

Northern Power Generation Company Limited

Thermal Power Station, Mehmood Kot Road, Muzaffargarh



Chief Executive Officer

066-9200165

No. CEO/MZG/NP/2851

Dated:- 15-08-2022

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

For info & n.e.p.d.
- Dir (R.O)
copy to
- AD (CT)
- Cms (Tech)
- M.P.

171812
cc. Chairman
- m (NBE/CC)
- m (LIC/7)

Subject: PETITION FOR MODIFICATION OF REFERENCE TARIFF OF COMBINED CYCLE POWER PLANT NANDIPUR GUJRANWALA NORTHERN POWER GENERATION COMPANY LIMITED-GENCO-III

I Sabeeh-Uz-Zaman Faruqi, Chief Executive Officer, NPGCL, being the duly authorized representative of Northern Power Generation Company Limited (NPGCL) hereby apply to the National Electric Power Regulatory Authority (NEPRA) for the approval of modification of Reference Tariff of CCPP Nandipur, pursuant to Section 17(3) of NEPRA Standards and Procedure Rules 1998.

I certify that the documents-in-support attached with this Application are prepared and submitted in conformity with the provisions of the Tariff modification, and undertake to abide by the terms and provisions of the above-said regulations. I further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and belief.

A Bank Draft No. BBB 14595885 of PKR 1,719,888/- (duly adjusted to income tax) in words (Rupees One Million Seven Hundred Nineteen Thousand Eight Hundred Eighty Eight only) drawn on Allied Bank Ltd. on account of subject Tariff Petition Fee calculated in accordance with NEPRA Tariff Rules is attached to this application.


(Sabeeh Uz Zaman Faruqi)
Chief Executive Officer NPGCL

Dated: 15-08-2022
REGISTRAR
0165

ORIGINAL

E-STAMP

Register No: ~~1157~~
Ahsan Ali E-Stamping Vend
Lic. No: ~~PB-GRW-156~~
Distt. ~~Gujranwala~~



ID : PB-GRW-029147452FBB7639
Type : Low Denomination
Amount : Rs 100/-



Description : AFFIDAVIT - 4
Applicant : NAVEED ATHAR CHAUDHRY {36302-1993704-5}
S/O : CHAUDHRY HASSAN ALI
Address : GUJRANWALA
Issue Date : 10-Aug-2022 12:35:48 PM
Delisted On/Validity : 17-Aug-2022
Amount in Words : One Hundred Rupees Only
Reason : FOR NEPRA
Vendor Information : Ahsan Ali | PB-GRW-156b | District Courts

نوٹ: یہ ٹرانزیکشن تاریخ اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔

AFFIDAVIT

BEFORE THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

I, Sabeeh uz Zaman Faruqui, Chief Executive Officer, Northern Power Generation Company Limited being duly authorized representative/attorney of Northern Power Generation Company Limited, hereby solemnly affirm and declare that the contents of the accompanying application for modification of Reference Tariff of Combined Cycle Power Plant, Nandipur No.CEO/MZG/NP/2851 dated: 15-08-2022 including all supporting documents are true and correct to the best of my knowledge and belief and that nothing has been concealed. I also affirm that all further documentation and information to be provided by me in connection with the accompanying application shall be true to the best of my knowledge and belief.

DEPONENT


(Sabeeh uz Zaman Faruqui)
Chief Executive Officer, NPGCL

Verified on oath this 15th day of August 2022 that the contents hereof are true and



Northern Power Generation Company Limited
Thermal Power Complex, Mehmood Kot Road, Muzaffargarh



Company Secretary Office

Phone: 066-9200296-Fax-066-9200166

No. NPGCL/CS/BoD-139/3/ 216-20

August 02, 2022

Board Resolution

To: ✓ The Chief Executive Officer, TPS Muzaffargarh

Subject: Matter of submitting the revised tariff petition for modification of reference tariff before NEPRA regarding CCPP Nandipur..

The Board of Directors of NPGCL has taken up the subject matter in its meeting No.139 held on July 23, 2022. The Board has passed the following resolution: -

- (i) "Resolved that the problem of disallowing resuming costs of Rs. 4,531.08 million in EPC costs will be taken up by the Management together with legal counsel to determine how these costs might be authorized by NEPRA, including the possibility of launching a lawsuit".
- (ii) "Resolved that the application for determination of Revised Tariff Petition for Modification of Reference Tariff of CCPP Nandipur be filed with the National Electrical Power Regulatory Authority (the Authority) on behalf of Northern Power Generation Company Limited (the Company), containing all issues arising from the NEPRA determination dated: 11-04-2022".
- (iii) "Resolved that the Chief Executive Officer of Northern Power Generation Company Ltd. be and is thus allowed to sign, submit the application of amended tariff petition to the Authority, and pay the filing fee according to the Authority's appropriate rates".
- (iv) "Resolved that M/s. A&K Consilium will file the case as consultant on behalf of NPGCL"
- (v) "Resolved that the following officers/representatives are authorized to file and sign, individually or jointly, the relevant papers in support of this petition, and to appear before NEPRA (the Authority) and represent NPGCL during the proceedings of this petition:
 - Chief Executive Officer
 - Chief Financial Officer
 - Chief Engineer/Chief Technical Officer
 - Plant Manager CCPP Nandipur

This is for your information and necessary action please.


Muhammad Aamir Zakes
Company Secretary

Copy for information and record:

1. Chief Financial Officer, NPGCL
2. Chief Engineer / Chief Technical Officer
3. Plant Manager Nandipur.
4. Master File

original

**PETITION FOR TARIFF MODIFICATION /REVISION
OF REFERENCE TARIFF**

Submitted to:

National Electric Power Regulatory Authority (NEPRA)

Submitted by:

**NORTHERN POWER GENERATION COMPANY LIMITED (NPGCL/
GENCO-III)**

FOR ITs

COMBINED CYCLE THERMAL POWER PLANT AT NANDIPUR

Financial Advisor

A&K CONSILIUM



Tariff Modification/ Revision Application

Northern Power Generation Company Ltd (NPGCL)

Petition/Application

The Company is hereby filing the petition/ application (hereinafter the Modification Petition) to NEPRA for modification of certain costs allowed by NEPRA in the approved EPC Stage Tariff of Combined Cycle Power Plant (CCPP) at Nandipur as notified through letter No. No. NEPRA/TRF-271/NPGCL-2014/5617-5619 dated 14.04.2015, No. NEPRA/TRF-271/NPGCL-2014/1214-1216 dated 27.01.2016, No. NEPRA/TRF-271/NPGCL-2014/12403-12405 dated 02.09.2016, No. NEPRA/TRF-271/NPGCL-2014/15831-15833 dated 29.08.2019 and NEPRA/R/ADG(Trf/ TRF-271/ NPGCL-2020/4909-4911 dated 11.04.2022.

Generation License

National Electric Power Regulatory Authority (NEPRA) granted NPGCL a Generation License bearing No. GL/03/2002 initially for a term of 25 years on July 01, 2002. NEPRA vide Modification-II dated October 31, 2014 to the generation license included Combined Cycle Power Plant, Nandipur and re-fixed the term of generation license up to the year 2044 with the addition of Nandipur CCPP Block.

Power Purchase Agreement

On novation from NTDC, CPPA-G has signed Power Purchase Agreement (PPA) with NPGCL on 15.09.2015, which includes CCPP Nandipur as Complex-V.

Grounds

This Modification Petition is based on facts, circumstances and grounds as elaborated at Section 3 of this Modification Petition.

Modified Costs & Tariff


Modified costs and Tariff resulting from Modification of certain costs as elaborated at Section 7 to 14 of this Modification Petition.

Prayer

It is prayed that NEPRA Authority:

- i. Accepts this Modification Petition,
- ii. Modifies the costs requested by the Petitioner,
- iii. Approves the Modified EPC Stage Reference Tariff and
- iv. Approves the terms and conditions of the Modified EPC Stage Reference Tariff.

We would like to avail the opportunity of hearing in the matter before NEPRA Authority to fully elaborate our point of view supported by valid and cogent evidences to clarify grounds, facts and circumstances as laid down in this Modification Petition:


(Sabeeh-Uz-Zaman Faruqi)
Chief Executive Officer

Glossary

AGJV	AMCORP-GASCO Joint Venture
BTU	British Thermal Unit
CDC	Current Dependable Capacity
Cft	Cubic Feet
COD	Commercial Operation Date
Company	Northern Power Generation Company Limited
CPGCL	Central Power Generation Company (GENCO-2)
CPPA-G/ Power Purchaser	Central Power Purchase Agency
CPI	Consumer Price Index
CPP	Capacity Purchase Price
CV	Calorific Value
DECL/DEC	Dongfang Electric Company Limited
EPP	Energy Purchase Price
FCC	Fuel Cost Component
FSA	Fuel Supply Agreement
GOP	Government of Pakistan
GE	General Electric USA
HEPSEC	Hydro Electric Power System Engineering Co.
HHV	Higher Heating Value
HR	Heat Rate
HSD	High Speed Diesel
HSFO	High Sulfur furnace Oil
IPP	Independent Power Producer
Kw	Kilowatt
kWh	Kilowatt hour
LHV	Lower Heating Value
MW	Mega Watt (1,000 kilowatts)
MWh	Mega Watt Hour
NEPRA/ Authority	National Electric Power Regulatory Authority
NESPAK	National Engineering Services of Pakistan
NTDC	National Transmission and Dispatch Company Limited
NPGCL	Northern Power Generation Company Limited
O&M	Operation & Maintenance
OEM	Original Equipment Manufacturer
Petitioner	Northern Power Generation Company Limited
PKR/ Rupees/ Rs.	Pak Rupees, Legal Currency of Pakistan
PPA	Power Purchase Agreement
RFO	Residual Fuel Oil
RLNG	Re-gasified Liquid National Gas
ROE	Return on Equity
ROI	Return on Investment
SNGPL	Sui Northern Gas Pipeline Limited
Ton	Metric Ton i.e., 1000 Kg
USD	United States Dollar
WAPDA	Pakistan Water & Power Development Authority
WPI	Wholesale Price Index

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Section 1 Petition Summary

Name of Applicant	Northern Power Generation Company Limited (NPGCL)
Registered Office:	197-WAPDA House, Lahore
Main Place of Business:	Thermal Power Station, Mahmood Kot Road, Tehsil & District Muzaffargarh
Telephone:	066-9200151-56
Facsimile:	066-9200166
Licensee details:	NPGCL is the licensee of National Electric Power Regulatory Authority (NEPRA) and holds the Generation License bearing No. GL/03/2002 dated 01.07.2002.

Representatives of NPGCL:

The petition is being filed through Engr. Sabeeh-Uz-Zaman Faruqi, Chief Executive Officer of NPGCL who has been duly authorized by Board of Directors vide Resolution passed in its meeting held on 23.07.2022 to sign and file the Tariff Petition **for revision/modification of the EPC Stage Reference Tariff of CCPP Nandipur of NPGCL**. Additionally, the following officers of NPGCL shall present any document, in support of the Tariff Petition, as needed and do all acts necessary for completion and processing of the application: -

- Finance Director/ Chief Financial Officer
- Chief Engineer/ Technical Director,
- Plant Manager CCPP Nandipur

The Tariff Petition is being submitted with the assistance of Financial Consultant M/S A&K Consilium, who shall also represent the case of NPGCL before NEPRA during hearing.

The Affidavit of the signatory/ CEO is appended and copy of the Bank Draft (tariff petition fees) is attached.



Section 2 About the Petitioner and background of tariff

- 2.1 Consequent upon the restructuring of power wing of Pakistan Water and Power Development Authority, hereinafter referred to as the "WAPDA", its thermal power generation facilities have been split into four (4) independent generation companies, which are known as GENCO(s). Subsequent to this, GENCO - III, or Northern Power Generation Company Limited (NPGCL), was incorporated on October 15, 1998 as a Public Limited Company under the Companies Ordinance of 1984.
- 2.2 NPGCL commenced its commercial operation on March 01, 1999. It was originally organized to take over all the properties, rights, assets, obligation and liabilities of Power Stations of Thermal Power Station Muzaffargarh, Natural Gas Power Station Multan, Gas Turbine Power Station Faisalabad and Steam Power Station Faisalabad.
- 2.3 National Electric Power Regulatory Authority (NEPRA) granted NPGCL a Generation License bearing No. GL/03/2002, initially for a term of 25 years on July 01, 2002. NEPRA, vide Modification-I dated April 18, 2014, retired/excluded the three units of NGPS Multan i.e., Unit No. 1, 3 & 4 (each of 65.00 MW) from the Generation License of NPGCL. However, NEPRA vide Modification-II dated October 31, 2014 to the generation license included Combined Cycle Power Plant, Nandipur and re-fixed the term of generation license up to the year 2044 with the addition of Nandipur CCPP Block.
- 2.4 NEPRA determined power sale tariff of CCPP Nandipur on 14.04.2015 for 30 years based upon the tariff petition filed by NPGCL on 20.05.2014. NEPRA decided Review Motion on 27.01.2016 and also decided on 02.09.2016 the reconsideration request made by the Federal Govt. NEPRA has also decided Review Motion on 29.08.2019 filed by NPGCL on the fuel price adjustment prescribed by NEPRA on 27.01.2016 after allowing the impact of HHV-LHV factor. NEPRA has decided the Reference Tariff revision/ modification petition on 11.04.2022 filed by NPGCL on 16.10.2020.
- 2.5 Since after achieving COD with effect from 23.07.2015, on the request of NPGCL, NEPRA is adjusting the Fixed and Variable O&M component of CPP and EPP periodically in accordance with the indexation / adjustment mechanism provided in its Determinations.

✓

Section 3 Grounds of Tariff Modification Petition

3.1. In accordance with approval of revised PC-I of 425/525MW Combined Cycle Power Plant Nandipur made in July 2013 by the Executive Committee of National Economic Council (ECNEC), the Petitioner carried out works of conversion of power plant to Gas and developing gas supply infrastructure through awarding following four independent work orders:

- i. **Work Order dated 31.01.2015:** For converting Gas Turbines from dual fuel (HSFO & HSD) to dual fuel (Gas & HSD), the OEM (GE USA) will install the necessary equipment and Gas fuel modules/skids,
- ii. **Work Order dated 29.12.2015:** SNGPL will Lay 24" dia and 88 KM, gas pipe line from Qilla Sattar to Nandipur Power Plant and hookup with SNGPL network at Tatlayali and 100 MMCFD capacity 1 Nos gas metering station at Nandipur Power plant,
- iii. **Contract dated 13.02.2017:** AGJV will design, supply, installation, testing & commissioning of the works for connection of SNGPL's (Gas supplier) metering station including compressing facility to the OEM (GE USA) supplied skids for the conversion of PG 9131E Gas Turbines to Gas fuel at Nandipur.
- iv. **Supply Order dated 10.02.2017:** Supply of Gas Booster possessed by CPGCL Guddu to CCPP Nandipur of NPGCL.

Actual contract cost of installing necessary equipment and gas fuel modules/skids to GE (USA) remained the same as was initially estimated and indicated in the Tariff Petition dated 20.05.2014 of the Petitioner estimated whereas contract costs of laying gas pipeline & gas metering station by SNGPL and developing gas pipeline infrastructure together with adding gas booster/ compressing facility connecting to individual GT module/skids were variant than the estimated costs. Actual contract costs of these two works were each other adjusted to ensure supply of gas to the power plant of requisite gas pressure which SNGPL was not ensuring with its regular gas supply system.

In its Determination dated 11.04.2022, NEPRA has allowed reduced cost of Rs 2,808 million duly verified by the SNGPL as against initial estimated cost of Rs 4,750 million for laying gas connections works carried out by SNGPL whereas as against actual cost of Rs 1,969.8 million for enlarged scope of work, NEPRA has restricted actual cost of laying pipeline & gas compressing/ booster facility up to Rs 501.61 million only, maintaining its earlier determined USD 4.87 million cost allowed based upon the DEL's initial financial quotes dated 17.09.2014 for smaller scope of work. NEPRA has also disallowed consideration price of Rs 1,242.052 million paid by the Petitioner to CPGCL for supply of Gas Booster. This is unsustainable by the Petitioner and allowing actual cost for these works has been requested through this Tariff modification/ revision petition.

3.2. After carrying out works as mentioned at paragraph 3.1, the power plant has been converted from dual-fuel (HSFO & HSD) to dual-fuel (GAS & HSD), but NEPRA has determined Fuel Cost Components (FCC) for operation of power plant on RFO and Gas only whereas determined Fuel Cost Component on operation of power plant on HSD is not available, which has been requested through this tariff modification/ revision petition.



3.3. The Determination of Reference Tariff of fuel cost component on simple cycle operation of CCPP Nandipur on Gas/RLNG on the analogy of determination of tariff for PTPL, Jhang and QTPL, Bhikki has been requested in this tariff modification/ revision petition.




Section 4 Statement of Compliance

4.1. Statutory Compliance

- i. Under Section 7 of the "Regulation of Generation, Transmission & Distribution of Electric Power Act, 1997 (hereinafter called as 'NEPRA Act')", the Regulator is responsible for determining tariff, rates, charges and other terms and conditions for the supply of electricity by the generation, transmission and distribution companies.
- ii. NEPRA is also responsible for determining the process and procedures for reviewing tariffs, recommending tariff adjustments, and revision thereof.
- iii. Under Section 15 of the NEPRA Act, the Regulator has granted a Generation License to NPGCL/ Petitioner for a period of 25 years with effect from 01 July 2002. Later, NEPRA has made three (3) modifications in the generation licenses modifying the generating capacity and period of license.
- iv. Under Rule 6 of the Generation Rules 2000, the licensee can charge only such tariff for provision of electric power as approved by the Authority. Accordingly, on filing petitions by NPGCL for determination of its tariff for sale of its generated electricity, NEPRA has determined Reference Tariff for CCPP Nandipur as discussed above.
- v. As per NEPRA Regulations, the same generation tariff shall be applicable until new tariff is determined for the Petitioner.
- vi. This Tariff Modification Petition is being filed in accordance with Section 17(3) of NEPRA Tariff Standards and Procedure Rules 1998.
- vii. The Petitioner places reliance on the precedence of Uch-II Thermal Power Plant and Patrind Hydropower plant wherein NEPRA Authority accepted the tariff modification petition after their Commercial Operation Dates and determined modified Reference Tariff vide letter No. NEPRA/TRF-266/UCH-II-2014/6206-6208 dated April 22, 2015 and No. NEPRA/R/SA(Tariff)/TRF- 172/SHPL-20 11/19480-19482 July 29, 2020 respectively.

4.2. Regulatory Compliance

- i. NTDC has been approached through letter dated 2006.2022 for reimbursement of actual paid amount of 697.10 million for power dispersal of CCPP Nandipur in the light of Authority's decision,
 - ii. Separate request for approval of fuel cost component for each period/month of the pre-COD sale is being submitted to the Authority so that the same may be claimed from CPPA in accordance with the established practice.
 - iii. Generation License Modification application has been filed with NEPRA through letter dated 06.07.2022 to remove inconsistencies particularly regarding primary/secondary fuel.
- 

Section 5 Comparison of Proposed and Existing Reference Tariff

The comparison of Capacity Purchase Price including fixed Operation & maintenance, Fuel Cost Component and Variable Operation & Maintenance Charge Reference Tariff as requested in the Reference Tariff modification Petition is given in the table below:

On RFO	Reference Tariff		Modified Reference Tariff	
	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
Tariff Components				
Capacity Purchase Price	2.1998	0.9788	2.3757	1.0854
Fuel Cost Component	7.9009	7.9009	7.9009	7.9009
Variable O&M	0.4800	0.4800	0.4391	0.4391
Total	10.5807	9.3597	10.7157	9.4254

On HSD	Reference Tariff		Modified Reference Tariff	
	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
Tariff Components				
Capacity Purchase Price	-	-	2.3757	1.0854
Fuel Cost Component	-	-	12.8153	12.8153
Variable O&M	-	-	0.4391	0.4391
Total	-	-	15.6301	14.3398

On Gas/RLNG	Reference Tariff		Modified Reference Tariff	
	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)	(Rs/kW/hr)
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
Tariff Components				
Capacity Purchase Price	2.0960	0.9811	2.1834	1.0053
Fuel Cost Component	7.3803	7.3803	7.3803	7.3803
Variable O&M	0.2148	0.2148	0.2148	0.2148
Total	9.6911	8.5762	9.7785	8.6004

Simple Cycle FCC Tariff on Gas/RLNG	Ref.Tariff	Revised.Tariff
Fuel Cost Component C.Cycle (Rs/kW/hr)	7.3803	7.3803
Fuel Cost Component S.Cycle (Rs/kW/hr)	-	10.7848



Section 6 Relief Sought

The above revised/ modified Reference Tariff is presented for the approval by the Authority on the basis of the above stated facts, circumstances and assumptions **effective from the COD i.e., 23.07.2015** for 30 years, subject to necessary indexation/adjustments.



Section 7 Assumptions/ Basis of Revision of Reference Tariff (CAPEX)

7.1 Scope of Work and Cost of Plant Conversion on Gas/ Gas connection

In accordance with approval of the revised PC-I of 425/525MW Combined Cycle Power Plant (CCPP) Nandipur made in July 2013 by the Executive Committee of National Economic Council (ECNEC), the Petitioner in its earlier Petition dated 20.05.2014 to NEPRA, requested to allow cost of conversion of project from current RFO fuel to Gas fuel amounting to US\$ 25 Million. In addition, the petitioner also requested to allow cost of US\$ 58.644 Million (PKR 3,970,260,000) for dedicated pipe line and other infrastructure required for transmission of Gas. In support, the petitioner submitted M/S SNGPL quotation stating a total cost of Rs 5,567.07 million, out of which Rs 3,970.26 million will be the pipeline cost for Nandipur power project and the remaining for Chichokimalian. The SNGPL had however, linked this agreement with the availability of 1.2 BCF gas from southern sources.

In view of non-commitment of supply of Gas, in its determination dated 14.04.2015, NEPRA did not allow a gas connection cost of Rs 3,970.26 million and gas conversion cost of \$25 million however decided, in case of firm commitment of gas supply, gas conversion cost can be considered if the petitioner submits a request under the prescribed law, supported with relevant documents.

After getting firm commitment for supply of gas from the Federal Government, in its petition dated 24.04.2015, the Petitioner made similar request again to NEPRA. The Authority, however decided in its determination dated 27.01.2016, which is reproduced as hereunder:

49. The gas conversion cost of USD 20.29 million, which is based on estimate offered by GE worth USD 15.42 million and USD 4.87 million offered by DECL is, considered legitimate cost. The Authority has therefore decided to allow the same as maximum ceiling subject to adjustment at the time COD on the provision of documentary evidence.

As is evident from the determination stated above, based upon estimates given by GE and DECL, NEPRA has assessed maximum ceiling of USD 20.29 M of gas conversion works.

In its determination dated 02.09.2016, keeping in view the approval of OGRA, the Authority decided that Nandipur power plant shall also be given the prudent cost related to gas infrastructure at the time of COD. In this regard, NPGCL shall submit verifiable documentary evidence of actual cost incurred on gas pipeline, duly verified by SNGPL.

Through Tariff revision application dated 16.10.2020, the Petitioner submitted the documentary evidence of actual cost of PKR 2,808.69 million incurred on gas pipeline duly verified by SNGPL, which Authority very graciously approved in its determination dated 11.04.2022. The comparison of contracted and verified cost has been shown in the table below:



		Mln. Rs		
Sr#	Description	Contracted	Verified	Incr/(Decr)
A	Pipeline construction works			
1	Survey & Design & Overhead	13.00	1.20	(11.80)
2	Pipeline metering system construction activities	1,063.00	193.72	(869.28)
3	Freehold Land	425.00	520.16	95.16
4	Civil works	42.00	635.16	593.16
		1,543.00	1,350.25	(192.75)
B	Equipment/ material	3,207.00	1,458.44	(1,748.56)
	Total	4,750.00	2,808.69	(1,941.31)

The above comparison shows that major reduction in cost is for purchase of equipment/ material, which has been off-set against increase in gas connection cost incurred through works carried out by AGJV and Gas Booster supplied by CPGCL, Guddu.

In its petition dated 16.10.2020, the Petitioner however stated that works of conversion of plant on gas by installing of the necessary equipment and Gas fuel modules/skids has been carried out by GE (USA) being OEM and having propriety rights, the SNGPL has carried out works of Laying 24" dia and 88 KM, gas pipe line from Qilla Sattar to Nandipur Power Plant and hookup with SNGPL network at Tatlayali and has also installed 100 MMCFD capacity (1) Nos gas metering station at Nandipur Power plant.

The works of designing, supplying, installation, testing & commissioning of the connection of SNGPL's (Gas supplier) metering station including compressing facility to the OEM (GE USA) supplied skids for the conversion of PG 9131E Gas Turbines to Gas fuel at Nandipur have been carried out by AGJV. For this purpose, sealed bids were invited on Competitive Bidding (CB) basis through an advertisement published in English National Newspapers on 17-09-2016 as well as placed on PPRA website <http://www.ppra.org.pk>.

Bids were opened on October 14, 2016, following two (2) bidders participated:

- i. Dongfang Electric Corporation Limited, China (DECL)
- ii. Amcorp-Gasco Joint Venture, Pakistan (AGJV)

DECL's read out price was USD 15,311,157 (PKR 1,598,484,790.80) whereas AGJV's read out price was PKR 1,782,000,000. DECL was not declared successful bidder due to following reasons:

- i. Bid security was not submitted along with the Bid.
- ii. Project completion time of DECL was 12 months as compared to desired minimum 06 months offered by M/S AGJV.

It may be noted that the scope of work contained in the Tender documents was comprised of the installation of relocated and retrofitted gas compressors from Guddu Power Plant, all the related work for gas conversion (except modification in GTs and supply of fuel gas conditioning and filtering skids) of Power Plant in Combined Cycle Mode.

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The Petitioner through its tariff revision petition dated 16.10.2020 requested NEPRA to allow actual cost of PKR 4,963.674 million and duties & taxes of Rs 463,903,644 million on account of conversion of plant on gas and modify the Reference Tariff accordingly.

In its Determination dated 11.04.2022, Authority allowed cost of USD 15.418 million for the works carried out by GE(USA) for conversion of plant on Gas. NEPRA did not allow the requested cost of Rs 1,969.8 million for the works carried out by AGJV for design, supply, installation, testing & commissioning of the works for connection of SNGPL's (Gas supplier) metering station including compressing facility to the OEM (GE USA) supplied skids for the conversion of PG 9131E Gas Turbines to Gas fuel at Nandipur. Instead; NEPRA maintained its earlier Decision of allowing cost of USD 4.870 million based upon initial financial quote given by DECL. Related remarks of NEPRA has been reproduced as under:

"The Authority has considered the submissions of the Petitioner and documentary evidence pertaining to of Rs 1,969.8 million and the AGJV scope of conversion work. The Authority is of the opinion that the initial cost of Rs. 2,090 million for gas conversion work was approved on the basis of submission/ request of the Petitioner which was subject to adjustment as per actual only if it is less than the cap amount. The Petitioner did not seek approval of the revised cost before execution. Therefore, there is no justification to review the approved cost beyond the capped amount except for any exchange rate variation in GE scope of cost."

In this regard it is submitted that combining of cost by NEPRA of two independent works carried out by two separate contractors is not justified. The scope of works of GE (USA) and AGJV, though interconnected but have been carried out entirely separate. Further allowing USD 4.870 million relying upon DECL initial quote dated 17.09.2014 is also not justified because the initial financial quote of USD 4.870 million provided by DECL was for smaller scope of work. The DECL when participated in the tendering process submitted financial bid opened on 14.10.2016, of USD 15.311 million for the enhanced scope of work. DECL also provided alternate proposal for aforesaid works of additionally supply and installation of Gas Booster for USD 24.995 million. The comparison of scope of work mentioned by DECL in its initial financial quote dated 17.09.2014 and financial bid opened on 14.10.2016 has been reproduced as under:

Scope of work of Initial proposal of DECL dated 17.09.2014

3. Refer Page 2, Clause 1.3, "Scope of Work": Scope of work shall also include electromechanical works, inclusive of all instrumentation, control and all other related systems/equipment necessary for safe operation of the system. Also, we understand that DEC's scope of work starts from termination point for SNGPL, i.e. gas station outside the power plant boundary wall and extends upto the off-base fuel gas module of the gas turbine. Please confirm.

