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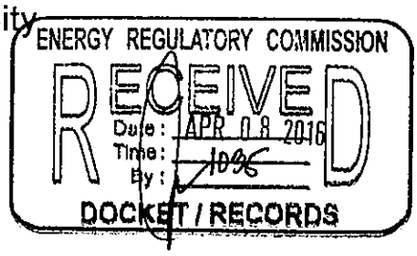
Republic of the Philippines
ENERGY REGULATORY COMMISSION
San Miguel Avenue, Pasig City



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

APR 08 2016

ERC CASE NO. 2016-040 RC

MANILA ELECTRIC COMPANY (MERALCO),
Applicant.
x----------x

APPLICATION

Applicant **MANILA ELECTRIC COMPANY (MERALCO)**, through the undersigned counsel, and to this Honorable Commission, most respectfully avers that:

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 H0H1-X0X1 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

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

Summary; (iii) Cost Benefit Analysis Calculation; and (iv) Gantt Chart;

- **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.

Pasig City, 04 April 2016.

MANILA ELECTRIC COMPANY
Applicant
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Republic of the Philippines)
City of Pasig) S.S.

VERIFICATION
and CERTIFICATION ON NON-FORUM SHOPPING

I, **RONNIE L. APEROCHO**, of legal age, married, with office address at Manila Electric Company, Technical Services Building, Meralco Center, Ortigas Avenue, Pasig City, hereby state under oath that:

1. I am the First Vice President and Head of Networks, Manila Electric Company, who is authorized to represent it in this Application as per the attached Secretary's Certificate (Annex "**D**");

2. I have caused the preparation of the instant Application and read the contents thereof, and I attest that the allegations herein contained are true and correct based on my personal knowledge and on authentic records;

3. I have not commenced any other action or proceeding involving the same issues in the Supreme Court, the Court of Appeals or any court, tribunal, or quasi-judicial agency and, to the best of my knowledge, no such other action or claim is pending therein; and,

4. Should I hereinafter learn that the same or a similar action or claim has been filed or is pending in the Supreme Court, the Court of Appeals or any court, tribunal, or quasi-judicial agency, I shall report the said fact within five (5) days from discovery thereof to this Honorable Commission.

RONNIE L. APEROCHO
Affiant

SUBSCRIBED and SWORN to before me this ____ day of APR 05 2016 2016, affiant exhibited to me his SSS ID No. 03-15624854 issued in the Philippines.

Doc. No. 280;
Page No. 57;
Book No. III;
Series of 2016.

ATTY. MONICA M. MARTIN
NOTARY PUBLIC
Pasig, Pateros, Taguig & San Juan
Issued on July 13, 2015 at Pasig City
until December 31, 2016
Roll No. 55693; IBP No. 1023726; 01/08/16; RSM Chapter
PTR No. 1473411; 01/21/16; Pasig City
7th Floor, Lopez Bldg., Ortigas Ave., Pasig City

ANNEX " A "

MANILA ELECTRIC COMPANY

Emergency Project Information Summary

MERALCO

Project Code	N/A	**Priority Ranking**	Emergency
Project Title	EMERGENCY REPLACEMENT OF POWER TRANSFORMER BANK NO. 2 AT NORTH PORT SUBSTATION		
Project Type	Renewal		
Project Driver	Network: Asset Condition		
Project Cost (in millions)	Forex: USD 1.12 M	Local: PHP 1.93 M	Total: PHP 54.76 M
Regulatory Year	RY2016	**Commissioning Date**	January 2016

Project Description

The emergency Capital Expenditure (CAPEX) project is for the replacement of the defective 83 MVA, 115 kV – 34.5 kV, three-phase Power Transformer with On Load Tap Changer (OLTC) at North Port Substation.

The scope of project includes among other things:

- Unspotting of Power Transformer
- Hauling of Power Transformer and acc.
- Spotting of Power Transformer
- Pre-Assembly Test (Dew Point / Core to ground)
- Power Transformer Assembly and Harness/Acc.
- Vacuum Drying / Leak Test
- Mobilization of Oil Machine
- Mobilization of ISO Tank with oil
- Oil Reconditioning
- Oil Filling
- Hot Oil Circulation
- Stabilizing / Bleeding
- Electrical / Calibration Testing
- Chemical testing
- Final Re-touch and Clearing
- De-mobilization of Heavy equipment
- Protection Works and Other Substation Works
- Pre-Com Checklist and Final Inspection
- Commissioning
- Site Clearing and Material Return
- Activities for final testing of faulted power transformer

Project Justification

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 transformation rating of 115kV-34.5kV, while the remaining banks (3, 4 and 5) have a 34.5kV-6.24kV rating. But Power Transformer Bank Nos. 3, 4 and 5 are merely drawing power from Bank Nos. 1, 2 and 6.

