National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No. NEPRA/R/LAG-77/38670 – 76 October 8, 2021

Chief Executive Officer
Foundation Power Company (Daharki) Ltd. (FPCDL)
1st Floor, Block No. 2,
Fauji Tower, 68 Tipu Road,
Chaklala, Rawalpindi.

Subject: **Modification in Generation Licence No. IGSPL/06/2007**
Licence Application No. LAG-77
Foundation Power Company (Daharki) Ltd. (FPCDL)

Reference: FPCDL's LPM submitted vide letter No. FP/F&A(Accounts)/357/25/NEPRA dated 14.07.2020.

It is intimated that the Authority has approved Modification in Generation Licence No. IGSPL/06/2007 dated February 22, 2007 in respect of Foundation Power Company (Daharki) Limited (FPCDL) pursuant to Section 26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with Regulation 10(11)(a) of the NEPRA Licensing (Application and Modification Procedure) Regulation 1999.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification of FPCDL alongwith Modification-I in the Generation Licence No. IGSPL/06/2007, approved by the Authority.

Enclosure: As Above

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(Syed Safeer Hussain)

Copy to:

1. Secretary, Power Division, Ministry of Energy, 'A' Block, Pak Secretariat, Islamabad
2. Managing Director, Private Power & Infrastructure Board (PPIB), Ground & 2nd Floors, Emigration Tower, Plot No. 10, Mauve Area, Sector G-8/1, Islamabad
3. Managing Director, NTDC, 414 WAPDA House, Lahore
4. Chief Executive Officer, Central Power Purchasing Agency Guarantee Limited (CPPA-G) Shaheen Plaza, 73-West, Fazl-e-Haq Road, Islamabad
5. Chief Executive Officer, K-Electric Limited (KEL), KE House, Punjab Chowrangi, 39 – B, Sunset Boulevard, Phase-II, Defence Housing Authority, Karachi.
6. Director General, Sindh Environmental Protection Agency, Govt. of Sindh, Plot No. ST-2/1, Sector 23, Korangi Industrial Area, Karachi.

National Electric Power Regulatory Authority
(NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification in the Generation of Foundation Company Power Deharki Limited

Oct

~~September~~ 8, 2021
Case No. LAG-77

(A). Background

(i). The Authority in terms of Section-14B (previously Section-15) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act") granted a Generation Licence (No. IGSPL/06/2007 dated February 22, 2007) to Foundation Power Company Deharki Limited (FPCDL) for its 179.05 MW indigenous low BTU gas based generation facility/combined cycle thermal power plant.

(ii). According to the above Generation Licence, the generation facility/thermal power plant was proposed to be consisted of 1x114 MW gas turbine 1x64.15 MW steam turbine. The generation facility is located at approximately 8.0 KM from Deharki city on Dad Laghari Road, Deharki, in the province of Sindh. The Generation Licence was granted for a term of 25 years from the tentative Commercial Operation Date (COD) of the project (i.e. May 20, 2009).

(B). Communication of Modification

(i). FPCDL in accordance with Regulation-10(2) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the "Licensing Regulations"), communicated a Licensee Proposed Modification (LPM) in its existing Generation Licence on July 16, 2020.

(ii). In the text of the proposed modification, FPCDL has proposed to incorporate certain changes in its Generation Licence including (a). change of expiry date of the Generation Licence from May 19, 2034 to May 15, 2036; (b). incorporation of time required to synchronize to grid; (c) incorporation of ramping rate; and (d). change in capacity at site conditions.

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(iii). Regarding grid synchronization time of the plant, and ramping rate, FPCDL submitted/requested to incorporate the following in the Generation Licence:

Length of Shutdown (in Hours)	**Hot Start < 8**	**Warm Start 8 to 48**	**Cold Start >48**
Time required for SSGC to supply treated gas	120	480	480
Time required to synchronize to Grid for Gas Turbine (in Minutes)	60	60	60
Time required to synchronize to Grid for Steam Turbine (in Minutes)	145	200	230
Time required to synchronize to Grid for CC full load (in Minutes)	345	815	875
Ramping Rate (% MW/Min)	**Hot Start (MW/Min)**	**Warm Start (MW/Min)**	**Cold Start (MW/Min)**
Complex load range % age			
0≤ 46%	2.3%	2.6%	2.6%
>46%≤63%	0.87%	0.49%	0.34%
>63%≤100%	1.84%	1.26%	0.98%

(iv). Regarding capacity, FPCDL proposed following changes in the Generation Licence.

Description	**Existing**	**Proposed**
Installed Capacity (Gross ISO)	179.05 MW	195.17 MW
De-rated Capacity at Mean Site Conditions	177.54 MW	185.00 MW
Auxiliary Consumptions	6.054 MW	04.903 MW
Net Capacity	171.483 MW	180.097 MW

(v). In the statement of the reasons in support of the modification, FPCDL, inter alia, stated/submitted that:

(a). **Expiry of the Generation Licence:** The Authority granted the Generation Licence till May 19, 2034. The actual COD was however achieved on May 16, 2011. Based on the actual COD and expected life of 25 years, it is requested to amend the expiry date of Generation Licence to May 15, 2036.

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(b). **Grid Synchronization time:** FPCDL is a Low BTU gas fired combined cycle power Plant. Mari Petroleum Company Limited (MPCL) is supplying low BTU natural gas from its Mari Deep Reservoir. FPCDL constructed a 14.9 KM long pipeline having 20" diameter to transport the gas to operate the plant. The production & processing facilities of MPCL in Mari Field comprise of separation battery and a dehydration plant. Low BTU natural gas from nine (09) individual wells is produced according to its potential and transported to Mari Deep Central Processing Facilities (MDCPF), carried through different diameter gathering pipelines prior to its delivery to FPCDL. The supplied gas has high concentration of moisture and heavy hydrocarbons which are dangerous for the safe operations of the gas turbine. MPCL has to process the gas in separation battery and dehydration plant to remove these heavy hydrocarbons and moisture content before delivery to FPCDL. The Licensee/FPCDL is the only consumer of gas from the MDCPF of MPCL and has dedicated gas pipeline of 14.9 Km. Therefore, at each shut down of the power plant, MPCL also has to shut down its gas wells and dehydration plant. MPCL needs to follow standard/recommended gas wells/dehydration plant start-up sequences and requires enough time to achieve technical parameters of dehydration plant, keeping in view the plant and circulating solvent health integrity, to remove moisture and heavy hydrocarbons and to maintain gas pressure in 14.9 Km long line. The applicable timelines are mentioned in the Gas Supply Agreement (GSA). As per GSA, notice time required to Gas Supplier is given as 2 days for cold start-up and 4 hours for hot startup. However, based on the experience of last nine years of plant operations, the matter was again taken up with MPCL for revision of these notice times. MPCL clarified that it requires 8 hours (480 min) for cold/warm start-up and 2 hours (120 min) for hot startup. The Gas Supplier requires these timelines for obtaining its plant parameters and lineup of associated gathering network/connected wells. The constraints of these timelines are limited to achieve the solvent regeneration temperature gradually to the temperature i.e.

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390F from its cold state. According to the cooling curves of the Original Equipment Manufacturer- of the Steam Turbine OEM (i.e. Fuji Electric Company, Japan), the different modes of start-up with corresponding shut down period are: Hot Start (< 8 Hours), Warm Start (8 to 48 Hours) and Cold Start (>48 Hrs.). The grid synchronization time is based on the Complex start-up curves at different start-up modes, Complex shut-down curve and Complex/Generator load rates & holding times submitted by EPC Contractor (i.e. Doosan Heavy Industries & Construction Company, Korea). The total time required for synchronization also includes the time required by MPCL.