DECL's Reply: Electromechanical work include all instrumentation, control and all other related systems/equipment necessary from the gas station outside the power plant boundary wall to the off-base fuel gas module only. The work of scope from off-base module to the turbine base is in GE's scope, for detail, please kindly check from GE.

Scope of work of DECL Financial bid opened on 14.10.2016

3

3.2 DECL's scope of supply for the gas conversion work includes one set of natural gas regulating station where gas boosters and associated facilities will be provided by NPGCL, NPGCL shall be responsible for its performance and associated facilities such as natural gas piping system, firefighting system, shed of natural gas booster / regulating station and etc.. DECL's scope of work for the gas conversion work comprises design, supply, construction, installation, commissioning based on the above mentioned DECL's scope of supply.

3.3 DECL's scope of work for the gas conversion work is as follows:

- 1) The design, supply, construction, installation and commissioning of natural gas pipeline from one meter outside the Natural Gas Station which is out of DECL's scope to DECL supplied natural gas regulating station. The above mentioned Natural Gas Station out of DECL's scope will be near to Gate House No. 2 in between Batching Plant and boundary wall of GEPCO Training Center according to NSPAK's letter No. 3038/165/HAK/M6/951 dated June 12, 2014 which is attached as part of this Technical Proposal.

DECL's Alternate proposal dated 14.10.2016 for Supply & erection of Gas booster as well

3.2 DECL's scope of supply for the gas conversion work includes one set of natural gas booster / regulating station and associated facilities as natural gas piping system, firefighting system, shed of natural gas booster / regulating station and etc.. DECL's scope of work for the gas conversion work comprises design, supply, construction, installation, commissioning based on the above mentioned DECL's scope of supply.

The comparison of financial quotes given by DECL has been shown in the table below:

DECL Financial Proposal	16.10.2016	With Gas Booster	
	16.10.2016	16.10.2016	17.09.2014
	USD	USD	USD
Cost of Material & Equipment	10,785,600	19,888,600	2,979,940
Cost of Services	3,399,800	3,399,800	1,890,060
Taxes	1,125,757	1,706,800	-
Total	15,311,157	24,995,200	4,870,000

Owing to low pressure of gas and departmental propriety rights limitations to the execute gas connection works beyond gas metering station (located outside the power plant boundary wall) by SNGPL, the Petitioner carried out competitive bidding for execution of works of enhanced scope of work including design, supply, installation, testing & commissioning for connection of SNGPL's (Gas supplier) metering station to the OEM (GE USA) supplied skids for the conversion of PG 9131E Gas Turbines to Gas fuel. The enhancement in scope of work of said area was done by reducing the proportionate scope of work initially contemplated to be carried by SNGPL. Being only responsive bidder, the Petitioner awarded to the contract to AGJV as its financial quote was

assessed reasonable and competitive by the Owner's Engineer (NESPAK) for Rs 1,782 million. Actual/ accrued cost of the contract has been worked out as Rs 1,969.8 million including PST of Rs 187.8 million which has been paid/accrued at different rates applicable at the time of payments. The bid price quoted by AGJV was considered as excluding of PST.

Through this Reference Tariff revision/ modification Petition, Authority is therefore requested to please allow actual cost of PKR 1,969.8 million as against already determined amount of Rs 501 million (equal to USD 4.870 million), for the works of design, supply, installation, testing & commissioning of the works for connection of SNGPL's (Gas supplier) metering station to the OEM (GE USA) supplied skids for the conversion of PG 9131E Gas Turbines to Gas fuel, carried out by AGJV.

7.2 Gas Booster Cost

In its Reference Tariff modification application dated 16.10.2020, NPGCL requested the Authority to allow consideration amount of Rs 1,242.052 million paid to CPGCL Guddu for acquiring Gas Booster. It was explained to the Authority that in response to the letter of NPGCL dated 07.11.2013 regarding proposal of GE for adding gas booster, NESPAK through their letter dated 11.02.2014 at serial# 13 (k) remarked that in case required gas pressure is not ensured from the available gas, then gas compressor station should be added in the scope of work. In response to the NPGCL letter, SNGPL through letter dated 03.04.2015 replied that they will supply gas to CCPP Nandipur at gas pressure of 300-400 PSIG, therefore any pressure boosting/ regulation shall have to be arranged by NPGCL at their own.

DECL in its financial bid dated 16.10.2016, provided alternate proposal by including the cost of supply of booster emphasizing in the technical proposal saying that;

Fuel gas supply system

As NPGCL provided natural gas pressure 300-400 psig cannot meet the requirement of GT inlet as 380-400psig, the gas boosting device (compressor) will be installed along with the gas regulating station, which will be supplied by NPGCL. The gas regulating station will be put into service when the inlet natural gas pressure meets the requirement of GT inlet. The gas boosting device (compressor) will be put into service when the inlet natural gas pressure cannot meet the requirement of GT inlet. The gas boosting device (compressor) shall meet the requirement of GT inlet parameters such as GT inlet gas pressure, GT inlet gas pressure fluctuation, GT inlet gas temperature etc., which shall be guaranteed by NPGCL.

The gas fuel system will be equipped with natural gas booster station including strainer pressure regulating valves, shut-off valves, pipes, metering device, pressure gauge and indicating instruments and will be provided with necessary protective equipment for proper control and safe operation of the unit.



In order to meet with the project completion timelines, re-set to recover delays, NPGCL acquired readily available gas booster from CPGCL (GENCO-2) at consideration price of Rs 1,242,051,646. To ensure required pressure of the gas to the power plant, similar gas booster stations have also been installed at other RLNG power plants like Baloki, Haveli Bahder shah etc.

The Authority in its determination dated 11.04.2022 however decided as under:

“While determining tariff of 747 MW Guddu power plant, the Authority allowed gas booster compressor station cost of Rs. 1.465 billion. CPGCL did not inform during the proceedings of the determination of tariff about the acquisition of free of cost gas booster station from Engro Fertilizer and its transfer to GENCO-III in consideration of Rs. 1.242 billion. Had it been informed at that time, the cost of CPGCL's booster station would have been reduced by the equivalent amount. Since the adjustment was not made at that time, it would be necessary to make appropriate adjustment. The Authority has decided to treat the transfer of gas booster station at zero rate. NPGCL is directed to cancel the credit note in favour of CPGCL for gas booster or issue a debit note for equivalent amount in pursuance of the directions of the Authority.”

The Authority has disallowed legitimate Gas Booster consideration price of Rs 1.242 billion paid to CPGCL, owing to the lapse occurred on the part of CPGCL for not disclosing the facts to the Authority at the time of determination of Tariff of 747 MW Guddu power plant. This is unfair; as Petitioner has been penalized for the fault of another independent legal entity.

Through this Reference Tariff revision/ modification Petition, Authority is therefore again requested to please allow consideration price of Rs 1,242,051,646 actually paid/settled to CPGCL for the legitimate supply of Gas Booster to the Petitioner.

7.3 Revised Cost of Plant conversion on Gas

The work order wise comparison of assessed and revised cost of plant conversion on Gas has been shown in the table below:

Capital Cost Components	Cost Assessed		Revised Cost		Incr /(Decr)	
	USD Mln	PKR Mln	USD Mln	PKR Mln	USD Mln	PKR Mln
Plant Gas Conversion-GE	15.42	1,588.26	15.42	1,588.26	-	-
Gas Connection AGJV	4.87	501.61	19.12	1,969.80	14.25	1,468.19
Gas Connection- CPGCL	-	-	12.06	1,242.05	12.06	1,242.05
Gas Connection- SNGPL	27.27	2,808.69	27.27	2,808.69	-	-
Total	47.56	4,898.56	73.87	7,608.80	26.31	2,710.25



Section 8 Assumptions/ Basis of revised Debt Servicing & ROE Charge

The Authority in its determination dated 14.04.2015 has assessed Net generating capacity of CCPP Nandipur on operation of power plant on RFO/HSD as 411.351 MW and in determination dated 27.01.2016 assessed net generating capacity on operation of power plant on gas/ RLNG as 450.4777 MW. This translates into annual generation of 3,603.4 GWh on RFO/HSD and 3,946.6 GWh on Gas/RLNG.

With debt financing ratio of 70% and repayment of loan in 15 years with interest rate of 10.024% (8.53 Base rate+1.494 Spread), assessed annual debt servicing charge on operation of power plant on RFO/HSD based upon the assessed capital cost of 47,742.15 million, works out as Rs. 4,399.81 million, which is translated into Rs. 1.2210/ kWh. At the same ratio of financing, repayment terms and interest rate, assessed annual debt servicing charge on operation of power plant on Gas/RLNG is translated into Rs 1.1148/kWh.

Based upon the revised capital cost of Rs 49,210.34 million, at same debt financing ratio, repayment period and interest rate, the revised annual debt servicing charge on operation of power plant on RFO/HSD works out Rs 4,535.11 million which is translated into Rs. 1.2586/ kWh and Rs. 1.1491/kWh on operation of power plant on Gas/ RLNG.

With 30% equity financing ratio of the assessed capital cost of Rs 47,742.15 million at 10% Return on Equity (ROE) rate, assessed annual ROE charge including Return on Equity During Construction (ROEDC) works out Rs 1,868.38 million, which is translated into Rs. 0.5185/kWh on operation of power plant on RFO/HSD whereas Rs. 0.4734/ kWh on operation of power plant on Gas/RLNG.

Based upon the revised capital cost of Rs 49,210.34 million, at same equity financing ratio and ROE rate, the revised ROE charge on operation of power plant on RFO/HSD works out Rs 1,920.93 million which is translated into Rs. 0.5331/ kWh and Rs. 0.4867/kWh on operation of power plant on Gas/ RLNG.

The working of debt servicing cost and Return on Equity has been attached.

Through this revised tariff petition, Authority has been requested to determine revised annual debt servicing charge and Return of Equity on operation of power plant on RFO/HSD and Gas/RLNG as proposed.

It is further requested that revised ROE may be approved @15% effective from COD i.e., 23.05.2015 and @10% effective from the modified tariff notified by NEPRA in accordance with SRO dated 27.05.2022.



Section 9 Assumptions/ Basis of Revised Fuel Cost Component

9.1 Generation capacity

In the first Tariff petition filed by NPGCL for CCPP Nandipur on 20.05.2014, Net Capacity (MW) and Net Efficiency (%) as requested by petitioner and allowed by NEPRA on 14.04.2015 are tabularized as below;

Description	Requested by Petitioner in first Tariff Petition (20.05.2014)	Allowed by NEPRA in first Tariff determination (14.04.2015)
Fuel: RFO		
Net capacity (MW)	411.351 MW	411.351 MW
Net Efficiency (%)	44 %	45 %
Fuel: Gas		
Net capacity (MW)	447.672 MW	Not Allowed
Net Efficiency (%)	48 %	Not Allowed
Fuel: HSD		
Net capacity (MW)	411.351 MW	Not Allowed
Net Efficiency (%)	44 %	Not Allowed

Being aggrieved, NPGCL filed a review motion on 24.04.2015 which was disposed by NEPRA on 27.01.2016. The determined Capacity and plant efficiency is as under;

Description	Requested by Petitioner in Review Tariff Petition (24.04.2015)	Allowed by NEPRA in Review Tariff determination (27.01.2016)
RFO Only		
Net capacity (MW)	411.351 MW	411.351 MW
Net Efficiency (%)	44 %	45 %
Gas/RLNG Only		
Net capacity (MW)	447.672 MW	506.21 MW
Net Efficiency (%)	48 %	49%
Gas & HSFO (Intermittent)		
Net capacity (MW)	-	450.4777 MW
Net Efficiency (%)	-	49%
HSD only		
Net capacity (MW)	411.351 MW	Not Allowed
Net Efficiency (%)	44 %	Not Allowed

9.2. COD and Completion of Gas Conversion works

The GTs and CCPP achieved Commercial Operation on various dates as tabulated below;

3✓

Unit	Make	Commercial Operation Date	Fuel Type
GT-1	GE, USA	20-05-2015	HSFO / HSD
GT-2	GE, USA	27-03-2015	HSFO / HSD
GT-3	GE, USA	06-12-2014	HSFO / HSD
ST-4	DECL, China	23-07-2015	Steam

Operation of CCGP plant on RFO/HSD alone : **From COD to 08.05.2017**

Intermittent Operation duration (Both Fuel/Pre-select load) : **08.05.2017 to 06.10.2017**

Operation of Plant on Gas/RLNG alone (on Base Load) : **w.e.f. 06.10.2017**

9.3. Generation License Modification

The Petitioner has submitted Generation License modification application in NEPRA. As stated in the said application, after conversion of power plant, the primary fuel is Gas/ RLNG and secondary fuel is HSD. This has necessitated that Petitioner should have approved Fuel Cost Component on operation of power plant on HSD as well.

9.4. Revised Fuel Cost Component

Reference Fuel Cost Component on operation of power plant on HSD is therefore, proposed as Rs 12.8153/kWh based upon, 45% efficiency, heat rate of BTU 7,582/kW/hr, LHV/HHV factor of 1.05, calorific value of BTU 36,019/ Ltr and fuel price of Rs 57.98/ Liter including transportation charges.

NPGL in its earlier petition dated 24.04.2015 explained to NEPRA that operation of plant on open-cycle may be determined to meet with national power demand when Steam Unit is not available for operation. NEPRA in its determination dated 27.01.2016 at para# 57 however, remarked that;

“Open cycle operation of CCGT drop the efficiency value by about 12% to 13% in absolute terms. Which means that consumers will get the same units of electricity with 1.5 times the cost. This type of inefficient operation post COD has never been allowed to any IPP on similar technology post COD and this project should not be an exception. Therefore, the petitioner's request in this regard is rejected.”

It has been noted that NEPRA has already determined simple cycle FCC tariff on Gas/RLNG for QTPL, Bhikki and PTPL, Jhang. Authority is therefore, requested to please approve simple cycle FCC on Gas/ RLNG on the analogy of aforesaid power plants

The comparison of Reference Fuel Cost Component (FCC) with requested modified FCC has been shown in the table below:

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Fuel Cost Component	Ref: Tariff	Revised Tariff
On Combined Cycle	(Rs/kW/hr)	(Rs/kW/hr)
RFO	7.9009	7.9009
Gas/RLNG	7.3803	7.3803
HSD	-	12.8153
On Simple Cycle		
Gas/RLNG	-	10.7848

Working of requested modified/revised fuel cost components has been attached.



Section 10 Assumptions/ Basis of Revised Operation & Maintenance Expense

In its determination dated 11.04.2022, based upon contract agreement dated 06.02.2017 signed by the Petitioner with Hydro-electric Power System Engineering Company (the Operator), Authority has determined fixed and variable O&M charge on operation of power plant on Gas/ RLNG as under:

Gas/RLNG	<u>Rs/kWh</u>
Fixed O&M- Foreign	0.1276
Fixed O&M- Local	0.1369
Variable O&M- Foreign	0.2099
Variable O&M- Local	0.0049

In its determination dated 14.04.2015, Authority has determined fixed and variable O&M charge in local and foreign currencies on operation of power plant on RFO, whereas the same for operation of power plant on HSD has not been determined. Based upon the price schedule and operating parameters contained on contract agreement dated 06.02.2017 signed by the Petitioner with the Operator, fixed and variable O&M charge in local and foreign currencies on operation of power plant on RFO and HSD has been revised proposed in the table below:

Revised Petition	<u>Assessed Rs/kWh</u>	<u>Revised Rs/kWh</u>
Fixed O&M- Foreign	0.1273	0.1503
Fixed O&M- Local	0.0898	0.1469
Variable O&M- Foreign	0.4800	0.4340
Variable O&M- Local	-	0.0051

The calculation of local & foreign fixed and variable operation & maintenance cost has been annexed.



Section 11 Indexations

- a. Reference Gas/RLNG price of Rs. 956.97/MMBtu. **Fuel Cost** Component (FCC) shall be adjusted in accordance with the price variation of the fuel consumed at the new price of Gas/RLNG- to be notified by the competent Authority/OGRA adjusted for HHV-LHV factor of 1.107553.
- b. Reference RFO price of Rs. 38,265/M.T and HSD price Rs 57.98/ Liter, **Fuel Cost** Component (FCC) shall be adjusted in accordance with the price variation of the fuel consumed at the new price of RFO and HSD to be notified by the competent Authority/OGRA adjusted for HHV-LHV factor of 1.05.
- c. The local component of **Fixed O&M** and **Variable O&M** shall both be quarterly indexed to the WPI (Manufacturing) as notified by the Pakistan Federal Bureau of Statistics, whereas the both the foreign components of the above shall be indexed to (a) the US CPI issued by the US Bureau of Labor Statistics, and (b) the USD / PKR exchange rate based on the revised TT & OD selling rate of USD as notified by the National Bank of Pakistan.
- d. **Cost of Working Capital** component of the reference generation tariff shall be indexed to (a) change in FCC due to fuel price variations, and (b) the 3 Month KIBOR rate as notified by the State Bank of Pakistan.
- e. The tariff component, **Return on Equity**, shall be quarterly indexed to the USD / PKR exchange rate based on the revised TT & OD selling rate of USD as notified by the National Bank of Pakistan.
- f. The **Cost of Insurance**: As per para# 67 of the Determination of 27.01.2016, the actual insurance cost for the minimum cover required under contractual obligations with the Power Purchaser not exceeding 1.35% of the EPC cost will be treated as pass-through. Insurance component of reference tariff shall be adjusted as per actual on yearly basis upon production of authentic documentary evidence by NPGCL.
- g. The **Debt Servicing** cost component shall be adjusted in accordance with the applicable indexations of the 6 Month KIBOR rate (or another benchmark as applicable).

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Section 12 General Assumptions

In addition to the assumptions made in this document above, the following general assumptions have been taken into account for the computation of the Petitioner's generation tariff. Any changes in these assumptions shall result in a change to the tariff proposed in this document.

- a. Auxiliary consumption is 13.649 MW on RFO/HSD Operations and 13.02 MW on Gas/RLNG Operations.
- b. A constant ROE is assumed, which results in an IRR of 15% over 30 years.
- c. No hedging cost has been assumed for exchange rate fluctuations during construction.
- d. The tariff is calculated on the basis of a notional 60% plant factor for RFO/HSD and 90% plant factor for RLNG.
- e. Working capital has been financed by a separate working capital arrangement, and is not included in the Project cost.
- f. 100% local debt is procured.
- g. Reference US CPI 234.722
- h. Reference PAK CPI 195.13
- i. PKR to US Dollar exchange rate 103.0



Section 13 Determination Sought

The learned Authority is kindly requested to approve the Company's requested modified Reference Tariff, along-with the pertinent adjustments, indexations, in accordance with the parameters & assumptions mentioned above. The Petitioner would be pleased to provide any further information, clarification, or explanation that may be required by the Authority during its evaluation process.

A handwritten signature in dark ink, appearing to be 'M. J. Singh', is located in the upper right quadrant of the page.

Section 14 Annexures and Appendices

A. Schedule of Annexures

1. Bank Draft as petition filing fee.
2. Copy of BOD resolution approving filing of tariff petition in NEPRA.
3. Affidavit signed by Engr. Sabeeh-Uz-Zaman Faruqi, Chief Executive Officer of NPGCL.

B. Schedule of Appendices

1. Bid evaluation report of November 2016 of NESPAK for Gas connection & conversion works,
2. Extracts of the Agreement dated 13.02.2017 signed by the Petitioner with the AGJV for Gas connection & conversion works.
3. Details of payments made to AGJV showing invoice number, date & amount and payment cheque number & date,
4. Copy of offer of Dongfang Electric Corporation dated 17.09.2014 for plant conversion.
5. Copy of Financial bid of DongFang Electric Corporation dated opened on 14.10.2016 for plant conversion & Gas connection.
6. Item-wise comparison of assessed and revised capital cost,
7. Calculation of debt servicing and ROE charge,
8. Calculation of revised/modified Capacity Purchase Price
9. Calculation of modified/ revised Fuel Cost Component,
10. Calculation of Fixed and Variable O&M expenses as per Agreement dated 06.02.2017 signed by the Petitioner with the Operator.

Note: Copies of Appendices have been placed in separate folder



NORTHERN POWER GENERATION COMPANY LIMITED (NPGCL)

TARIFF MODIFICATION/ REVISION PETITION FOR 425/525 MW CCPP NANDIPUR dated 15.08.2022

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ENGINEERING, PROCUREMENT,
CONSTRUCTION AND COMMISSIONING

OF

GAS CONVERSION WORKS / SERVICES

AT

425/525 MW (GROSS) COMBINED CYCLE POWER
PLANT
NANDIPUR, GUJRANWALA,

PAKISTAN

EVALUATION REPORT
OF BIDS

NOVEMBER 2016



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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

Northern Power Generation Company Limited (NPGCL) (the "Owner") invited Bids from the reputed and experienced Contractors for Engineering, Procurement, Construction and Commissioning of Gas Conversion Works/Services at 425/525 MW CCPP at Nandipur, Gujranwala. The scope comprises the installation of relocated and retrofitted gas compressors from Guddu Power Plant, all the related work for gas conversion (except modification in GTs and supply of fuel gas conditioning skids) and Performance Testing of Power Plant in Combined Cycle Mode.

Competitive Bidding (CB) was conducted vide publication of Tender Notice in leading newspapers as well as on website of PPRA.

Bids were opened on October 14, 2016, and the following two (2) bidders participated:

- Dongfang Electric Corporation Limited, China (DECL)
- Amcorp-Gasco Joint Venture, Pakistan

And the read out Prices are as under:

Sr. No.	Bidder's Name	Read Out Price		Read Out Price in Single Currency
		PKR	USD	PKR
1.	DECL	-	15,311,157	1,598,484,790.80
2.	Amcorp-Gasco JV	1,782,000,000	-	1,782,000,000.00

ES.2 PRELIMINARY EXAMINATION OF BIDS

Both the bids were examined for responsiveness in technical & commercial terms. In the course of determining substantial responsiveness of each bid, it was considered: whether the bid is complete and does not deviate from the scope: bid does not deviate from basic technical/commercial requirements: required sureties have been furnished: documents have been properly signed: bid is valid till required period: completion period offered is within specified limits: bidder is eligible to bid and possesses the requisite experience.

Both the Bidders were asked for clarifications regarding their Bids for which responses were received. The same are attached as *Annex-1(b)*.

The Bid from DECL, China was not considered for detailed evaluation because of their non-responsiveness. The details of non-responsiveness of DECL is stated in subsequent sections of this report. Bid from M/s Amcorp-Gasco JV, Pakistan being compliant to the Bidding Document, was considered for Detailed Evaluation (*However, time for completion is not as per the requirement of bidding documents*).

Financial requirements have been complied by M/s Amcorp-Gasco Joint Venture for payment terms and financial strength.

Alternative Bid of M/s DECL, China offering new MAN booster compressors, with completion time of 24 months is considered as major deviation from scope of work and requirements of bidding documents.

ES.3 CONCLUSIONS:

M/S Amcorp-Gasco JV emerges as substantially responsive and Bid is declared as lowest Evaluated Bid.

ES.4 RECOMMENDATIONS

It is recommended that;

Award and signing of the contract for the "Engineering, Procurement, Construction and Commissioning of Gas Conversion Works/Services for 425/525 MW Combined Cycle Power Plant, Nandipur" may be initiated with M/s Amcorp-Gasco JV. at a total cost (Contract Price) of PKR 1,782,000,000 (Pak Rupees One Billion Seven Hundred and Eighty Two Million Only).

Before signing of the Contract, the following should be formalized and agreed with clarity:

- Terms and mode of payment, LD's. and insurance by either Party.
- Completion time of the project quoted as 229 days against completion time of project upto February 15, 2017 as per the bidding documents, as discussed and recommended at NS1 of *Annex-2(b)*, "Notes to Summary of Results".
- Punjab revenue services tax applicability in the context of October 03, 2016 notification.
- Schedule of gas supply to Nandipur by SNGPL.
- Performance testing of whole CCPP to be discussed and agreed in detail / clarity. Its timing and interconnecting obligations / availability / conditions / logistics of all stake holders (SNGPL, Gas Conversion contractor, GE's scope of services for Gas Conversion, O&M Operator and Power Purchaser).
- Warranty is provided for twelve (12) months as per Bid (Definitions). however, it is stressed to have longer (may be 24 months) warranty for smooth and efficient operation of the Compressors.
- Effective liaising with GE and GASCO for immediate rescue in case of any shut down to minimize the loss of "Availability" of Plant within the Tariff / PPA implications is also required.
- Mandatory Spare Parts of Compressors must be kept at site, also. This may require some O&M obligation adjustments; to be carefully be looked into.
- The NPGCL has to decide from the beginning if it is desired to operate plant on mix of HSFO and GAS or only on GAS. It has significant implications towards ultimate output. In case of mix firing (Gas+HSFO), minor increase in output (MW) is expected, whereas if HSFO system is abandoned, the simple cycle increase Guarantee is 18% ($\pm 0.49\%$ test uncertainty). Combined cycle output increase is not absolute due to uncertainties in the

Executive Summary

performance of HRSG's / Steam turbine system and the maintenance conditions of BOP.
It is assured that in actual it may be increased up to (\pm) 500MW.

1. INTRODUCTION

1.1 SCOPE OF BID

Northern Power Generation Company Limited (NPGCL) (hereinafter called the "Owner") invited Bids from the reputed and experienced Contractors for gas conversion works/services of 425/525 MW CCPP at Nandipur, Gujranwala.

The scope of work covered under this Contract comprises dismantling of existing three Gas Compressors with all its accessories/instrumentation from Thermal Power Station Guddu, transportation from Guddu to Nandipur, retrofitting and installation of the said Gas Compressors and all related auxiliary systems according to the requirements of Gas Turbines and fuel skids, installed at Nandipur, including all the related Civil Works, complete job in all respects, Interconnection between SNGPL Gas Regulation and Metering Station and the Gas Compressors, Interconnection between Gas Compressors and Gas Turbine Gas Skids. Testing and Commissioning of Compressors and fuel Gas system as a whole including Performance Testing of Power Plant in Combined Cycle Mode.

1.2 SOURCE OF FUNDS

In accordance with the provisions of Sub-Clause IB 1.2 of Instructions to Bidders, the financing for the Contract has been arranged by the Owner through its own resources.

1.3 INVITATION FOR BIDS

Sealed bids were invited on Competitive Bidding (CB) basis through an advertisement published in English National Newspapers of repute as well as on PPRA website <http://www.ppra.org.pk>.

As per the first advertisement at **Exhibit-I**, the date of submission/opening of Bidding Documents was October 05, 2016 which was extended upto October 14, 2016 through corrigendum (**Exhibit II**).

1.4 PRE-BID CLARIFICATIONS OF BIDDING DOCUMENTS

Certain queries/requests for clarifications on the contents of Bidding Documents were received from M/s Amcorp-Gasco JV. The same were responded in writing through pre-bid clarifications (*Annex-I(a)*).

1.5 SUBMISSION AND OPENING OF BIDS

Two (02) bidders submitted their bids up to the deadline for submission of bids, i.e., on October 14, 2016 upto 1500 hrs and the bids were opened on the same date at 1530 hrs by the bid opening Committee constituted by the Owner in the presence of representatives of the Bidders in the office of Chief Engineer/Project Director 425/525 MW CCPP Nandipur, in accordance with the provision of Clause IB 22.1 of ITB. Name of bidders that participated in the bidding process are given as under:

1. Dongfang Electric Corporation Limited, China

2. Amcorp-Gasco Joint Venture, Pakistan

Pursuant to the provision of the Clause IB-22.3 of ITB Salient features including inter alia name of each Bidder, total Bid Price, discount offered (if any) and presence or absence of Bid Security equivalent to 2.5% of Bid price as per Clause IB 15.1, were publicly read out and recorded as under.

Sr. No.	Bidder's Name	Read Out Price PKR	Read Out Price USD	Discount Offered	Bid Security PKR
1.	DECL	-	15,311,157	-	39,923,954
2.	Amcorp-Gasco JV	1,782,000,000	-	-	48,000,000

The record of read out prices of each bidder is shown in **Exhibit III** of the Report as well.

The attendance of Bid Opening Committee Members and Bidder's Representatives along with their telephone numbers and e-mail addresses are given in the attached **Exhibit IV** of the Report.

