National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No. NEPRA/R/LAG-273/6366-71 April 18, 2018

Mr. Cai Bin,
Chief Executive Officer,
Port Qasim Electric Power Company (Private) Limited,
House No. 63, Street No. 5, Sector F-8/3,
Islamabad.

Subject: **Modification in Generation Licence No: IGSPL/47/2015**
Licence Application No. LAG-273
Port Qasim Electric Power Company (Private) Limited, (PQEPCPL)

Reference: PQEPCPL's application vide letter dated January 19, 2018

It is intimated that the Authority has modified the Generation Licence No. IGSPL/47/2015 in respect of Port Qasim Electric Power Company (Private) Limited (PQEPCPL), pursuant to Regulation 10(11)(a) of the NEPRA Licensing (Application and Modification Procedure) Regulations 1999.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification in the Generation Licence of PQEPCL along with Modification-I in the Generation Licence No. IGSPL/47/2015, as approved by the Authority.

Encl: 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, NTDC, 414-WAPDA House, Lahore.
3. Chief Executive Officer, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
4. Chief Executive Officer, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad
5. Director General, Environment Protection Department, Government of Sindh, Complex Plot No. ST-2/1, Korangi Industrial Area, Karachi.

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification in the Generation Licence of Port Qasim Electric Power Company (Pvt.) Limited

April 18, 2018
Case No. LAG-273

(A). Background

(i). The Authority in terms of Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act") granted a generation licence (No. IGSPL/47/2015 dated February 03, 2015 to Port Qasim Electric Power Company (Pvt.) Limited (PQEPCPL) for its 1320 MW imported coal based generation facility/thermal power plant.

(ii). According to the above mentioned generation licence, the generation facility/thermal power plant of PQEPCPL consist of 2x660 MW steam turbine with a super critical boiler. The generation facility is located at Port Qasim, Karachi in the Province of Sindh.

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(B). Communication of Modification

(i). PQEPCPL 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 January 19, 2018.

(ii). In the text of the proposed modification, PQEPCPL proposed to modify the ramping rate (MW/min) and time required to synchronize to Grid (HRs) in its generation licence as given below:

Ramping Rate:

Unit load range % age	Cold Start (%MW/Min)	Warm Start (%MW/Min)	Hot Start (%MW/Min)
0—<30%	≤0.2	≤0.5	≤1
>30%— ≤50%	≤0.3	≤0.7	≤1

>50— ≤100%	≤0.5	≤1	≤1

Time required to Synchronize to Grid:

Length of Shutdown in hours	≤ 2	>2 but ≤ 8	>8 but ≤ 32	>32 but ≤150	>150
Time required to synchronize to Grid (Min)	≤ 200	≤ 270	≤ 480	≤ 580	≤ 900

(iii). Regarding "statement of the reasons in support of the modification", PQEPCPL has, inter alia, stated that the proposed changes to the ramping rates and the time required for synchronization to the Grid are necessary because these specifications provided to NEPRA at the time of filing of the application for grant of the generation licence were tentative and indicative in nature. Accordingly, these specifications require modification in light of the actual design and requirements of the power plant, the data and instructions provided by the Original Equipment Manufacturer (OEM) to the company.

(iv). About "statement of the impact on the tariff, quality of service and the performance by the Licensee of its obligations under the licence", PQEPCPL has submitted that the tariff, quality of service and the performance of the company of its obligations under the generation licence will not be affected by the proposed modification.

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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 PQEPCPL, the Registrar published the communicated LPM on February 01, 2018 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 February 01, 2018. 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 to submit 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 four (04) stakeholders including Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), China Power Hub Generation Company (Pvt.) Limited (CPHGC), Punjab Mineral Development Corporation (PbMDC) and Energy Department, Govt. of Sindh (EDGoS). The salient points of the comments offered by the above stakeholder are summarized in the following paragraphs:

(a). CPPA-G submitted that review of the proposed modification reveals that PQEPCPL intends to lower ramping rate and for lower ramping rate, the complex/unit requires more time to comply with the despatch instructions and resultantly it increases the unit/complex startup cost. Furthermore, PQEPCPL has applied for calculating Notice to Synchronize with Grid (NTS) from ignition of its boiler which is contrary to the prudent utility practices as it should be taken from the notice by the System Operator. Grid synchronization time should be on lower side, NTS should be calculated from notice/instruction by the System Operator and these parameters should also be consistent with that of other coal fired power plants having similar fuel, size, capacity and technology, for opportune and cost efficient despatch of the complex;

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(b). CPHGC in its comments submitted that it has no objection to the issuance of the LPM to PQEPCPL;

(c). PbMDC submitted that it has no objection to the proposed modification in the generation licence of PQEPCPL; and

(d). EDGoS commented that as the ramping rate and grid synchronization time provided at the time of grant of generation licence were tentative and indicative in nature therefore, the modification is supported. However, the tariff, quality of service and the performance by the licensee and its obligation under the licence should not be affected.

