

Republic of the Philippines
ENERGY REGULATORY COMMISSION
San Miguel Avenue, Pasig City

**IN THE MATTER OF THE
APPLICATION FOR
APPROVAL OF THE
EMERGENCY INSTALLATION
OF ONE (1) 83 MVA POWER
TRANSFORMER AT NORTH
PORT SUBSTATION**

ERC CASE NO. 2016-040 RC

**MANILA ELECTRIC
COMPANY (MERALCO),
Applicant.**

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D O C K E T E D
Date: Jul 25 2016
By: [Signature]

NOTICE OF PUBLIC HEARING

TO ALL INTERESTED PARTIES:

Notice is hereby given that on 8 April 2016, the Manila Electric Company (MERALCO) filed an Application for approval of the emergency installation of one (1) 83 MVA Power Transformer at the North Port Substation.

In the said Application, MERALCO alleged the following:

1. Applicant is a private corporation duly organized and existing under the laws of the Republic of the Philippines, with principal office located at Lopez Building, Ortigas Avenue, Barangay Ugong, Pasig City. It may be served with notices and other processes of this Honorable Commission through its undersigned counsel at the address indicated herein.
2. Applicant has a legislative franchise to construct, operate and maintain an electric power distribution system for the conveyance of electric power to the end-users in the cities and municipalities of Metro Manila, Bulacan, Cavite and Rizal, and certain cities/municipalities/barangays in Batangas, Laguna, Quezon and Pampanga, pursuant to Republic Act No. 9209.
3. Applicant seeks the Honorable Commission's approval of its emergency installation of one (1) 83 MVA, 115 kV-34.5

kV, three (3)-phase power transformer with On-Load Tap Changer (OLTC) for the replacement of the North Port Substation's defective Power Transformer Bank No. 2.

4. The Application is being filed pursuant to the Honorable Commission's Resolution No. 26, Series of 2009, entitled: "*Resolution Amending the Rules for Approval of Regulated Entities' Capital Expenditure Projects*". Emergency Capital Expenditure projects are those that require immediate implementation during an event that is not a force majeure or fortuitous event in order to maintain safe, reliable, secure and efficient operation of the power system.

5. However, for purposes of recovering the capital cost of the emergency project through the DU's rates, the same will go through the process of evaluation by the Honorable Commission during the regulatory reset of the DU, unless there is basis for a rate-reopening in the current regulatory period, in accordance with the Rules for the Setting of Distribution Wheeling Rates (RDWR) for DUs.

BACKGROUND

6. The North Port Substation is located at Lot 1, Tayuman, Tondo, Manila. The said substation has six (6) Power Transformer Banks. Power Transformer Bank Nos. 1, 2 and 6 have a rating of 115kV-34.5kV, while the remaining banks (3, 4 and 5) have a 34.5kV-6.24kV rating. However, the Power Transformer Bank Nos. 3, 4 and 5 are only drawing power from Bank Nos. 1, 2 and 6.

7. On 15 December 2015, North Port Power Transformer Bank No. 2 was tripped out by transformer differential relay with targets of phases B & C due to exploded high side bushings (H1 & H2).

8. Thus, the power transformer was immediately subjected to initial test on 16 December 2015 that showed relatively low insulation resistance measured on primary to ground (H-G) and carbonized insulating oil on the OLTC and main tank. The test also indicated that there was a need to replace the damaged bushings.

9. On 20 December 2015, Winding Resistance and Turn Ratio test was performed on the power transformer without primary and secondary bushings. The results showed relatively low winding resistance on H1-H0 windings and low % turn ratio on HoH1-XoX1 windings, and confirmed that there was a need to replace the bushings and recondition the insulating oil.

10. Accordingly, the tripping out of North Port Power Transformer Bank No. 2 necessitated the transfer of its load to adjacent power transformers with 115 kV-34.5 kV rating namely, North Port 133 MVA Bank No. 6 and Tutuban 83 MVA Bank No. 2.

11. With such a setup, the North Port Bank No. 6 was operating above critical level at 80.1% that can adversely affect the quality of electric service to the various major and vital customers in the area such as University of Sto. Tomas, Chinese General Hospital, Department of Public Works and Highways, Asian Terminals, Inc., Asia Brewery, Inc., Philippine Ports Authority, Philippine National Railways and the City Government of Manila.

12. Considering the critical effect of shifting the load of the power transformer to the adjacent North Port Bank No. 6, a stop gap measure had to be undertaken. Applicant had to use an available 83 MVA Power Transformer and temporarily install the same to replace the North Port Power Transformer Bank No. 2 so that the latter power transformer can be pulled out for further testing. The new Power Transformer was energized on 26 January 2016. Shown below are the loadings of the affected power transformers with and without the replacement of North Port Power Transformer Bank No. 2.

Table 1: Without Project

Parameter Under Consideration	
Loading of North Port 133-MVA Bank No. 6	80.1%
Loading of Tutuban 83-MVA Bank No. 2	55.0%
System Loss	8,479,172 kWh

Table 2: With Project

Parameter Under Consideration	
Loading of North Port 133-MVA Bank No. 6	37.1%
Loading of Tutuban 83-MVA Bank No. 2	45.3%
Loading of North Port 83-MVA Bank No. 2	52.6%
System Loss	8,229,062 kWh

13. The new 83 MVA Power Transformer had to be temporarily installed in order to normalize the level of quality

of electric service of the affected customers in the City, of Manila.