(c). **Ramping Rate:** The proposed ramping rates are based on the complex start-up curves at different start-up modes, Complex shut-down curve and Complex/Generator load rates & holding times provided by the OEM. The given ramping rates are the steady rates at which the gas turbine generator and the steam turbine generator loads can be raised after synchronizing with the NTDC grid.

(d). In the statement of reasons in support of the proposed changes in capacity, FPCDL submitted that all figures of plant capacity in the Generation Licence were indicative and the Net Capacity available to NTDC for dispatch and other purchasers will be determined through procedure contained in the Agreements or Grid Code. With respect to Power Purchase Agreement (PPA), Initial Tested Capacity Test under section 8.3 (i) of Article VIII was carried out under the observation of the "Engineer", KEMA International BV. Following the 6-hours ITC test, the Initial Tested Capacity was established at 180.097 MW. FPCDL has provided data/curves from OEM and Capacity Test Certificate in support of its statements.

(vi). About "statement of the impact on the tariff, quality of service and the performance by the Licensee of its obligations under the licence", FPCDL submitted that the tariff, quality of service and the performance of the Company of its obligation under the Generation Licence will not be affected by the proposed modification in the Generation Licence.

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(C). Processing of LPM

(i). After completion of all the required information as stipulated under the Regulation-10(2) and 10(3) of the Licensing Regulations by FPCDL, the Registrar published the communicated LPM on August 06, 2020, in one (01) English and one (01) Urdu newspaper to inform the general public, interested/affected parties, and different stakeholders about the said LPM as required under the Regulation-10(4) of the Licensing Regulations. The Registrar invited comments of the said stakeholders in favor or against the communicated LPM.

(ii). Apart from the above, separate letters were also sent to government ministries, their attached departments and representative organizations etc. on August 06, 2020. Through the said letters, the stakeholders were informed about the communicated LPM and publication of notice in the press. Further, the said entities were invited for submitting their views and comments in the matter for assisting the Authority.

(D). Comments of Stakeholders

(i). In response to the above, the Authority received comments from two (02) stakeholders including Central Power Purchasing Agency (Guarantee) Limited (CPPA-G) and Energy Department Govt. of Sindh. The salient points of the comments offered by the said stakeholders are summarized in the following paragraphs:

(a). CPPA-G in its submission commented on the issue of (a) Extension in Period of Generation Licence; (b). Time required to Synchronize to Grid; (c). Ramping Rate and (d). Change in capacity of the plant at mean site conditions. Regarding the proposed change in the term of licence/expiry date, CPPA-G submitted that the term of PPA is for 25 years and COD is achieved on dated May 16, 2011, therefore extension in Generation Licence is supported but subject to the condition that FPCDL will not claim Minimum Energy Shortfall (MES) payments in Energy invoices and Capacity payments even when plant is standby creating extra burden to the end-consumers. As FPCDL comes at 16th in merit order and the chances of FPCDL getting full despatch are diminishing. Therefore, the matter needs to be addressed. Regarding the proposed time required to synchronize

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to the grid, CPPA-G submitted that the time required to synchronize to the grid claimed by the petitioner carries financial implications. However, if company does not claim Capacity Payments during the extended time beyond what is already agreed in PPA then financial implication can be avoided. On the issue of loading the Complex to full load and Ramping Rate, CPPA-G commented that loading the Complex to full load and ramping rates have already been agreed and applied by the FPCDL for many years since COD and the same were incorporated in the PPA, so any further change in loading/ramping rate will not be supported. Regarding the change in capacity of the power plant at mean site conditions, CPPA-G informed that the Independent Engineer (IE) has determined the maximum Capacity of the Plant as 180.097 MW at mean site conditions and with output degradation factors as per PPA signed between FPCDL and CPPA-G. The same can be incorporated in Generation Licence.

(b). EDGoS in its comments submitted that the proposed modification in the Generation Licence of FPCDL may be supported as per government policy guidelines and NEPRA Licensing Rules, subject to the condition that the said modification will not be in contravention of NEPRA Licensing Rules and government policies in this regard. It should be ensured that there would be no adverse impact on the quality of service and tariff if modification in licence is allowed. The guideline of the environment protection agency should strictly be followed.

(ii). The Authority reviewed/examined the above comments of CPPA-G and EDGoS and considered it appropriate to seek perspective of the licensee/FPCDL on the same. In response to the observations/comment of the the stakeholders, the licensee/FPCDL submitted a detailed reply. The reply/perspective of the licensee/FPCDL has been summarized in the following paragraphs.

(iii). On the comments/observations of CPPA-G regarding change in term of licence, FPCDL submitted that the Generation Licence was issued by NEPRA for a term of 25 years from COD and FPCDL has requested to extend the expiry date from

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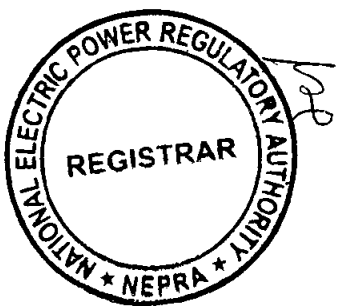
actual COD i.e. May 16, 2011 instead of originally anticipated COD of September 09, 2009 as commissioning got delayed by twenty (20) months, for which FPCDL has already paid US$ 13.21 million, on account of Liquidated Damages to the power purchaser. The comments/observations of CPPA-G regarding merit order of FPCDL Plant are not agreed. The Policy of Govt. for gas price fixation has an anomaly wherein low BTU gas is equated with high BTU gas. It has a profound bearing on non-utilization of indigenous resource of the Country because low BTU gas is otherwise a waste gas. The Govt. is already considering review of this anomaly. Further, CPPA-G/NTDC should revise the basis of Merit Order and it should be based on Govt's cost (other than taxes and levies) which in the case of FPCDL comes to 25% (approx.) of the current gas cost charged to FPCDL. This matter should be addressed as soon as possible. Regarding the grid synchronization time/values given in PPA, it was submitted by FPCDL that the same are "for reference only" and have to be submitted by the Company as provided by the OEM/EPC. These values were submitted to the Power Purchaser after the commissioning tests of the FPCDL Plant. With reference to financial implication on notice period, FPCDL submitted that there will be financial implications if Power Purchaser delays its demand requirement at any time, but our petition is to allow intimation time for upcoming demand without delaying its requirement. This intimation time is mainly required by the Gas Supplier (MPCL) as per GSA for the treatment of supplied gas following a standby period to sole consumer (FPCDL) from dedicated gas reservoir, to remove moisture and heavy hydrocarbons from low BTU Gas (being a low quality gas) and to maintain gas pressure in 14.9 Km long dedicated gas pipeline. Therefore, the proposed modification carries no financial implication if there is no delay in demand requirement of Power Purchaser.