1.6 VALIDITY OF BID

The validity of Bid, as per provisions of Sub-Clause IB 16.1 of Instructions to Bidders, shall be 90 days after the date of bid opening i.e., until January 11, 2017 whereas Bid Security validity, as per provisions of Sub-Clause 15.2 of Instructions to Bidders, shall be up to February 08, 2017 (i.e., 28 days after 90 days of Bid Validity Period).

1.7 READOUT PRICES IN SINGLE CURRENCY (PKR)

The above readout prices at para 1.5 were converted @ PKR 104.4 (conversion rate on the date of opening of Bid) to single currency (PKR).

Sr. No.	Bidder's Name	Read Out Price		Read Out Price in Single Currency
		PKR	USD	PKR
1.	DECL	-	15,311,157	1,598,484,790.80
2.	Amcorp-Gasco JV	1,782,000,000	-	1,782,000,000.00

Pakistan open market Forex rate as of October 14, 2016 is attached as **Exhibit V**.

1.8 POST-BID CLARIFICATIONS OF BIDS

Pursuant to Sub-Clause 23.1 of Instructions to Bidders, to assist in the examination, evaluation and comparison of the Bids, the Owner (NPGCL) requested the Bidders for clarification(s) in writing of their Bids concerning ambiguities or inconsistencies found in the Bids, attached at *Annex-1(b)*.

2. PRELIMINARY EXAMINATION AND DETERMINATION OF SUBSTANTIAL RESPONSIVENESS OF BIDS

2.1 GENERAL

Pursuant to Sub-Clause IB 24.3 of Instructions to Bidders, prior to the detailed evaluation of bids, substantial responsiveness of each bid to the requirements of the bidding documents has been determined. The criteria for preliminary examination of bids and determination of their substantial responsiveness, is given under Clause IB.24 of Instructions to Bidders. A substantially responsive bid, as spelled out, is one which conforms to all the terms and conditions of the bidding documents without material deviations.

A material deviation as per Sub-Clause IB 24.3 or reservation is one (i) which affects in any substantial way the scope, quality or performance of the works / services; (ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Owner's rights or the bidder's obligations under the Contract; or (iii) whose rectification / adoption would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

2.1.1 COMMERCIAL/CONTRACTUAL REQUIREMENTS

- i) Bidder to quote for complete scope of Bid, specified in Sub-Clause IB 1.1 of ITB,
- ii) Eligibility of Bidder, specified in Sub-Clause IB 2.1 of ITB,
- iii) Eligibility of Goods and Services, specified in Sub-Clause IB 3.1 of ITB,
- iv) Form of Bid duly filled in and signed, as per Sub-Clause IB 9.1(b) and Clause IB 17,
- v) All Schedules (I to XII) to Agreement, duly filled in and signed, as per Sub-Clause IB 9.1(c) of ITB,
- vi) Schedule of Prices (IX to Bid) duly filled in and signed, as per Clause IB 11 of ITB,
- vii) Bid Security furnished with the Bid, in accordance with Sub-Clause IB 9.1(e) and Clause IB 15 of ITB,
- viii) Power of Attorney, specified in Sub-Clause IB 9.1(f) and IB 17.5 of ITB,
- ix) In case of a bid submitted by joint venture (JV), a copy of JV Agreement or a Letter of Intent to enter into JV Agreement be submitted, as specified in Sub-Clause IB 9.1(g) and IB 13.5 of ITB,
- x) Prices quoted by the Bidder shall remain fixed during performance of the Contract, as specified in Sub-Clause IB 11.4 of ITB,
- xi) Bid Prices are quoted in Pak Rupee, specified in Sub-Clause IB 12.1(a) of ITB
- xii) Bidder meets the qualification requirements, specified in Sub-Clause IB 13.4(b) of ITB,
- xiii) Bids shall be valid for the period specified in Sub-Clause IB 16.1 of ITB,
- xiv) Each Bidder has submitted only one bid, either by himself or as a partner of a JV specified in Sub-Clause IB 39.1
- xv) The Bidder has provided Integrity Pact duly filled in and signed along with the Bid, specified in Sub-Clause IB 44.1 of ITB,

Section -2: Preliminary Examination and Determination of Substantial Responsiveness of Bids

- xvi) The Bid is generally in order without any material deviation or non-conformance.

2.1.2 TECHNICAL REQUIREMENTS

- i. The bid is complete and does not deviate from the scope; specified in Sub-Clause IB 24.1 a (i)
- ii. Bidder has provided Documentary evidence of establishment / working of firm since last five (05) years specified in Sub-Clause IB 13.4(a).
- iii. The bidder has provided information regarding the time since the Contractor has been in this business and the time since he has been doing works / services of similar nature; specified in Attachment B to ITB point 6.
- iv. The bidder has provided reference lists of similar works done/services performed by the bidder in its country and abroad; specified in Attachment B to ITB point 7.
- v. The Bidder has provided details of projects under execution and future contractual commitments; specified in Attachment B to ITB point 8.
- vi. The bidder has provided Evidence of ISO certification of bidder's firm/JV firms specified in Attachment B to ITB point 16

2.2 CONFORMANCE OF BIDS WITH RESPECT TO COMMERCIAL/ CONTRACTUAL REQUIREMENTS

Both the Bids were checked to determine their conformance and responsiveness against the commercial/contractual requirements of Bidding Documents, described at Section 2.1.1 above. The results of this conformance checking are described in *Annex-2(a) & Annex-2(b)* and summarized as under:

2.2.1 SCOPE OF BIDS

- a) DECL has taken extra ordinary exceptions within the context of Clause IB 1.1, 17.6, Schedule I, II, III, IV, V, VI, VII, VIII, IX, X which are considered as material deviations discussed at *Annex-2(a) & Annex-2(b)*.
- b) Amcorp-Gasco JV quoted for complete scope of Bid, except minor exceptions, that have been clarified; as discussed in the relevant section of the report.

2.2.2 ELIGIBLE BIDDERS

Both Bidders meet the eligibility criteria specified in Sub-Clause IB 2.1 of ITB.

2.2.3 ELIGIBLE GOODS AND SERVICES

Bidders, M/s DECL and M/s Amcorp-Gasco JV meet the requirements for eligibility of the Goods and Services as per Sub-Clause IB 3.1 of ITB.

2.2.4 FORM OF BID

The Forms of Bids were checked and the results of this checking are given as under:

- a) Bid of M/s DECL: Form of Bid has not been attached with the Bid
- b) Bids of M/s Amcorp-Gasco JV : Form of Bid enclosed with this bid is found duly filled in and signed, conforming to the bidding requirements.

2.2.5 SCHEDULES TO BID

The comments on conformance checking of different "Schedules to Bid" enclosed with all the two (2) Bids is attached as *Annex-2(a) & 2(b)* of the report. Brief detail is given as under:

- a) M/s DECL has attached cover letter, technical proposal with several deviations, commercial proposal of bid, project drawings and schedule, however, has not attached several important forms of bid, company's experience, profile, personnel list/qualification etc.
- b) M/s Amcorp-Gasco JV has attached all forms of Bid, Appendix-I and all schedules duly filled with minor exceptions subject to the clarifications.

2.2.6 SCHEDULE OF PRICES

M/s DECL, China has provided the schedule of prices but not verified clauses of payments written on Schedule IX- Schedule of Prices.

The Schedule of Prices in the Bid of M/s Amcorp-Gasco JV is found duly filled but not signed/verified clauses of payments mentioned on Schedule IX- SOP of Bidding document.

2.2.7 POWER OF ATTORNEY

M/s DECL has not provided the requisite power of attorney document.

M/s Amcorp-Gasco JV has provided the Power of Attorney duly filled, signed and stamped and has nominated. Mr. Ali Raza Kazmi, Director of Amcorp. to act as the focal person in the proceedings of bid.

2.2.8 JOINT VENTURE (JV) AGREEMENT, (IF APPLICABLE)

Section -2: Preliminary Examination and Determination of Substantial Responsiveness of Bids

Out of two Bids, one Bid is submitted as an intended joint venture by two companies viz., M/s AMCORP and Gasco JV. The Bidder has provided a "Letter of Undertaking" in his Bid.

2.2.9 BID PRICES ARE FIXED

M/s DECL have taken deviation on the bidding requirement which have direct impact on Bid Price and is contrary to the Bid Scheme of dismantling / retrofitting of available compressors at Guddu.

M/S Amcorp-Gasco has provided separate prices named as summary of prices and optional items price whereas the optional items were included in the scope of work. Clarification was sought from the bidder and M/s Amcorp-Gasco JV confirmed that 01 x Gas chromatograph, 01 x Metering Skid & 01 x Inlet Heater is included in their base proposal.

Additional Redundant Inlet Heater, Gas Chromatograph & metering skid is quoted as Option.

M/s Amcorp-Gasco JV has not added Punjab revenue services Tax in their Bid price, however, the latest Notification dated October 03, 2016, is provided, which was issued before the Bid opening date hence, this exception is acceptable.

However, Legal and tax experts of NPGCL must look into it before finalizing the Contract.

2.2.10 BID CURRENCIES

As per IB 12 (Currencies of Bid and Payment), M/s DECL have quoted prices in US \$, deviating from Bid requirements.

Whereas M/s Amcorp-Gasco JV have quoted Prices in PKR for the Goods and Services offered from Pakistan and abroad, conforming to the requirements of Clause IB 12 of ITB.

2.2.11 BID SECURITY

M/s DECL has submitted a Bid security in the form of Cheque issued by Standard Chartered Bank in the name of NPGCL after discussing and mutual agreement with Employer.

The Bid Security provided with the Bid by M/s Amcorp-Gasco JV is found substantially conforming to the bidding requirements.

2.2.12 BID VALIDITY

Both the Bidders have offered validity of their Bids conforming to the requirements of Sub-Clause IB 16.1 of ITB.

2.2.13 ONE BID PER BIDDER

M/s DECL has provided one base Bid and one alternative Bid, Alternative bid involves procurement and commissioning of new compressors instead of dismantling and retrofitting the compressors from Guddu, as per the requirement of the Bid scheme of dismantling / retrofitting of NPGCL's available compressor at Guddu.

M/s Amcorp-Gasco JV has offered one Bid conforming to the requirements of Sub-Clause IB 39.1 of ITB.

2.2.14 INTEGRITY PACT

DECL has not submitted the Integrity Pact.

M/s Amcorp-Gasco JV have provided "Integrity Pact" duly filled in and signed.

2.2.15 BIDS GENERALLY IN ORDER WITHOUT MATERIAL DEVIATIONS

The Bid of M/s DECL not found in order because of the material deviations throughout their Bid as well as an attached list of declared deviations titled "Clarification/Deviations Schedule on Nandipur Gas conversion Project" attached as *Annex-3*, taken by the Bidder in its Bid as discussed above and in *Annex-2(a)* & *Annex-2(b)* and is declared non-responsive.

The Bid of M/s Amcorp-Gasco JV is generally in order and is declared **responsive**.

2.3 CONFORMANCE OF BIDS WITH RESPECT TO TECHNICAL REQUIREMENTS

Both Bids were checked to determine their conformance and responsiveness against the technical requirements of Bidding Documents, described at Section 2.1.2 above. The results of this conformance checking are described in *Annex-2* and summarized as under:

2.3.1 Conformance to Qualification Requirements

All the Bids were checked for their compliance to the qualification requirements of Bidding Documents. The result of examination has been summarized in *Annex-2(a)* and *Annex-2(b)* of the Report.

2.3.2 Scope of Works and Services

Compliance with the requirements of the Scope of Work, Schedule I, in general and clearly indicating any major/minor deviation separately, and its impact on obligations/cost.

Section -2: Preliminary Examination and Determination of Substantial Responsiveness of Bids

M/s DECL has made several alterations, omissions and additions to Schedule 1 (Scope of Work and Services) which constitute a material deviation pursuant to Clause 24.3 of ITB. Also the bidder has not indicated cost impact of some deviations.

M/s Amcorp-Gasco JV found substantially responsive to the Bidding Documents, except for items discussed in detailed evaluation

2.3.3 Experience Requirements

In pursuance of Sub-Clause 13.4 of Instructions to Bidders, the Bidder must possess and provide evidence of the following experience:

"Documentary evidence of establishment / working of firm since last five (05) years and Documentary evidence of carrying out such type of works previously" as per Clause IB 13.4.

M/s DECL has not provided any documentary evidence of experience. Due to deviation in scope of work and non-responsive, no documentary evidence has been asked in clarification. However, as DECL is working as EPC contractor at Nandipur Power Plant it is considered that these documentary evidences can be provided by DECL if so required.

M/s Amcorp-Gasco JV possesses the required experience and provided evidence for such experience.

2.3.4 ISO Certification

The Bidder will provide evidence of ISO certification of the Firm.

M/s DECL has not submitted evidence of ISO Certification. However, as DECL is working as EPC contractor at Nandipur Power Plant it is considered that these documentary evidences can be provided by DECL if so required.

M/s Amcorp-Gasco JV submitted acceptable evidence for having ISO Certification.

2.3.5 Bids Generally in Order without Material Deviations

The Bid of M/s DECL is not found in order because of the material deviations by the Bidder in their Bids as discussed above and stated in the Notes of Annex-2, and are declared non-responsive.

The Bid of M/s Amcorp-Gasco JV, is generally in order.

2.4 CONCLUSION

Summarizing the above discussion from Section 2.1 to 2.3 with respect to commercial/contractual and technical conformance checking of both Bids. The bid of M/s DECL is considered non-responsive to commercial / contractual and technical requirements indicated in Section 2.1.1 and 2.1.2. The Bid of M/s Amcorp-Gasco JV is considered substantially responsive (See Annex-2(a) & (b)).

2.5 CORRECTION OF ARITHMETIC ERRORS

2.5.1 Pursuant to Sub-Clause 24.2 of Instructions to Bidders, bid as determined substantially responsive (M/s Amcorp-Gasco JV), was checked for any arithmetic errors in calculation and summation as per the below mentioned criteria as given in the Bidding Documents (Sub-Clause IB 24.2)

- (a) If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected;
- (b) If there is any discrepancy between the amount in words and figures, the amount in words shall prevail;
- (c) If there is any discrepancy between the total bid price entered in the Form of Bid and the total shown in the Schedule of Prices summary, the amount stated in the Form of Bid will be corrected by the Owner in accordance with the corrected Schedule of Prices.

2.5.2 Price quoted by M/s DECL has an error. Due to non-responsiveness of the bid, correction of arithmetic error was not sought / applied on SOP.

2.5.3 As a result of detailed checking in accordance with the criteria laid down in paragraph 2.5.1, no arithmetic errors were found in M/s Amcorp-Gasco JV Bid.

2.6 BIDS FOR DETAILED EVALUATION

Bid of M/s Amcorp-Gasco JV is considered substantially responsive bid as enumerated in paragraph 2.4 and have been considered for Detailed Evaluation as mentioned in the subsequent sections of this Report.

ENGINEERING, PROCUREMENT, CONSTRUCTION AND COMMISSIONING OF GAS
CONVERSION WORKS / SERVICES

AT

425/525 MW (GROSS) COMBINED CYCLE POWER PLANT
NANDIPUR, GUJRANWALA,
PROVINCE OF PUNJAB, PAKISTAN

BETWEEN



NORTHERN POWER GENERATION COMPANY LIMITED
(THE "EMPLOYER")

&



AMCORP

JOINT VENTURE

GASCO



AMCORP - GASCO JOINT VENTURE
(THE "CONTRACTOR")

FEBRUARY, 2017

N. F.

AGREEMENT FOR ENGINEERING, PROCUREMENT, CONSTRUCTION AND COMMISSIONING

This AGREEMENT FOR ENGINEERING, PROCUREMENT, CONSTRUCTION AND COMMISSIONING (this "Agreement") is made and entered into as of this 13th day of February, 2017 by and between:

1. **NORTHERN POWER GENERATION COMPANY LIMITED (NPGCL)**, a company wholly owned by the Ministry of Water and Power; duly organized and existing under the laws of Pakistan with office located at Thermal Power Station, Muzaffargarh, and where the context so requires, its successors-in-interest and permitted assigns (the "Employer"); and
2. **AMCORP – GASCO JOINT VENTURE**, a company incorporated under the laws of [insert jurisdiction of incorporation] having its registered office at Karachi (the "Contractor");

(the Contractor and the Employer are hereinafter jointly referred to as the "Parties" or singularly as "Party").

RECITALS

- (a) WHEREAS, the Employer desires to make gas conversion of existing [425/525] MW (Gross) combined cycle power generation facility (the "Facility", as hereinafter defined) to be located at Nandipur, Gujranwala, Province of Punjab, Pakistan.
- (b) WHEREAS, the Employer has carried out a competitive bidding process to select an experienced, competent and nationally / internationally recognized contractor with the capability to undertake the Works in accordance with requirements of the Employer.
- (c) WHEREAS, on conclusion of the bidding process the Contractor was declared as the successful bidder.
- (d) WHEREAS, the Employer, accepting the Contractor's bid, issued to the Contractor the Letter of Acceptance dated December 02nd, 2016 and Corrigendum of LOA No. CEO/NPGCL/CE/PD/NP/C&C/9878-87 dated December 24th, 2016, which has been duly countersigned acceptance by the Contractor on December 26th, 2016.
- (e) WHEREAS, in accordance with the requirements of the bidding process adopted, the Parties are entering into this Agreement being the form of Contract / Agreement referred to in the Bidding Documents.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the receipt and sufficiency of which is hereby acknowledged, intending to be legally bound, the Parties hereto agree as follows:

IN WITNESS THEREOF, the parties hereto have executed this Agreement on this 13th day of February, 2017 in two identical counterparts, each of which shall be deemed as original.

For and on behalf of

NORTHERN POWER GENERATION
COMPANY LIMITED (The "Employer")

Signature

Signed by

Designation

Chief Executive Officer
NPGCL (GENCO-III)
(Seal)

Witness No. 1:

Signature

Signed by

Designation

Witness No. 2:

Signature

Signed by

Designation

For and on behalf of

AMCROP - GASCO JOINT VENTURE
(The "Contractor")

Signature

Signed by

Designation

(Seal)

Witness No. 1:

Signature

Signed by

Designation

Witness No. 2:

Signature

Signed by

Designation

NANDIPUR GAS CONVERSION PROJECT

3. PROJECT SCOPE

The Nandipur Power Plant has currently 425 MW electricity generating capacity through three (3) Gas Turbines (GTs), three (3) Heat Recovery Steam Generators (HRSGs) and one Steam Turbine. The power plant is currently operating on High Sulfur Furnace Oil (HSFO) and High Speed Diesel (HSD) as startup/stop fuel.

NPGCL intends to convert the Nandipur Power Plant from fuel oil driven to fuel gas driven. M/s G.E. (General Electric, USA) has already supplied three (3) Fuel Gas Conditioning Skids (one for each Gas Turbine). These skids have already been procured and supplied by M/s G.E. and placed at site for installation. The installation of Fuel Gas Conditioning Skids and modifications within Gas turbines due to fuel conversion shall not be part of this Project. All other works required to ensure safe and reliable operation of Nandipur Combined Cycle Power Plant on fuel gas shall be within the scope of this Project. GE scope of work is attached as Annex -1 for information.

The fuel gas for Gas Turbines operation shall be supplied by SNGPL through 24" pipeline. The SNGPL shall lay the 24" pipeline up to NPGCL plant battery limit (metering station). SNGPL shall install their own pig traps and metering station. This project scope shall be started from SNGPL metering skid outlet nozzle.

The operating pressure and temperature of SNGPL fuel gas shall not fulfill the Gas Turbines' operating requirement. Therefore a compression facility is required to boost the pressure of fuel gas from SNGPL pressure to GT required pressure. In order to install compression facility at Nandipur Power Plant, NPGCL intends to relocate three (3) 16SGTD/WH64 Superior Compressors along with associated equipment and available utilities systems from Guddu Power Plant and install at Nandipur Power Plant. The relocating compressors shall be re-configured as per Nandipur operating conditions and process requirement. SNGPL gas outlet conditions, compressors inlet conditions and compressors outlet conditions shall be compatible/supportive with GE's Fuel Gas Conditioning Skids requirement.

The SNGPL will only provide their 24" pipeline up to Nandipur plant battery limit. The project scope includes to install piping/pipeline from SNGPL battery limit up to inlet of compression facility and from compression facility discharge up to Individual Fuel Gas Conditioning skids of GT alongwith supply/installation of all valves, fittings, instruments, control system etc. A compressor facility by-pass (with double block & bleed arrangement) shall also be provided.

The SNGPL fuel gas has minimum operating temperature which is below compressor as well as Gas Turbine's minimum operating temperature and therefore a new electrical/fired heater shall also be installed on fuel gas line to raise the fuel gas temperature up to

NANDIPUR GAS CONVERSION PROJECT

compressor minimum required operating temperature during the winter. New electrical/fire heater selection, engineering, procurement and installation shall be within the scope of this Project.

For the new compression facility to be installed at Nandipur Power Plant, the existing three (3) 16SGTD/WH64 Superior Compressors along with associated equipment and available utilities' systems and control system shall be dismantled from Guddu Power Plant. The same relocating compressors shall be re-configured as per Nandipur Power Plant requirement and shall be installed at Nandipur Power Plant. The associated inlet separator (currently installed at common inlet line of compressors), Compressors' Instrument Air Package including two (2) Instrument Air Compressors with hold-up vessels, drier etc. and compressor station control system with all installed control panels, HMI, instrumentation/power cables, Junction box etc. shall also be dismantled and relocated to Nandipur Power Plant. Compressors' OEM i.e. GE (Oil & Gas) has confirmed to the Employer that existing compressors of Guddu power plant can meet the performance requirements of installation and use at Nandipur vide their letter dated August 11, 2016. GE letter is attached as Annexure - I.

The compression facility shall have its dedicated vent and blowdown system and hydrocarbon liquid storage and loading facility. The proper venting and safety system for compression facility shall also be provided. The firefighting (with proper water hydrants) shall be provided for compression facility. The proper sprinkler system shall be provided on compressors' engine. Compressors shall be covered with steel shed along with maintenance crane.

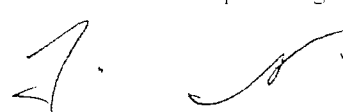
Dedicated MCC room and Control room shall be provided to monitor and control of new compression facility.

The Contractor may get re-configuration of gas compressors as per Nandipur GTs requirement from OEM of gas compressor which is General Electric (Oil & Gas), USA.

In general co-ordination/interaction with SNGPL as gas supplier, DECL as EPC contractor for Nandipur plant and GE as OEM for GTs; Gas Compressors and gas conditioning skids supplier & installer shall be responsibility of the Contractor.

Interacting with GE during their Open Cycle performance testing on Gas Turbines as per attached scope of work and arranging/conducting performance testing, submission of PT report of the combined cycle after Gas Conversion activities has completed by SNGPL, EPCC, GE equipment and GE for Gas Turbine.

As GE has guaranteed that after conversion of Nandipur Gas Turbines on Gas, output of all GT units will increase by 18% on "Gas Only" Operation in Simple Cycle configuration with test uncertainty of $\pm 0.49\%$, the Contractor has to provide guarantee accordingly for



NANDIPUR GAS CONVERSION PROJECT

increase in output of combined cycle operation on "Gas Only".

Emissions from Compressor Engines' shall be compliant with National Environment Quality Standards (NEQs) Pakistan.

Following shall also be within the scope of this Contract:

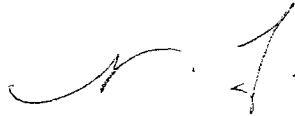
- 1) Fuel gas metering within NPGCL area shall be provided over and above that supplied by SNGPL
- 2) Gas Chromatograph
- 3) Gas leakage detection system
- 4) HAZOP Report Preparation, Fire Monitors and complete fire fighting system for gas compressors facility
- 5) Fire alarm & detection system and its communication with existing fire alarm and detection system
- 6) Procurement of any hardware, if required, in existing plant CCR building relating to gas conversion other than the GE (Turbine OEM) scope of work.
- 7) Procurement of New Control system (PLC), if required, for Nandipur compression facility
- 8) Modification/hardware procurements, if required, at existing MCC panels from which provision of power supply for Nandipur compression facility has been considered.
- 9) Steel Shed for the new RCC Pit of Vent KOD and Liquid Storage Vessel.
- 10) Civil foundation, culvert, trench installation/modification related to inter-connecting piping or ESV
- 11) Site Grading and filling works, if required, at the Nandipur Power Station with respect to the Works to be completed by the Contractor.
- 12) Any demolishing works required at Nandipur site with respect to the Works to be completed by the Contractor.
- 13) Fencing area around new compression facility
- 14) Integrity and stability check of the existing 20 ft landscape allocated for compressor discharge line especially land-sliding during any worst weather conditions or un-foreseen reason.
- 15) Any other supply and installation scope not mentioned in above stated Scope of Work but essentially required for safe completion of work.
- 16) Communication of PLC with existing DCS system

As per EPC Contract with Dong Fang Electric Corporation Limited (DECL) (Refer Minutes of Pre-Award Meeting No.1 dated September 03, 2007 attached as Annexure -II) Gas Turbine Generators, HRSGs, Steam Turbine Generator and Plant Auxiliaries were sized as per the requirement of Plant running on Fuel Gas. However the EPC has to ensure at his end for the appropriation of the equipment /systems including but not limited to the following:



NANDIPUR GAS CONVERSION PROJECT

- a) Main and Auxiliary Cooling Water System
- b) Closed Cooling Water System
- c) Compressed Air System
- d) Main and Reheat Steam System
- e) Feed Water System
- f) Condensate System
- g) DM Water System
- h) Fire Fighting System
- i) DCS System

A handwritten signature in black ink, consisting of a stylized 'N' followed by a dot and a '1'.



AMCORP

AMCORP-GASCO JOINT VENTURE

FUEL CONVERSION OF 425-525 MW COMBINED CYCLE POWER PLANT, NANDIPUR, ON
GAS FUEL



GASCO

Client : NORTHERN POWER GENERATION COMPANY LTD. NP GCL (GENCO-III)

SUMMARY OF PRICE

ITEM NO.	DESCRIPTION	TOTAL PRICE	
		PROCUREMENT	CONSTRUCTION
1	Reciprocating Compressor Retrofit	522,000,000.00	95,000,000.00
2	Mechanical Works	441,000,000.00	140,000,000.00
3	Electrical Works	50,000,000.00	23,000,000.00
4	I&C Works	54,000,000.00	27,000,000.00
5	Civil Works		131,000,000.00
6	Engineering Services		56,000,000.00
7	Dismantling, Transportation & Relocation of Compressor Packages	51,000,000.00	140,000,000.00
Sub Total		1,148,000,000.00	624,000,000.00
Grand Total			1,782,000,000.00

NOTES

1. Price validity is for 90 days.
2. The price includes all applicable taxes and duties except Punjab Revenue Service Tax.
3. GENCO to provide SRC Letter of Support for equipment to be imported from Abroad (outside of Pakistan).

