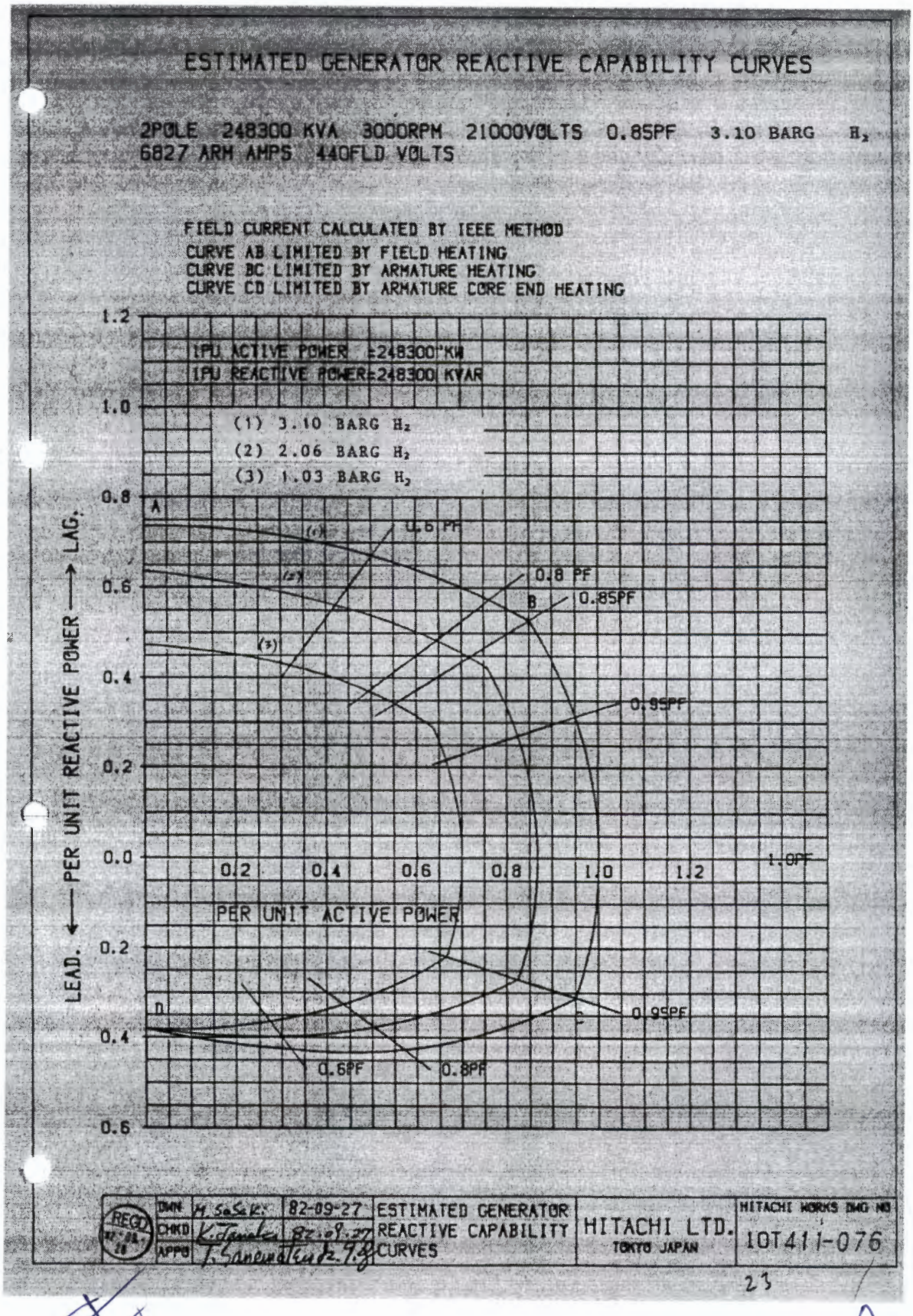
1. Annual Maintenance: Annual maintenance of 30 days.
2. Overhaul: Every 4th Operational year.

"Maintenance Cycle" means a cycle ending at the completion of license useful life of Unit 6 and shall include the Major Overhaul of Unit 6.