(iv). On the observations of CPPA-G regarding ramping rate of the plant, FPCDL submitted that the understanding of CPPA-G is not correct. Full load and ramping up rates were never agreed between FPCDL & CPPA-G/NTDC. Further, Unit/Complex start-up, shut-down and ramping curves, supplied by EPC were submitted to the Power Purchaser soon after the commissioning tests of the FPCDL Plant in accordance with the PPA. The Company shall provide the Unit/Complex ramping curves for the loading of the machine at different load positions as well as for the start-ups and shut-downs of the Unit/Complex as supplied by the OEM/EPC. Thus, this aspect remained an unfinished agenda. Various meetings with the Power Purchaser were also held in Lahore and Islamabad since the COD but these values/curves could not be agreed and FPCDL had been facing dispatch failures and



forced outages on account of non-approval of these values/curves. In the last meeting of Operating Committee dated February 17, 2020 the Power Purchaser itself opined that these values could only be agreed if these are reflected in the Generation Licence, therefore it was decided by both the parties that the Company should pursue an LPM in its Generation Licence for the approval of these values.

(v). On the observations/comments of EDGoS, it was submitted by FPCDL that it has applied for modification in its Generation Licence as per the policy guidelines of the Government and rules/regulations of the Authority/NEPRA. It is ensured that the proposed modifications if approved, would have no adverse impact on the quality of service and tariff of the Licensee/FPCDL. It is further ensured that there is no violation of guidelines of environmental protection agency.

(E). Hearing of the Parties

(i). The Authority considered the matter in its regulatory meeting and after reviewing/examining the above reply of FPCDL to the observations of CPPA-G and EDGoS, observed that CPPA-G being the Power Purchaser has observations regarding the communicated LPM. In view of the said, the Authority considered it appropriate to give an opportunity of hearing to the parties (i.e. FPCDL and CPPA-G), for expressing their positions in the matter.

(ii). Accordingly, the Authority conducted a meeting/hearing of the parties on March 03, 2021. In the said meeting, FPCDL presented its case and re-iterated its position as mentioned at Para D(iii) & D(iv) above. In response, CPPA-G agreed to the clarification and explanation by FPCDL and did not raise any further observations. However, the Authority took serious notice of the delay (almost nine (09) years) in submission of the LPM application/incorporation of technical parameters in the Generation Licence and PPA and enquired about the same.

(iii). In response, the representative of FPCDL submitted that the required technical data was provided to the Power Purchaser in 2012, to incorporate the same in the PPA and then in the Generation Licence. However, even after series of meetings, the matter of incorporation of the said parameters in the PPA could not be resolved and lately in February 2020, the Power Purchaser/CPPA-G required FPCDL to first incorporate the said parameters in the Generation Licence. Accordingly,

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FPCDL submitted the LPM application.

(iv). In view of the above, the Authority directed CPPA-G/the Power Purchaser to confirm that FPCDL had provided the required data/information/documents soon after COD of the plant. In response, CPPA-G through its letter dated March 17, 2021, *inter alia*, confirmed that FPCDL had provided the data on August 16, 2012. In view of the said, the Authority considered it appropriate to proceed further with the LPM of FPCDL as stipulated in the relevant Regulations and the NEPRA Licensing (Generation) Rules 2000 (the "Generation Rules").

(F). Evaluation/Findings

(i). The Authority has examined the entire case in detail including the already granted Generation Licence of FPCDL, communicated LPM, comments of stakeholders, rejoinders from the Licensee and provisions of relevant rules & regulations.

(ii). In this regard, the Authority has observed that originally the Authority granted a Generation Licence (No. IGSPL/06/2007 dated February 22, 2007) to FPCDL for its 179.05 MW indigenous low BTU gas based generation facility/combined cycle thermal power plant located at approximately 8.0 KM from Deharki city on Dad Laghari Road, Deharki, in the province of Sindh.

(iii). The above mentioned Generation Licence was granted for a term of twenty five (25) years, after the anticipated COD of the power plant on May 20, 2009 (i.e. valid till May 19, 2034). Further, as per the Generation Licence, the ramping rate, grid synchronization time and loading the complex to full load were required to be provided by the Licensee/FPCDL, later on (when confirmed from OEM).

(iv). According to the communicated LPM under consideration, the Licensee/FPCDL intends to incorporate certain changes in its Generation Licence including (a). change of expiry date of the Generation Licence from May 19, 2034 to May 15, 2036 (b). incorporation of time required to synchronize to grid (min) and ramping rate (MW/min); and (c). change in capacity at site conditions.

(v). Regarding LPM in the Generation Licence, the Authority has observed that Regulation-10(2) of the Licensing Regulations stipulates that a licensee may, at

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any time during the term of a licence, communicate to the Authority an LPM setting out (a). the text of the proposed modification; (b). a statement of the reasons in support of the modification; and (c). a statement of the impact on the tariff, quality of service and the performance by the licensee of its obligations under the licence.

(vi). In this regard, it is relevant to mention that the Authority in terms of Section-26 of the NEPRA Act read with Regulation-10(5) of the Licensing Regulations is empowered to modify an existing licence of a licensee subject to and in accordance with such further changes as the Authority may deem fit if, in the opinion of the Authority such modification (a). does not adversely affect the performance by the licensee of its obligations; (b). does not cause the Authority to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). is or is likely to be beneficial to the consumers; (d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e). is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(vii). As explained above, the Authority granted a Generation Licence (No. IGSPL/06/2007 dated February 22, 2007) to FPCDL with a gross ISO installed capacity of 179.05 MW for a period of twenty five (25) years effective from tentative COD of the project (i.e. May 20, 2009) valid till May 19, 2034. However, the plant achieved COD on May 16, 2011, almost two years later from the anticipated COD. According to FPCDL, it has already paid LDs to the power purchaser due to the said delay in COD. In view of the actual COD of the project achieved on May 16, 2011, FPCDL has filed the LPM, *inter alia*, for extension/revision of expiry date of the Generation Licence from May 19, 2034 to May 15, 2036.

(viii). Regarding ramping rate and grid synchronization time of the Units/Complex, the Authority has observed that according to Para-6(v)&(vi) of schedule-I of the above mentioned Generation Licence, the said parameters are required to be provided later (i.e. the Licensee/FPCDL had to provide/confirm the parameters of ramping rate and time required to synchronize to grid after engineering design of the project). Further, regarding the said parameters, the PPA dated August 29, 2007 signed between FPCDL and the Power Purchaser, provided some reference numbers only which were required to be firmed once provided by the OEM.

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Accordingly, after completion/COD of the project, FPCDL took up the matter with the power purchaser for incorporation of the same in the PPA, however, the issue did not resolve. In view of the said, FPCDL has filed the current LPM, *inter alia*, to incorporate the grid synchronization time and ramping rate in the Generation Licence.

(ix). In this regard, through the communicated LPM, FPCDL has proposed to include the said parameters in the Generation Licence as provided by the OEM of the steam turbine (i.e. Fuji Electric Company, Japan) and the EPC Contractor (i.e. Doosan Heavy Industries & Construction Company, Korea). In support, FPCDL has also submitted the start-up and cooling curves and certificate provided by the above mentioned OEM and EPC Contractor.