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14.10.16

14/10

14/10/2016

14/10

Schedule - IX: SCHEDULE OF PRICES

No.	Item	Percentage	Amount
1	Advance Payment	10%	178,200,000.00
2	Substantial Design Completion	10%	178,200,000.00
a	Submission of Geotechnical Soil Investigation Report	1.0%	17,820,000.00
b	Approval of Plot Plans / Layout	1.0%	17,820,000.00
c	Area Levelling/Grading and Fence/Boundary Layout Finalization	1.0%	17,820,000.00
d	Issuance and Approval of Compressor foundation IFC drawings	2.5%	44,550,000.00
e	Issuance and Approval of Other Equipment/Buildings IFC drawings	2.0%	35,640,000.00
f	Piping Layout Finalization	1.5%	26,730,000.00
g	Power, Control and Instrumentation Cable Layout	1.0%	17,820,000.00
3	Gas Compressor and other Material Delivery at site and Civil completion	50%	891,000,000.00
a	Submission of un-priced PO issued to GE (Compressor Retrofit)	6.5%	115,830,000.00
b	Submission of BL and shipping documents (Compressor Retrofit)	9.0%	160,380,000.00
c	Construction of Main Equipment Foundation	5.0%	89,100,000.00
d	Construction of Sleepers/pipe supports/buildings/foundations etc.	2.5%	44,550,000.00
e	Dismantling of Compressors and other accessories	7.0%	124,740,000.00
f	Transportation of Compressor and other accessories to Nandipur	2.0%	35,640,000.00
g	Flow Line Pipe Un-priced PO issued to Supplier	3.0%	53,460,000.00
h	Flow Line - submission of BL & Shipping docs	5.0%	89,100,000.00
j	Piping Material - Un Priced PO to Supplier	1.0%	17,820,000.00
k	Piping Material - BL & Shipping documents	2.0%	35,640,000.00
l	Piping Material - Fabrication, Welding & HT	2.5%	44,550,000.00
m	I&E Material - Un Priced PO to Supplier	1.0%	17,820,000.00
n	I&E Material - BL & Shipping Documents	1.5%	26,730,000.00
o	I&E Material - Laying	2.0%	35,640,000.00
4	Erection / Installation and Commissioning	30%	534,600,000.00
a	Placement of Compressor on civil foundation	4.0%	71,280,000.00
b	Flow Line Construction	6.0%	106,920,000.00
c	Placement of Other Equipment on civil foundation	4.0%	71,280,000.00
d	Erection of Off-skid, on-skid and inter-skid piping	5.0%	89,100,000.00

[Handwritten Signature]

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No.	Description	Retention %	Amount
e	E&I work	4.0%	71,280,000.00
f	Commissioning Works	7.0%	124,740,000.00
5	Retention Money after completion of Warranty Period	10%	178,200,000.00

Note:

- Submission of progressive invoices of works / supply / services by Contractor (max. two nos.) in a month is allowed.
- Progressive invoices to be submitted to Engineer (NESPAK) for verification of actual works carried out by Contractor.
- Progressive payment will be made by Employer after verification of invoices by Engineer.
- Ten percent (10%) retention money will be deducted from each invoice.
- Retention Money deducted will be paid after completion of warranty period and or extended warranty period.






Northern Power Generation Company Limited
Thermal Power Station, Mehmood Kot Road, Muzaffargarh, Punjab
Phone: 066-9200155/066-9200156 Fax: 066-9200166

Office of the Chief Executive Officer

No. CEO/NPGCL/CE/PD/NP/C&C/9878-87

Dated. 24 / 12 /2016

M/s. AMCORP-GASCO (Joint Venture),
501, Amber Estate Building,, Sharee-e-Faisal,
Karachi.

Subject: CORRIGENDUM TO THE LETTER OF ACCEPTANCE (LOA)
Engineering, Procurement, Construction and Commissioning of Gas
Conversion Works/Services of 425/525 MW, Combined Cycle Power Plant
Nandipur, Gujranwala, Pakistan

Ref: 1- Letter of Acceptance bearing No.CEO/NPGCL/CE/PD/NP/C&C/9492-9501 dtd: 02/12/2016.
2. AMCORP-GASCO (Joint Venture) letter dated: 07.12.2016.
3. NESPAK clarification vide letter No.3038/165/AHM/M1/0691 dated 09.12.2016.

Following correction/ revision is hereby issued in our letter referred at Sr. # 1 above:-

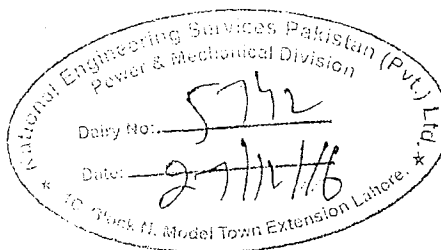
1. The name of the Contractor may be read as AMCORP-GASCO (Joint Venture) instead of GASCO Engineering (Pvt.) Ltd.
2. The Total Contract Price of PKR 1,782,000,000/- (*Pak Rupees One Billion Seven Hundred Eighty Two Million Only*) (**Total Contract Price**); (including all the applicable taxes, levies/ duties, except Punjab Revenue Services Tax which would be applicable as per applicable law), for the complete works/ services on turnkey basis, as per agreed time schedule for works/ services to be performed on the conditions as prescribed in the Contract Agreement.

Other terms of the letter dated 02.12.2016 (Sr. # 1 above) will remain the same:

Chief Executive Officer
NPGCL, TPS, Muzaffargarh.

Cc:

1. Prof. Dr. Tabrez Aslam Shami Chairman, BoD (NPGCL), University of Central Punjab, Lahore.
2. Joint Secretary (Transmission), Block-A, Pak Secretariat, Ministry of Water & Power, Islamabad.
3. CEO, GHCL, OPF Building, Shahr-e-Jamhoriat, Islamabad.
4. General Manager (D&D) Thermal, GHCL, 181, WAPDA House, Lahore.
5. Chief Engineer/Project Director, 425 MW, CCPP, Nandipur.
6. Finance Director, NPGCL GENCO-III, Muzaffargarh.
7. Vice President, NESPAK, 1-C, Block-N, Model Town, Lahore.
8. Project Manager (NESPAK), (Nandipur Power Project), 1-C, Block-N, Model Town, Lahore.
9. CRE, NESPAK, 425 MW, CCPP, Nandipur.
10. Master Copy.



NORTHERN POWER GENERATION COMPANY LTD.
CCPP NANDIPUR GUJRANWALA
STATEMENT OF PAYMENT RELEASED TO M/S AMCORP-GASCO (JV)
Gas Conversion Work
Detail of Payments made to M/S AMCORP-GASCO (JV)

Sr. No.	Invoice No.	Date	Invoice Amount	PST	Total Amount in PKR	Date of Payment	Cheque No.
1	AMCORP-GASCO-GHC-001	31.01.2017	178,200,000.00	28,512,000.00	206,712,000	16.03.2017	41359023
2	AMCORP-GASCO-GHC-002	10.03.2017	196,020,000.00	28,226,880.00	224,246,880	12.04.2017	41359062
3	AMCORP-GASCO-GHC-003	31.03.2017	178,200,000.00	25,660,800.00	203,860,800	09.05.2017	41359089
4	AMCORP-GASCO-GHC-004	12.04.2017	35,640,000.00	5,132,160.00	40,772,160	17.05.2017	41359100
5	AMCORP-GASCO-GHC-005	06.05.2017	160,380,000.00	23,094,720.00	183,474,720	16.06.2017	41359129
6	AMCORP-GASCO-GHC-006	22.05.2017	276,210,000.00	39,774,240.00	315,984,240	27.07.2017	45645850 & 45645868
7	AMCORP-GASCO-GHC-008	07.07.2017	151,470,000.00	21,811,680.00	173,281,680	28.08.2017	
8	AMCORP-GASCO-GHC-009	21.07.2017	89,100,000.00	12,830,400.00	101,930,400	27.10.2017	45645942
9	AMCORP-GASCO-GHC-011	24.10.2017	35,640,000.00	1,603,800.00	37,243,800	04.12.2017	45645967
10	AMCORP-GASCO-GHC-012	01.01.2018	89,100,000.00	4,009,500.00	93,109,500	02.03.2018	45606032
11	AMCORP-GASCO-GHC-013	26.04.2018	35,640,000.00	1,603,800.00	37,243,800	24.05.2018	45646097
12	AMCORP-GASCO-GHC-014	25.05.2018	44,550,000.00	2,004,750.00	46,554,750	08.08.2018	45646130
13	AMCORP-GASCO-GHC-015	31.07.2018	44,550,000.00	2,004,750.00	46,554,750	19.10.2018	45646139
14	AMCORP-GASCO-GHC-017	10.08.2018	71,280,000.00	3,207,600.00	74,487,600	22.02.2019	56081434
15	AMCORP-GASCO-GHC-018	01.01.2019	71,280,000.00	3,207,600.00	74,487,600	29.05.2019	56081455
			1,479,060,000	174,172,680	1,653,232,680		
Payable							
16	AMCORP-GASCO-GHC-022	25.06.2019	124,740,000.00	4,722,300.00	129,462,300	Payable	
17	Retained Amount		178,200,000.00	8,910,000.00	187,110,000	"	
			302,940,000	13,632,300	316,572,300		
			1,782,000,000	187,804,980	1,969,804,980		

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东方电气
DONGFANG ELECTRIC

DONGFANG ELECTRIC CORPORATION LIMITED

333 Shuhan Road, Chengdu, Sichuan, 610041, P.R. China
Tel: (+86-28) 87583501-3509, Fax: (+86-28) 87583652
http://www.dec-ltd.cn, E-Mail: Nandipur@dongfang.com

Our Ref: DEC-S/NP-NPGCL/14- 442

Date: Sep. 17, 2014

Pages: 2+3

CE/PD

425MW CCGP Nandipur

Northern Power Generation Company Limited (NPGCL),

Nandipur Site Office, Gujranwala

Subject: Offer for Gas Conversion from HFO for 425 MW Combined Cycle Power Plant Nandipur

Reference:

- 1) Your letter No. 3038/165/AHM/M21/004 dated Aug. 26, 2014
- 2) Your letter No. 3038/165/AHM/M21/003 dated Aug. 7, 2014
- 3) Our letter No. DEC-H/NP-NESPAK/14-028 dated Jul. 23, 2014

Dear Sir,

With reference to conversion from HFO to NG project for 425MW CCGP at Nandipur we are pleased to submit our offer at your request.

The technical clarification for the issues as mentioned in the letter referred 2) above is enclosed herewith for your information and action.

The Price of the gas conversion proposal is USD 4,870,000 (Say four million eight hundred and seventy thousand US dollars only) with the following detail and conditions.

1. Detail of the price

Sr. No.	Description	Amount (USD)
1	Equipment and Material	2,979,940
2	Civil and Erection Works	1,890,060
3	Total	4,870,000

2. The above price excludes the cost of GE's works and supplies (equipment, materials, installation works, commissioning works, training, performance and reliability test, etc.).
3. The above price excludes mandatory and recommended spares and consumables price, if any.

425MW CCGP Nandipur Project, Gujranwala, Pakistan
Tel: +92-55-3400580 Fax: +92-55-3493111 E-mail: nandipur@dongfang.com

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DONGFANG ELECTRIC CORPORATION LIMITED



333 Shuhan Road, Chengdu, Sichuan, 610041, P.R. China
Tel: (+86-28) 87583501-3509, Fax: (+86-28) 87583652
<http://www.dec-ltd.cn>, E-Mail: Nandipur@dongfang.com

4. The above price excludes all taxes and duties levied within Pakistan.
5. The warranty period of the gas conversion project will be one year.
6. For other terms, refer to Contract Documents signed on 28th Jan. 2008 between NPGCL and DEC Ltd.
7. This offer will remain valid until the 15 March 2015.

Your prompt reply will be highly appreciated. Should you have any queries please contact DEC people concerned at Nandipur site.

Faithfully yours,

Wang Wei
Dy. General Manager
Thermal Power Division
Dongfang Electric Corporation Limited, International

Encl.: As Above Stated

3 pages

- CC: 1) Project Manager, 425 MW, CCPP Nandipur NESPAK House, Lahore.
2) CRE, 425 MW, CCPP Nandipur, NESPAK Site Office

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The reply for NESPAK Comments on Gas Conversion Proposal

1. The document has not been approved by your QA/QC engineer. Please do the needful.

DECL's Reply: We will do it later.

2. Refer Page 1, last line, "HRSB" to be corrected as "HRSG"

DECL's Reply: Clerical error, it must be "HRSG" which stand for Heater Recovery Steam Generator

3. Refer Page 2, Clause 1.3, "Scope of Work": Scope of work shall also include electromechanical works, inclusive of all instrumentation, control and all other related systems/equipment necessary for safe operation of the system. Also, we understand that DEC's scope of work starts from termination point for SNGPL, i.e. gas station outside the power plant boundary wall and extends upto the off-base fuel gas module of the gas turbine. Please confirm.

DECL's Reply: Electromechanical work include all instrumentation, control and all other related systems/equipment necessary from the gas station outside the power plant boundary wall to the off-base fuel gas module only. The work of scope from off-base module to the turbine base is in GE's scope, for detail, please kindly check from GE.

4. Refer Page 3, Clause 1.1, please correct proprietary control system MARK-VI to "MARK-VIe".

DECL's Reply: Clerical error, WE confirm it is "MARK-VIe".

5. Please specify in the document the minimum and maximum pressure and temperature requirements at interface point.

DECL's Reply: we have already got some data which will not influence our design work so far as now, but we need further confirm among DECL, SNGPL, GE.

6. Reference article 3.1, ambient temperature should be corrected to 30 degree C.

DECL's Reply : We confirm that the ambient temperature is 30°C (30 degree centigrade)

7. Reference article 3.1 Cooling water temperature should be corrected to 27 degree C

DECL's Reply : We confirm that the cooling water temperature is 27°C (27 degree centigrade)

8. Reference article 3.3, fuel consumption for 3 GT sets has been taken as 100mmcf/d whereas as per Minutes of the meeting holding among NPGCL, NESPAK, DECL and GE on June 04, 2014 at the project site, GE confirmed the gas requirement as 38

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mmcf/d per GI i.e 114 mmcf/d for 3 GTs. Please check and update the design / drawings accordingly.

DECL's Reply: Our design capacity for Gas regulator and ancillary pipe based on 38 mmcf/d per GI (114 mmcf/d for 3 GTs, about 45000 Nm³/h), as mentioned in section 3.1 of the technical proposal. Meanwhile, during the meeting held in Chengdu dated June 17-19, 2014, it was informed by the Engineer that SNGPL will supply 100mmcf/d at Maximum capacity. Therefore, the interface data in Section 3.3 of the technical proposal is provided as 100 mmcf/d, and it is not the design input data.

9. Reference drawing # 60-F618EC-04, sheet 1; please provide isolation valve between interface point and emergency shut-down valve.

DECL's Reply: We agree on providing the isolation valve, normally the isolation tap included in the emergency shut-down valve to isolate the upper pipeline and the gas regulator station.

10. Reference drawing # 60-F618EC-04, sheet 1; please confirm that the ultrasonic flow meter has all the requisite equipment and capabilities for metering the gas flow as well as the total gas quantity.

DECL's Reply: We confirm.

11. Reference drawing # 60-F618EC-04, sheet 1; Process flow diagram may please be provided for the gas conversion work

DECL's Reply: We will provide later.

12. Reference drawing # 60-F618EC-04, sheet 2; instead of 1×100%, either 2×100% or 2×50% cyclone separator should be provided

DECL's Reply: We will provide as per your requirement.

13. Reference drawing # 60-F618EC-04, sheet 2&3; Please confirm that cyclone separator / filter have auto draining capability.

DECL's Reply: it has the auto and manual draining capability.

14. Reference drawing # 60-F618EC-04, sheet 4; only one water bath heater is shown on the drawing. Please confirm that 2×100% water bath heaters will be provided.

DECL's Reply: consider the ambient temperature on the site, the water bath heater will seldom usage. we believe one water bath heater could be rational and reliable. Or we can discuss later.

15. Reference drawing # 60-F618EC-04, sheet4; separate metering for gas supply to water bath heater should be provided.

DECL's Reply: we can discuss later.

16. Reference drawing # 60-F618EC-04, 'Energas' and 'others' are mentioned at various places. We understand that after interface point everything is included in Decl's

scope , please confirm.

DECL's Reply: Refer to the reply of item No.3.

17. Reference drawing # 60-F618EC-04, sheets 1 to 6; all reference drawings mentioned herein may either be provided , or reference drawing numbers may Pleased be corrected.

DECL's Reply: We will provide later.

18. Reference drawing # 60-F618EC-04, sheets 1 to 6; detail, catalogues and working principle of equipment vis-à-vis gas conversion work including vertical cyclone separators, filter, water bath heater etc. may please be provided.

DECL's Reply: We will provide later.

19. The document and drawing do not provide information with regard to pipes' thicknesses and basis for selection of pipe sizes. The document should be updated to include details of sizes, thicknesses and materials of pipes as well as recommended and calculated velocities in various sections of pipes. Please also submit the related design calculations, the drawings should also be updated to indicate pipe thicknesses.

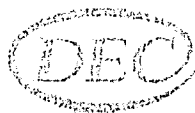
DECL's Reply: We will provide later.

To: 425/525 MW CCPP Nandipur, District Gujranwala
Attn: Chief Engineer/ Project Director
Tel: +92-55-3400526,
Fax: +92-55-3493761,
E-mail: maiueme@gmail.com

**Gas Conversion Work
For
425MW Combined Cycle Power Plant
Nandipur**

Reference No.: HD-Nandipur -Gas - 01

Date Of Opening Of Bid: 14th of October 2016
Warning: Not To Open Before 14th of October 2016



东方电气股份有限公司
DONGFANG ELECTRIC CORPORATION LIMITED

Dongfang Electric Corporation Limited

333, Shuhan Avenue, Chengdu, Sichuan, P.R. China

[Handwritten signatures and dates]
14-10-16
14-10-16
14/10/2016
14/10/16



DONGFANG ELECTRIC CORPORATION LIMITED

333, Shuhan Avenue,

Chengdu, Sichuan,

P. R. China

Date: October 13, 2016

Our Ref. No.: HD-Nandipur-Gas-01

COVERING LETTER

To: 425 MW CCPP Nandipur,
District Gujranwala
Attn: Chief Engineer/ Project Director
Tel: +92-55-3400526,
Fax: +92-55-3493761,
E-mail: mairueme@gmail.com

Sub: Nandipur Gas Conversion Project

Dear Sir,

We Dongfang Electric Corporation Ltd. (DEC) has been working very closely with you on Nandipur 425MW combined cycle power plant project and through our joint efforts the project has been completed.

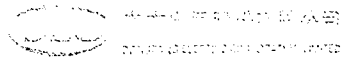
DEC has attached utmost importance to Nandipur Gas Conversion Project (Project). At your invitation we prepared the base proposal and alternative proposal respectively and we are very pleased to submit our proposal for this Project. Our proposal consists of the following technical and commercial parts:

Covering Letter
Technical Proposal
Commercial Proposal

The alternative proposal is based on a brand new compressor instead of used compressor from Guddu combined cycle power plant.

The proposal is submitted herein with one original and three copies. The Proposal remains valid for a period of ninety (90) days after October 14, 2016.

We are applying for Bid Security from Chinese bank and scheduled bank in Pakistan. However, due to the short time the Bid Security cannot be presented with the proposal. After discussing with the Employer and mutually agreed we'll submit a cheque equivalent to 2.5% of Bid Price.



We cherish our good cooperation during execution of Nandipur 425MW combined cycle power plant project. We'd like to work closely with you again to conclude the contract and start to implement the Project as early as possible. We are also confident DEC will be able to complete this Project with the rich experience and excellent service.

Look forward to mutually beneficial cooperation on this Project.

Yours faithfully,

Wang Wei
Dy General Manager
Thermal Power Division
DEC Ltd International
Tel. No. +86 28 87583164
Fax No. +86 28 87583040
Email: wangwei01@dongfang.com

Technical Proposal
Of
Gas Conversion Work
For
425MW Combined Cycle Power Plant
Nandipur



Dongfang Electric Corporation Ltd.

September 2016



Scanned with CamScanner



TABLE OF CONTENTS

1	Brief Introduction of 425MW CCGT Nandipur
2	Design Basis
3	Scope of Work
4	General Layout
5	Design Conditions
6	Design input parameter
7	The fuel gas supply system
8	Firefighting system for the natural gas booster / regulating station
9	Shed for the natural gas booster / regulating station
10	Performance data
11	Construction scheme
12	Schedule of conversion work
13	Drawings

1 Brief Introduction of 425MW CCPP Nandipur

425MW CCPP Nandipur is located in the Upper Chanab Canal, UCC, next to Nandipur 13.8MW hydraulic power station, left of the Canal, Punjab province. The traffic here is very convenient and 12 km to the nearest city Gujranwala. It will take 2.5 hour by car from the Site to Lahore which is the most developed city in Pakistan.

The combined cycle power generation units consist of three (3) sets GE combustion turbine generator unit of model PG9171E, three (3) sets double pressure, none reheat, vertical, natural circulation, none supplementary firing type heat recovery steam generator (HRSG) with bypass stack and one (1) set double pressures, none reheat, single rotor, one casing and condensing type steam turbine, which accords with 3+3+1 configuration. The gas turbines are to operate on high sulphur fuel oil (HSFO) as base fuel and high speed diesel (HSD) as stand-by fuel.

Electrical power which is generated by each turbine generator is delivered to the 132kV switchgear through generator step up transformer (GSUT). Each generator is connected to one two-winding GSUT through isolated phase bus duct (IPB) and generator circuit breaker (GCB) which are used to isolate the turbine generator outlet from the GSUTs. The voltage of gas turbine generator outlet is 15kV and 15.75kV for steam turbine generator. The power transmitted to the grid is evacuated through six 132kV transmission lines. The 132kV switchgear is double bus bar with one and a half circuit breaker scheme.

Distributed control system (DCS) is provided as the primary control and monitoring system of the Plant. The system is functionally and geographically distributed. GTGs will be monitored and controlled by its proprietary control system MARK-Vie and the rest of the Plant by DCS and PLC system.

Two sets of cooling water system are provided for the Plant. One is once-through cooling water system and the other one is recycled cooling water system with mechanical draft cooling tower. After lifted from water intake pump house, the raw water is settled in the settling basin firstly, then the water is clarified by the mechanical accelerated clarifier, and finally the clarified water is filtered by the filter, and then piped to the potable water system and DM water system.

2 Design Basis

- 1) EPC contract document for 425MW CCPP Nandipur between DECL and NPGCL
- 2) MOM between NPGCL, DECL and GE for gas conversion

- 3) GE Proposal for adding natural gas capability
- 4) Geotechnical report of this project
- 5) Latest Chinese national code and standard
- 6) Detail design document and drawing of 425MW CCPP Handipur

3 Scope of Work

- 3.1 NPGCL proposes adding gas burning capability for 3 × Fr 91E gas turbines, USNs: 890253, 890255 and 890249 manufactured by GE, shipped in 2009, and installed at Nandipur site in Pakistan.
- 3.2 DECL's scope of supply for the gas conversion work includes one set of natural gas regulating station where gas boosters and associated facilities will be provided by NPGCL, NPGCL shall be responsible for its performance and associated facilities such as natural gas piping system, firefighting system, shed of natural gas booster / regulating station and etc.. DECL's scope of work for the gas conversion work comprises design, supply, construction, installation, commissioning based on the above mentioned DECL's scope of supply.
- 3.3 DECL's scope of work for the gas conversion work is as follows:
 - 1) The design, supply, construction, installation and commissioning of natural gas pipeline from one meter outside the Natural Gas Station which is out of DECL's scope to DECL supplied natural gas regulating station. The above mentioned Natural Gas Station out of DECL's scope will be near to Gate House No. 2 in between Batching Plant and boundary wall of GEPCO Training Center according to NSPAK's letter No. 3038/165/HAK/M6/951 dated June 12, 2014 which is attached as part of this Technical Proposal.
 - 2) The supply of gas booster and its associated facilities is not in DECL's scope and NPGCL shall be responsible for its performance.
 - 3) The design, supply, construction, installation and commissioning of natural gas pipeline from the natural regulating station to the off-base gas fuel module of gas turbine which is not in DECL's scope.
 - 4) The interface between NPGCL and DECL is one (1) meter out of Natural Gas Station out of DECL's scope and until off-base gas fuel module of gas turbine which is out of DECL's scope.
 - 5) The supply and installation of natural gas pipeline from gas conditioning skid to flow meter, from flow meter to SSOV & SSOVV and from SSOV & SSOVV to off-base gas fuel module of gas turbine. The above mentioned gas conditioning skid, flow meter, SSOV & SSOVV and off-base gas fuel module of gas turbine are not in

DECL's scope.

- 6) The supply and installation of cable between gas conditioning skid, flow meter, SSOV & SSOVV, off-base gas fuel module of gas turbine and PEECC. The above mentioned gas conditioning skid, flow meter, SSOV & SSOVV and off-base gas fuel module of gas turbine are not in DECL's scope.

3.4 Engineering scope in detail is as follows

Item	Description	DECL's scope	NPGCL's scope
1	Add Gas Fuel System - All On-Base Equipment - Fuel Nozzle Assembly - FNs with tips		✓
2	Add Gas Fuel System - All On-Base Equipment - Liquid Fuel Purge Valve		✓
3	Add Gas Fuel System - All On-Base Equipment - Solenoid Driver for LF Purge Valve		✓
4	Add Gas Fuel System - All On-Base Equipment - LF Purge Air Cooler		✓
5	Add Gas Fuel System - All On-Base Equipment - 5psi Liquid Fuel Purge Check Valves		✓
6	Add Gas Fuel System - All On-Base Equipment - Purge Air Filter		✓
7	Add Gas Fuel System - All On-Base Equipment - LF Piping Mod - Check valves & re-route		✓
8	Add Gas Fuel System - All On-Base Equipment - Gas Fuel Piping - Gas Header		✓
9	Add Gas Fuel System - All On-Base Equipment - Gas Fuel Piping - Flexible Pigtails		✓
10	Add Gas Fuel System - All On-Base Equipment - Control Trip Oil		✓
11	Add Gas Fuel System - All On-Base Equipment - Atomizing Air Piping Mod - Solenoid Driver		✓
12	Add Gas Fuel System - All On-Base Equipment - Atomizing Air Bypass Valve		✓
13	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Stop Ratio Valve		✓
14	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Control Valve		✓
15	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Valve Servo Arrangement		✓
16	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Stop Ratio & Control Valve Assembly		✓
17	Add Gas Fuel System - Off-Base Gas Fuel Module - Transducer Arrangement		✓
18	Add Gas Fuel System - Off-Base Gas Fuel Module - Fuel Gas Y-Strainer		✓
19	Add Gas Fuel System - Off-Base Gas Fuel Module - Solenoid Valve		✓

20	Add Gas Fuel System - Off Base Gas Fuel Module Gas Purge Valves		✓
21	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Purge Actuation Solenoids		✓
22	Add Gas Fuel System - Air-Operated Valves for Instrument Air System		✓
23	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Purge Lines		✓
24	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Gas Lines		✓
25	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Hydraulic Lines		✓
26	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Instrument Air		✓
27	IR Hazardous Gas Protection System Turbine Compartment - Gas detectors		✓
28	IR Hazardous Gas Protection System Turbine Compartment - Off-base Gas Alarm Module		✓
29	IR Hazardous Gas Protection System Gas Fuel Module		✓
30	CFD Analysis		✓
31	Revised Control Curve		✓
32	Cabling / Wiring from Gas Fuel Module to Controls System		✓
33	Turbine Compartment Wiring		✓
34	Controls modifications - Add Gas		✓
35	Controls modifications - Add Safety Shut Off Valve		✓
36	Engineering site review		✓
37	Scrubber Skid - Coalescing Filters (Right and Left) with Ball Valves		✓
38	Scrubber Skid - Ball Valves for Main Gas Piping		✓
39	Scrubber Skid - Metal Seat Valves & Automatic Drain Valves		✓
40	Scrubber Skid - Ball Valves & Check Valves for Instrumentation Isolation, Vent & Drain		✓
41	Scrubber Skid - Level & Flow Instruments		✓
42	Scrubber Skid - Pressure & Temperature Instruments		✓
43	Scrubber Skid - Stainless Steel Manifold & Accessories		✓
44	Scrubber Skid - JB & Cables from sensors to JB		✓
45	Enclosure Fan and 63 AT Switch		✓
46	Ventilation Modifications		✓
47	Safety Shut Off Valve and Vent Arrangement		✓
48	Emissions Monitoring System Note: The existing emissions monitoring system will not be updated.	x	x
49	Additional Terminal Boards for Control System of GT		✓
50	Gas chromatograph	x	x

Item	Description	DECL's scope	NPGCL's scope
51	Natural Gas Station near to Gate House No. 2 in between Batching Plant and boundary wall of GEPCO Training Center		√
52	One Set of Natural Gas Regulating Station	√	
53	Natural gas boosters and associated facilities		√
54	Interface of DECL Supplied Natural Gas Regulating Station with DCS	√	
55	Gas flow meter (upstream of gas module - installed in customer piping)		√
56	Pressure / temperature sensors / instrumentation		√
57	Integration of gas flow meter with GT control system (Software)		√
58	Integration of Pressure / Temperature Sensors / Instrumentation with GT control system (Software)		√
59	Condensate tank	√	
60	Demineralized water supply system for water injection system Note: The upgrade of demineralized water supply system for water injection system does not require additional water.	x	x
61	Buried ground network Note: No additional buried ground network is required.	x	x
62	Cathodic protective Note: No additional cathodic protective is required.	x	x
63	Vent Stack including ventilation fan duct from indoor gas fuel module to outdoor	√	
64	Gas detection within DECL supplied natural gas regulating station	√	
65	Gas detection for gas turbine compartment, gas module and other equipment supplied by NPGCL		√
66	Design of pipeline interface and material between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid		√
67	Design of pipeline route between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid	√	
68	Supply and installation of pipeline between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid	√	
69	Piping connections between GT compartment and off-base gas fuel module of GT		√
70	Design of electrical and instrument cable (type of cable including # of conductors) and interface (termination point from JB to MKVle) between gas conditioning skid, flow meter, SSOV & SSOVV and Mark Vie		√
71	Supply and installation of electrical and instrument cable between gas conditioning skid, flow meter, SSOV & SSOVV and Mark Vie	√	
72	Electrical and instrument cables from off-base gas fuel module to Mark VI		√