(ii). The Authority examined the above comments of the stakeholders and found that except CPPA-G comments of all other stakeholders are found in favor of the LPM, whereas CPPA-G has raised certain observation/queries regarding the proposed modification. Accordingly, the Authority considered it appropriate to seek perspective of the licensee/PQEPCPL on the observations of CPPA-G.

(iii). On the comments of CPPA-G, PQEPCPL submitted that the modifications to the ramping rates and the time required to synchronize to grid are necessary because these specifications provided by the company to NEPRA at the time of filing of the application for grant generation licence were tentative and indicative in nature. Consistent with NEPRA's determination in the matter of Huaneng Shandong Ruyi Pakistan Energy (Pvt.) Limited-HSRPEPL's modification application and the generation licence, the company is requesting modification of its generation licence in light of the actual design of the power plant and the instructions/recommendation received from the manufacturer. Further, this modification is consistent with that of other coal fired power plants having similar fuel, size, capacity and technology, with the purpose to ensure safe and efficient operation of the power plant. In this regard, PQEPCPL has also submitted certificate from the Original Equipment Manufacturer (OEM), regarding ramping rate and grid synchronization time.

(iv). Regarding the proposed changes in the ramping rate, PQEPCPL submitted that the changes are necessary due to the following reasons:

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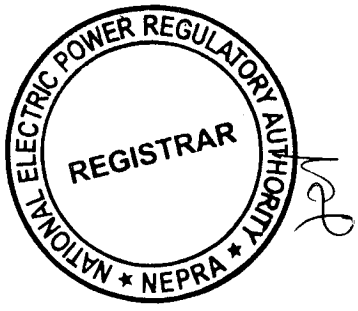
(a). The operational life span of steam turbine cylinder may be seriously impacted due to the excessive rate of change of load and temperature.

(b). If the ramping rate is not modified, it will cause an adverse change in the airflow, amount of coal, fineness of pulverized coal, concentration of pulverized coal and quantity of water into the boiler furnace, which may impact the boiler heat absorption, and may cause a substantial change in main steam temperature and pressure of the boiler. Under these

circumstances, the boiler may overheat or leak. Furthermore, the life span of turbine may be affected due to the excessive heat stress on the cylinder metal;

(c). If the ramping rate is not modified, it will result in combustion instability due to excessive variation in coal fineness and concentration into the boiler, caused by excessive load change rate, which may lead to partial choking in the boiler or boiler shut down, and may result in excessive flue gas emissions;

(d). The intermediate storage type coal pulverizing system is equipped with a pulverized coal bin to store qualified coal powder. When the load increases, the stored pulverized coal is directly sent into the furnace to respond quickly to the load requirement. While the direct blowing pulverizing system has no storage equipment, which needs to produce the qualified coal powder in the coal mill in real time for the boiler, to respond to the load requirement. Accordingly, the ramping rate of intermediate storage type coal pulverizing system could be much higher than 2% and direct blowing pulverizing system shall be limited within 1%. Direct blowing pulverizing system is equipped in Port Qasim Power Plant and all the mills shall start up one by one, which will cost more time to reach full load and result in the limited ramping rate.



(v). Regarding the proposed changes in the grid synchronization time, PQEPCPL has submitted that the revised synchronization time are based on the technical requirements of the manufacturer's technical specification and take into account the efficient and safe operation. For example, if the shut down period is more than 150 hours, then 420 minutes are required for boiler to set up temperature and pressure after the successful ignition, 40 minutes are required for steam turbine rush to 1500 rpm and 370 minutes for turbine equipment warming in medium speed, 30 minutes are required from 1500 rpm to speed up to 3000 rpm and 10 minutes for turbine equipment warming again at 3000 rpm. Then, 30 minutes are required to synchronize with the grid. Therefore, total time required to synchronize to the grid, for shutdown period of more than 150 hours is

translated into 900 minutes. Similarly for a shutdown period of 2 hours: 150 minutes are required for boiler to set up temperature and pressure after the success ignition; 30 minutes are required for steam turbine rush to 3000rpm, Then, 20 minutes are required for synchronize to grid. Therefore, total 200 minutes are required for unit start-up.

(vi). Regarding observations of CPPA-G on the difference between "notice to synchronize with grid" and "time required to synchronize to grid" PQEPCPL agreed that the time required to synchronize to grid should be on lower side, the notice to synchronize with grid should be calculated from notice/instruction by the System Operator and is to be finalized in PPA Schedule-5. In this regards, it is clarified that in LPM application the heading "notice to synchronize with grid" is mistakenly written instead of "time required to synchronize to the grid".