(x). Based on final design and OEM data FPCDL has proposed the following grid synchronization time (Minutes) and ramping rate (MW/min):

Grid Synchronization Time (Minutes)			
Length of Shutdown (in Hours)	**Hot Start < 8**	**Warm Start 8 to 48**	**Cold Start >48**
Time required for MPCL to supply treated gas	120	480	480
Time required to synchronize to Grid for Gas Turbine (in Minutes)	60	60	60
Time required to synchronize to Grid for Steam Turbine (in Minutes)	145	200	230
Time required to synchronize to Grid for CC full load (in Minutes)	345	815	875
Ramping Rate (% MW/Min)			
Complex load range % age	**Hot Start (MW/Min)**	**Warm Start (MW/Min)**	**Cold Start (MW/Min)**
0≤ 46%	2.3%	2.6%	2.6%
>46%≤63%	0.87%	0.49%	0.34%
>63%≤100%	1.84%	1.26%	0.98%

(xi). In this regard it is clarified that the technical data provided by the applicants at the time of filing of Generation Licence applications are mostly tentative and according to the feasibility study of the project. The ramping rate and time required for synchronization are design parameters and fixed at the design stage. The same are expected to be refined/finalized at later stages of the project implementation,

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according to the OEM provided data/design. Accordingly, finalization of the said parameters is considered as subject matter of PPAs. However, the PPA signed between CPPA-G and FPCDL did not provide firm numbers rather only reference values of ramping rates and grid synchronization time were mentioned in the PPA which were again subject to change/update by the Company/FPCDL after final design of the plant equipment.

(xii). This issue has also been considered in the Generation Licences and accordingly a sub-article has been added in the Generation Licences. In this regard, in article 3.3 of the Generation Licence of FPCDL, the licensee has been directed to provide the final arrangement, technical and financial specification and other specific details pertaining to its generation facility before its COD. Accordingly, after finalization of design/COD of the project, FPCDL took up the matter with the Power Purchaser but issue was not resolved. In this regard, FPCDL has informed that at later stage, the Power Purchaser opined that these values could only be agreed if these are reflected in the Generation Licence. Accordingly, FPCDL has submitted this LPM to incorporate the said parameter in its Generation Licence.

(xiii). In this regard, the Authority has observed that previously in similar cases regarding ramping rate and grid synchronization time, the OEM provided data has prevailed and allowed to be incorporated in the generation licences and PPAs (e.g. Huaneng Shandong Rui, Port Qasim Electric and Engro Powergen Thar, etc.) In view of the said, the Authority considers that the same method/tool can be used as precedent in this case.

(xiv). Regarding the proposed ramping rate, the Authority has observed that there are total of nine (09) scenarios proposed (i.e. three (03) loading range of the complex and three (03) scenarios for each loading range based on hot, warm and cold start. Out of the said nine (09) scenarios, in six (06) scenarios the ramping rates proposed by FPCDL are much better than the indicative numbers of the PPA whereas, in the remaining three (03) scenarios the proposed rates are on the lower side as compared to the indicative rates. However, these numbers are actual and as per OEM therefore required to be incorporated in the Generation Licence of FPCDL. Further, FPCDL and the system operator have confirmed that the proposed ramping rate carry zero or negligible financial impact.

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(xv). Regarding the proposed grid synchronization time, the Authority has observed that apparently the same is on a higher side. In this regard, the Authority has noted that this is due to an issue of a unique nature in the case of FPCDL, as it is based on low BTU gas located near the gas fields of MPCL/Gas Supplier. FPCDL is the only consumer of MPCL and has a dedicated gas pipeline of 14.9 Km therefore at each shut down of the power plant, MPCL must also shut down its gas wells and dehydration plant. MPCL requires 8 hours (480 min) for cold/warm start-up and 2 hours (120 min) for hot startup to obtain its plant parameters and lineup of associated gathering network/connected wells. This unique situation of the plant requires the system operator to provide timely prior intimation/notice, if required.

(xvi). Regarding financial impact of the grid synchronization time due to utilization of diesel/HSD during stat up of the complex, FPCDL has submitted that it has no tariff provision in the PPA on HSD operation. Further, as per PPA, FPCDL cannot charge the startup charges for the first 23 startups (i.e. 10 Hot Starts, 10 Warm Starts and 3 Cold Starts) and there will be startup charges of maximum of 6,000 liters from startup # 24 and onwards. However, FPCDL never exceeded the limit of 23 free startups whereas HSD consumption for every type of startup remained 6000 liters on average. Further, the intimation time required by the Gas Supplier will not change the HSD consumption and time to achieve base load from synchronization in every type of startup.

(xvii). In this regard, the Authority has observed that the plant of FPCDL is a base load plant based on low BTU gas providing cheap electricity to the grid. It is placed higher in the economic merit order and faces very fewer shutdowns. It is also evident from the operational record that since commissioning of the plant on May 16, 2011, the grid synchronization of the plant has caused zero financial impact to the power purchaser/end consumers. Further, as per PPA, the plant has provision of free starts (23 free start-ups per year) and being operated as base load plant has never even exhausted its annual free start-ups therefore, it will not cause any financial implications for the consumers.

(xviii). Regarding change in capacity of the power plant, the Authority has observed that initially FPCDL envisaged to install a CCPP consisting of 1x114.9 MW gas turbine of G.E. and 1x64.15 MW steam turbine of Fuji, Japan making the total installed capacity of the plant 179.05 MW. However, later on capacity of the gas

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turbine and steam turbine were finalized/firmed up as 130.50 and 64. 67 respectively, making the total installed capacity of the plant 195.17 MW. In view of the said, FPCDL has proposed to incorporate the said changes/enhancement in the installed, de-rated and net capacities in its Generation Licence, as given below.

Description	Existing	Modified
Installed Capacity (Gross ISO)	179.05 MW	195.17 MW
De-rated Capacity (at Site Conditions)	177.54 MW	185.00 MW
Auxiliary Consumptions	6.054 MW	04.903 MW
Net Capacity	171.483 MW	180.097 MW

(xix). Regarding the existing capacities of the plant, the Authority has observed that according to Schedule-II of the Generation Licence, all these capacity related figures were indicative. The net capacity available to the purchaser had to be determined through procedure contained in the Agreements or Grid Code. Further, the proposed capacity have no adverse impact on the tariff as the tariff granted to FPCDL is already based on the net capacity actualized on COD. Therefore, the Authority considers that the final/firmed up capacity numbers are required to be incorporated in the Generation Licence.

(xx). Foregoing in view, the Authority considers that (a). the LPM will not have any adverse effect on the performance of the Licensee of its obligations;(b) the LPM has not caused the Authority to act or acquiesce in any act or omission of the licensee/FPCDL in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to the NEPRA Act; (c). the LPM will be beneficial to the consumers in general as compared to other fuels, cheaper energy that too based on an indigenous resource will be available to the Power Purchaser; (d). the LPM is reasonably necessary for the licensee/FPCDL to effectively and efficiently perform its obligations under the Licence; and (e). the LPM is necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the Licensee.

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(G). Approval of LPM

(i). In view of the above, the Authority is satisfied that the Licensee/FPCDL has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms of Section-26 of the NEPRA Act read with Regulation-10(11)(a) of the Licensing Regulations approves the communicated LPM in the Generation Licence of FPCDL without any changes to the extent of (a). change of expiry date of the Generation Licence from May 19, 2034 to May 15, 2036; (b). incorporation of time required to synchronize to grid; (c) incorporation of ramping rate; and (d). change in capacity at site conditions.

(ii). Accordingly, the Generation Licence (No. IGSPL/06/2007 dated February 22, 2007) granted to FPCDL is hereby modified. The changes made in the Generation Licence are attached as annexure to this determination. The approval of the LPM is subject to the provisions contained in the NEPRA Act, relevant rules framed there under, terms & conditions of the Generation Licence and other applicable documents.