When Power Transformer Bank No. 2 was tripped by differential relay with phases B & C targets due to exploded high side bushings (H_1 & H_2), the transformer was subjected to some tests: (a) Initial Test which showed relatively low insulation resistance measured on primary to ground (H-G), carbonized insulating oil on the OLTC and main tank; and damaged bushings should be replaced; and (b) Winding Resistance and Turn Ratio test on the power transformer without primary and secondary bushings that showed relatively

	low winding resistance on H1H0 windings and low % turn ratio on H0H1-X0X1 windings and that there is a need to replace the bushings and recondition the insulating oil. Considering the failure of the North Port Power Transformer Bank No. 2, its load had to be transferred 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. With such a setup, the North Port Bank No. 6 had to be operated above critical level at 80.1%. This may adversely affect the quality of electric service to the various major and vital customers in the area such as University of Santo 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. As stop gap measures to the possible adverse effects of said load shifting to customers in the area and distribution system, Applicant temporarily installed and used an available 83 MVA Power Transformer to replace the North Port Power Transformer Bank No. 2 so that the latter power transformer can be pulled out for further testing and in order to normalize the level of quality of electric service of the affected customers in the City of Manila. The new Power Transformer was energized on 26 January 2016. 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. On 24 February 2016, a final test was conducted on the power transformer with replaced bushings. The result of the final test was released on 03 March 2016 where the Power Transformer Bank No. 2 was declared defective since the measured turns ratio of 90.01% on H0H1-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.
Annex A	Technical and Economic Analysis
Annex B	Project Cost
Annex C	Real to Nominal Conversion Worksheet
Annex D	Cost Benefit Analysis Calculation
Annex E	Gantt Chart

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

ANNEX A: TECHNICAL AND ECONOMIC ANALYSIS

1. BACKGROUND

1.1. Existing System

The North Port substation has six (6) power transformer banks. The 83-MVA Power Transformer Bank No. 2 is a seventeen (17) year old, 83 MVA, 115 kV – 34.5 kV, three-phase power transformer with on-load tap changer (OLTC).

On 15 December 2015, the 83 MVA Power Transformer Bank No. 2 was tripped out by transformer differential relay with targets of phases B & C due to exploded high side bushings (H_1 & H_2). Hence, the transformer without bushings was subjected to initial test and Winding Resistance and Turn Ratio test.

However, the loads of the power transformer had to be transferred to adjacent power transformers with 115-34.5 kV rating namely, North Port 133 MVA Bank No. 6 and Tutuban 83 MVA Bank No. 2 in order to serve the load requirements of Power Transformer Bank 2. As a consequence, North Port Bank No. 6 was operating above critical level. Thus, this can adversely affect the quality of electric service to affected customers in the City of Manila.

As stop gap measures, Applicant had to temporarily install and use the available 83 MVA Power Transformer so as to replace the North Port Power Transformer Bank No. 2 so that the latter transformer can be pulled out for further testing. The new Power Transformer was energized on 26 January 2016.

Also, several preparatory activities had been undertaken before the final testing of the replaced power transformer.

As above-mentioned, a final test was conducted on the power transformer with replaced bushings. The results of the final test was released on 03 March 2016 where the Power Transformer Bank No. 2 was declared defective. The 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.