Item	Description	DECL's scope	NPGCL's scope
73	Incorporating the filter skid to DCS (if required)	√	
74	Electrical and instrument cable connection between GE JB and DCS other than between filter skid to DCS. Note: There is no electrical and instrument cable connection between GE JB and DCS other than between filter skid to DCS.	x	x
75	Thermal insulation of DECL supplied natural gas pipeline	√	
76	Electrical tracing Note: Electrical tracing of natural gas pipeline is not required.	x	x
77	UPS power supply Note: No additional UPS power supply is required.	x	x
78	Fire-fighting systems for gas turbine compartment, off-base gas fuel module and other equipment supplied by NPGCL	x	x
79	Fire-fighting systems for DECL Supplied Natural Gas Regulating Station	√	
80	Third party inspections (if needed)		√
81	Transportation of NPGCL supplied equipments & materials from Lahore or Karachi port to Site		√
82	Transportation of DECL supplied equipments & materials from Lahore or Karachi port to Site	√	
83	Piping design specifications between gas module (FG1) & downstream heater - stainless steel, drops, diameter, etc.		√
84	Integration of the Fuel Conditioning Skid to the Control System (Software)		√
85	MCC modifications to provide additional power to the Fuel Conditioning Skid & Fuel Metering Skid		√
86	Instrument Air System modifications to provide additional air to Fuel Metering Skid and GT Enclosure (HG System)		√
87	HazGas Detection and Protection for Fuel Conditioning Skid (no enclosure - open) Note: The same is not required.	x	x
88	Change in actuators, etc. due to rating for GT Enclosure and Accessory Module Note: No changes necessary.	x	x

3.5 Service scope in detail is as follows:

Item	Description	DECL's scope	NPGCL's scope
1	Shut down unit to replace the various combustion system components install piping and manifolds		√
2	Install/modify the liquid fuel purge system manifold, check valves, air filters, solenoid and piping		√

Item	Description	DECL's scope	NPGCL's scope
3	Install on-base gas manifold		√
4	Mount trip oil system pressure switches Note: Same job is not required.	x	x
5	Install the gas fuel module, gas clean up system and gas heating system		√
6	Modify the controls per the new requirements		√
7	Install the gas fuel purge system solenoids, pressure switch, control valves, air filters, pressure regulator valves and piping		√
8	Install SSOV and vent arrangement in customer piping upstream of fuel gas module Note: TDI will be provided by GE.	√	
9	Hazardous Area Re-Classification - replace heaters, receptacles, switches, lights; ensure conduct sealing and ventilation system verification (if required) if the original and existing equipments / materials are supplied by GE		√
10	Hazardous Area Re-Classification - replace heaters, receptacles, switches, lights; ensure conduct sealing and ventilation system verification (if required) if the original and existing equipments / materials are supplied by DECL instead of GE	√	
11	Cut openings in the off-base enclosure wall for installation of field run piping	√	
12	Install fire detection system in gas compartment with associated electrical equipment (junction boxes, wiring, ...)		√
13	Install CO2 piping in gas enclosures Note: Same job is not required.	x	x
14	Install CO2 dampers on enclosure ventilation system Note: Same job is not required.	x	x
15	Install other fire protection devices for GT system (audible and visual alarm, break glass unit...) Note: Same job is not required.	x	x
16	Install fire protection cubicle in GT control room Note: Same job is not required.	x	x
17	Definition of the location where the HP CO2 skid and the control cubicle (in the control room) Note: Same job is not required.	x	x
18	GT Performance test prior to outage (Pre-Test)		√
19	GT Performance test immediately after outage (Post-Test)		√
20	Prior to Pre-Test, calibration of existing station instruments used to calculate and correct performance or used to control the unit Note: GE will provide a list of instruments to be calibrated.	√	

Item	Description	DECL's scope	NPGCL's scope
21	Verify compressor water wash drain valves are closed during performance test		√
22	Verify proper operation of compressor start bleed valves and inlet bleed heat valves during performance test		√
23	Scaffolding and mobile crane for the work out of DECL's scope		√
24	Scaffolding and mobile crane for the work in DECL's scope	√	
25	Tools rental for GT Natural Gas Conversion only		√
26	GE TA's services and any TA services for the equipments / systems not supplied by DECL		√
27	TA services for the equipments / systems supplied by DECL	√	
28	Installation of test instruments for the work out of DECL's scope		√
28	Installation of test instruments for the work in DECL's scope	√	
29	Technical direction for the conduct of the test for NPGCL supplied equipments / systems		√
30	Technical direction for the conduct of the test for DECL supplied equipments / systems	√	
31	Collection/analysis of test data for NPGCL supplied equipments / systems		√
32	Collection/analysis of test data for DECL supplied equipments / systems	√	
33	GT Performance test scope: test procedure, instruments, execution, fuel analysis and test report		√
34	Supervision and management of NPGCL's employees, agents, or other sellers		√
35	Any power generating work		√
36	All civil work	√	
37	Any services associated with any equipments / systems / materials not supplied by DECL		√
38	Security escorts outside of the site		√
39	Maintenance of any unit accessories		√
40	Designated representative for co-ordination of activities between all parties on-site and sign timesheets (if any)		√
41	Compressed air and site utilities in amounts, pressures and voltages necessary to perform work scope		√
42	Adequate lighting for NPGCL nightshift work		√
43	Adequate lighting for DECL nightshift work	√	
44	Assistance for visa sponsorship of all DECL's personnel, as required		√
45	Lay down space arrangement		√

Item	Description	DECL's scope	NPGCL's scope
46	Climate controlled office adjacent to work site area with secure storage space		✓
47	Reliable and stable DSL / high speed internet connection for DECL's personnel		✓
48	Fire-fighting equipment, fire fighting services, site security, etc.		✓
49	First-aid facilities		✓
50	Rotor-lifting beam, rotor stands, cribbing material		✓
51	Personal protective equipment for DECL's personnel	✓	
52	Site-specific safety equipment (if any)		✓
53	Site-specific safety orientation (if any)		✓
54	Washroom, sanitary, change room and parking facilities for DECL's personnel		✓
55	Trash containers and disposal		✓
56	Disconnect, isolate, lock out, tag out and reconnect electrical apparatus		✓
57	Receiving, off-loading and proper storage of all items supplied by DECL	✓	
58	Secured storage space arrangement for all items supplied by DECL		✓
59	Operators for shutdown, start-up, drain system, fill oil system, etc.		✓
60	Machine shop facilities		✓
61	On-site machining and painting if required for the items in NPGCL's scope		✓
62	On-site machining and painting if required for the items in DECL's scope	✓	
63	All permits, licenses and utility charges		✓
64	Installation of the coalescing filters		✓
65	Any inspection services and general outage consumables required for the installation of NPGCL supplied equipment		✓
66	Shade / general weather protection to SSOV and Flowmeter if required Note: GE will provide the requirement.	✓	
67	Piping supports and racks for piping from Gas Fuel Module to GT Note: GE to provide interface drawings.	✓	
68	Accessible routing path from Gas Fuel Module location to PEECC Note: GE to provide the cables information.	✓	
69	Position GT gas conditioning skid and off-base gas fuel module on the foundation		✓
70	Installation of flow meter and SSOV & SSOVV of gas turbine	✓	

Item	Description	DECL's scope	NPGCL's scope
71	Commissioning of NPGCL supplied equipments / systems		√
72	Commissioning of DECL supplied equipments / systems	√	
73	GT commissioning till base load		√
74	CCPP commissioning till full load	√	
75	Accommodation for DECL's personnel		√

4 General Layout

The natural gas booster / regulating station and the relating pipelines will be installed, tested and commissioned. Considering the limitation of the existing facilities and the narrow site space, the natural gas booster / regulating station can only be arranged in the east of mechanical draft cooling tower and north of the workshop building which is adjacent to the spillway of the Upper Chanab Canal. For the convenience of the construction and operation, the new natural gas pipelines will be routed along with the existing pipe racks or roads of plant. And the same pipelines will be designed to be installed on the existing pipe racks as much as possible.

5 Design Conditions

Fuel type	Natural gas
Barometric pressure	985.61mbar
Ambient temperature (Maximum)	48.9℃
Ambient temperature (Minimum)	-1.1℃
Annual average relative humidity (Maximum)	83.1%
Annual average relative humidity (Minimum)	50.3%

6 Design input parameter

Cooling water temperature	28.5℃
Gas fuel consumption of 1 GT (Maximum)	19.5lb/s
GT required inlet gas fuel pressure	380-400PSIG

Natural gas fuel composition:

Component	Unit	RLNG (1)	Southern System Gas (2)	(1) and (2) Commingled Gas
Methane	% Mole	90.15	87.02	88.852±5%
Ethane	% Mole	8	1.122	5.148±5%

Propane	% Mole	0.25	0.250	0.257±5%
iso-Butane	% Mole	0.1	0.1	0.183±5%
n-Butane	% Mole			
iso-Pentane	% Mole			
n-Pentane	% Mole			
Hexane Plus	% Mole			
Carbon Dioxide	% Mole	0	1.797	0.745±5%
Nitrogen	% Mole	1.5	9.496	4.815±5%
Gross Calorific Value	BTU/Scf	1050	916.356	950 to 1000
Net Calorific Value	BTU/Scf			
Specific Gravity				
Gas Pressure	psig	300-400	300-400	300-400
		20.7-27.6bar	20.7-27.6bar	20.7-27.6bar

7 Fuel gas supply system

As NPGCL provided natural gas pressure 300-400 psig cannot meet the requirement of GT inlet as 380-400psig, the gas boosting device (compressor) will be installed along with the gas regulating station, which will be supplied by NPGCL. The gas regulating station will be put into service when the inlet natural gas pressure meets the requirement of GT inlet. The gas boosting device (compressor) will be put into service when the inlet natural gas pressure cannot meet the requirement of GT inlet. The gas boosting device (compressor) shall meet the requirement of GT inlet parameters such as GT inlet gas pressure, GT inlet gas pressure fluctuation, GT inlet gas temperature etc., which shall be guaranteed by NPGCL.

The gas fuel system will be equipped with natural gas booster station including strainer pressure regulating valves, shut-off valves, pipes, metering device, pressure gauge and indicating instruments and will be provided with necessary protective equipment for proper control and safe operation of the unit.

At the same time each GT will be equipped with one (1) complete factory assembled gas conditioning skid, flow meter, SSOV & SSOVV and off-base gas fuel module including all accessories, which will be supplied by NPGCL.

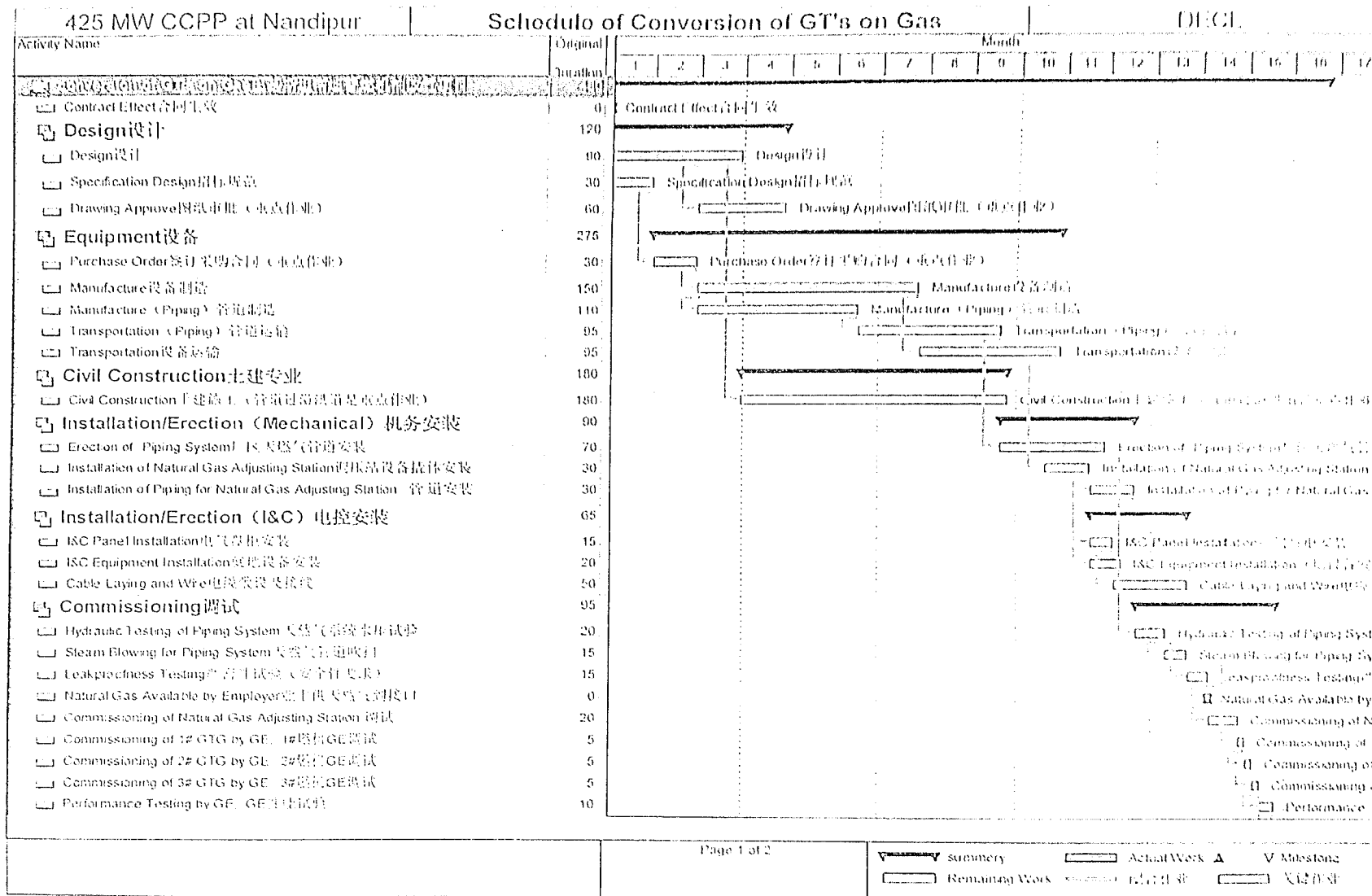
- 8 Firefighting system for the natural gas booster / regulating station
Water spray firefighting system and fire hydrants nearby will be provided for the natural gas booster / regulating station.
- 9 Shed for the natural gas booster / regulating station
The shed for natural gas booster / regulating station will be provided as sun and rain shelter.
- 10 Performance Data
After the issue regarding the GT exhaust parameter is clarified and decided by NPGCL, we will provide the same as soon as possible after the due calculation. Details please refer to our letter No. DEC-S/NP-NESPAK/15-490 dated July 4, 2015 which is attached for your reference.
- 11 Construction scheme
Basically, all the construction works will be based on approved design drawings. And specially, the new construction scheme will pay more concern on the protection of existing buildings & other facilities to avoid any damage on present Power Plant operation. So that,
- 1) During excavation works, it should take special measurement to support as-build buildings and to avoid any damage on the underground facilities.
 - 2) For the erection works scheme, it should select the time which can cooperate with the operation schedule which is provide by the Employer in advance.
 - 3) For the pipeline cross the spillway, piling as abutment will be constructed with closure or half-closure method. During the construction period, the spillway discharge should be controlled as minimum quantity, which require the Employer's cooperation & managing.
 - 4) Scheme for other erection works will be same to the erection of present completed Power Plant.
- 12 Schedule of conversion work
See the attachment.
- 13 Drawings
Attached please find 3 drawings as follows:

Sr. No	Drawing No.	Drawing title
1	60-F6181E1C-02	GAS COMPRESSOR STATION AND PIPING ARRANGEMENT IN PLANT LAYOUT

2	60-F6181E1C-03	GENERAL ARRANGEMENT OF GAS TURBINE AND HRSG
3	60-F6181E1C-04	NATURAL GAS COMPRESSOR STATION P&ID

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Scanned with CamScanner



425 MW CCPP at Nandipur		Schedule of Conversion of GT's on Gas										DECL						
Activity Name	Original Duration	Month																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<input checked="" type="checkbox"/> Integral Start up Commissioning for CCPP 整套调试 <input type="checkbox"/> Commissioning of CCPP 联合循环整套调试 <input type="checkbox"/> Performance Testing of CCPP 联合循环性能试验 <input type="checkbox"/> TOC of CCPP 联合循环移交	30 15 15 0																	

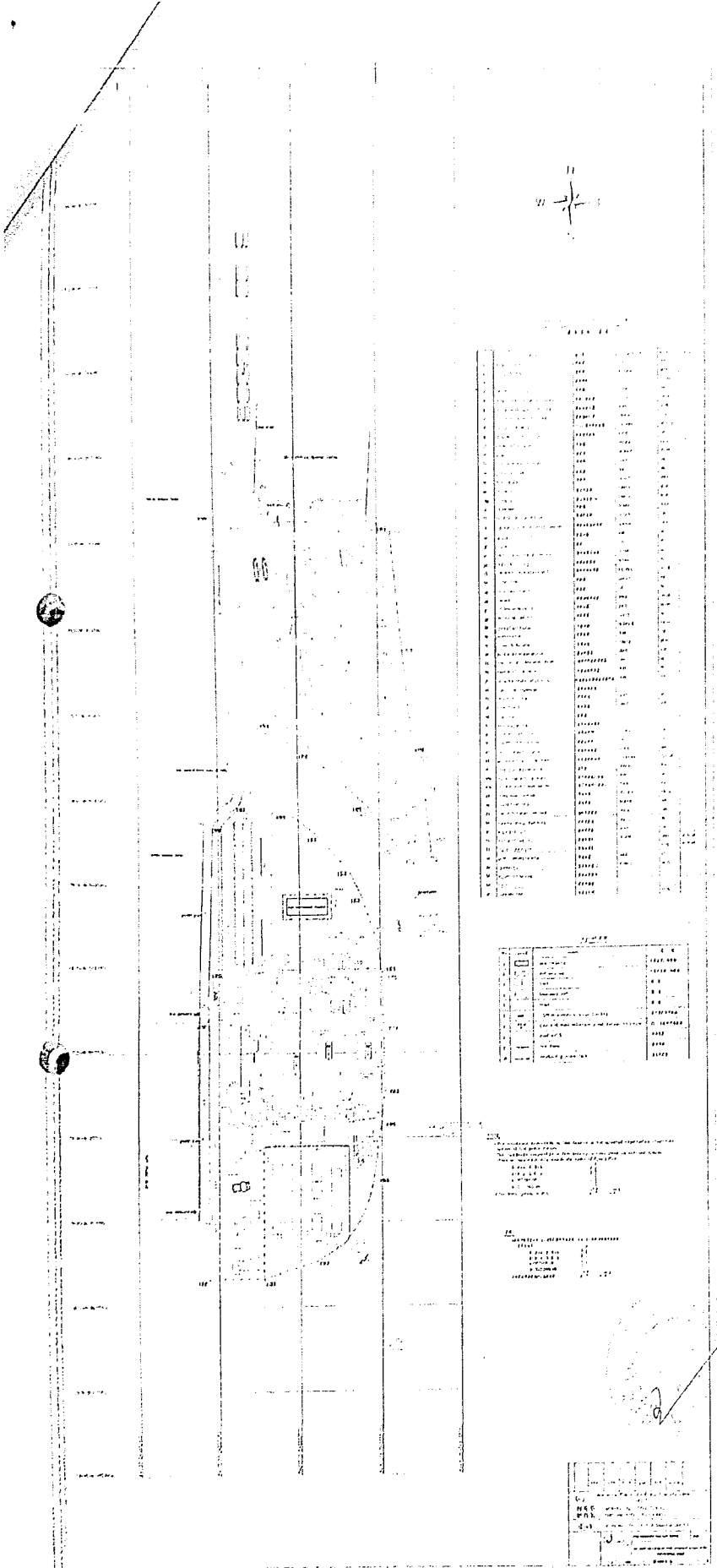
☐ Commission
☐ Perform
☒ TOC

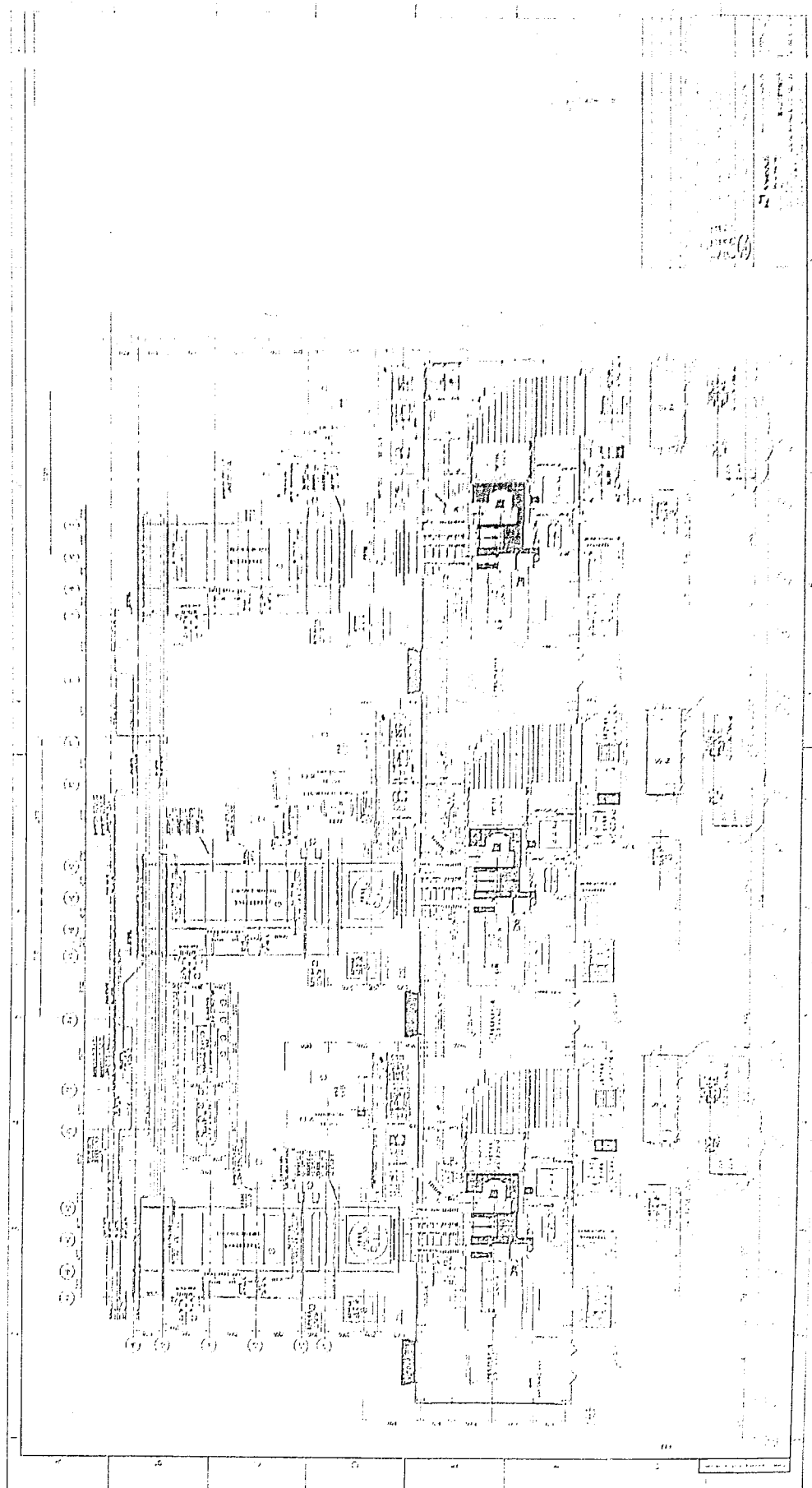
Page 2 of 2

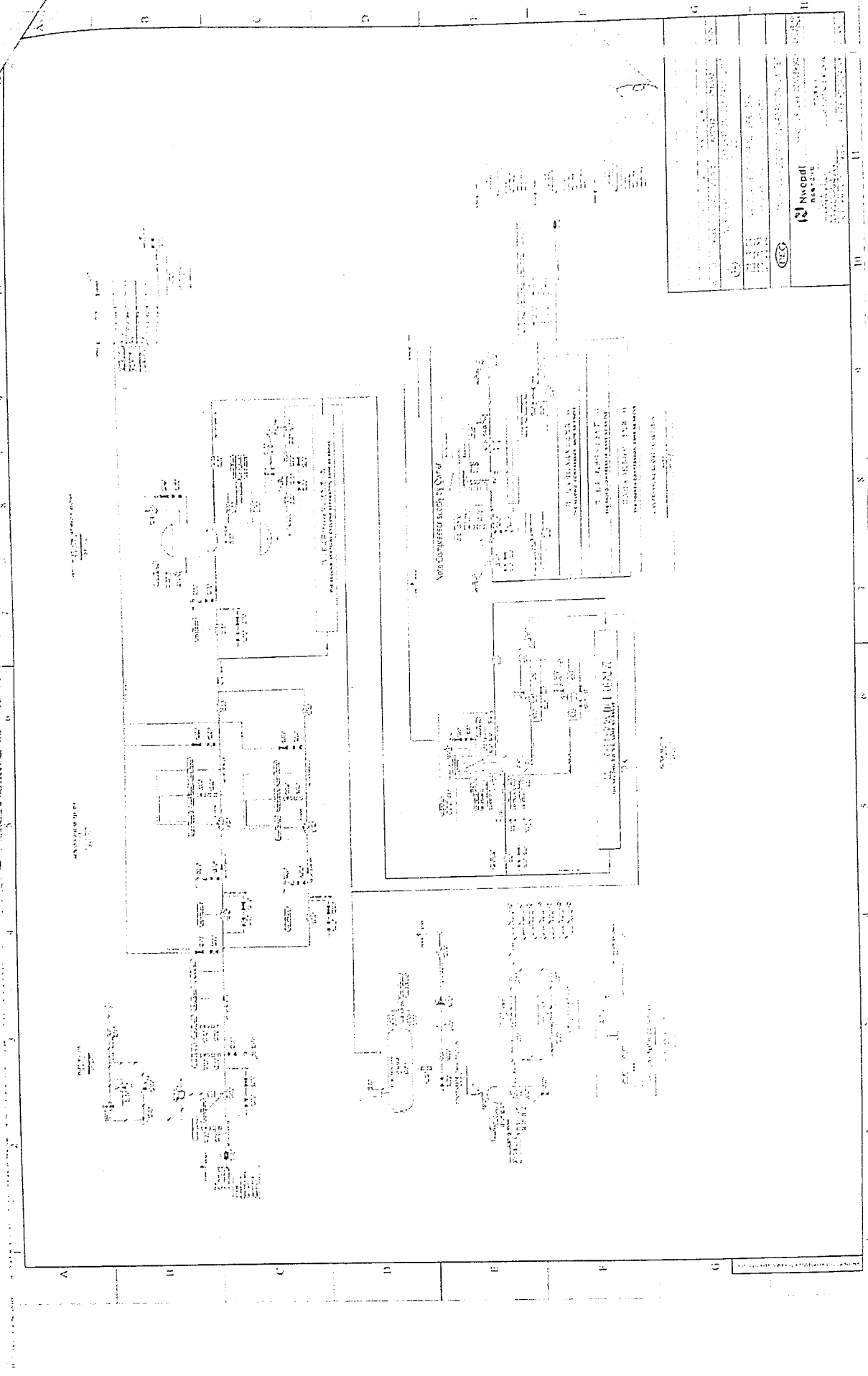
☒ summary
☐ Remaining Work

☐ Actual Work
☐ 配合作业

☐ Milestone
☐ 关键作业









Date: October 13th, 2016

Commercial Proposal for Nandipur Gas Conversion Project

To: 425 MW CCPP Nandipur,
District Gujranwala
Attn.: Chief Engineer/ Project Director
Tel: +92-55-3400526,
Fax: +92-55-3493761,
E-mail: mairueme@gmail.com

Dear Sir,

We Dongfang Electric Corporation Limited ("DEC") are very pleased to submit a commercial proposal to NPGCL ("Employer") for gas conversion works on turnkey basis.