Authority

Engr. Maqsood Anwar Khan
(Member)

Rehmatullah Baloch
(Member)

Rafique Ahmed Shaikh
(Member)

Tauseef H. Farooqi
(Chairman)

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National Electric Power Regulatory Authority (NEPRA)

Islamabad – Pakistan

GENERATION LICENCE

No. IGSPL/06/2007

In exercise of the Powers conferred under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the Generation Licence (No. IGSPL/06/2007 dated February 22, 2007) granted to Foundation Power Company (Daharki) Limited, to the extent of changes mentioned hereunder:

(a). Expiry date of the Generation Licence appearing on the **Face Sheet** has been changed from **May 19, 2034** to **May 15, 2036;**

(b). Changes made in **Schedule-I** of the Generation Licence are attached as **Revised/Modified Schedule-I**; and

(c). Changes made in **Schedule-II** of the Generation Licence are attached as **Revised/Modified Schedule-II**;

This **Modification-I** is given under my hand on this 8th **day** of ~~September~~ OCT **Two Thousand & Twenty One.**

08X21

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

SCHEDULE-I
(REVISED/MODIFIED)

The location, size (capacity in MW) technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the Generation Facilities of the Licensee.

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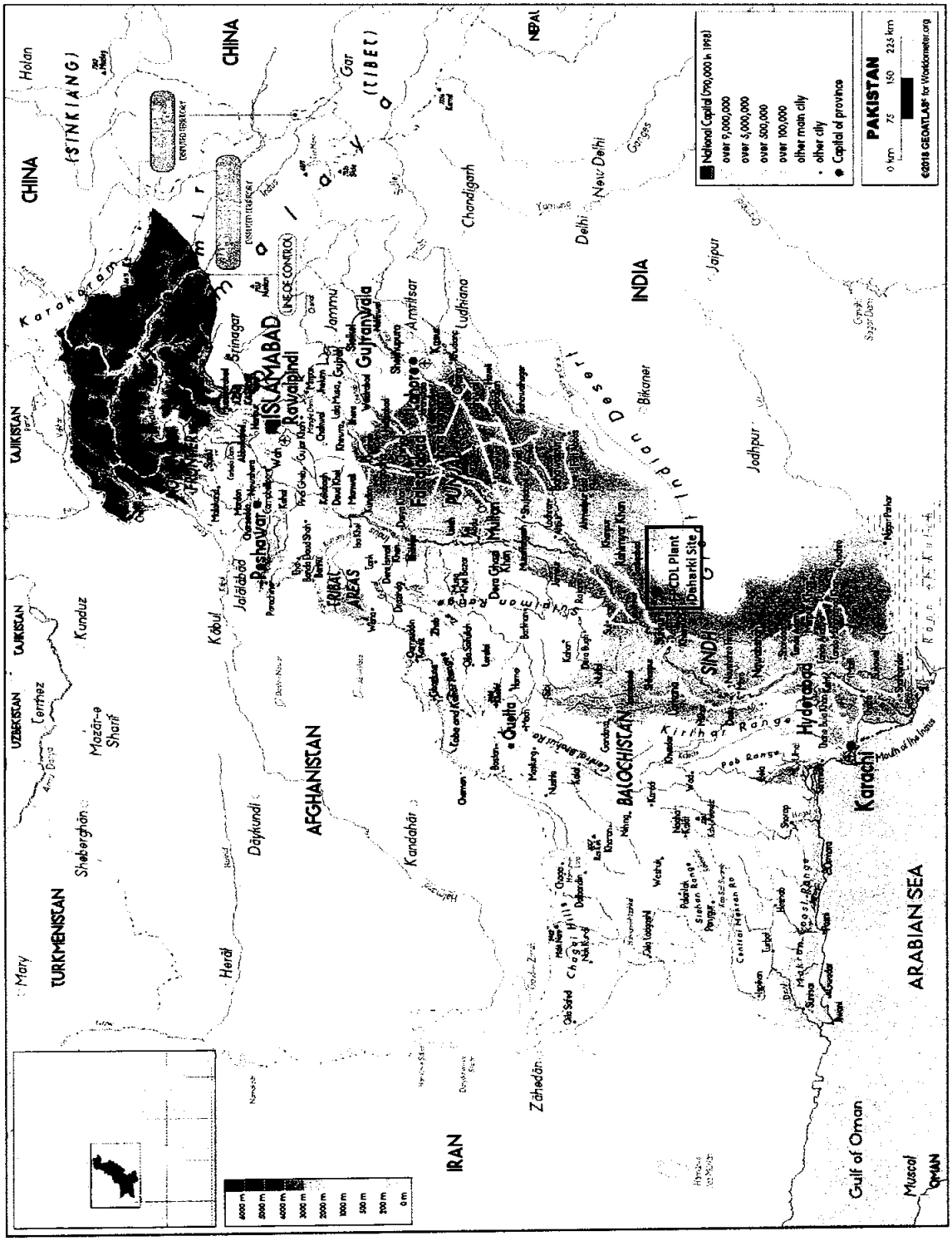
Location of the Generation Facility/Thermal Power Plant of the Licensee



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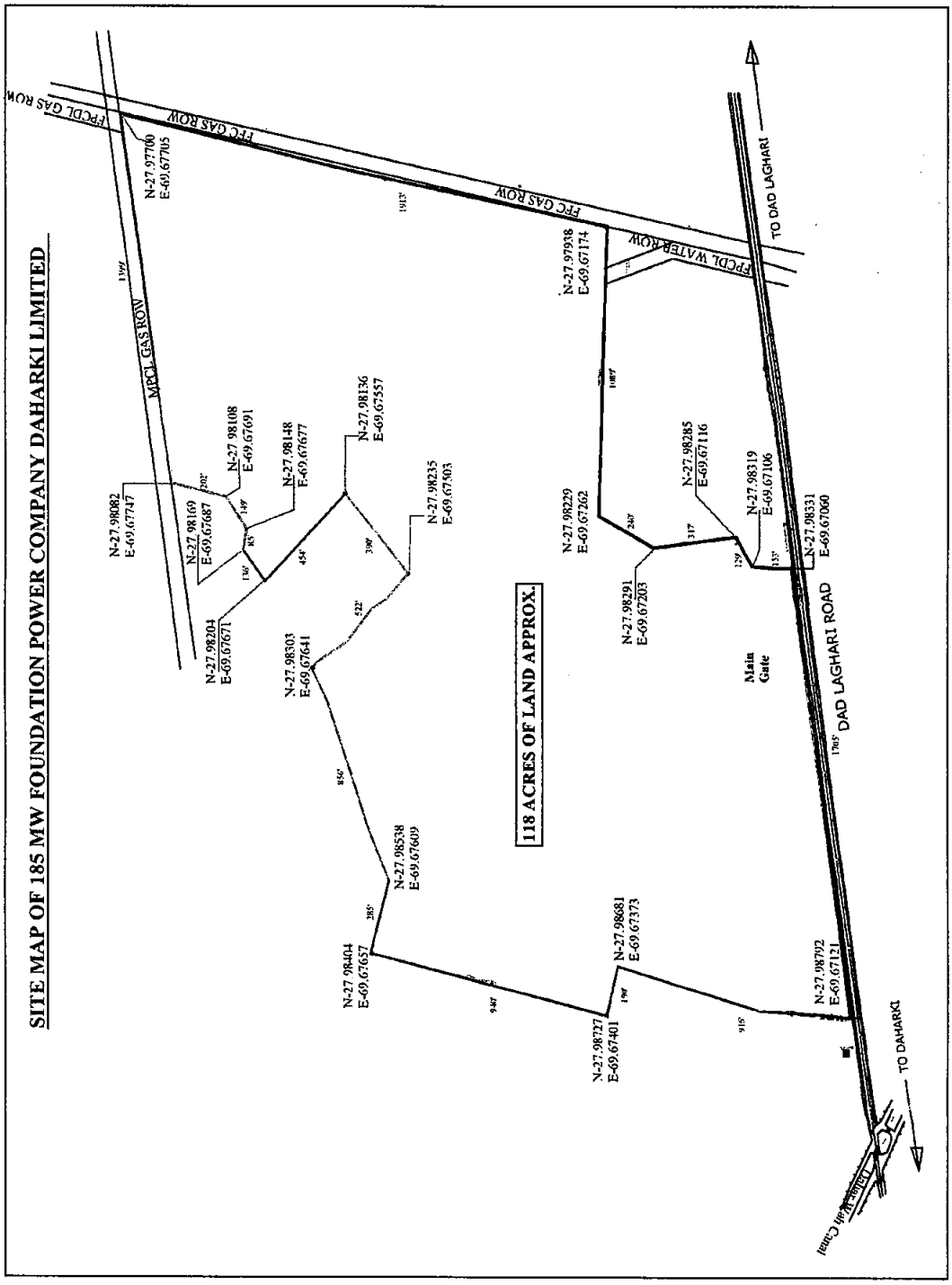
Location of the Generation Facility/Thermal Power Plant of the Licensee