1.2. Planning Criteria and Standards

In planning for the renewal and refurbishment projects of its distribution system, MERALCO adheres to the following policies and criteria:

1.2.1. Planning Policies

Substation Maintenance/Planning Policies

- For 34.5 KV primary rating & below – inspection at least once a month
- For 115 KV/230 KV rating – inspection at least twice a month

- Thermographic Scanning and Ultrasonic Detection -at least every three months.
- Electrical Testing – every 2 years
- Oil Sampling/Testing – every year
- Dissolved Gas Analysis (DGA) – Every 3 months for 80MVA & below
- Dissolved Gas Analysis – Monthly for above 80MVA rating

1.2.2. Planning Criteria

CAPEX Projects (Maintenance) Planning Criteria

The replacement of power transformers is driven by the following criteria:

- Condition and age
  - Failure of winding ratio test.
  - Combination of optimized asset life and constant failure of electrical testing
- Technological obsolescence
  - Combination of optimized asset life and problem of parts due to obsolescence
- Compliance to regulatory and statutory requirements
  - Such as voltage variations requirements to meet customer needs
- Project NPV>0, FIRR>WACC, B/C>1.0
  NPV – Net Present Value
  FIRR – Finance Internal Rate of Return
  WACC – Weighted Average Cost of Capital
  B/C – Benefit to Cost Ratio

2. PERFORMANCE ASSESSMENT

The tripping out of North Port 83-MVA Power Transformer Bank No. 2 has resulted in the following constraints and deficiencies:

- The loads of the power transformer had to be transferred to adjacent power transformers with 115-34.5 kV rating in order to serve the load requirements of Power Transformer Bank 2;

- The transfer of loads of Power Transformer Bank No.2 to said adjacent transformers resulted in above-critical loading of North Port Bank No.6;and

- The said loading level of North Port 133-MVA Bank No. 6 should be immediately mitigated/addressed considering that its above-critical loading can adversely affect the quality of electric service to the various major and vital customers in the area such as University of Santo 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.

2.1. Analysis

2.1.1 Qualitative Performance Measures

Parameter Under Consideration	Result without Project	Result with Project
Loading of existing North Port 133-MVA Bank No. 6 (Condition: North Port Transformer Bank no. 2 is out)	Critical level	Within normal loading condition
System Loss	Higher system loss	Lower system loss

2.1.2 Quantitative Performance Measures

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

2.2. Specific Planning Criteria breached

In this project, the transformer failed the Winding Ratio, DGA and Oil Insulating tests and was recommended for immediate replacement.

3. PROJECT FORMULATION AND EVALUATION

3.1 Project Alternative

In the process of determining the most cost-effective solution to address the identified deficiencies, MERALCO generated several technically-feasible alternatives that could satisfy the requirements in a timely and efficient manner.

The problem and project alternatives are summarized below:

Problem Description	**Defective Power Transformer**	
Project Alternatives		**Classification**
Alternative 1	Replace the existing transformer with a new transformer with OLTC.	Stand-alone
Alternative 2	Transfer the load to adjacent transformers without replacement of North Port Transformer Bank No.2	Stand–alone

3.1.1 Alternative 1

Alternative 1 is replacement of the defective Power Transformer Bank No. 2 with a new 83 MVA power transformer with OLTC. With the implementation of this alternative, the load requirements of Power Transformer Bank 2 will be served without any dire impacts to the distribution system and customers.

3.1.2 Alternative 2

Alternative 2 pertains to the transfer the loads of North Port Transformer Bank No.2 to North Port 133-MVA Bank No. 6 and Tutuban 83-MVA Bank No. 2.

The repair of Power Transformer Bank No.2 was also considered but this will take a longer period of time as compared to when the same is replaced. During the period of repair, Applicant will have to resort to load shifting from North Port Power Transformer Bank No.2 to the said adjacent power transformers and this may compromise the safety, reliability and security of the distribution system

The scope of work will include not only the repair of the transformer but also transport of the transformer from North Port substation to the supplier's factory which in this case is from PT

CG Power Systems in Bogor, Indonesia and back. In the past, price quotation for repair only of similar transformer is in the amount of Php 33 M.

3.2 Technical Analysis

The following table summarizes the comparison of the advantages and disadvantages of the alternatives:

Alternative	Advantages	Disadvantages
Alternative 1 Replace the existing transformer with a new transformer with OLTC.	• Considering that there will be no transfer of loads from Power Transformer Bank No.2 to adjacent power transformers with 115kV -34.5kV rating, North Port Bank No. 6 will not be loaded above critical level. • There will be no problems/concerns on loading of North Port 133-MVA Bank No. 6 and the quality and reliability of electric service to customers in said area will not be affected; • Lower system loss in the affected area; and • This will restore normal distribution line flexibility and ultimately ensure the reliability of the distribution system.	There is no significant disadvantage.
Alternative 2 Transfer the load to adjacent transformers without replacement of North Port Transformer Bank No.2	• There is no advantage.	• Critical loading of North Port Bank No. 6.; • The loading level of the above-mentioned power transformer bank pose serious distribution concern such that it can adversely affect the