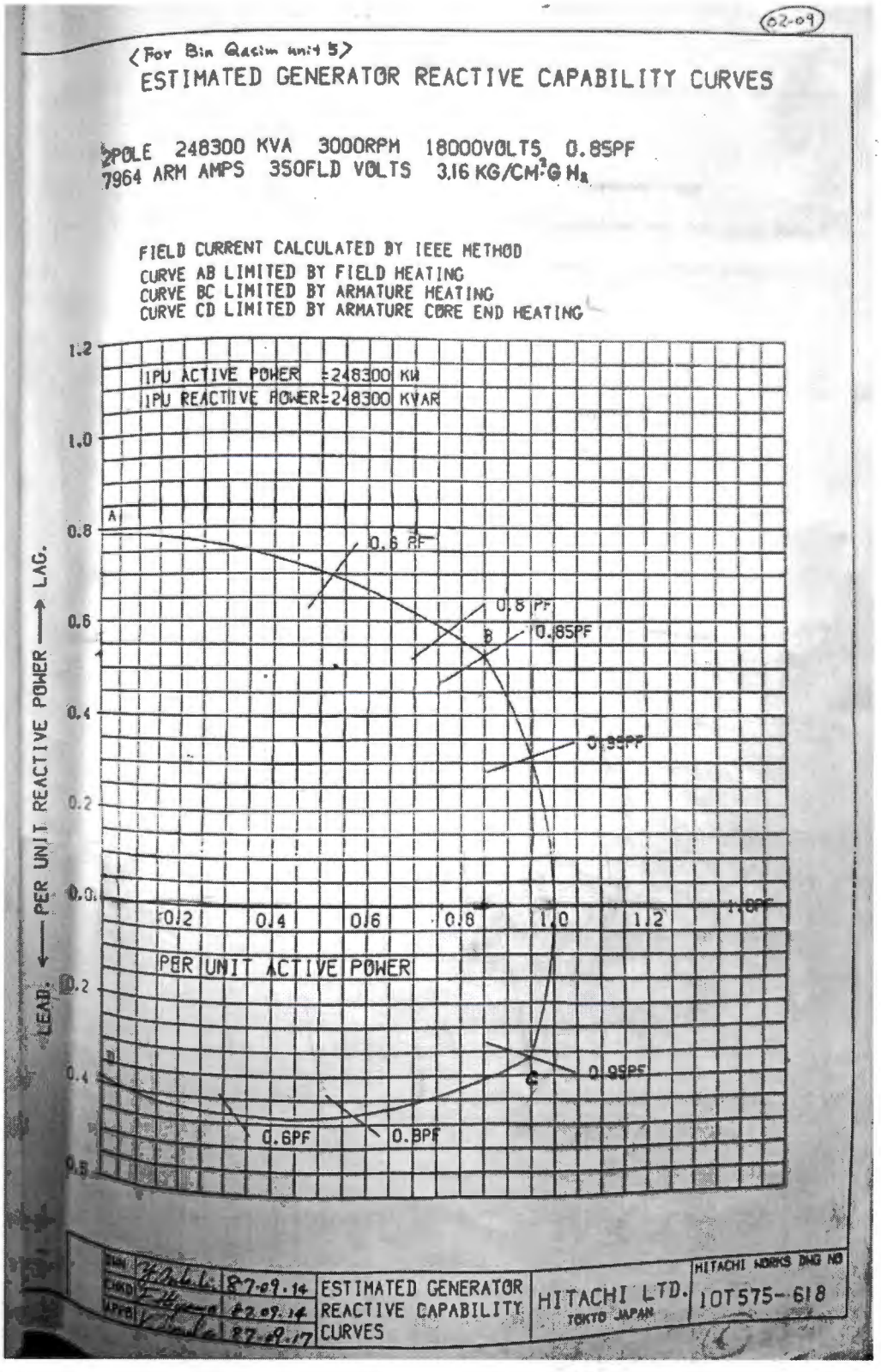
"Overhaul" means the major overhaul of steam turbine (ST) as recommended by OEM.

5.8. Generator Capability Curve:

Unit 1 & 2:



Unit 5


62-09
<For Bin Qacim unit 5>
ESTIMATED GENERATOR REACTIVE CAPABILITY CURVES
2POLE 248300 KVA 3000RPM 18000VOLTS 0.85PF
7964 ARM AMPS 350FLD VOLTS 3.16 KG/CM²G H₂
FIELD CURRENT CALCULATED BY IEEE METHOD
CURVE AB LIMITED BY FIELD HEATING
CURVE BC LIMITED BY ARMATURE HEATING
CURVE CD LIMITED BY ARMATURE CORE END HEATING
1PU ACTIVE POWER =248300 KW
1PU REACTIVE POWER=248300 KVAR
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.2
0.4
0.6
A
B
C
D
0.6 PF
0.8 PF
0.85PF
0.95PF
0.95PF
0.6PF
0.8PF
0.2
0.4
0.6
0.8
1.0
1.2
PER UNIT ACTIVE POWER
PER UNIT REACTIVE POWER ⟶ LAG.
⟵ LEAD
DRN
CHKD
APPD
87.09.14
87.09.14
87.09.17
ESTIMATED GENERATOR REACTIVE CAPABILITY CURVES
HITACHI LTD.
TOKYO JAPAN
HITACHI WORKS DWG NO
10T575-618