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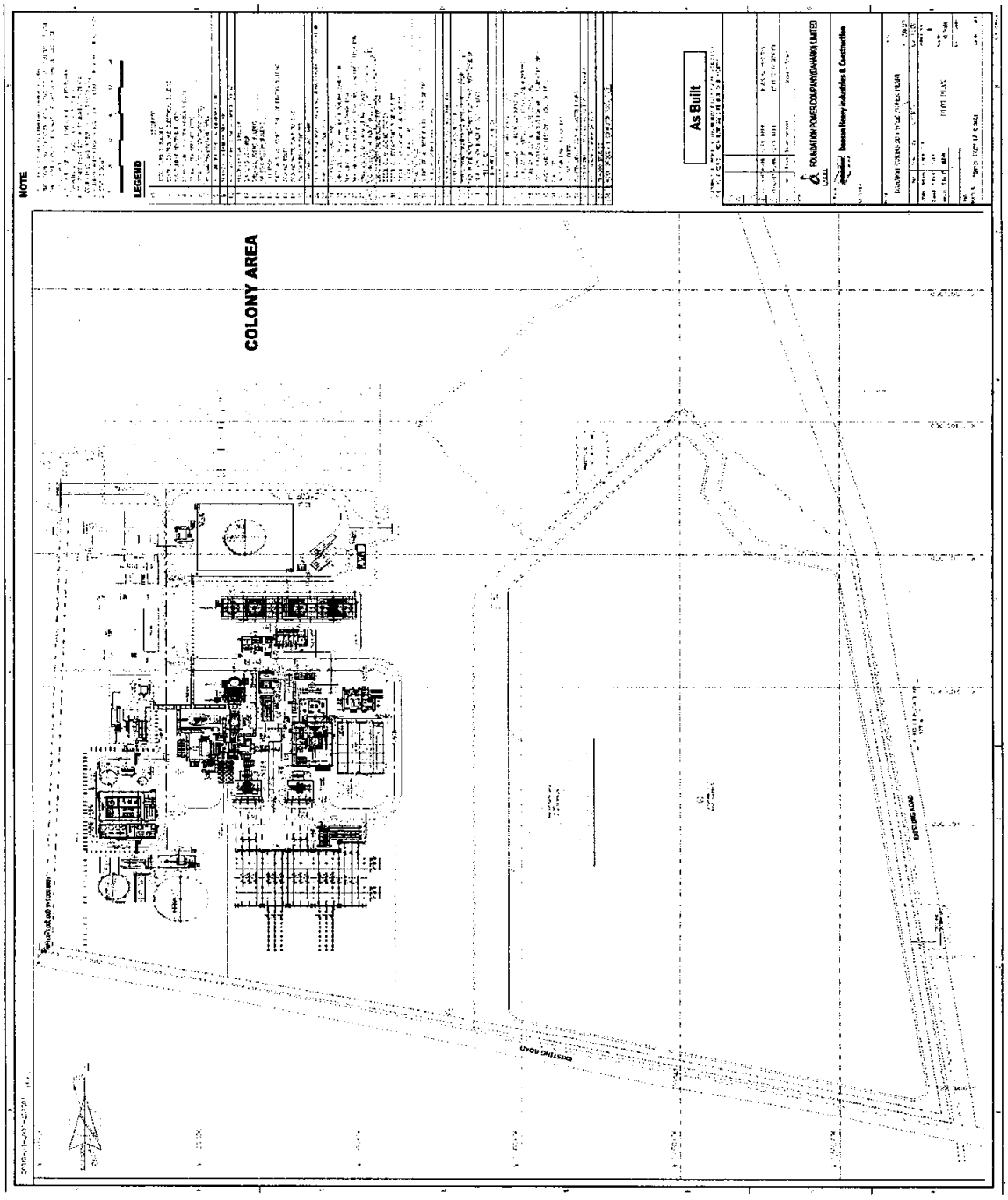
Layout of the Generation Facility/Thermal Power Plant of the Licensee



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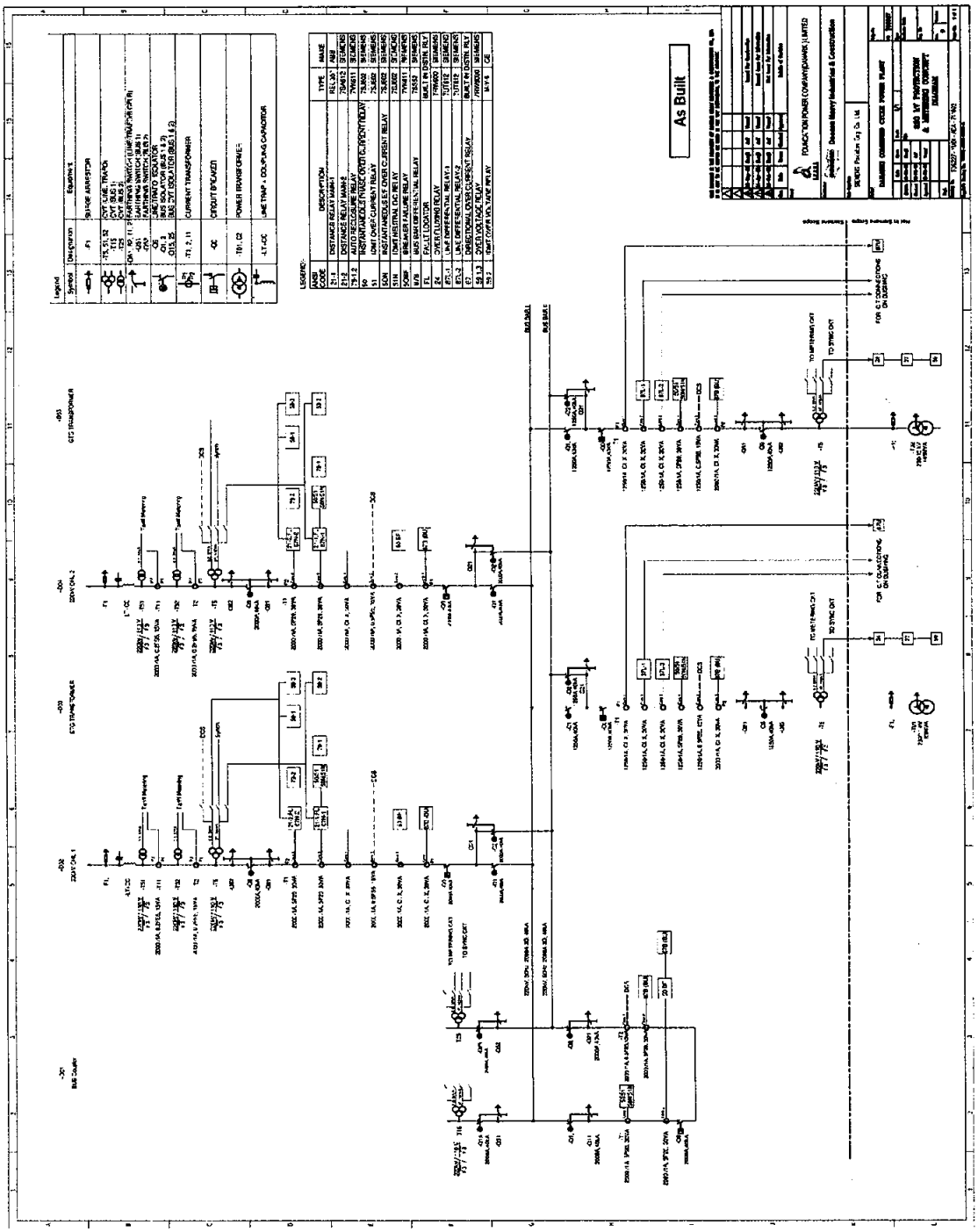
Single Line Diagram (Electrical) of the Generation Facility/Thermal Power Plant of the Licensee