Alternative	Advantages	Disadvantages
		quality of electric service to customers in the area; • This will increase the system loss in the affected area; and • The poor distribution line flexibility may adversely affect the reliability of the distribution system

3.2 Financial Analysis

The financial evaluations of the alternative projects are summarized in the following table:

Project Alternative	Project Description	Net Present Value (NPV) (in millions)	(FIRR)	B/C
Alternative 1	Replace the existing transformer with a transformer with OLTC	291.89	15%	1.18
Alternative 2	Transfer the load to adjacent transformers without replacement of North Port Transformer Bank No.2	-8,002.21	8.76%	0.82

4. RECOMMENDATION

Replacement of the failed 83-MVA Power Transformer at North Port Substation with a new 83-MVA Power Transformer will resolve systems constraints and deficiencies considering that it prevents the above critical loading of North Port Bank No. 6.

Without the emergency project, there will be increased exposure of the affected 34.5kV distribution lines due to emergency load shifting. Also, there will be constraints in accommodating additional loads due to inadequate capacity.

Scope of work

- Replacement of 83MVA power transformer with OLTC.
- Unspotting of Power Transformer

- Hauling of Power Transformer and acc.
- Spotting of Power Transformer
- Spotting of RCC
- Pre-Assembly Test (Dew Point / Core to ground)
- Mobilization of Heavy Eqpt
- Uncrating of Accessories (at temporary storage)
- Hauling of Accessories to Site
- Power Transformer Assembly and Harness/Acc.
- Vaccum Drying / Leak Test
- Mobilization of Oil Machine
- Mobilization of ISO Tank with oil
- Oil Reconditioning
- Oil Filling
- Hot Oil Circulation
- Stabilizing / Bleeding
- Electrical / Calibration Testing
- Chemical testing
- Final Re-touch and Clearing
- De-mobilization of Heavy equipment
- Protection Works and Other Substation Works
- Pre-Com Checklist and Final Inspection
- Commissioning
- Site Clearing and Material Return
- Activities for final testing of faulted power transformer

4.1. Impact

This will resolve the above-mentioned constraints and deficiencies of the distribution system in Manila.

ANNEX B: PROJECT COST

The project cost includes labor and material costs. The material costs are based on the moving average price of the equipment that will be used in relation to this project. The cost includes required foundation, transformer oil, taxes, duties, brokerage, trucking services and installation.

Table 1: Detailed Cost Estimates by RDWR Asset Categories

Asset category	Labor Cost	Material Cost	Other Cost	Sub-Total
Power transformer	1,521,101.73	52,831,998.47	409,288.76	54,762,388.98
Total (PhP)	1,521,101.73	52,831,998.47	409,288.76	54,762,388.98

Table 2: Summary of Cost Estimates

Description	Quantity	Major Equipment	Total
North Port Power Transformer	1	83 MVA, 115kVY-34.5kVY-13.8kVD three-phase power transformer with On –Load Tap Changer (OLTC)	54,762,388.98
Total (PhPReal 2016)			54,762,388.98

Table 3. Cost Component Breakdown

Cost Component	RY 2016
Local	1,930,390.51
FOREX (US $)	1,118,603.91
Total (PhP, Real 2016)	**54,762,388.98**

ANNEX C: EXPENDITURE SUMMARY

MANILA ELECTRIC COMPANY
Capital Expenditure - Major Projects
US$ Expenditure (including all international expenditure)

MERALCO

PROJECT NAME:
Replacement of Power Transformer No. 2 (83 MVA, 115kV-34.5kV) at North Port Substation

CAPITAL EXPENDITURE - MAJOR PROJECTS (US$ COMPONENT)

Forecast (US$, real) (Regulatory Year)