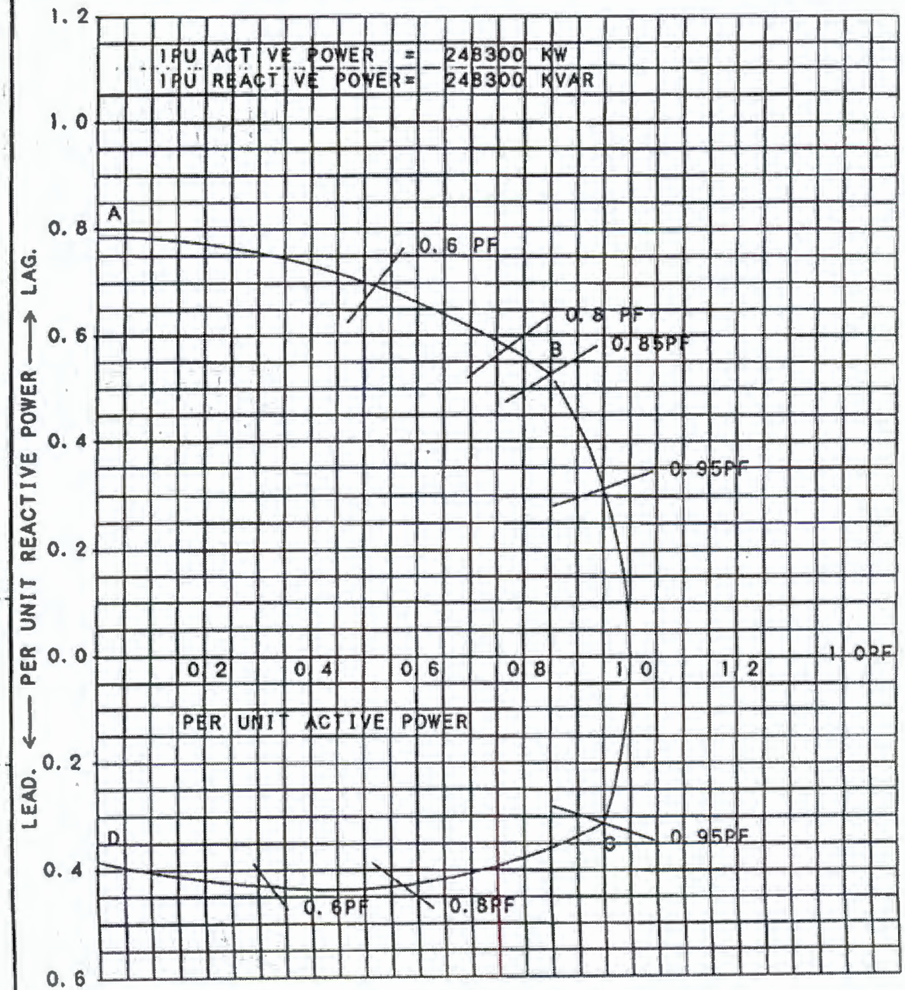
Unit 6

310T953-854

ESTIMATED GENERATOR REACTIVE CAPABILITY CURVES

2POLE 248300 KVA 3000RPM 18000VOLTS 0.85PF
7964 ARM AMPS 350FLD VOLTS 3.10 barg H_2

FIELD CURRENT CALCULATED BY IEEE METHOD
CURVE AB LIMITED BY FIELD HEATING
CURVE BC LIMITED BY ARMATURE HEATING
CURVE CD LIMITED BY ARMATURE CORE END HEATING



96 07 18	DWN.	G. Yoshioka	96-07-04	ESTIMATED GENERATOR REACTIVE CAPABILITY CURVES	Hitachi, Ltd. Tokyo Japan
	CHKD.	[signature]	96-07-04		HITACHI WORKS DWG. No. 310T953-854
	APPD.	[signature]	96-07-04		REV. 0

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SCHEDULE - 6

METERING STANDARDS AND TESTING

1. Provision of Tariff Metering

1.1 The metering points to record the MWh and MVARh exchange between the Complex and the Offtaker's grid system shall be on the high voltage side of the generating unit transformer as shown in an appropriate diagram to be provided by the Power Producer. The Metering System has been installed by the Power Producer. Exclusive dedicated set of current and voltage transformers is provided by the Power Producer to feed the current and voltage to the Metering System of the Complex. The meters owned by the Offtaker will be located nearest to respective meters that are being owned by Power Producer. Photographic facilities will be provided by the Power Producer as part of the verification process for monthly meter readings.

1.2 The Metering System and the Back-up Metering System shall be to a mutually agreed international standard providing a measured accuracy of 0.2%.