(vii). In response to the observations of CPPA-G regarding unit/complex start up cost, PQEPCPL submitted that the issue of unit start up cost (the relevant parts in Schedule-5 of PPA) will be discussed and finalized with CPPA-G in good faith, considering the agreement between CPPA-G and other coal fired power plants having similar fuel, size, capacity and technology. PQEPCPL will try its best to satisfy the best interests of power purchaser and consumers. PQEPCPL, has further clarified that the proposed modification will not have any adverse impact on tariff and performance of the power plant.

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(viii). The Authority examined the above replies of PQEPCPL to the observations of CPPA-G and found the same plausible. Accordingly, the Authority considered appropriate to process the LPM of PQEPCPL as stipulated in the relevant Regulations and NEPRA Licensing (Generation) Rules 2000 (the "Generation Rules").

(E). Evaluation/Findings

(i). The Authority has examined the entire case in detail including the already granted generation licence, information submitted along with the application of LPM, comments of stakeholders, response of PQEPCPL to the comments, and relevant rules and regulations.

(ii). The Authority observes that in terms of Regulation-10(2) of the Licensing Regulations, a licensee may, at any time during the term of a licence, communicate to the Authority an LPM setting out (a). the text of the proposed modification, and (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.

(iii). Regarding criteria of modification in a licence, the Authority observes that in terms of Regulation-10(5) of the Licensing Regulations, it is entitled to modify a licence in accordance with an authority proposed modification or LPM, 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.

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(iv). The main features of the LPM under consideration are that the Authority granted PQEPCPL a generation licence (No. IGSPL/45/2015 dated February 03, 2015) with an installed capacity of 1320.00 MW based on 2x660 MW steam turbine with a super critical boiler. According to the generation licence, the generation facility is to be operated primarily on imported coal.

(v). According to the schedule-I of the above mentioned generation licence, ramping rate of the generation facility was 13.2MW/min under 30% Maximum Continuous Rating (MCR), 19.8 MW/min from 30% to 50% MCR and 33 MW/min from 50% to 100% MCR. Further, time required to synchronize with the grid is mentioned as 4.25h, 2.0h and 0.75~1.0h for cold, warm and hat start respectively.

(vi). Through the communicated LPM PQEPCPL has proposed to reduce/modify the ramping as following:

Unit load range % age	Cold Start (%MW/Min)	Warm Start (%MW/Min)	Hot Start (%MW/Min)
0—<30%	≤0.2	≤0.5	≤1
>30%— ≤50%	≤0.3	≤0.7	≤1
>50— ≤100%	≤0.5	≤1	≤1

(vii). Further, PQEPCPL has also proposed to change the time required to synchronize to grid according to the length of the shutdown time of the units/complex as mentioned hereunder:

Length of Shutdown (Hrs.)	Time required to synchronize to Grid
≤ 2	≤ 200 Minutes (3.3 hrs)
>2 but ≤ 8	≤ 270 Minutes (4.5 hrs)
>8 but ≤ 32	≤ 480 Minutes (8.0 hrs)
>32 but ≤150	≤ 580 Minutes (9.7 hrs)
>150	≤ 900 Minutes (15 hrs)

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(viii). In this regard, the Authority observes that the technical data provided by the applicant at the time of filing of generation licence application 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 refine at final stages of the project, according to the manufacturer's provided data. 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 PQEPCPL, 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 Commercial Operation Date (COD). PQEPCPL has submitted the LPM before its COD. Further, the Section 4.2 of the Power Purchase Agreement (PPA) dated April 18, 2015 envisages that PQEPCPL will provide the data as per manufacturer/EPC loading curves for the complex. In this regard, the Authority observes that the proposed changes in the ramping rate and grid synchronization time are as per manufacturer/EPC loading curves.

(ix). The Authority observes that the issue of ramping rate grid synchronization time was also faced by a similar project of Shandong Rui Pakistan Energy (Pvt.) Limited (HSRPEPL). The Authority considered the proposed changes and observed that the same are necessary for the safety and proper operation of the units. Accordingly, the Authority approved the change in the said parameters in generation licence of HSRPEPL according to the data/recommendation provided by the equipment manufacturer.

(x). Regarding impact of the communicated LPM on tariff, the Authority observes that through determination No. NEPRA/TRF-299/PQEPCPL-2015/1839-1841 dated February 13, 2015, it has granted up front tariff to PQEPCPL for its imported coal based project. Although the proposed changes will result in slight increase in the startup cost of the generation facility, however considering the envisaged base load operation of the plant, the impact on tariff is negligible. Therefore, the Authority is of the opinion that the communicated LPM of PQEPCPL will not have any adverse impact on its existing up front tariff.