Category		2016	2017	2018	2019
Regulated Distribution Services Assets					
Network	Land and Land Rights (Distribution Purposes)				
	Structures and Improvements (Distribution Purposes)				
	Station Equipment				
	Power transformers	1,118,604			
	Switchgear				
	Protective equipment				
	Metering & control equipment				
	Communications equipment				
	Other station equipment				
	Poles, Towers and Fixtures - Distribution				
	Overhead Conductors and Devices - Distribution				
	Underground Conduits - Distribution				
	Underground Conductors and Devices - Distribution				
	Distribution Transformers				
	Power Conditioning Equipment				
	Meters, Metering Instruments & Metering Transformers - Distribution				
	Information technology equipment (distribution)				
	Regulated Entity Property on Consumer's Premises				
	Street Lights and Signal Systems				
	Submarine Cables				
Non-network	Land and Land Rights (non-network)				
	Structures and Improvements (non-network)				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment (non-network)				
	Power-operated Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
Materials	Materials and supplies (including spares)				
Subtrans	Transferred subtransmission assets				
	Sub-total Regulated Distribution Services	1,118,604	0	0	0
Distribution Connection Services Assets					
Network	Poles, Towers and Fixtures (Customer)				
	Overhead Conductors and Devices (Customer)				
	Underground Conduits (Customer)				
	Underground Conductors and Devices (Customer)				
	Line Transformers (Customer)				
	Information Systems Equipment (Connection)				
Non-network	Land and Land Rights (non-network)				
	Structures and Improvements (non-network)				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment (non-network)				
	Power-operated Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
Materials	Materials and supplies (including spares)				
	Sub-total Distribution Connection Assets	0	0	0	0
Regulated Retail Services Assets					
	Meters, Instruments & Metering Transformers (Consumer Consumption Metering)				
	Land and land rights				
	Structures and improvements				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
	Sub-total Regulated Retail Services Assets	0	0	0	0
TOTAL CAPEX		1,118,604	0	0	0

Notes : References to Regulatory Years are for the 12-month period ending on Jun 30 of the year noted.

HISTORICAL EXPENDITURE CONVERTED TO REAL EXPENDITURE

Category	
Regulated Distribution Services Assets	
Network	Land and Land Rights (Distribution Purposes)
	Structures and Improvements (Distribution Purposes)
	Station Equipment
	Power transformers
	Switchgear
	Protective equipment
	Metering & control equipment
	Communications equipment
	Other station equipment
	Poles, Towers and Fixtures - Distribution
	Overhead Conductors and Devices - Distribution
	Underground Conduits - Distribution
	Underground Conductors and Devices - Distribution
	Distribution Transformers
	Power Conditioning Equipment
	Meters, Metering Instruments & Metering Transformers - Distribution
	Information technology equipment (distribution)
	Regulated Entity Property on Consumer's Premises
	Street Lights and Signal Systems
	Submarine Cables
Non-network	Land and Land Rights (non-network)
	Structures and Improvements (non-network)
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment (non-network)
	Power-operated Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
Materials	Materials and supplies (including spares)
Subtrans	Transferred subtransmission assets
	Sub-total Regulated Distribution Services
Distribution Connection Services Assets	
Network	Poles, Towers and Fixtures (Customer)
	Overhead Conductors and Devices (Customer)
	Underground Conduits (Customer)
	Underground Conductors and Devices (Customer)
	Line Transformers (Customer)
	Information Systems Equipment (Connection)
Non-network	Land and Land Rights (non-network)
	Structures and Improvements (non-network)
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment (non-network)
	Power-operated Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
Materials	Materials and supplies (including spares)
	Sub-total Distribution Connection Assets
Regulated Retail Services Assets	
	Meters, Instruments & Metering Transformers
	(Consumer Consumption Metering)
	Land and land rights
	Structures and improvements
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
	Sub-total Regulated Retail Services Assets
TOTAL CAPEX	

ANNEX C: EXPENDITURE SUMMARY

MANILA ELECTRIC COMPANY
Capital Expenditure - Major Projects
Local Expenditure

MERALCO

PROJECT NAME:
Replacement of Power Transformer No. 2 (83 MVA, 115kV-34.5kV) at North Port Substation

CAPITAL EXPENDITURE - MAJOR PROJECTS (LOCAL COMPONENT)

Forecast (PhP, real) (Regulatory Year)