2. Testing

2.1 The calibration of the Metering System and the Back-up Meter system will be checked to ensure that the accuracy remains within the specified limits. The method of calibration and frequency of tests will be agreed between the Power Producer and the Offtaker based on knowledge of the performance and the design of the installed meters and the manufacturers' recommendations.

2.2 Testing and calibration of the Metering System shall be carried out by the Offtaker after giving appropriate notice to the Power Producer in line with the agreed frequency of testing or in the event of either party having reasonable cause to believe the meters are outside specified limits. During such tests and calibration, the Power Producer shall have the right to have a representative present at all times.

2.3 Testing and calibration of the Back-up Meter system shall be carried out by the Power Producer after giving appropriate notice to the Offtaker in line with the agreed frequency of testing or in the event of either party having reasonable cause to believe the meters are outside specified limits. During such tests and calibration, the Offtaker shall have the right to have a representative present at all times.

3. CT and PT Error Compensation

3.1 Compensation will be made for the errors of current and voltage transformers in the meter calibration or during the computation of records. Current and voltage transformers will be tested for ratio and phase angle errors following manufacture at an accredited testing station in the presence of representatives from the Power Producer and the Offtaker. Test certificates issued by the testing station will be issued independently to both parties.

SCHEDULE 8

INSURANCE

OPERATING PERIOD

Sum Insured, Deductible and Indemnity Period for Fire with Allied Perils

8.1 Fire with Allied Perils - Fixed Assets:

Cover: Direct Physical Loss or Damage due to Fire, Riot and Strike Damage, Malicious Damage, Earth Quake (Fire and Shock), Impact Damage, Explosion Aircraft Damage, Atmospheric Disturbance which is the property of the Insured and/ or properly under the care/ custody/ control of the Insured for which the Insured is responsible.

Sum insured:

Property Damage = PKR 42,392,805,805

Loss Limit = PKR 10,000,000,000

Deductible:

5% of loss amount minimum PKR 280,000,000 (equivalent to USD 1,000,000) for each occurrence for earth quake and all ensuing damages

PKR 280,000,000 (equivalent to USD 1,000,000) each occurrence for all other losses.

Insured: Principal Insured: K-Electric Limited

Additional Insured:

Financiers
Security Trustee
Lenders
Each for their respective rights and interest.

8.2 Terrorism

Cover: All real and personal property of every kind

Sum insured: Property Damaged = PKR 42,392,805,805

Deductible:

PKR 7,000,000/-any one occurrence in respect of Property Damage.

Limit of Liability:

PKR 35,000,000,000 any one occurrence and in the annual Aggregate in respect of Property Damage. This limit is for all generating plants of the Company; however, full amount can be claimed at the BQPS-1 Annually.

Insured: Principal Insured: K-Electric Limited

Additional Insured:

Financiers
Security Trustee
Lenders
Each for their respective rights and interest

8.3 Public Liability Insurance

Cover: Bodily Injury including death and Property Damage to third party due to Power Generation, Transmission and Distribution of K Electric

Limit of Liability:

Bodily Injury including death and Property Damage to third party PKR 50,000,000 per occurrence and PKR 300,000,000 in Annual Aggregate. This limit is for all assets of the Company, however, full amount can be claimed at the BQPS-1 annually.

Deductible:

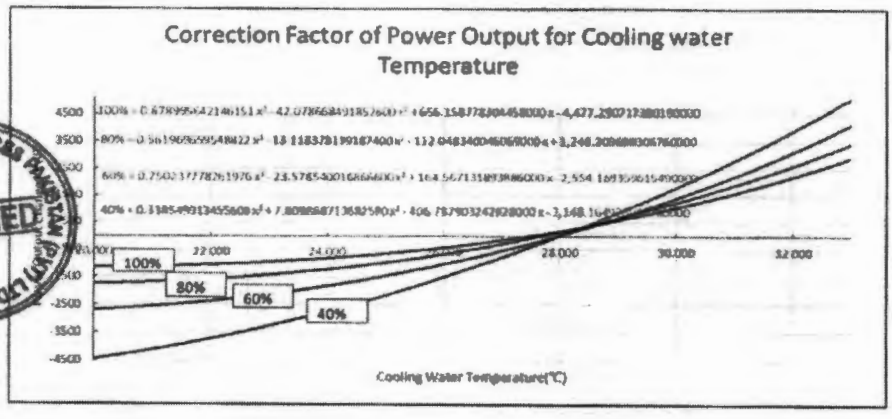
PKR 500,000/- for bodily injury including death.
PKR 1,000,000 for property per accident for each and every loss.

Insured: Principal Insured: K-Electric Limited

SCHEDULE 10

CHARACTERISTIC CURVES – BQPS-I

Sea Water temperature correction curve for Output (Unit 1, 2)



Sea Water temperature correction curve for Output (Unit 5, 6)