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(xi). In view of the above, the Authority considers that the LPM will not have any adverse affect on the performance of the Licensee of its obligations. Further, the LPM will not cause the Authority to act or acquiesce in any act or omission of the licensee/PQEPCPL in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to the NEPRA Act. The LPM will be beneficial to the consumers in general as compared to other fuels cheaper energy based on indigenous resource will be available to the power purchaser. The LPM is reasonably necessary for the licensee/PQEPCPL to effectively and efficiently perform its obligations under the licence. 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.

Approval of LPM

(i). In view of the above, the Authority is satisfied that PQEPCPL has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms of Regulation-10(11)(a) of the Licensing Regulations approves the communicated LPM.

(ii). Accordingly, the generation licence (No. IGSPL/47/2015 dated February 03, 2015) is hereby modified. The changes made in the generation licence are attached as annexure to this determination. The approval of the LPM will be subject to the provisions contained in the NEPRA Act, relevant rules & regulations framed there under, terms & conditions of the generation licence and other applicable documents.

Authority

Rehmatullah
(Member)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member)

17.4.18

Saif Ullah Chattha
(Member/Vice Chairman)

17-4-2018

Tariq Saddozai
(Chairman)

18.04.18

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National Electric Power Regulatory Authority (NEPRA)

Islamabad – Pakistan

GENERATION LICENCE

No. IGSPL/47/2015

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/47/2015 dated February 03, 2015) granted to Port Qasim Electric Power Company (Private) Limited, to the extent of changes mentioned hereunder:

(a). Changes made in **Schedule-I** of the generation licence regarding ramping rate and time required to synchronize to grid attached as **Annexure-A**.

This **Modification-I** is given under my hand on this 18th **day** of **April Two Thousand & Eighteen**

18/04/18

Registrar

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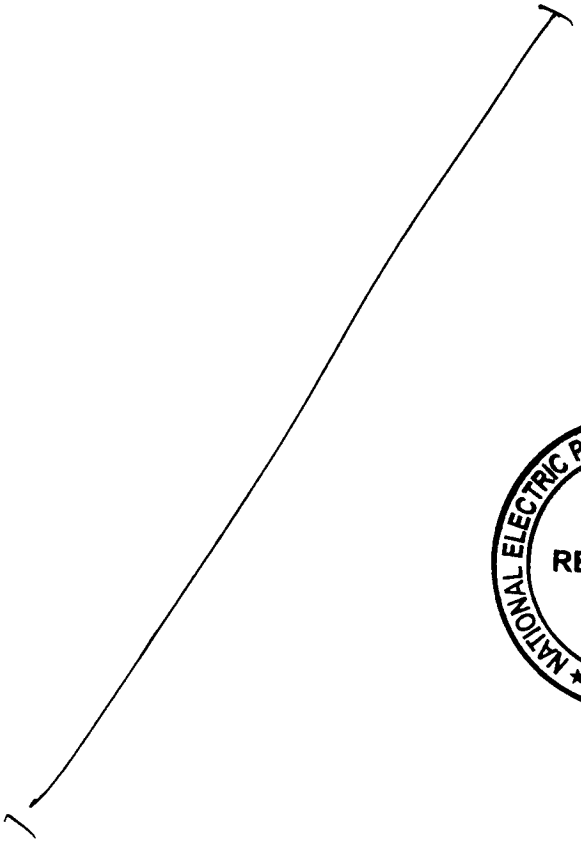
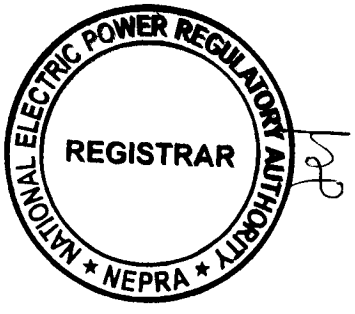
Annexure-A

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Modification-I in the Generation Licence (No. IGSPL/47/2015, dated February 03, 2015) of Port Qasim Electric Power Company (Private) Limited

(A). Details of Generation Facility/Power Plant:

1. At Para F(v) of schedule-I the detail relating to ramping rate of the generation facility/power plant has been revised/modified as:

Load (%age)	Cold Start (% MW/Min)	Warm Start (% MW/Min)	Hot Start (% MW/Min)
0 <30	≤ 0.2	>0.2 ≤ 0.5	>0.5 ≤ 1
>30 ≤ 50	≤ 0.3	>0.3 ≤ 0.7	>0.7 ≤ 1
>50 ≤100	≤ 0.5	>0.5 ≤ 1.0	= 1

2. At Para F(vi) of schedule-I the detail relating to time required to synchronize to Grid has been revised/modified as:

Length of Shutdown (in Hours)	≤ 2	>2 but ≤ 8	>8 but ≤ 32	>32 but ≤150	>150
Time required to synchronize to Grid (Min)	≤ 200	≤ 270	≤ 480	≤ 580	≤ 900

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