Category		2016	2017	2018	2019
Regulated Distribution Services Assets					
Network	Land and Land Rights (Distribution Purposes)				
	Structures and Improvements (Distribution Purposes)				
	Station Equipment				
	Power transformers	1,930,391			
	Switchgear				
	Protective equipment				
	Metering & control equipment				
	Communications equipment				
	Other station equipment				
	Poles, Towers and Fixtures - Distribution				
	Overhead Conductors and Devices - Distribution				
	Underground Conduits - Distribution				
	Underground Conductors and Devices - Distribution				
	Distribution Transformers				
	Power Conditioning Equipment				
	Meters, Metering Instruments & Metering Transformers - Distribution				
	Information technology equipment (distribution)				
	Regulated Entity Property on Consumer's Premises				
	Street Lights and Signal Systems				
	Submarine Cables				
Non-network	Land and Land Rights (non-network)				
	Structures and Improvements (non-network)				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment (non-network)				
	Power-operated Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
Materials	Materials and supplies (including spares)				
Subtrans	Transferred subtransmission assets				
	Sub-total Regulated Distribution Services	1,930,391	0	0	0
Distribution Connection Services Assets					
Network	Poles, Towers and Fixtures (Customer)				
	Overhead Conductors and Devices (Customer)				
	Underground Conduits (Customer)				
	Underground Conductors and Devices (Customer)				
	Line Transformers (Customer)				
	Information Systems Equipment (Connection)				
Non-network	Land and Land Rights (non-network)				
	Structures and Improvements (non-network)				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment (non-network)				
	Power-operated Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
Materials	Materials and supplies (including spares)				
	Sub-total Distribution Connection Assets	0	0	0	0
Regulated Retail Services Assets					
	Meters, Instruments & Metering Transformers (Consumer Consumption Metering)				
	Land and land rights				
	Structures and improvements				
	Office Furniture and Equipment				
	Transportation Equipment				
	Stores Equipment				
	Tools, Shop and Garage Equipment				
	Laboratory Equipment				
	Information Systems Equipment				
	Communication Plant and Equipment				
	Miscellaneous Equipment				
	Sub-total Regulated Retail Services Assets	0	0	0	0
TOTAL CAPEX		1,930,391	0	0	0

Notes : References to Regulatory Years are for the 12-month period ending on June 30 of the year noted.

HISTORICAL EXPENDITURE CONVERTED TO REAL EXPENDITURE

Category	
Regulated Distribution Services Assets	
Network	Land and Land Rights (Distribution Purposes)
	Structures and Improvements (Distribution Purposes)
	Station Equipment
	Power transformers
	Switchgear
	Protective equipment
	Metering & control equipment
	Communications equipment
	Other station equipment
	Poles, Towers and Fixtures - Distribution
	Overhead Conductors and Devices - Distribution
	Underground Conduits - Distribution
	Underground Conductors and Devices - Distribution
	Distribution Transformers
	Power Conditioning Equipment
	Meters, Metering Instruments & Metering Transformers - Distribution
	Information technology equipment (distribution)
	Regulated Entity Property on Consumer's Premises
	Street Lights and Signal Systems
	Submarine Cables
Non-network	Land and Land Rights (non-network)
	Structures and Improvements (non-network)
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment (non-network)
	Power-operated Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
Materials	Materials and supplies (including spares)
Subtrans	Transferred subtransmission assets
	Sub-total Regulated Distribution Services
Distribution Connection Services Assets	
Network	Poles, Towers and Fixtures (Customer)
	Overhead Conductors and Devices (Customer)
	Underground Conduits (Customer)
	Underground Conductors and Devices (Customer)
	Line Transformers (Customer)
	Information Systems Equipment (Connection)
Non-network	Land and Land Rights (non-network)
	Structures and Improvements (non-network)
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment (non-network)
	Power-operated Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
Materials	Materials and supplies (including spares)
	Sub-total Distribution Connection Assets
Regulated Retail Services Assets	
	Meters, Instruments & Metering Transformers
	(Consumer Consumption Metering)
	Land and land rights
	Structures and improvements
	Office Furniture and Equipment
	Transportation Equipment
	Stores Equipment
	Tools, Shop and Garage Equipment
	Laboratory Equipment
	Information Systems Equipment
	Communication Plant and Equipment
	Miscellaneous Equipment
	Sub-total Regulated Retail Services Assets
TOTAL CAPEX	

ANNEX C: EXPENDITURE SUMMARY

MANILA ELECTRIC COMPANY
Capital Expenditure - Major Projects
Total Expenditure, local and foreign (PhP, real)

MERALCO

PROJECT NAME:
Replacement of Power Transformer No. 2 (83 MVA, 115kV-34.5kV) at North Port Substation