14. Several preparatory activities had to be undertaken before the final testing of the replaced power transformer such as, fabrication of adapter for bushings, draining of carbonized insulating oil, and installation of adapters and replacement of test bushings and sealing.

15. On 24 February 2016, a final test was conducted on the power transformer with replaced bushings. The results of the final test were released on 03 March 2016 where the Power Transformer Bank No. 2 was declared defective since the measured turns ratio of 90.01% on H0, H1-X0X1 windings exceeded the limits due turn-to-turn short on H0H1 winding.¹ The Dissolved Gas Analysis (DGA) also showed high generation of combustible gases at the time of fault as verified in the field and laboratory equipment. At this point, the new 83 MVA Power Transformer that was earlier temporarily installed was considered a permanent replacement.

16. It was extremely important for the Applicant to immediately implement the replacement of the defective transformer at North Port Substation in order to serve and promote public interest and welfare in a more suitable and adequate manner, as power interruptions in the affected areas will be avoided and affected customers will not be burdened with higher line losses resulting from emergency load shifting.

17. The cost of the emergency replacement including the cost of the 83 MVA, 115 kV-34.5 kV, three-phase power transformer with OLTC installed at North Port Substation is **FIFTY FOUR MILLION SEVEN HUNDRED SIXTY TWO THOUSAND THREE HUNDRED EIGHTY EIGHT & 98/100 PESOS (Php54,762,388.98)**. This amount also includes costs of transformer oil, taxes, duties, brokerage, trucking services and installation.

18. In further support of the Application, attached hereto are the following documents:

- **Annex "A"** – Emergency CAPEX Project Information Summary with supporting documents: (i) Technical and Economic Analysis, (ii) Cost Estimates; (c) Expenditure Summary; (iii) Cost Benefit Analysis Calculation; and (iv) Gantt Chart;

¹ As per IEEE Standard C57.12.00-2006, acceptable tolerance values for winding ratios should be within $\pm 0.5\%$ of the nameplate voltages.

- **Annex “B”** – Documents showing the results of tests conducted on Power Transformer Bank No.2; and
- **Annex “C”** – Judicial Affidavit of Engr. Jose Mari P. Melendres, Vice President and Head of Applicant’s Sub-transmission Services Office.

PRAYER

WHEREFORE, it is respectfully prayed to this Honorable Commission that the emergency installation of one (1) 83 MVA, 115 kV – 34.5 kV, three-phase power transformer with OLTC at the North Port Substation be **APPROVED**.

Other relief just and equitable under the premises are likewise prayed for.

The Commission has set the said Application for determination of compliance with the jurisdictional requirements, expository presentation, Pre-Trial Conference, and presentation of evidence on **07 September 2016 (Wednesday) at two o’clock in the afternoon (02:00 P.M.) at the ERC Hearing Room, 15th Floor, Pacific Center Building, San Miguel Avenue, Pasig City.**

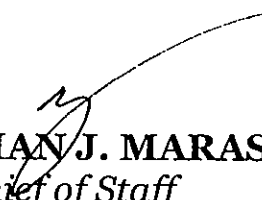
All persons who have an interest in the subject matter of the proceeding may become a party by filing, at least five (5) days prior to the initial hearing and subject to the requirements in the ERC’s Rules of Practice and Procedure, a verified petition with the Commission giving the docket number and title of the proceeding and stating: (1) the petitioner’s name and address; (2) the nature of petitioner’s interest in the subject matter of the proceeding, and the way and manner in which such interest is affected by the issues involved in the proceeding; and (3) a statement of the relief desired.

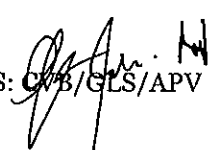
All other persons who may want their views known to the Commission with respect to the subject matter of the proceeding may file their opposition to the Application or comment thereon at any stage of the proceeding before the Applicant conclude the presentation of its evidence. No particular form of opposition or comment is required, but the document, letter or writing should contain the name and address of such person and a concise statement of the opposition or comment and the grounds relied upon.

All such persons who wish to have a copy of the Application may request the Applicant, prior to the date of the initial hearing, that

they be furnished with a copy of the Application. The Applicant is hereby directed to furnish all those making a request with copies of the Application and its attachments, subject to reimbursement of reasonable photocopying costs. Any such person may likewise examine the Application and other pertinent records filed with the Commission during the standard office hours.

WITNESS, the Honorable Chairman **JOSE VICENTE B. SALAZAR** and the Honorable Commissioners **ALFREDO J. NON**, **GLORIA VICTORIA C. YAP-TARUC**, **JOSEFINA PATRICIA A. MAGPALE-ASIRIT**, and **GERONIMO D. STA. ANA**, Energy Regulatory Commission, this 11th day of July 2016 in Pasig City.


ATTY. NATHAN J. MARASIGAN
Chief of Staff
Office of the Chairman and CEO


LS: CMB/GLS/APV