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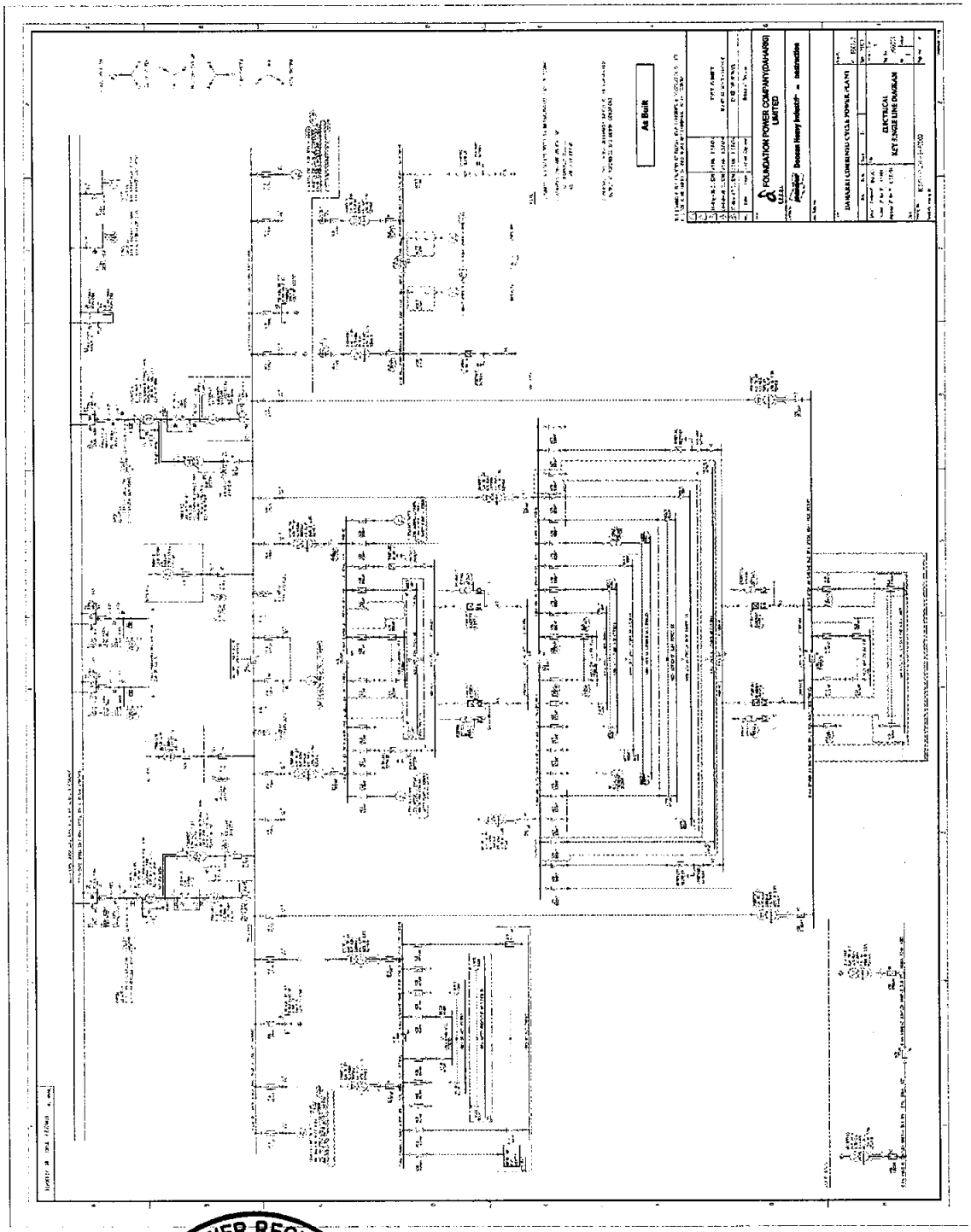
Single Line Diagram (Electrical) of the Generation Facility/Thermal Power Plant of the Licensee



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Interconnection arrangement for the Generation Facility/Thermal Power Plant of the Licensee

The power of the power plant is dispersed to the system directly within SEPCO and MEPCO load center at 220 KV voltage level as follows: -

1. A 220/132 KV Grid Station (Daharki temporary) with two 250 MVA and 160 MVA, 220/132 KV transformers, approximately 100m away from FPCDL power plant grid towards Engro Power Plant and Sadiqabad.

2. A 220 KV (Twin Bundled) Rail Conductor with an approximate length of 35 KM connecting Engro PowerGen Qadirpur with 220/132 KV Grid station (Daharki temporary).

3. A 220 KV (Twin Bundled) Rail Conductor with an approximate length of 35 KM connecting Engro PowerGen Qadirpur with Thermal Power Plant of M/S Foundation Power Company Daharki Ltd.

4. A 132KV D/C Rail Conductor from 220/132 KV Grid station (Daharki temporary) with an approximate length of 80 km connecting 132KV Sadiqabad grid station.