Category		CAPITAL EXPENDITURE - MAJOR PROJECTS (TOTAL, REAL) Forecast (PhP, real) (Regulatory Year)			
		2016	2017	2018	2019
Regulated Distribution Services Assets					
Network	Land and Land Rights (Distribution Purposes)	0	0	0	0
	Structures and Improvements (Distribution Purposes)	0	0	0	0
	Station Equipment				
	Power transformers	54,762,389	0	0	0
	Switchgear	0	0	0	0
	Protective equipment	0	0	0	0
	Metering & control equipment	0	0	0	0
	Communications equipment	0	0	0	0
	Other station equipment	0	0	0	0
	Poles, Towers and Fixtures - Distribution	0	0	0	0
	Overhead Conductors and Devices - Distribution	0	0	0	0
	Underground Conduits - Distribution	0	0	0	0
	Underground Conductors and Devices - Distribution	0	0	0	0
	Distribution Transformers	0	0	0	0
	Power Conditioning Equipment	0	0	0	0
	Meters, Metering Instruments & Metering Transformers - Distribution	0	0	0	0
	Information technology equipment (distribution)	0	0	0	0
	Regulated Entity Property on Consumer's Premises	0	0	0	0
	Street Lights and Signal Systems	0	0	0	0
	Submarine Cables	0	0	0	0
Non-network	Land and Land Rights (non-network)	0	0	0	0
	Structures and Improvements (non-network)	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment (non-network)	0	0	0	0
	Power-operated Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
Materials	Materials and supplies (including spares)	0	0	0	0
Subtrans	Transferred subtransmission assets	0	0	0	0
	Sub-total Regulated Distribution Services	54,762,389	0	0	0
Distribution Connection Services Assets					
Network	Poles, Towers and Fixtures (Customer)	0	0	0	0
	Overhead Conductors and Devices (Customer)	0	0	0	0
	Underground Conduits (Customer)	0	0	0	0
	Underground Conductors and Devices (Customer)	0	0	0	0
	Line Transformers (Customer)	0	0	0	0
	Information Systems Equipment (Connection)	0	0	0	0
Non-network	Land and Land Rights (non-network)	0	0	0	0
	Structures and Improvements (non-network)	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment (non-network)	0	0	0	0
	Power-operated Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
Materials	Materials and supplies (including spares)	0	0	0	0
	Sub-total Distribution Connection Assets	0	0	0	0
Regulated Retail Services Assets					
	Meters, Instruments & Metering Transformers (Consumer Consumption Metering)	0	0	0	0
	Land and land rights	0	0	0	0
	Structures and improvements	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
	Sub-total Regulated Retail Services Assets	0	0	0	0
TOTAL CAPEX		54,762,389	0	0	0

Notes : References to Regulatory Years are for the 12-month period ending on June 30 of the year noted.

ANNEX C: EXPENDITURE SUMMARY

MANILA ELECTRIC COMPANY
Capital Expenditure - Major Projects
Total Expenditure, local and foreign (PhP, nominal)

MERALCO

PROJECT NAME:
Replacement of Power Transformer No. 2 (83 MVA, 115kV-34.5kV) at North Port Substation

CAPITAL EXPENDITURE MAJOR PROJECTS TOTAL (NOMINAL)