1. Price Offer

The price offer of gas conversion from HFO for 425MW combined cycle power plant Nandipur is as follows:

US\$ 15,311,157.00 (In words: US Dollars Fifteen million and three hundred eleven thousand one hundred Fifty Seven only)

Break-Down Price List for Nandipur Gas Conversion Project.

Sl. No.	Description	Price (USD)	Price (PKR)
A	Supply of Gas Conversion Equipment		
1	Equipment and materials on FOB Chinese port basis	10,683,900.00	
1.1	Booster and associated facilities	Supplied by NPGCL	
1.2	Regulation station and accessories including the bypass system	8,801,200.00	
1.3	Pipe and other materials	1,882,700.00	
2	Shipping including insurance	67,900.00	
3	CIF Pakistan seaport	10,751,800.00	
4	Local transport	33,800.00	
	Sub-total	10,785,600.00	
B	Services		
5	Civil	934,200.00	

5.1	Bored pile works for pipe across spillway	160,886.00	
5.2	Foundation and architectural	647,485.00	
5.3	Steel Structure installation	125,827.00	
6	Erection	862,800.00	
6.1	Booster and accessories	215,700.00	
6.2	Regulation station and accessories	302,100.00	
6.3	Bypass system	90,300.00	
6.4	Pipe and other materials	254,700.00	
7	Commissioning and performance test including instrument calibration	1,602,800.00	
7.1	Commissioning	859,850.00	
7.2	PT	622,950.00	
7.3	Instrument calibration	120,000.00	
	Sub-total	3,399,800.00	
C	Withholding tax	918,669.00	
D	Sales tax on services	207,088.00	
	Total Price	15,311,157.00	

Notes:

- o The above price is based on the scope of work described in Technical Proposal of Gas Conversion Work. Throughout the Works National standard of China (GB), which is equivalent to the latest relevant recommendation of international standard, will be adopted for the project.
- o The price includes the at-the-site training price for 10 persons for 5 working day period.
- o The price includes the cost of commissioning and test for natural gas regulating station as well as the entire power plant.
- o The price includes the cost of inspection on existing equipment, but excludes the cost of repairing/replacing/modification to existing equipment in the power plant such as HRSG, steam turbine, generator and others in case those equipment need modifying or repairing or replacing.
- o The price includes withholding tax @ 6% and sales tax on services@17%, but excludes customs duty for goods and materials that become the property of the Employer.

- D. T. G. Nandipur
- The price excludes the cost of GE's works and supplies (equipment, materials, installation works, commissioning works, training, performance and reliability test, etc.).
 - The price excludes GE technical advisory charges, if such service is required during commissioning and test.
 - The price excludes the cost of dismantling of existing gas compressor from Thermal Power Station Guddu with all its accessories / instrumentation, transportation from Guddu to Nandipur, Installation and retrofitting of the said gas compressors and all related auxiliary systems. We suggest that the separate contract for the said gas compressor should be signed between the Employer and GE (Oil & Gas).
 - The price excludes cost of recommended spares and consumables. Four-year recommended spare part list with price is attached for your reference/review.
 - Employer shall provide free of charge water, power for construction of the work, office and residence for Contractor's personnel at site.
 - This offer will remain valid for Ninety (90) days after October 14, 2016.

2. Project Dates

Effective Date is signing date of the Contract. NTP Date is the date on which NPGCL will issue a written Notice-To-Precede (NTP) to Contractor so that Contractor can start the Works. The NTP date is Commencement Date of the construction schedule. Warranty Period or Defects Liability Period is 12 months for DEC newly supplied natural gas regulating station only after the COD date.

3. Time of Completion

16 months starting from commencement of the Contract (NTP) to completion of the Reliability Test Run on natural gas regulating station.

4. Terms of Payment

All payments (except Advance payment) to DEC shall be made through Letter of Credit (L/C).

Twenty percent (20%) of the Total Contract Price shall be paid as interest free advance, through Telegraphic Transfer (T/L) within thirty (30) days after signing of Contract Agreement against advance payment bank guarantee.

4.1 Equipment portion:

Seventy percent (70%) of the equipment portion price of each consignment of imported material and equipment will be paid against shipping documents.

Ten percent (10%) of the equipment portion price of material and equipment will be paid after issuance of Taking-Over Certificate. This Contractor will submit Bank Guarantee for five percent of the equipment portion price. Bank Guarantee shall be valid till issuance of Defects Liability Certificate.

4.2 Local transport portion:

Eighty percent (80%) of the Local transport Value (Local Transport including inland insurance for Local Goods) within 30 days after the equipment arrives at the Site against monthly invoices for actual progress of work for the respective month accompanied by the statement of work duly verified by the Engineer and the Employer.

4.3 Services portion:

Seventy percent (70%) of the services portion price will be paid against bi-weekly invoicing for actual progress of work for the respective period.

Ten percent (10%) of the service portion price will be paid after issuance of Taking-Over Certificate.

5. Terms and Conditions

The contract structure, terms and conditions may be discussed during the contract discussion and shall be mutually agreed.

6. Performance Data

1) Gas turbine generator at 30°C ambient temperature

Operating point	Fuel	Gross Output at GTG Terminal (KW)	Gross Heat Rate at GTG Terminal (Kj/kwh)	Net Output at GTG Terminal (KW)	Net Heat Rate at GTG Terminal (Kj/kwh)
100%	NG				

2) Expected entire power plant performance

Sr. No.	Ambient Temperature (°C)	Gross Output (KW)	Gross Heat Rate (Kj/kwh)	Net Output (KW)	Net Heat Rate (Kj/kwh)
1	-1	587,752	7303		
2	30	514,844	7174		
3	47.6	451,846	7464		

Net output is defined as output measured at high voltage side of generator transformer.



Notes: The above data are based on GT estimated performance data and cannot be guaranteed because only natural gas regulating station will be supplied and other existing equipment in the power plant is not modified/repared/replaced.

The above data are based on assumption that equipment is in a clean condition.

3) Guaranteed natural gas regulating station performance

Steady-state: Supply pressure at FG1 at any operating point within the gas turbine capability is regulated within +/- 1% of point, with a peak-to-peak period of not less than 8 seconds (0.25% per second average rate of change).

Transient: During transients maximum supply pressure excursions do not exceed either a 1% per second ramp or a 5% step. The 1% per second ramp limit is applicable over the range of minimum required pressure to maximum operating pressure. The 5% step limit is applicable over the range of minimum required pressure to 95% of maximum operating pressure and with no more than one 5% step change in 5 seconds. These transient limits apply during brief periods associated with pressure control mode transfers such as transfer between gas fuel pressure regulating valves, gas compressor changeovers or gas supply source changeovers, or rapid fuel demand transients such as gas turbine load rejections or trips.

Note: The natural gas regulating station is designed and performance is guaranteed on the basis of natural gas specification provided by NPGCL:

(1) Natural gas pressure range is between 20.7 and 30bar.

(2) Wobbe index:

The natural gas composition and temperature shall be maintained such that the Modified Wobbe Index (MWI) doesn't exceed +/- 5 percent of the NG design value during startup. While in steady state operation, composition and temperature must be maintained such that MWI doesn't exceed +/- 5 percent of its design value. The allowable rate of change for MWI is 0.3%/Sec and temperature rise will not exceed 1°C/s.

7. Major vendors

No.	Equipment	Supplier	Shipment Port
1	Gas regulating station	Dalian Energas Gas System Co. Ltd. or Shanghai Fiorentini Gas Equipment Co. Ltd.	Dalian China or Shanghai China

8. Others

In case the installation work completes but natural gas is not available leading to delay in commissioning, the Employer shall take responsibility to protect and secure the equipment and the power plant against any deterioration, loss and damage, during which some equipment and materials may be damaged. The Employer shall be responsible for the replacement.

Employer shall be responsible for operating the power plant and providing fuels and consumables free of charge during commissioning and tests.

Commissioning and tests on gas turbines and entire power plant after installing natural gas regulating station shall be done during the same period.

Employer shall provide necessary safety and security measures to the project and shall be responsible for providing its own sufficient stationed security guards and get enough local police on duty through coordination with the local government for the sake of Contractor's personnel and plant equipment storage at the site and transportation beyond the boundary wall of site and camp.

Contractor shall only warrant the gas conversion work supplied by the Contractor instead of existing entire power plant, booster and associated facilities supplied by Employer, GE supplies from the NTP until the earlier of: (i) twelve (12) months after Taking Over of the gas conversion work, or (ii) twenty eight (28) months after delivery date of the gas regulating equipment.

Total number of staff (Engineers and others) to be engaged for erection will be about 70.

We are confident that our offer is very competitive and of interest to you and we hope the contract can be signed soon so the work can be commenced as early as possible.

Should you have any questions, please do not hesitate to contact us.

Yours faithfully,

Signed

Name and Title

Wang Wei

Deputy General Manager of Thermal Power
Division II

For

Dongfang Electric Corporation Limited

Address

No. 333, Shuhan Road, Chengdu 610036, China

Fax Number (86-26) 87867746

Date October 12, 2016

Enclosure: Clarification/Deviation Schedule (3 pages)

Four-year recommended spare part list (1 page)



Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
Commercial Part					
1	INSTRUCTIONS TO BIDDERS IB12.1	ITB-5	For Goods and Services which the Bidder will supply from within Pakistan and abroad, the prices shall be quoted in the Pak. Rupees including all relevant taxes / duties on supply / services i.e. total price for the complete Works.	Payments under this Agreement shall be made by the Employer in US Dollar	
	AGREEMENT 14.7.2 Mode of payments for EPC Price	55	All payments under this Agreement shall be made by the Employer in local currency(Pak Rupee).		
2	AGREEMENT 1.1 Scope of Bid	8	"Punch list Completion Period for the Works" means the three (3) months period starting from the date on which the Taking-Over Certificate for the Works/Services issued	"Punch list Completion period" for the Works" means the one (1) year period starting from the date on which the Taking-Over Certificate for the Works/Services issued	
3	AGREEMENT 14.2 Advance Payment	20	Upon receipt by the Employer of the Advance Payment Security and the Performance Security and issuance of the Notice to Proceed by the Employer, the Contractor shall raise invoice for: fifteen percent (15%) of the EPC Price. The Employer shall within seven (7) Business Days of receipt of such invoices remit the Advance Payment to the Contractor.	For the Advance Payment percentage there are two different description. Please clarify.	
	Schedule-IX schedule of prices		Advance Payment - 10%		

Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
4	AGREEMENT 5.5 Training	30	The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements. If this Agreement specifies training which is to be carried out before taking-over, the Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 (Taking Over of the Works and Sections) until this training has been completed.	The at-the-site training for 10 persons for 3 working day period will be carried out	
5	AGREEMENT 8.2 Time for Completion	38	The Contractor shall complete whole of the Works, and each phase/Section of the Works within the Time for Completion by February 15, 2017.	The Works shall be completed within 18 months from NTP	
6	AGREEMENT 10.1 Taking Over of the Works and Sections	46	The Employer shall issue the Taking over Certificate when: i. The applicable criteria, as set out in the Employer's requirements fulfilled; ii. All the works, required to be completed, are completed	ii. All the works, required to be completed, are completed except in minor respects that do not affect their use for the purpose	
7	AGREEMENT 19.1 Definition of Force Majeure	69	(b) any Change in Law	Deleted this item	
8	Scope of Supply	3 of 29	Dismantling, Transportation, Engineering and Installation of these three (3) Compressors at Nandipur Power plant along with complete allied facilities for the successful operation of Compressors at desired specification / requirement and total quality control shall be part of EPCC contractor's scope.	Shall be in Employer's scope	

Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
Technical Part					
1	Schedule-I 3 PROJECT SCOPE	5 of 29	There is no definite time for gas supply	Please specify the gas supply time	
2	Schedule-I 3 PROJECT SCOPE	5 of 29	The SNGPL will only provide their 24" pipeline up to Nandipur plant battery limit. The project scope includes to install piping/pipeline from SNGPL battery limit up to inlet of compression facility and from compression facility discharge up to Individual Fuel Gas Conditioning skids of GT alongwith supply/installation of all valves, fittings, instruments, control system etc. A compressor facility by-pass (with double block & bleed arrangement) shall also be provided. The engineering design work will be carried out for this project in accordance with following applicable project specifications and international codes and standards.	The Employer shall be responsible for compressor and its facility	
3	Schedule-I 4.14 CODES AND STANDARDS	13 of 29	<ul style="list-style-type: none"> • API, ASME, NFPA, ASCE, ACI, AISC, UBC • IEC, NEC, BSI and IEEE • Client Technical Specifications & Philosophies • Any other Applicable codes and standards. 	Chinese standards shall be adopted.	
4	Schedule-I 5.4 Civil & Structures Scope	26 of 29	<p>Following basis are considered while preparing proposal development related to civil and structure scope of work.</p> <ul style="list-style-type: none"> • Construction of new Boundary wall related to SNGPL metering station installation is considered as length of 100 m similar to existing wall. • Demolition of existing boundary wall related to SNGPL metering station installation is considered as length of 100 m. 	Please specify the SNGPL metering station location	

FOUR YEAR RECOMMENDED SPARE PARTS

ITEM	NAME	SIZE	UNIT	Q.TY	ORIGIN	MANUFACTURER
1	O-RINGS	Ø 10	M	50	CHINA	ENERGAS
2	FILTER ELEMENT	DuoToV 90/736	SET	10	GERMANY	VOTEC
3	GASKET	14"-300#	PIECE	8	CHINA	ENERGAS
4	GASKET	8"-300#	PIECE	16	CHINA	ENERGAS
5	GASKET	2"-150#	PIECE	10	CHINA	ENERGAS
6	GASKET	1"-300#	PIECE	30	CHINA	ENERGAS
7	PI	1/2"	PIECE	2	CHINA	SANTO
8	TI	3/4"	PIECE	2	CHINA	TANKING
9	INSTRUMENT VALVE	1/2"	PIECE	2	CHINA	JPE
10	BALL VALVE	1/2"	PIECE	2	CHINA	JPE
11	BOLTS AND NUTS	ALL TYPE MODELS OF 20%			CHINA	ENERGAS
	TOTAL PRICE (USD)					1022

TOTAL PRICE IS ONE HUNDRED SIXTY THREE THOUSAND THREE HUNDRED SIX US DOLLARS.

To: 425/525 MW CCPP Nandipur, District Gujranwala
Attn: Chief Engineer/ Project Director
Tel: +92-55-3400525,
Fax: +92-55-3493761,
E-mail:mairueme@gmail.com

COPY

**Gas Conversion Work
For
425MW Combined Cycle Power Plant
Nandipur
(Alternative)**

Reference No.: HD-Nandipur -Gas - 01

Date Of Opening Of Bid: 14th of October 2016
Warning: Not To Open Before 14th of October 2016



东方电气股份有限公司
DONGFANG ELECTRIC CORPORATION LIMITED

Dongfang Electric Corporation Limited

333, Shuhan Avenue, Chengdu, Sichuan, P.R. China

DONGFANG ELECTRIC CORPORATION LIMITED

333, Shuhan Avenue,

Chengdu, Sichuan,

P. R. China

Date: October 13, 2016

Our Ref. No.: HD-Nandipur -Gas-01

COVERING LETTER

To: 425 MW CCGP Nandipur,
District Gujranwala
Attn.: Chief Engineer/ Project Director
Tel: +92-55-3400526.
Fax: +92-55-3493761.
E-mail: mairueme@gmail.com

Sub: Nandipur Gas Conversion Project

Dear Sir,

We Dongfang Electric Corporation Ltd. (DEC) has been working very closely with you on Nandipur 425MW combined cycle power plant project and through our joint efforts the project has been completed.

DEC has attached utmost importance to Nandipur Gas Conversion Project (Project). At your invitation we prepared the base proposal and alternative proposal respectively and we are very pleased to submit our proposal for this Project. Our proposal consists of the following technical and commercial parts:

Covering Letter
Technical Proposal
Commercial Proposal

The alternative proposal is based on a brand new compressor instead of used compressor from Guddu combined cycle power plant.

The proposal is submitted herein with one original and three copies. The Proposal remains valid for a period of ninety (90) days after October 14, 2016.

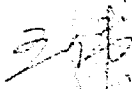
We are applying for Bid Security from Chinese bank and scheduled bank in Pakistan. However, due to the short time the Bid Security cannot be presented with the proposal. After discussing with the Employer and mutually agreed we'll submit a cheque equivalent to 2.5% of Bid Price.

CONFIDENTIAL

We cherish our good cooperation during execution of Nandipur 425MW combined cycle power plant project. We'd like to work closely with you again to conclude the contract and start to implement the Project as early as possible. We are also confident DEC will be able to complete this Project with the rich experience and excellent service.

Look forward to mutually beneficial cooperation on this Project.

Yours faithfully,



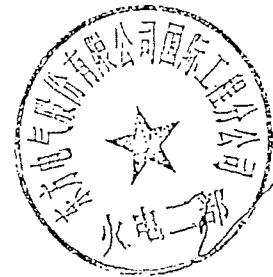
Wang Wei
Dy General Manager
Thermal Power Division
DEC Ltd International
Tel. No. : 86 28 87583164
Fax No. : 86 28 87583040
Email: wangwei01@dongfang.com



Dongfang Electric Corporation Ltd.
(DECL)

**Technical Proposal
Of
Gas Conversion Work
For
425MW Combined Cycle Power Plant
Nandipur
(Alternative)**

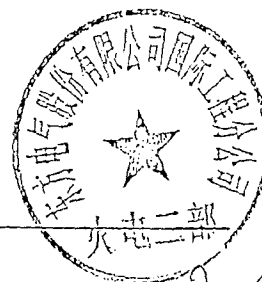
October 2016



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1	Brief Introduction of 425MW CCPP Nandipur
2	Design Basis
3	Scope of Work
4	General Layout
5	Design Conditions
6	Design input parameter
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9	Shed for the natural gas booster / regulating station
10	Performance data
11	Construction scheme
12	Schedule of conversion work
13	Drawings



1 Brief Introduction of 425MW CCPP Nandipur

425MW CCPP Nandipur is located in the Upper Chanab Canal, UCC, next to Nandipur 13.8MW hydraulic power station, left of the Canal, Punjab province. The traffic here is very convenient and 12 km to the nearest city Gujranwala. It will take 2.5 hour by car from the Site to Lahore which is the most developed city in Pakistan.

The combined cycle power generation units consist of three (3) sets GE combustion turbine generator unit of model PG9171E, three (3) sets double pressure, none reheat, vertical, natural circulation, none supplementary firing type heat recovery steam generator (HRSG) with bypass stack and one (1) set double pressures, none reheat, single rotor, one casing and condensing type steam turbine, which accords with 3+3+1 configuration. The gas turbines are to operate on high sulphur fuel oil (HSFO) as base fuel and high speed diesel (HSD) as stand-by fuel.

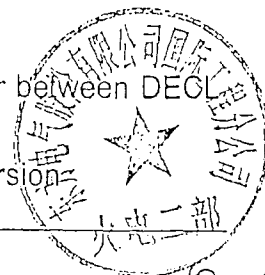
Electrical power which is generated by each turbine generator is delivered to the 132kV switchgear through generator step up transformer (GSUT). Each generator is connected to one two-winding GSUT through isolated phase bus duct (IPB) and generator circuit breaker (GCB) which are used to isolate the turbine generator outlet from the GSUTs. The voltage of gas turbine generator outlet is 15kV and 15.75kV for steam turbine generator. The power transmitted to the grid is evacuated through six 132kV transmission lines. The 132kV switchgear is double bus bar with one and a half circuit breaker scheme.

Distributed control system (DCS) is provided as the primary control and monitoring system of the Plant. The system is functionally and geographically distributed. GTGs will be monitored and controlled by its proprietary control system MARK-Vie and the rest of the Plant by DCS and PLC system.

Two sets of cooling water system are provided for the Plant. One is once-through cooling water system and the other one is recycled cooling water system with mechanical draft cooling tower. After lifted from water intake pump house, the raw water is settled in the settling basin firstly, then the water is clarified by the mechanical accelerated clarifier, and finally the clarified water is filtered by the filter, and then piped to the potable water system and DM water system.

2 Design Basis

- 1) EPC contract document for 425MW CCPP Nandipur between DECL and NPGCL
- 2) MOM between NPGCL, DECL and GE for gas conversion



- 3) GE Proposal for adding natural gas capability
- 4) Geotechnical report of this project
- 5) Latest Chinese national code and standard
- 6) Detail design document and drawing of 425MW CCPN Nandipur

3 Scope of Work

3.1 NPGCL proposes adding gas burning capability for 3 × Fr 91E gas turbines, USNs: 890253, 890255 and 890249 manufactured by GE, shipped in 2009, and installed at Nandipur site in Pakistan.

3.2 DECL's scope of supply for the gas conversion work includes one set of natural gas booster / regulating station and associated facilities as natural gas piping system, firefighting system, shed of natural gas booster / regulating station and etc.. DECL's scope of work for the gas conversion work comprises design, supply, construction, installation, commissioning based on the above mentioned DECL's scope of supply.

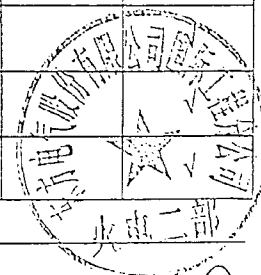
3.3 DECL's scope of work for the gas conversion work is as follows:

- 1) The design, supply, construction, installation and commissioning of natural gas pipeline from one meter outside the Natural Gas Station which is out of DECL's scope to DECL supplied natural gas booster / regulating station. The above mentioned Natural Gas Station out of DECL's scope will be near to Gate House No. 2 in between Batching Plant and boundary wall of GEPCO Training Center according to NSPAK's letter No. 3038/165/HAK/M6/951 dated June 12, 2014 which is attached as part of this Technical Proposal.
- 2) The design, supply, construction, installation and commissioning of natural gas pipeline from the natural gas booster / regulating station to the off-base gas fuel module of gas turbine which is not in DECL's scope.
- 3) The interface between NPGCL and DECL is one (1) meter out of Natural Gas Station out of DECL's scope and until off-base gas fuel module of gas turbine which is out of DECL's scope.
- 4) The supply and installation of natural gas pipeline from gas conditioning skid to flow meter, from flow meter to SSOV & SSOVV and from SSOV & SSOVV to off-base gas fuel module of gas turbine. The above mentioned gas conditioning skid, flow meter, SSOV & SSOVV and off-base gas fuel module of gas turbine are not in DECL's scope.
- 5) The supply and installation of cable between gas conditioning skid, flow meter, SSOV & SSOVV, off-base gas fuel module of gas turbine

and PEECC. The above mentioned gas conditioning skid, flow meter, SSOV & SSOV and off-base gas fuel module of gas turbine are not in DECL's scope.

3.4 Engineering scope in detail is as follows:

Item	Description	DECL's scope	NPGCL's scope
1	Add Gas Fuel System - All On-Base Equipment - Fuel Nozzle Assembly - FNs with tips		√
2	Add Gas Fuel System - All On-Base Equipment - Liquid Fuel Purge Valve		√
3	Add Gas Fuel System - All On-Base Equipment - Solenoid Driver for LF Purge Valve		√
4	Add Gas Fuel System - All On-Base Equipment - LF Purge Air Cooler		√
5	Add Gas Fuel System - All On-Base Equipment - 5psi Liquid Fuel Purge Check Valves		√
6	Add Gas Fuel System - All On-Base Equipment - Purge Air Filter		√
7	Add Gas Fuel System - All On-Base Equipment - LF Piping Mod - Check valves & re-route		√
8	Add Gas Fuel System - All On-Base Equipment - Gas Fuel Piping - Gas Header		√
9	Add Gas Fuel System - All On-Base Equipment - Gas Fuel Piping - Flexible Pigtails		√
10	Add Gas Fuel System - All On-Base Equipment - Control Trip Oil		√
11	Add Gas Fuel System - All On-Base Equipment - Atomizing Air Piping Mod - Solenoid Driver		√
12	Add Gas Fuel System - All On-Base Equipment - Atomizing Air Bypass Valve		√
13	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Stop Ratio Valve		√
14	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Control Valve		√
15	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Valve Servo Arrangement		√
16	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Stop Ratio & Control Valve Assembly		√
17	Add Gas Fuel System - Off-Base Gas Fuel Module - Transducer Arrangement		√
18	Add Gas Fuel System - Off-Base Gas Fuel Module - Fuel Gas Y-Strainer		√
19	Add Gas Fuel System - Off-Base Gas Fuel Module - Solenoid Valve		√
20	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Purge Valves		√



Item	Description	DECL's scope	NPGCL's scope
21	Add Gas Fuel System - Off-Base Gas Fuel Module - Gas Purge Actuation Solenoids		√
22	Add Gas Fuel System - Air-Operated Valves for Instrument Air System		√
23	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Purge Lines		√
24	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Gas Lines		√
25	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Hydraulic Lines		√
26	Stainless Steel Interconnecting Piping from Gas Module to TB CMPT - Instrument Air		√
27	IR Hazardous Gas Protection System Turbine Compartment - Gas detectors		√
28	IR Hazardous Gas Protection System Turbine Compartment - Off-base Gas Alarm Module		√
29	IR Hazardous Gas Protection System Gas Fuel Module		√
30	CFD Analysis		√
31	Revised Control Curve		√
32	Cabling / Wiring from Gas Fuel Module to Controls System		√
33	Turbine Compartment Wiring		√
34	Controls modifications - Add Gas		√
35	Controls modifications - Add Safety Shut Off Valve		√
36	Engineering site review		√
37	Scrubber Skid - Coalescing Filters (Right and Left) with Ball Valves		√
38	Scrubber Skid - Ball Valves for Main Gas Piping		√
39	Scrubber Skid - Metal Seat Valves & Automatic Drain Valves		√
40	Scrubber Skid - Ball Valves & Check Valves for Instrumentation Isolation, Vent & Drain		√
41	Scrubber Skid - Level & Flow Instruments		√
42	Scrubber Skid - Pressure & Temperature Instruments		√
43	Scrubber Skid - Stainless Steel Manifold & Accessories		√
44	Scrubber Skid - JB & Cables from sensors to JB		√
45	Enclosure Fan and 63 AT Switch		√
46	Ventilation Modifications		√
47	Safety Shut Off Valve and Vent Arrangement		√
48	Emissions Monitoring System Note: The existing emissions monitoring system will not be updated.		√
49	Additional Terminal Boards for Control System of GT		√
50	Gas chromatograph		√

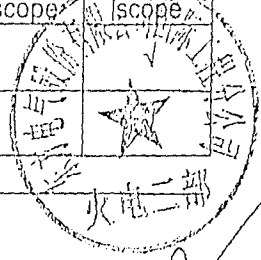


Item	Description	DECL's scope	NPGCL's scope
51	Natural Gas Station near to Gate House No. 2 in between Batching Plant and boundary wall of GEPCO Training Center		✓
52	One Set of Natural Gas Booster / Regulating Station	✓	
53	Interface of DECL Supplied Natural Gas Booster / Regulating Station with DCS	✓	
54	Gas flow meter (upstream of gas module - installed in customer piping)		✓
55	Pressure / temperature sensors / instrumentation		✓
56	Integration of gas flow meter with GT control system (Software)		✓
57	Integration of Pressure / Temperature Sensors / Instrumentation with GT control system (Software)		✓
58	Condensate tank	✓	
59	Demineralized water supply system for water injection system Note: The upgrade of demineralized water supply system for water injection system does not require additional water.	x	x
60	Buried ground network Note: No additional buried ground network is required.	x	x
61	Cathodic protective Note: No additional cathodic protective is required.	x	x
62	Vent Stack including ventilation fan duct from indoor gas fuel module to outdoor	✓	
63	Gas detection within DECL supplied natural gas booster / regulating station	✓	
64	Gas detection for gas turbine compartment, gas module and other equipment supplied by NPGCL		✓
65	Design of pipeline interface and material between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid		✓
66	Design of pipeline route between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid	✓	
67	Supply and installation of pipeline between gas conditioning skid, flow meter, SSOV & SSOVV and fuel gas skid	✓	
68	Piping connections between GT compartment and off-base gas fuel module of GT		✓
69	Design of electrical and instrument cable (type of cable including # of conductors) and interface (termination point from JB to MKVle) between gas conditioning skid, flow meter, SSOV & SSOVV and Mark Vie		✓
70	Supply and installation of electrical and instrument cable between gas conditioning skid, flow meter, SSOV & SSOVV and Mark Vie		
71	Electrical and instrument cables from off-base gas fuel module to Mark VI		