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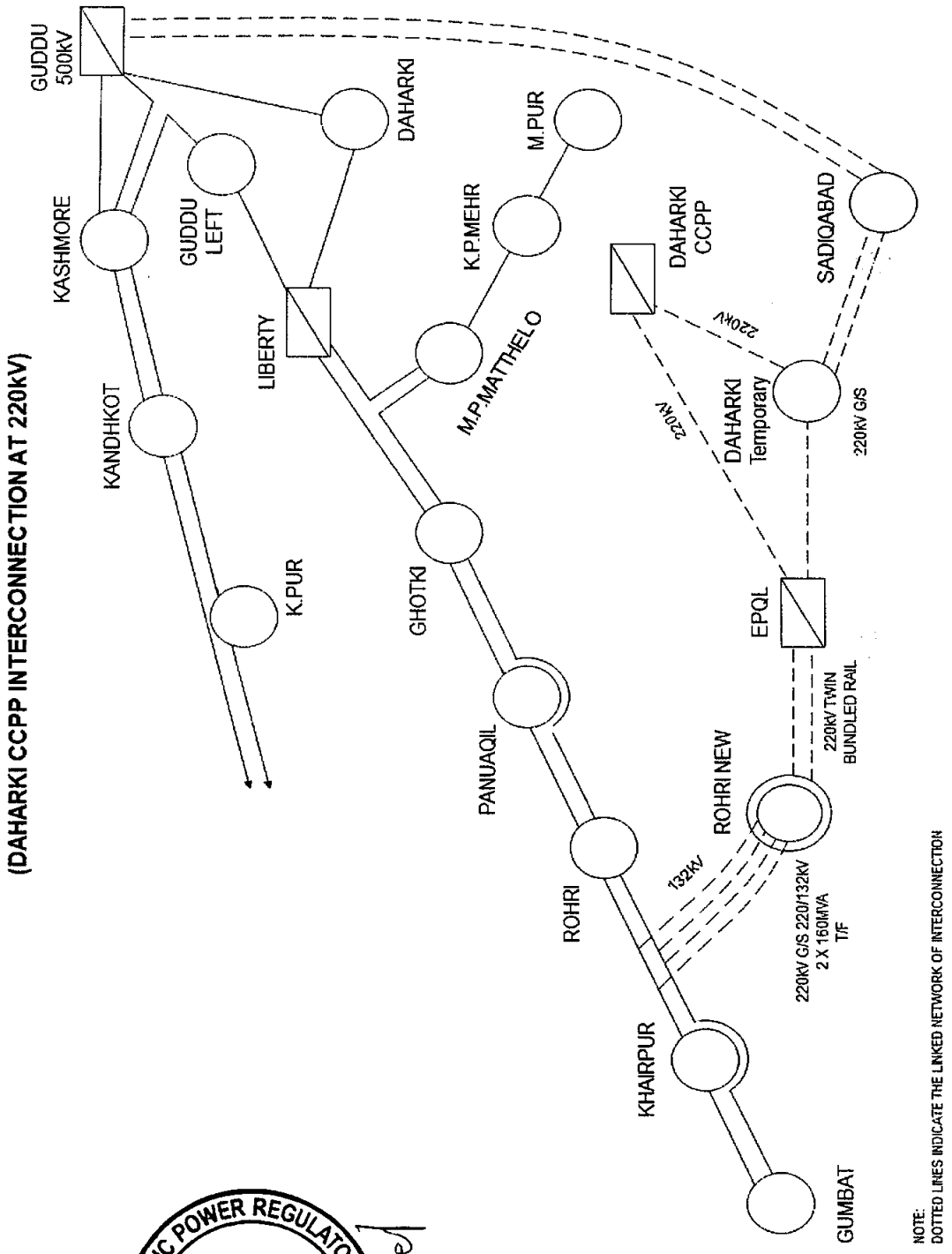
Interconnection arrangement for the Generation Facility/ Thermal Power Plant of the Licensee



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Details of the Generation Facility/Thermal Power Plant of the Licensee

A. General Information

(i).	Name of Licensee	Foundation Power Company Daharki Limited
(ii).	Registered Office	Fauji Towers, 68 Tipu Road, Chaklala, Rawalpindi
(iii).	Plant Location	Approx. 8 km from Daharki city on Dad Leghari Road
(iv).	Type of Generation Facility	Thermal Generation (Combined Cycle)

B. Plant Configuration

(i).	Plant Size Installed Capacity Gross ISO (15 °C)	195.17 MW
(ii).	Type of Technology	Combined Cycle Power Plant
(iii).	Number of Units/Size (MW)	1 X 130.50 MW (Gas Turbine)
		1 X 64.67 MW (Steam Turbine)
(iv).	Unit Make & Model	Gas Turbine:GE9171E
		Steam Turbine: Fuji Japan/FTE

C. Fuel Details

(i).	Primary Fuel	Low Btu Gas (530 - 590 Btu/Scf)
(ii).	Back-up Fuel	High Speed Diesel (HSD)
(iii).	Fuel Source (Imported/indigenous)	Indigenous
(iv).	Fuel Supplier	Mari Petroleum Company Limited (MPCL)

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(v).	Supply Arrangement	By a Gas Pipelines from Mari Gas Fields
(vi).	No of Storage Tanks of Backup Fuel (HSD)	01
(vii).	Storage Capacity of each HSD Tank	7500 m^3
(viii).	Gross Storage of HSD	7500 m^3 (Net Storage)

D. Emission Values

(i).	SO_x	SO_2 : 39**
(ii).	NO_x	115 mg/Nm^3 at 15% dry O_2 (by %volume)
(iii).	PM_{10}	50 mg/Nm^3

**0.2 metric tons per day per MWe of capacity

E. Cooling System

(i).	Cooling Water Source/Cycle	Well and/or Canal water / Close Cycle (Cooling Tower)

F. Plant Characteristics

(i).	Generation Voltage	10.5 kV – 15 kV			
(ii).	Frequency	50 Hz			
(iii).	Power Factor	0.8 Lagging – 0.95 Leading			
(iv).	Automatic Generation Control	Yes			
(v).	Ramping Rate (%MW/Min)	Load range	H. start	W. Start	Cold Start
		0≤46%	2.3%	2.6%	2.6%
		>46%≤63%	0.87%	0.49%	0.34%
		>63%≤100%	1.84%	1.26%	0.98%

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(vi).	Time required to Synchronize to Grid and loading the Complex to full load.	Hot Start:	345 Minutes (including 120 Min. required for supply of treated gas by MPCL)
		Warm Start:	815 Minutes (including 480 Min. required for supply of treated gas by MPCL)
		Cold Start:	875 Minutes (including 480 Min. required for supply of treated gas)

G. Other Details

(i).	Commercial Operation Date(COD)	May 16, 2011
(ii).	Expected Life of the Facility from COD	25 Years

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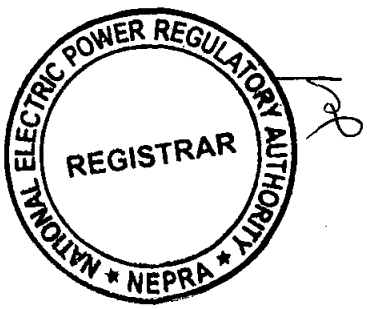
SCHEDULE-II
(REVISED/MODIFIED)

The Installed/ISO Capacity (MW), De-Rated Capacity at Mean Site Conditions (MW), Auxiliary Consumption (MW) and the Net Capacity at Mean Site Conditions (MW) of the Generation Facilities of Licensee are given in this Schedule.



SCHEDULE-II
(Revised/Modified)

1.	Gross ISO Installed Capacity of the Generation Facility/Thermal Power Plant (at 15^0C)	195.17 MW
2.	De-rated Capacity of the Generation Facility/Thermal Power Plant (at Mean Site Conditions)	185.00 MW
3.	Auxiliary Consumption of the Generation Facility/Thermal Power Plant	4.903 MW
4.	Net Capacity of the Generation Facility/Thermal Power Plant (at Mean Site Conditions)	180.097 MW

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