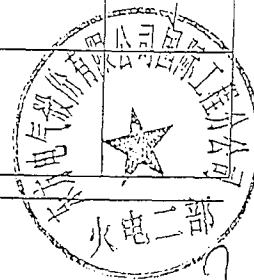
Item	Description	DECL's scope	NRGCL's scope
72	Interconnecting the filter skid to DCU (if required)	✓	
73	Electrical and instrument cable connection between CU, MU and DCU other than between filter skid to DCU. Note: There is no electrical and instrument cable connection between CU, MU and DCU other than between filter skid to DCU.	✓	✓
74	Thermal insulation of DECL supplied natural gas pipeline	✓	
75	Electrical tracing	✓	✓
76	UPS power supply Note: Electrical tracing of natural gas pipeline is not required.	✓	✓
77	Fire-fighting systems for gas turbine compartment, off-base gas fuel module and other equipment supplied by NRGCL.	✓	✓
78	Fire-fighting systems for DECL Supplied Natural Gas Booster / Regulating Station	✓	
79	Third party inspections (if needed)		✓
80	Transportation of NRGCL supplied equipments & materials from Lahore or Karachi port to Site		✓
81	Transportation of DECL supplied equipments & materials from Lahore or Karachi port to Site	✓	
82	Piping design specifications between gas module (FGT) & downstream heater - stainless steel, drops, diameter, etc.		✓
83	Integration of the Fuel Conditioning Skid to the Control System (Software)		✓
84	MCC modifications to provide additional power to the Fuel Conditioning Skid & Fuel Metering Skid		✓
85	Instrument Air System modifications to provide additional air to Fuel Metering Skid and GT Enclosure (HG System)		✓
86	HazGas Detection and Protection for Fuel Conditioning Skid (no enclosure - open) Note: The same is not required.	x	x
87	Change in actuators, etc. due to rating for GT Enclosure and Accessory Module Note: No changes necessary.	x	x

3.5 Service scope in detail is as follows:

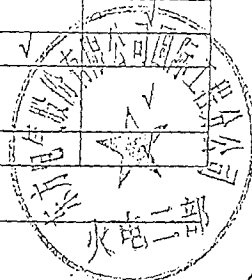
Item	Description	DECL's scope	NRGCL's scope
1	Shut down unit to replace the various combustion system components install piping and manifolds		
2	Install/modify the liquid fuel purge system manifold, check valves, air filters, solenoid and piping		



Item	Description	DECL's scope	NPGCL's scope
3	Install on-base gas manifold		√
4	Mount trip oil system pressure switches Note: Same job is not required.	x	x
5	Install the gas fuel module, gas clean up system and gas heating system		√
6	Modify the controls per the new requirements		√
7	Install the gas fuel purge system solenoids, pressure switch, control valves, air filters, pressure regulator valves and piping		√
8	Install SSOV and vent arrangement in customer piping upstream of fuel gas module Note: TDI will be provided by GE.	√	
9	Hazardous Area Re-Classification - replace heaters, receptacles, switches, lights; ensure conduct sealing and ventilation system verification (if required) if the original and existing equipments / materials are supplied by GE		√
10	Hazardous Area Re-Classification - replace heaters, receptacles, switches, lights; ensure conduct sealing and ventilation system verification (if required) if the original and existing equipments / materials are supplied by DECL instead of GE	√	
11	Cut openings in the off-base enclosure wall for installation of field run piping	√	
12	Install fire detection system in gas compartment with associated electrical equipment (junction boxes, wiring, ...)		√
13	Install CO2 piping in gas enclosures Note: Same job is not required.	x	x
14	Install CO2 dampers on enclosure ventilation system Note: Same job is not required.	x	x
15	Install other fire protection devices for GT system (audible and visual alarm, break glass unit...) Note: Same job is not required.	x	x
16	Install fire protection cubicle in GT control room Note: Same job is not required.	x	x
17	Definition of the location where the HP CO2 skid and the control cubicle (in the control room) Note: Same job is not required.	x	x
18	GT Performance test prior to outage (Pre-Test)		√
19	GT Performance test immediately after outage (Post-Test)		
20	Prior to Pre-Test, calibration of existing station instruments used to calculate and correct performance or used to control the unit Note: GE will provide a list of instruments to be calibrated.		



Item	Description	DECL's scope	NPGCL's scope
21	Verify compressor water wash drain valves are closed during performance test		√
22	Verify proper operation of compressor start bleed valves and inlet bleed heat valves during performance test		√
23	Scaffolding and mobile crane for the work out of DECL's scope		√
24	Scaffolding and mobile crane for the work in DECL's scope	√	
25	Tools rental for GT Natural Gas Conversion only		√
26	GE TA's services and any TA services for the equipments / systems not supplied by DECL		√
27	TA services for the equipments / systems supplied by DECL	√	
28	Installation of test instruments for the work out of DECL's scope		√
28	Installation of test instruments for the work in DECL's scope	√	
29	Technical direction for the conduct of the test for NPGCL supplied equipments / systems		√
30	Technical direction for the conduct of the test for DECL supplied equipments / systems	√	
31	Collection/analysis of test data for NPGCL supplied equipments / systems		√
32	Collection/analysis of test data for DECL supplied equipments / systems	√	
33	GT Performance test scope: test procedure, instruments, execution, fuel analysis and test report		√
34	Supervision and management of NPGCL's employees, agents, or other sellers		√
35	Any power generating work		√
36	All civil work	√	
37	Any services associated with any equipments / systems / materials not supplied by DECL		√
38	Security escorts outside of the site		√
39	Maintenance of any unit accessories		√
40	Designated representative for co-ordination of activities between all parties on-site and sign timesheets (if any)		√
41	Compressed air and site utilities in amounts, pressures and voltages necessary to perform work scope		√
42	Adequate lighting for NPGCL nightshift work	√	
43	Adequate lighting for DECL nightshift work	√	
44	Assistance for visa sponsorship of all DECL's personnel, as required		√
45	Lay down space arrangement		√



Item	Description	DECL's scope	NPGCL's scope
46	Climate controlled office adjacent to work site area with secure storage space		√
47	Reliable and stable DSL / high-speed Internet connection for DECL's personnel		√
48	Fire-fighting equipment, fire-fighting services, site security, etc.		√
49	First-aid facilities		√
50	Rotor-lifting beam, rotor stands, cribbing material		√
51	Personal protective equipment for DECL's personnel	√	
52	Site-specific safety equipment (if any)		√
53	Site-specific safety orientation (if any)		√
54	Washroom, sanitary, change room and parking facilities for DECL's personnel		√
55	Trash containers and disposal		√
56	Disconnect, isolate, lock out, tag out and reconnect electrical apparatus		√
57	Receiving, off-loading and proper storage of all items supplied by DECL	√	
58	Secured storage space arrangement for all items supplied by DECL		√
59	Operators for shutdown, start-up, drain system, fill oil system, etc.		√
60	Machine shop facilities		√
61	On-site machining and painting if required for the items in NPGCL's scope		√
62	On-site machining and painting if required for the items in DECL's scope	√	
63	All permits, licenses and utility charges		√
64	Installation of the coalescing filters		√
65	Any inspection services and general outage consumables required for the installation of NPGCL supplied equipment		√
66	Shade / general weather protection to SSOV and Flowmeter if required Note: GE will provide the requirement.	√	
67	Piping supports and racks for piping from Gas Fuel Module to GT Note: GE to provide Interface drawings.	√	
68	Accessible routing path from Gas Fuel Module location to PEECC Note: GE to provide the cables information.	√	
69	Position GT gas conditioning skid and off-base gas fuel module on the foundation		
70	Installation of flow meter and SSOV & SSOV of gas turbine		

Item	Description	DECL's scope	HPGCL's scope
71	Commissioning of HPGCL supplied equipments / systems		/
72	Commissioning of DECL supplied equipments / systems	/	
73	GT commissioning till base load		/
74	CCPP commissioning till full load	/	
75	Accommodation for DECL's personnel		/

4 General Layout

The natural gas booster / regulating station and the relating pipelines will be installed, tested and commissioned. Considering the limitation of the existing facilities and the narrow site space, the natural gas booster / regulating station can only be arranged in the east of mechanical draft cooling tower and north of the workshop building which is adjacent to the spillway of the Upper Chanab Canal. For the convenience of the construction and operation, the new natural gas pipelines will be routed along with the existing pipe racks or roads of plant. And the same pipelines will be designed to be installed on the existing pipe racks as much as possible.

5 Design Conditions

Fuel type	Natural gas
Barometric pressure	985.61mbar
Ambient temperature (Maximum)	48.9°C
Ambient temperature (Minimum)	-1.1°C
Annual average relative humidity (Maximum)	83.1%
Annual average relative humidity (Minimum)	50.3%

6 Design input parameter

Cooling water temperature	28.5°C
Gas fuel consumption of 1 GT (Maximum)	19.5lb/s
GT required inlet gas fuel pressure	320-400PSIG

Natural gas fuel composition:

Component	Unit	RLNG (1)	Southern System Gas (2)	(1) and (2) Correlating
Methane	% Mole	90.15	87.02	88.52±5%
Ethane	% Mole	8	1.122	5.14±5%

Propane	% Mole	0.25	0.266	0.257±5%
Iso-Butane	% Mole	0.1	0.3	0.183±5%
N-Butane	% Mole			
Iso-Pentane	% Mole			
N-Pentane	% Mole			
Hexane Plus	% Mole			
Carbon Dioxide	% Mole	0	1.797	0.745±5%
Nitrogen	% Mole	1.5	9.496	4.815±5%
Gross Calorific Value	BTU/Scf	1050	916.356	950 to 1000
Net Calorific Value	BTU/Scf			
Specific Gravity				
Gas Pressure	psig	300-400	300-400	300-400
		20.7-27.6bar	20.7-27.6bar	20.7-27.6bar

7 Fuel gas supply system

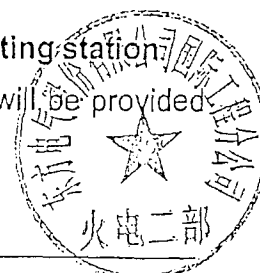
As NPGCL provided natural gas pressure 300-400 psig cannot meet the requirement of GT inlet as 380-400psig, the gas boosting device (compressor) will be installed along with the gas regulating station. The gas regulating station will be put into service when the inlet natural gas pressure meets the requirement of GT inlet.

The gas fuel system will be equipped with natural gas booster station including strainer pressure regulating valves, shut-off valves, pipes, metering device, pressure gauge and indicating instruments and will be provided with necessary protective equipment for proper control and safe operation of the unit.

At the same time each GT will be equipped with one (1) complete factory assembled gas conditioning skid, flow meter, SSOV & SSOVW and off-base gas fuel module including all accessories, which will be supplied by NPGCL.

8 Firefighting system for the natural gas booster / regulating station

Water spray firefighting system and fire hydrants nearby will be provided for the natural gas booster / regulating station.



9 Shed for the natural gas booster / regulating station

The shed for natural gas booster / regulating station will be provided as sun and rain shelter.

10 Performance Data

After the issue regarding the GT exhaust parameter is clarified and decided by NPGCL, we will provide the same as soon as possible after the due calculation. Details please refer to our letter No. DEC-S/NP-NESPAK/15-490 dated July 4, 2015 which is attached for your reference.

11 Construction scheme

Basically, all the construction works will be based on approved design drawings. And specially, the new construction scheme will pay more concern on the protection of existing buildings & other facilities to avoid any damage on present Power Plant operation. So that,

- 1) During excavation works, it should take special measurement to support as-build buildings and to avoid any damage on the underground facilities.
- 2) For the erection works scheme, it should select the time which can cooperate with the operation schedule which is provide by the Employer in advance.
- 3) For the pipeline cross the spillway, piling as abutment will be constructed with closure or half-closure method. During the construction period, the spillway discharge should be controlled as minimum quantity, which require the Employer's cooperation & managing.
- 4) Scheme for other erection works will be same to the erection of present completed Power Plant.

12 Schedule of conversion work

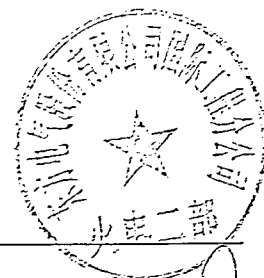
See the attachment.

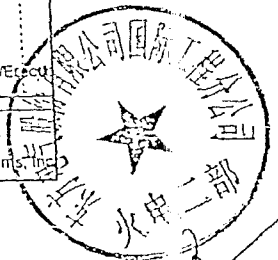
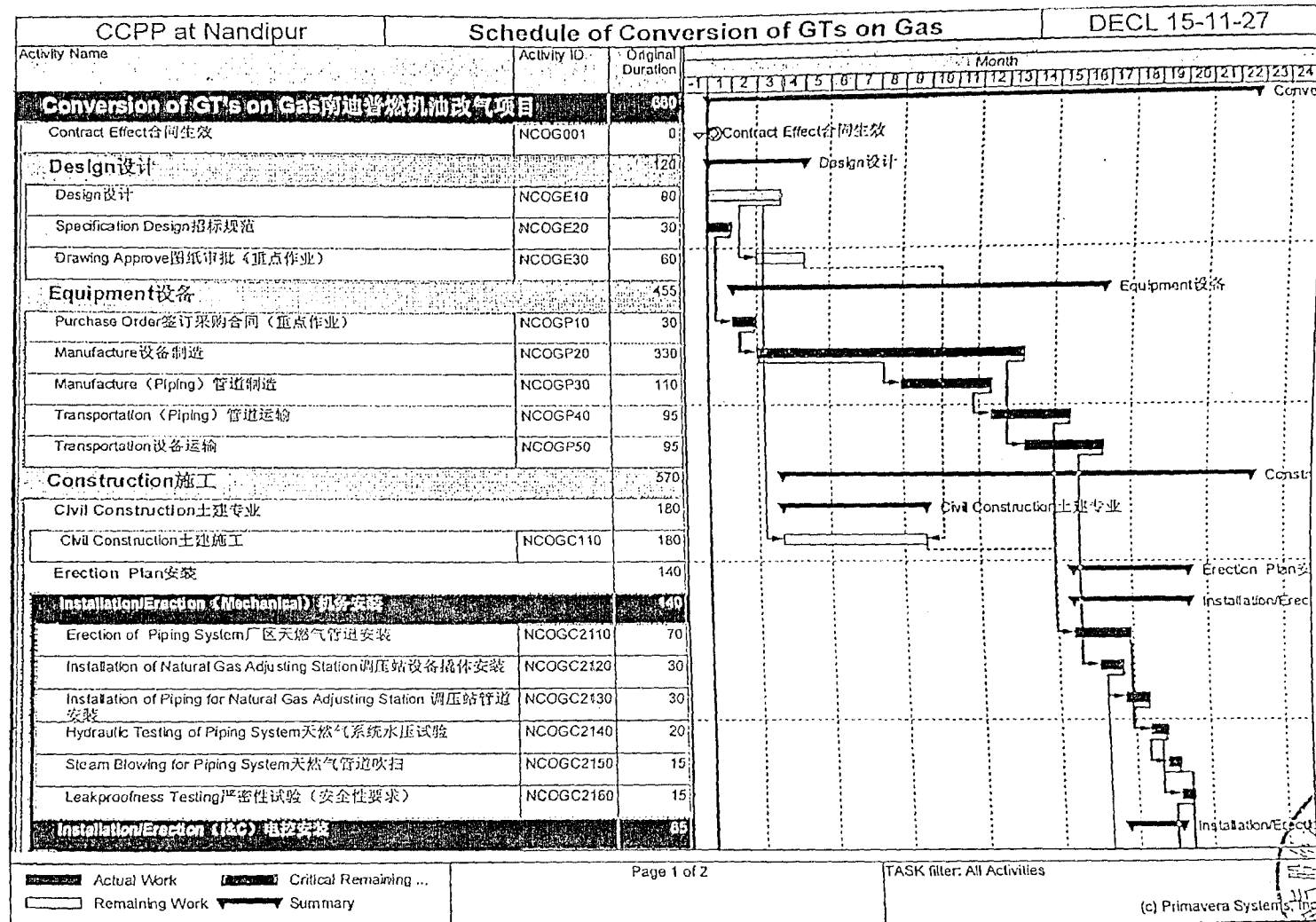
13 Drawings

Attached please find 4 drawings as follows:

Sr. No	Drawing No.	Drawing title
1	60-F6181E1C-02	GAS COMPRESSOR STATION AND PIPING ARRANGEMENT IN PLANT LAYOUT
2	60-F6181E1C-03	GENERAL ARRANGEMENT OF GAS TURBINE AND HRSG
3	60-F6181E1C-04	GENERAL ARRANGEMENT OF NATURAL GAS

		COMPRESSOR STATION
4	60-F6181E1C-05	NATURAL GAS COMPRESSOR STATION P&ID

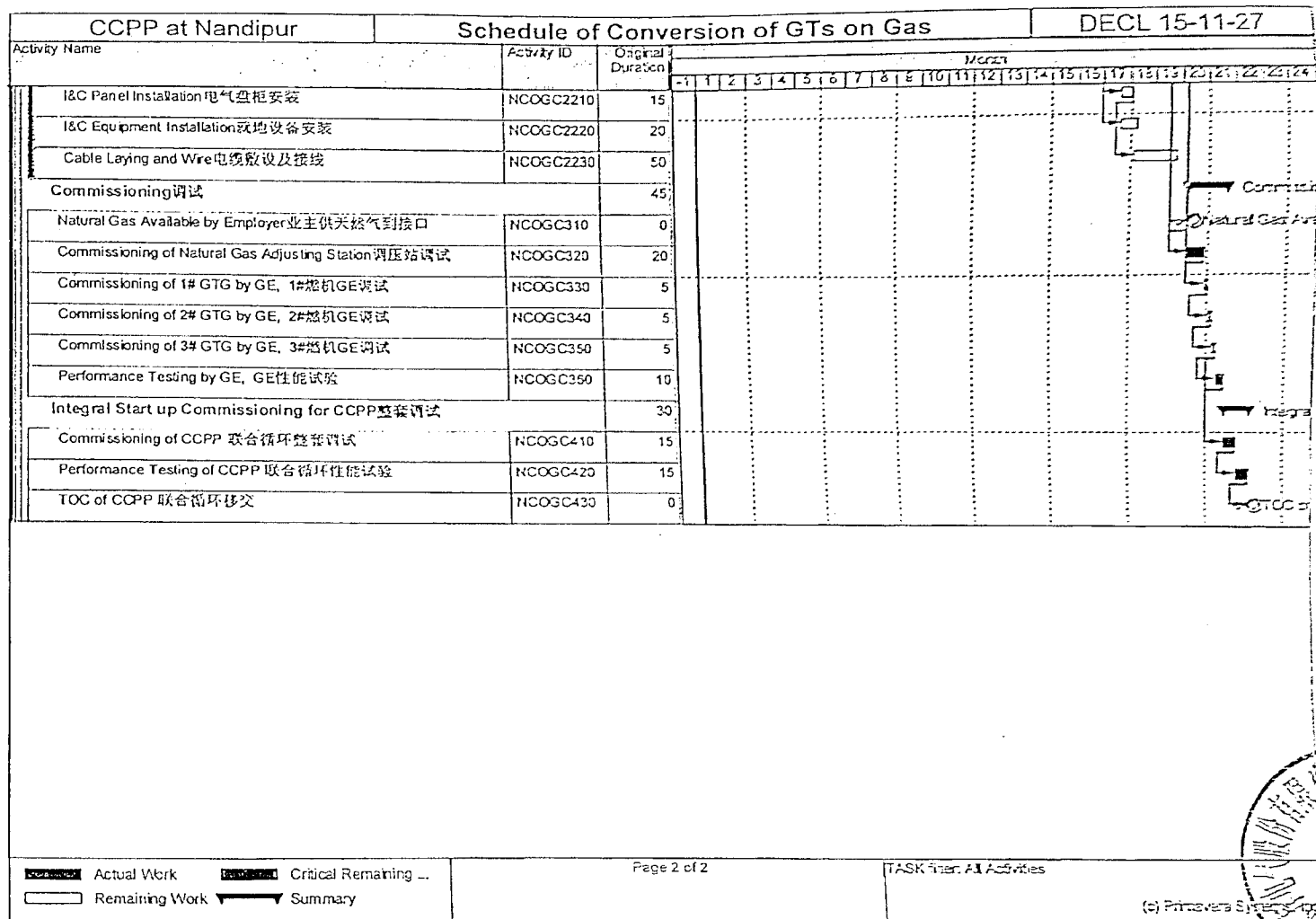


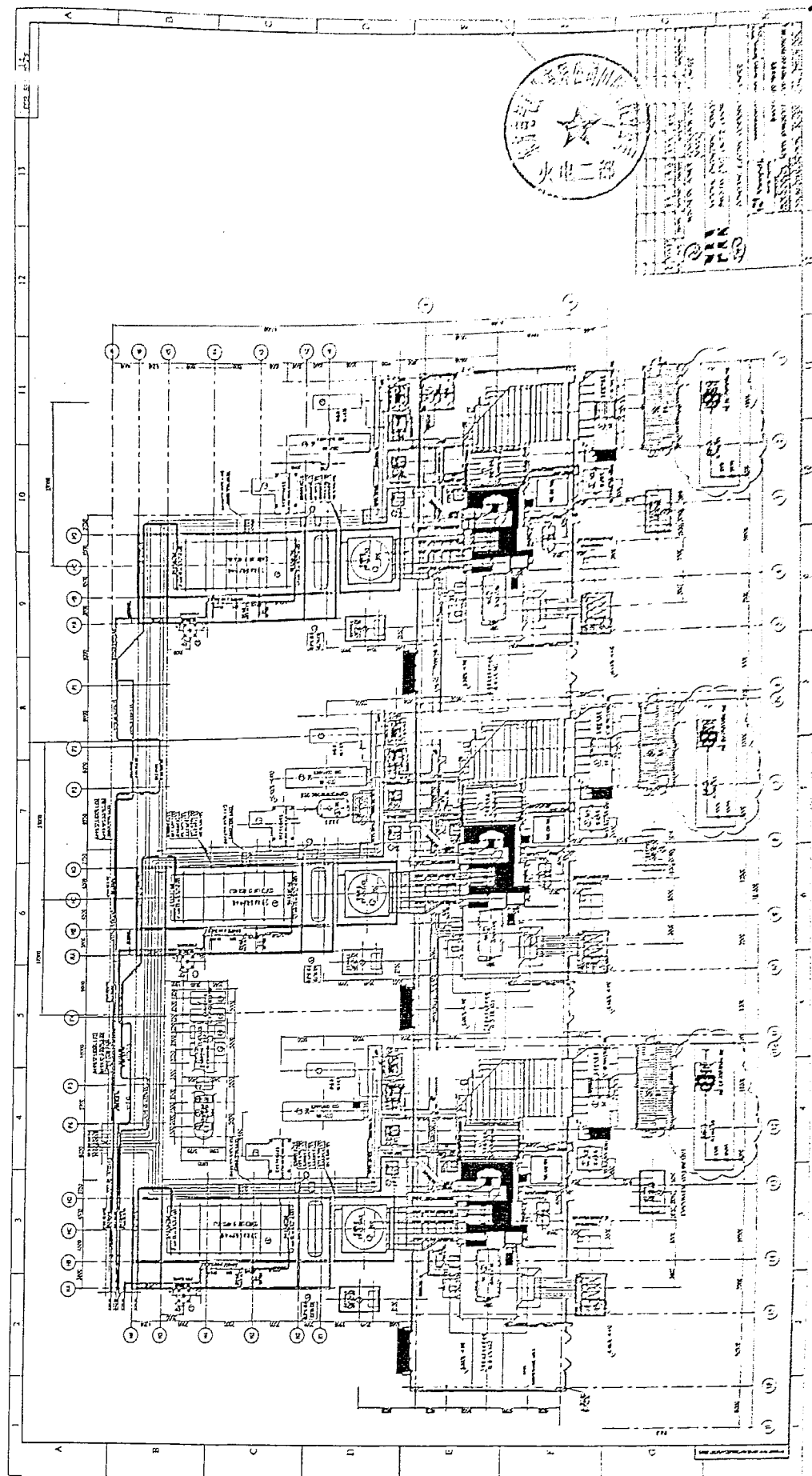


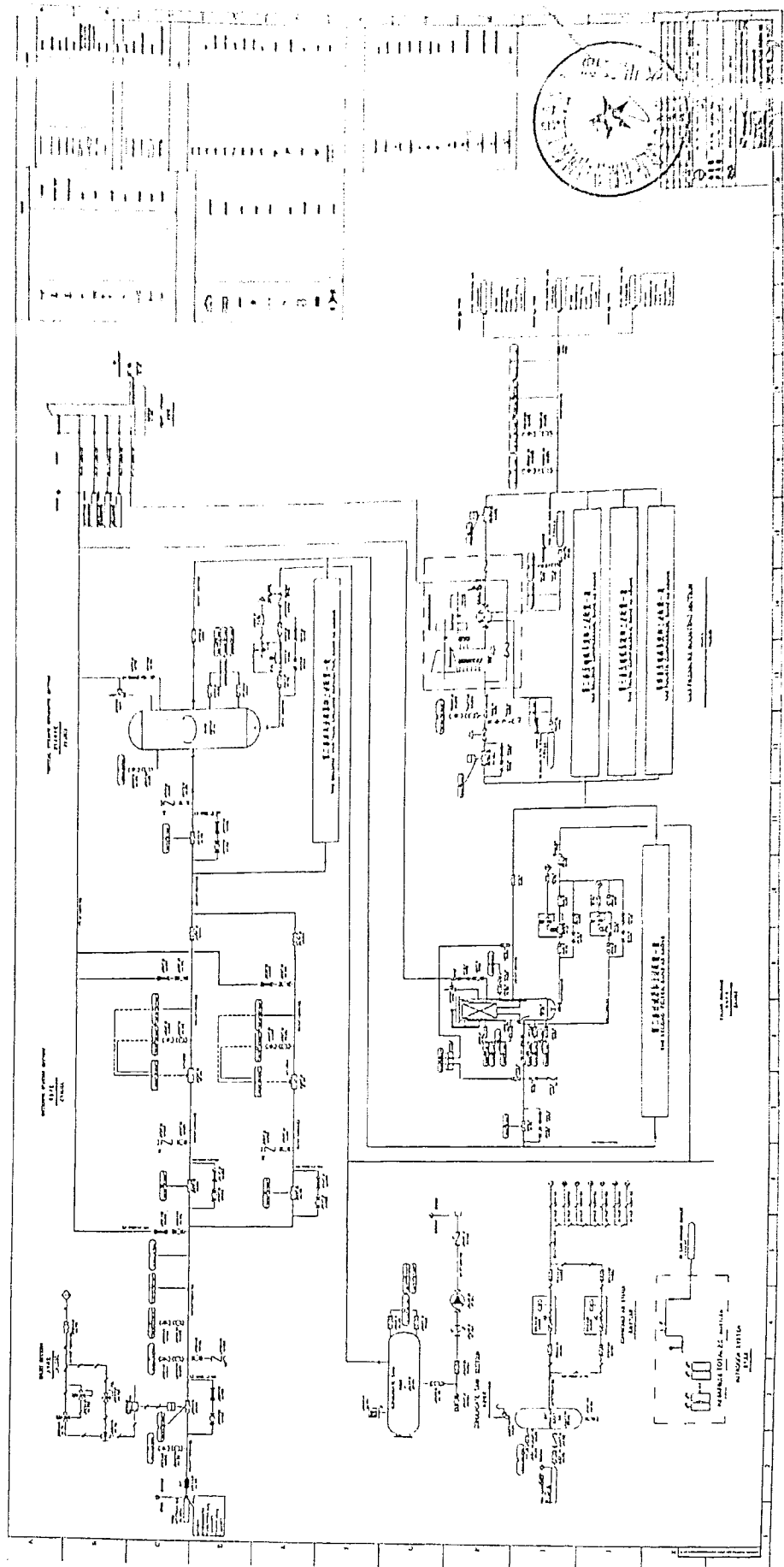
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Date: October 13th, 2016

Alternative Commercial Proposal for Nandipur Gas Conversion Project

To: 425 MW CCGP Nandipur,
District Gujranwala
Attn.: Chief Engineer/ Project Director
Tel: +92-55-3400526,
Fax: +92-55-3493761,
E-mail: mairueme@gmail.com

Dear Sir,

We Dongfang Electric Corporation Limited ("DEC") are very pleased to submit an alternative commercial proposal to NPGCL ("Employer") for gas conversion works on turnkey basis for your reference.

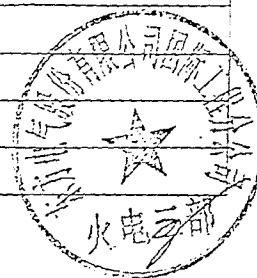
1. Price Offer

The price offer of gas conversion from HFO for 425MW combined cycle power plant Nandipur is as follows:

US\$ 24,995,200.00 (In words: US Dollars Twenty four million and nine hundred ninety five thousand two hundred only)

Break-Down Price List for Nandipur Gas Conversion Project.

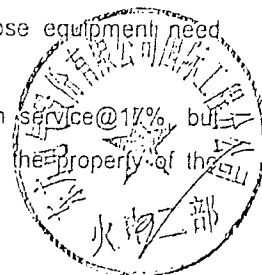
Sl. No.	Description	Price (USD)	Price (PKR)
A	Supply of Gas Conversion Equipment		
1	Equipment and materials on FOB Chinese port basis	19,783,900.00	
1.1	MAN Booster and accessories on FOB Singapore port basis	11,568,100.00	
1.2	Regulation station and accessories including the bypass system	6,633,100.00	
1.3	Pipe and other materials	1,582,700.00	
2	Shipping including insurance	69,900.00	
3	CIF Pakistan seaport	19,853,800.00	
4	Local transport	34,800.00	
B	Services		
5	Civil	934,200.00	



5.1	Bored pile works for pipe across spillway	160,888.00	
5.2	Foundation and architectural	847,485.00	
5.3	Steel Structure installation	125,827.00	
6	Erection	862,800.00	
6.1	Booster and accessories	215,700.00	
6.2	Regulation station and accessories	302,100.00	
6.3	Bypass system	90,300.00	
6.4	Pipe and other materials	254,700.00	
7	Commissioning and performance test including instrument calibration	1,602,800.00	
7.1	Commissioning	798,850.00	
7.2	PT	822,950.00	
7.3	Instrument calibration	120,000.00	
	Sub-total	3,399,800.00	
C	Withholding tax	1,499,712.00	
D	Sales tax on services	207,088.00	
	Total Price	24,995,200.00	

Notes:

- The above price is based on the scope of work described in Alternative Technical Proposal of Gas Conversion Work. Throughout the Works National standard of China (GB), which is equivalent to the latest relevant recommendation of international standard, will be adopted for the project.
- The price includes the at-the-site training price for 10 persons for 5 working day period.
- The price includes the cost of commissioning and test for natural gas regulating station as well as the entire power plant.
- The price includes the cost of inspection on existing equipment, but excludes the cost of repairing/replacing/modification to existing equipment in the power plant such as HRSG, steam turbine, generator and others in case those equipment need modifying or repairing or replacing.
- The price includes withholding tax @ 6% and sales tax on service @ 1%, but excludes customs duty for goods and materials that become the property of the Employer.



- The price excludes the cost of GE's works and supplies (equipment, materials, installation works, commissioning works, training, performance and reliability test, etc.).
- The price excludes GE technical advisory charge, if such service is required during commissioning and test.
- The price excludes cost of recommended spares and consumables. Four-year recommended spare part list with price is attached for your reference/review.
- Employer shall provide free of charge water, power for construction of the work, office and residence for Contractor's personnel at site.
- This offer will remain valid for Ninety (90) days after October 14, 2016.

2. Project Dates

Effective Date is signing date of the Contract. NTP Date is the date on which NPGCL will issue a written Notice-To-Precede (NTP) to Contractor so that Contractor can start the Works. The NTP date is Commencement Date of the construction schedule. Warranty Period or Defects Liability Period is 12 months for newly supplied natural gas regulating station only after the COD date.

3. Time of Completion

24 months starting from commencement of the Contract (NTP) to completion of the Reliability Test Run on natural gas regulating station.

4. Terms of Payment

All payments (except Advance payment) to DEC shall be made through Letter of Credit (L/C).

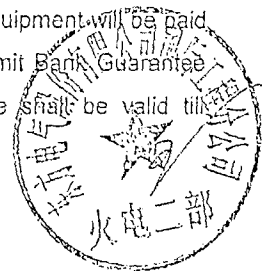
Twenty percent (20%) of the Total Contract Price shall be paid as interest free advance, through Telegraphic Transfer (T/L) within thirty (30) days after signing of Contract Agreement against advance payment bank guarantee.

4.1 Equipment portion:

Seventy percent (70%) of the equipment portion price of each consignment of imported material and equipment will be paid against shipping documents.

Ten percent (10%) of the equipment portion price of material and equipment will be paid after issuance of Taking-Over Certificate, while Contractor will submit Bank Guarantee for five percent of the equipment portion price. Bank Guarantee shall be valid till the Issuance of Defects Liability Certificate.

4.2 Local transport portion:



Eighty percent (80%) of the Local transport Value (Local Transport including Inland insurance for Local Goods) within 30 days after the equipment arrives at the Site, against monthly invoices for actual progress of work for the respective month accompanied by the statement of work duly verified by the Engineer and the Employer.

4.3 Services portion:

Seventy percent (70%) of the services portion price will be paid against bi-weekly invoicing for actual progress of work for the respective period.

Ten percent (10%) of the service portion price will be paid after issuance of Taking-Over Certificate.

5. Terms and Conditions

The contract structure, terms and conditions may be discussed during the contract discussion and shall be mutually agreed.

6. Performance Data

1) Gas turbine generator at 30°C ambient temperature

Operating point	Fuel	Gross Output at GTG Terminal (KW)	Gross Heat Rate at GTG Terminal (Kj/kwh)	Net Output at GTG Terminal (KW)	Net Heat Rate at GTG Terminal (Kj/kwh)
100%	NG				

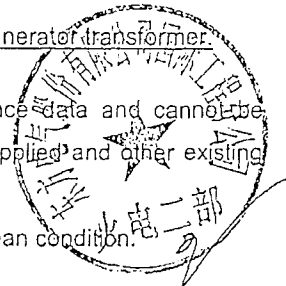
2) Expected entire power plant performance

Sr. No.	Ambient Temperature (°C)	Gross Output (KW)	Gross Heat Rate (Kj/kwh)	Net Output (KW)	Net Heat Rate (Kj/kwh)
1	-1	587,752	7303		
2	30	514,844	7174		
3	47.6	451,846	7464		

Net output is defined as output measured at high voltage side of generator transformer.

Notes: The above data are based on GT estimated performance data and cannot be guaranteed because only natural gas regulating station will be supplied and other existing equipment in the power plant is not modified/repared/replaced.

The above data are based on assumption that equipment is in a clean condition.



3) Guaranteed natural gas regulating station performance

Steady-state: Supply pressure at FG1 at any operating point within the gas turbine capability is regulated within +/- 1% of point, with a peak-to-peak period of not less than 8 seconds (0.25% per second average rate of change).

Transient: During transients maximum supply pressure excursions do not exceed either a 1% per second ramp or a 5% step. The 1% per second ramp limit is applicable over the range of minimum required pressure to maximum operating pressure. The 5% step limit is applicable over the range of minimum required pressure to 95% of maximum operating pressure and with no more than one 5% step change in 5 seconds. These transient limits apply during brief periods associated with pressure control mode transfers such as transfer between gas fuel pressure regulating valves, gas compressor changeovers or gas supply source changeovers, or rapid fuel demand transients such as gas turbine load rejections or trips.

Note: The natural gas regulating station is designed and performance is guaranteed on the basis of natural gas specification provided by NPGCL:

(1) Natural gas pressure range is between 20.7 and 30bar.

(2) Wobbe index:

The natural gas composition and temperature shall be maintained such that the Modified Wobbe Index (MWI) doesn't exceed +/- 5 percent of the NG design value during startup. While in steady state operation, composition and temperature must be maintained such that MWI doesn't exceed +/- 5 percent of its design value. The allowable rate of change for MWI is 0.3%/Sec and temperature rise will not exceed 1°C/s.

7. Major vendors

No.	Equipment	Supplier	Shipment Port
1	Gas regulating station	Dalian Energas Gas System Co. Ltd. or Shanghai Fiorentini Gas Equipment Co. Ltd.	Dalian China or, Shanghai China
2	Booster	MAN	Singapore

8. Others

In case the installation work completes but natural gas is not available leading to delay in commissioning, the Employer shall take responsibility to protect and secure the equipment and the power plant against any deterioration, loss and damages during which

some equipment and materials may be damaged. The Employer shall be responsible for the replacement.

Employer shall be responsible for operating the power plant and providing fuels and consumables free of charge during commissioning and tests.

Commissioning and tests on gas turbines and entire power plant after installing natural gas regulating station shall be done during the same period.

Employer shall provide necessary safety and security measures to the project and shall be responsible for providing its own sufficient stationed security guards and get enough local police on duty through coordination with the local government for the sake of Contractor's personnel and plant equipment storage at the site and transportation beyond the boundary wall of site and camp.

Contractor shall only warrant the gas conversion work supplied by the Contractor instead of existing entire power plant and GE supplies from the NTP until the earlier of: (i) twelve (12) months after Taking Over of the gas conversion work, or (ii) twenty eight (28) months after delivery date of the gas regulating equipment.

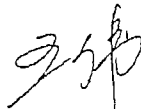
Total number of staff (Engineers and others) to be engaged for erection will be about 70.

We are confident that our offer is very competitive and of interest to you and we hope the contract can be signed soon so the work can be commenced as early as possible.

Should you have any questions, please do not hesitate to contact us.

Yours faithfully,

Signed



Name and Title

Wang Wei

Deputy General Manager of Thermal Power
Division II

For

Dongfang Electric Corporation Limited

Address

No. 333, Shuhan Road, Chengdu 610036, China

Fax Number

+86-28-87583040

Date

October 13, 2016

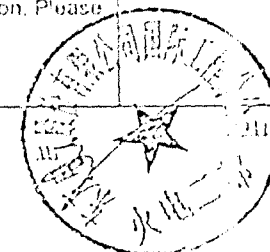
Enclosure: Clarification/deviation Schedule (3 Pages)

Four-year recommended spare part list (1 page)



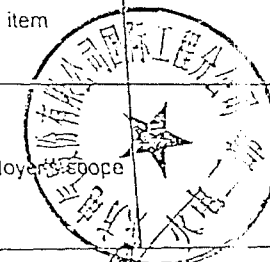
Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
Commercial Part					
1	INSTRUCTIONS TO BIDDERS IB12.1	ITB-5	For Goods and Services which the Bidder will supply from within Pakistan and abroad, the prices shall be quoted in the Pak. Rupees including all relevant taxes / duties on supply / services i.e. total price for the complete Works.	Payments under this Agreement shall be made by the Employer in US dollar.	
	AGREEMENT 14.7.2 Mode of payments for EPC Price	55	All payments under this Agreement shall be made by the Employer in local currency(Pak Rupee).		
2	AGREEMENT 1.1 Scope of Bid	8	"Punch list Completion Period for the Works" means the three (3) months period starting from the date on which the Taking-Over Certificate for the Works/Services Issued	"Punch list Completion Period for the Works" means the one (1) year period starting from the date on which the Taking-Over Certificate for the Works/Services issued	
3	AGREEMENT 14.2 Advance Payment	20	Upon receipt by the Employer of the Advance Payment Security and the Performance Security and issuance of the Notice to Proceed by the Employer, the Contractor shall raise invoice for: fifteen percent (15%) of the EPC Price. The Employer shall within seven (7) Business Days of receipt of such invoices remit the Advance Payment to the Contractor.	For the Advance Payment percentage, there are two different description. Please clarify.	
	Schedule-IX schedule of prices		Advance Payment - 10%		



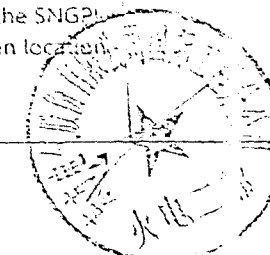
Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
4	AGREEMENT 5.5 Training	30	The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements. If this Agreement specifies training which is to be carried out before taking-over, the Works shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 (Taking Over of the Works and Sections) until this training has been completed.	The at-the-site training for 10 persons for 5 working day period will be carried out.	
5	AGREEMENT 8.2 Time for Completion	38	The Contractor shall complete whole of the Works, and each phase/Section of the Works within the Time for Completion by February 15, 2017.	The Works shall be completed within 16 months from NTP.	
6	AGREEMENT 10.1 Taking Over of the Works and Sections	46	The Employer shall issue the Taking over Certificate when: i. The applicable criteria, as set out in the Employer's requirements fulfilled; ii. All the works, required to be completed, are completed	ii. All the works, required to be completed, are completed except in minor respects that do not affect their use for the purpose	
7	AGREEMENT 19.1 Definition of Force Majeure	69	(b) any Change in Law	Delete this item	
8	Scope of Supply	3 of 29	Dismantling, Transportation, Engineering and Installation of these three (3) Compressors at Nandipur Power plant along with complete allied facilities for the successful operation of Compressors at desired specification / requirement and total quality control shall be part of EPCC contractor's scope.	Shall be in Employer's scope	



Clarification/Deviation Schedule On Nandipur Gas Conversion Project

S.No.	Clause No.	Page	Reference/Subject	Clarification sought/ Modification of clause	Remark
Technical Part					
1	Schedule-I 3 PROJECT SCOPE	5 of 29	There is no definite time for gas supply	Please specify the gas supply time	
2	Schedule-I 3 PROJECT SCOPE	5 of 29	The SNGPL will only provide their 24" pipeline up to Nandipur plant battery limit. The project scope includes to install piping/pipeline from SNGPL battery limit up to inlet of compression facility and from compression facility discharge up to Individual Fuel Gas Conditioning skids of GT alongwith supply/installation of all valves, fittings, instruments, control system etc. A compressor facility by-pass (with double block & bleed arrangement) shall also be provided.	The Employer shall be responsible for compressor and its facility.	
3	Schedule-I 4.14 ODES AND STANDARDS	13 of 29	The engineering design work will be carried out for this project in accordance with following applicable project specifications and international codes and standards. • API, ASME, NFPA, ASCE, ACI, AISC, UBC • IEC, NEC, BSI and IEEE • Client Technical Specifications & Philosophies • Any other Applicable codes and standards.	Chinese standards shall be adopted	
4	Schedule-I 5.4 Civil & Structures Scope	26 of 29	Following basis are considered while preparing proposal development related to civil and structure scope of work. • Construction of new Boundary wall related to SNGPL metering station installation is considered as length of 100 m similar to existing wall. • Demolition of existing boundary wall related to SNGPL metering station installation is considered as length of 100 m.	Please specify the SNGPL metering station location	



2/2

FOUR YEAR RECOMMENDED SPARE PARTS

Item	Name	Size	Unit	Q.TY	Origin	Manufacturer
1	O-RINGS	ø 10	M	50	CHINA	ENERGAS
2	FILTER ELEMENT	DuoToV 90/736	SET	10	GERMANY	VOTECH
3	GASKET	14"-300#	PIECE	8	CHINA	ENERGAS
4	GASKET	8"-300#	PIECE	16	CHINA	ENERGAS
5	GASKET	2"-150#	PIECE	10	CHINA	ENERGAS
6	GASKET	1"-300#	PIECE	30	CHINA	ENERGAS
7	PI	1/2"	PIECE	2	CHINA	SAITU
8	TI	3/4"	PIECE	2	CHINA	TIANKANG
9	INSTRUMENT VALVE	1/2"	PIECE	2	CHINA	JPE
10	BALL VALVE	1/2"	PIECE	2	CHINA	JPE
11	BOLTS AND NUTS	ALL TYPE MODELS OF 20%			CHINA	ENERGAS
12	COMPRESSORS PARTS					
12.1	LUBE OIL FILTER ELEMENT	TAP-OFE-0424	PIECE	96	SINGAPORE	TECHNICAL ASIA
12.2	SEAL GAS FILTER ELEMENT, (BOX OF 4)	TAP-OFEE-6G10	PIECE	12	SINGAPORE	TECHNICAL ASIA
12.3	NITROGEN GAS FILTER ELEMENT, (BOX OF 4)	TAP-N2EE-6G10	PIECE	12	SINGAPORE	TECHNICAL ASIA
12.4	LUBE OIL FILTER GASKET	TAP-LOF-GSKT	PIECE	48	SINGAPORE	TECHNICAL ASIA
12.5	OIL COOLER GASKET	TAP-OC-GSKT	PIECE	48	SINGAPORE	TECHNICAL ASIA
12.6	DISCHARGE COOLER GASKET	TAP-DC-GSKT	PIECE	48	SINGAPORE	TECHNICAL ASIA
	TOTAL PRICE (USD)					631,490

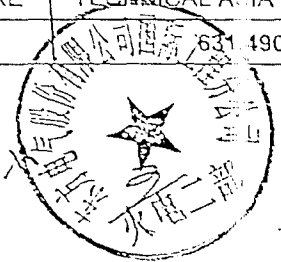
TOTAL PRICE IS SIX HUNDRED THIRTY ONE THOUSAND FOUR HUNDRED NINETY US DOLLARS.

21/11/16

14/10/2016

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14-10-16



To: 425/525 MW CCGT Nandipur, District Gujranwala
Attn: Chief Engineer/ Project Director
Tel: +92-55-3400526.
Fax: +92-55-3493761.
E-mail: mainrueme@gmail.com

COPY

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**Gas Conversion Work
For
425MW Combined Cycle Power Plant
Nandipur**

Reference No.: HD-Nandipur -Gas - 01

Date Of Opening Of Bid: 14th of October 2016
Warning: Not To Open Before 14th of October 2016

14/10/16

14/10/2016

14-10-16



东方电气股份有限公司

DONGFANG ELECTRIC CORPORATION LIMITED

Dongfang Electric Corporation Limited

333, Shuhan Avenue, Chengdu, Sichuan, P.R. China

14/10/2016

2.11
14.10.16.

Capital Cost Components	Assessed Capex		Revised Capex		Incr / (Decr)	
	USD Mln	PKR Mln	USD Mln	PKR Mln	USD Mln	PKR Mln
EPC Cost	319.57	27,933.16	319.57	27,933.16	-	-
Spare parts(ISP+BOP)	17.15	1,798.61	17.15	1,798.61	-	-
Duties and Taxes- EPC+S.parts)	25.61	2,365.32	25.61	2,365.32	-	-
Land and Building	6.35	654.19	6.35	654.19	-	-
Fuel for Testing	7.89	812.65	7.89	812.65	-	-
Power Dispersal	-	-	-	-	-	-
Admin cost	3.45	354.90	3.45	354.90	-	-
Employer's Engineer	4.58	471.40	4.58	471.40	-	-
O&M Mobilization	4.56	470.05	4.56	470.05	-	-
Plant Gas Conversion-GE	15.42	1,588.26	15.42	1,588.26	-	-
Gas Connection/Conversion AGJV	4.87	501.61	19.12	1,969.80	14.25	1,468.19
Gas Connection- CPGCL	-	-	12.06	1,242.05	12.06	1,242.05
Gas Connection- SNGPL	27.27	2,808.69	27.27	2,808.69	-	-
IDC & Financing Cost	89.60	7,983.32	89.60	7,983.32	-	-
Total	526.32	47,742.15	552.63	50,452.39	26.31	2,710.25

Working of Revised Capital Financing

Particulars		Assessed		Revised Proposed	
		USD Mln	PKR Mln	USD Mln	PKR Mln
Capital Cost		526.32	47,742.15	552.63	50,452.39
USD conversion rate (PKR)			103.00		103.00
Debt Financing Ratio			70%		70%
Equity Financing			30%		30%
Cost of Debt			10.024%		10.024%
Return on Equity			10%		10%
WACC			10.017%		10.017%
Debt Repayment period	Yrs		15		15
		<u>RFO/HSD</u>	<u>Gas/RLNG</u>	<u>RFO/HSD</u>	<u>Gas/RLNG</u>
Annual NEO	GWh	3,603.40	3,946.60	3,603.40	3,946.60
		<u>Debt</u>	<u>Equity</u>	<u>Debt</u>	<u>Equity</u>
Yearly Charge	Mln.Rs	4,399.81	1,868.38	4,649.58	1,963.78
Yearly Charge	Rs/kWh	1.1148	0.4734	1.1781	0.4976

EPC Stage Reference Tariff

Plant Operation on RFO/HSD

	Reference Tariff		Revised Reference Tariff	
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
Dependable Capacity (MW)	411.351	411.351	411.351	411.351
NEO at 100% capacity(GWh)	3,603.4	3,603.4	3,603.4	3,603.4
Capacity Charge Reference Tariff	Rs/kW/hr	Rs/kW/hr	Rs/kW/hr	Rs/kW/hr
Fixed O&M- Foreign	0.1273	0.1273	0.1503	0.1503
Fixed O&M- Local	0.0898	0.0898	0.1469	0.1469
Cost of working capital	0.1213	0.1213	0.1213	0.1213
Cost of Insurance	0.1219	0.1219	0.1219	0.1219
Debt servicing	1.2210	-	1.2903	-
Return on Equity	0.5185	0.5185	0.5450	0.5450
Total	2.1998	0.9788	2.3757	1.0854

	Reference Tariff		Revised Reference Tariff	
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
CPP Cost Components	Mln.Rs	Mln.Rs	Mln.Rs	Mln.Rs
Fixed O&M- Foreign	458.7	458.7	541.6	541.6
Fixed O&M- Local	323.6	323.6	529.3	529.3
Cost of working capital	437.1	437.1	437.1	437.1
Cost of Insurance	439.3	439.3	439.3	439.3
Debt servicing	4,399.8	-	4,649.6	-
Return on Equity	1,868.4	1,868.4	1,963.8	1,963.8
Total	7,926.8	3,527.0	8,560.6	3,911.1

Plant Operation on Gas/RLNG

	Reference Tariff		Revised Reference Tariff	
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
Dependable Capacity (MW)	450.4777	450.4777	450.4777	450.4777
NEO at 100% capacity(GWh)	3,946.6	3,946.6	3,946.6	3,946.6
Capacity Charge Reference Tariff	Rs/kW/hr	Rs/kW/hr	Rs/kW/hr	Rs/kW/hr
Fixed O&M- Foreign	0.1276	0.1276	0.1276	0.1276
Fixed O&M- Local	0.1369	0.1369	0.1369	0.1369
Cost of working capital	0.1213	0.1213	0.1213	0.1213
Cost of Insurance	0.1219	0.1219	0.1219	0.1219
Debt servicing	1.1148	-	1.1781	-
Return on Equity	0.4734	0.4734	0.4976	0.4976
Total	2.0960	0.9811	2.1834	1.0053

	Reference Tariff		Revised Reference Tariff	
	Year 1-15	Year 16-30	Year 1-15	Year 16-30
CPP Cost Components	Mln.Rs	Mln.Rs	Mln.Rs	Mln.Rs
Fixed O&M- Foreign	503.6	503.6	503.6	503.6
Fixed O&M- Local	540.3	540.3	540.3	540.3
Cost of working capital	478.7	478.7	478.7	478.7
Cost of Insurance	481.1	481.1	481.1	481.1
Debt servicing	4,399.8	-	4,649.6	-
Return on Equity	1,868.4	1,868.4	1,963.8	1,963.8
Total	8,271.9	3,872.1	8,617.1	3,967.5

Northern Power Generation Company Limited
425/525 MW CCPP Nandipur

Fuels	Reference Tariff			Modified Reference Tariff		
	RFO	Gas/RLNG	HSD	RFO	Gas/RLNG	HSD
Efficiency (%)	45.00	49.00	45.00	45.00	49.00	45.00
Heat Rates C. Cycle (Kj/kW/hr)	8,000	7,347	8,000	8,000	7,347	8,000
Heat Rates Simple Cycle (Kj/kW/hr)		-			10,736	
Heat Rates C. Cycle (BTU/kW/hr)	7,582	6,963	7,582	7,582	6,963	7,582
Heat Rates Simple Cycle (BTU/kW/hr)		-			10,175	
Fuel Cost Component C.Cycle (Rs/kW/hr)	7.9009	7.3803	-	7.9009	7.3803	12.8153
Fuel Cost Component S.Cycle (Rs/kW/hr)		-			10.7848	
Fuel Calorific Values (BTU/UOM)	38,557.80	1,000	36,019.00	38,557.80	1,000.00	36,019.00
HHV/ LHV factor	1.0500	1.107553	1.0500	1.0500	1.1076	1.0500
Fuel Prices (HHV) Rs/UOM	38,265.00	956.97	57.98	38,265.00	956.97	57.98
UOM	M.T	MMBTU	Ltr	M.T	MMBTU	Ltr

COD on RFO/HSD:	23.07.2015
Conversion date/COD on Gas	05.05.2017
Intermittent	05.05.2017 to 15.10.2018

HSD Purchase rate(1-15 Dec 2015)	Ltrs	Rs/Ltr	PKR
EX, Depot rate	40,000	57.59	2,303,600
Delivery charges		0.39	15,584
HSD Purchase rate incl delivery charges		57.98	2,319,184

Simple Cycle Heat rate (LHV)

	Pre	Post
GT-1 (kj/kWh)	11,236	10,736
GT-2 (kj/kWh)	11,086	10,768
GT-3 (kj/kWh)	11,035	10,703
Average Heat rate (kj/kWh)	11,119	10,736
BTU		3,412
kj		3,600
Coverion factor	kj/Btu	0.9478
Average Heat rate	BTU/kWh	10,175

Simple Cycle FCC Tariff on Gas/RLNG	Ref.Tariff	Revised.Tariff
Fuel Cost Component C.Cycle (Rs/kW/hr)	7.3803	7.3803
Fuel Cost Component S.Cycle (Rs/kW/hr)	-	10.7848

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Northern Power Generation Company Limited
425/525 MW CCPP Nandipur
HEPSEC (The Operator)

O&M Contract Price

	Local	Foreign		Total
	Rs. Mln	\$.Mln	Rs. Mln	Rs. Mln
Fixed	2,568.39	49.24	5,071.72	7,640.11
Variable	174.00	71.92	7,407.76	7,581.76
Fuel additive -variable	-	4.69	483.07	483.07
Total variable	174.00	76.61	7,890.83	8,064.83
Total	2,742.39	125.85	12,962.55	15,704.94
Mobalization	-	4.50	463.50	463.50
G.Total	2,742.39	130.35	13,426.05	16,168.44
Reference \$ exchange rate	103			

Reference Generation

GWh

RFO 2,263.41

Gas 31,764.87

Total 34,028.28

	Fixed O&M Gas		Fixed O&M RFO/HSD		Variable O&M		
	Rs.Mln	Rs/kW/h	Rs.Mln	Rs/kW/h	Rs.Mln	Rs/kWh-Gas	Rs/kWh-RFO/HSD
Local	2,321.26	0.0653	247.13	0.0686	174.00	0.0051	0.0051
Foreign	4,530.20	0.1275	541.50	0.1503	7,407.49	0.2177	0.2177
Foreign-fuel additive	-	-	-	-	483.34	-	0.2163
Sub total contract cost	6,851.46	0.1928	788.63	0.2189	8,064.83	0.2228	0.4391
Local NPGCL Overhead	282.00	0.0714	282.00	0.0783	-	-	-
Total	7,133.46	0.2642	1,070.63	0.2972	8,064.83	0.2228	0.4391
Local- total		0.1367		0.1469		0.4156	
Foreign-Total							0.4340

Note: The differnec between the foreign vaiable O&M between gas & RFO is fuel additive cost of \$ 0.0021/kWh @ Rs 103/USD (total USD 4.693 Mln).

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