Category		Forecast (PhP, nominal) (Regulatory Year) 2016	2017	2018	2019
Regulated Distribution Services Assets					
Network	Land and Land Rights (Distribution Purposes)	0	0	0	0
	Structures and Improvements (Distribution Purposes)	0	0	0	0
	Station Equipment				
	Power transformers	54,762,389	0	0	0
	Switchgear	0	0	0	0
	Protective equipment	0	0	0	0
	Metering & control equipment	0	0	0	0
	Communications equipment	0	0	0	0
	Other station equipment	0	0	0	0
	Poles, Towers and Fixtures - Distribution	0	0	0	0
	Overhead Conductors and Devices - Distribution	0	0	0	0
	Underground Conduits - Distribution	0	0	0	0
	Underground Conductors and Devices - Distribution	0	0	0	0
	Distribution Transformers	0	0	0	0
	Power Conditioning Equipment	0	0	0	0
	Meters, Metering Instruments & Metering Transformers - Distribution	0	0	0	0
	Information technology equipment (distribution)	0	0	0	0
	Regulated Entity Property on Consumer's Premises	0	0	0	0
	Street Lights and Signal Systems	0	0	0	0
	Submarine Cables	0	0	0	0
Non-network	Land and Land Rights (non-network)	0	0	0	0
	Structures and Improvements (non-network)	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment (non-network)	0	0	0	0
	Power-operated Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
Materials	Materials and supplies (including spares)	0	0	0	0
Subtrans	Transferred subtransmission assets	0	0	0	0
	Sub-total Regulated Distribution Services	54,762,389	0	0	0
Distribution Connection Services Assets					
Network	Poles, Towers and Fixtures (Customer)	0	0	0	0
	Overhead Conductors and Devices (Customer)	0	0	0	0
	Underground Conduits (Customer)	0	0	0	0
	Underground Conductors and Devices (Customer)	0	0	0	0
	Line Transformers (Customer)	0	0	0	0
	Information Systems Equipment (Connection)	0	0	0	0
Non-network	Land and Land Rights (non-network)	0	0	0	0
	Structures and Improvements (non-network)	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment (non-network)	0	0	0	0
	Power-operated Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
Materials	Materials and supplies (including spares)	0	0	0	0
	Sub-total Distribution Connection Assets	0	0	0	0
Regulated Retail Services Assets					
	Meters, Instruments & Metering Transformers (Consumer Consumption Metering)	0	0	0	0
	Land and land rights	0	0	0	0
	Structures and improvements	0	0	0	0
	Office Furniture and Equipment	0	0	0	0
	Transportation Equipment	0	0	0	0
	Stores Equipment	0	0	0	0
	Tools, Shop and Garage Equipment	0	0	0	0
	Laboratory Equipment	0	0	0	0
	Information Systems Equipment	0	0	0	0
	Communication Plant and Equipment	0	0	0	0
	Miscellaneous Equipment	0	0	0	0
	Sub-total Regulated Retail Services Assets	0	0	0	0
TOTAL CAPEX		54,762,389	0	0	0

Notes : References to Regulatory Years are for the 12-month period ending on June 30 of the year noted.

ANNEX "D"

Manila Electric Company

COST-BENEFIT-ANALYSIS TEMPLATE

MERALCO
may liwanag ang buhay

Project Name : Replacement of Power Transformer No. 2 (83 MVA, 115kV-34.5kV) at North Port Substation

Brief Description : The project is to replace the defective Power Transformer Bank No. 2 with a new 83 MVA power transformer with OLTC. With the implementation of this alternative, the load requirements of Power Transformer Bank 2 will be served without any dire impacts to the distribution system and customers.

	2016 Year 0	2017 Year 1	2018 Year 2	2019 Year 3	2020 Year 4	2021 Year 5	2022 Year 6	2023 Year 7	2024 Year 8	2025 Year 9	2026 Year 10	2027 Year 11	2028 Year 12	2029 Year 13	2030 Year 14
(Peso amounts in thousands)															
CASH INFLOWS															
Operational Savings															
Avoided cost					59,942.31										
Additional Revenue	6,803.03	6,803.03	6,939.09	6,939.09											
Intangible benefits															
	6,803	6,803	6,939	6,939	59,942	0	0	0	0	0	0	0	0	0	0
CASH OUTFLOWS															
Investment	54,762.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance cost	-	-	32.20	-	32.84	-	33.50	-	34.17	-	3,432.11	-	35.54	-	36.25
Dislocation cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intangible cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Tax Effect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	54,762	0	32	0	33	0	33	0	34	0	3,432	0	36	0	36
NET CASH FLOWS	(47,959)	6,803	6,907	6,939	59,909	0	(33)	0	(34)	0	(3,432)	0	(36)	0	(36)

	30 years
WACC	14.97%

IRR	**15%**	
NPV	**291.89**	(in thousands)
B / C	**1.18**	

2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,569.39	-	36.97	-	37.71	3,712.17	-	39.22	-	40.00	3,860.66	-	40.80	-	41.62	4,015.08
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,569	0	37	0	38	3,712	0	39	0	40	3,861	0	41	0	42	4,015
(3,569)	0	(37)	0	(38)	(3,712)	0	(39)	0	(40)	(3,861)	0	(41)	0	(42)	(4,015)

Manila Electric Company

COST-BENEFIT-ANALYSIS TEMPLATE

MERALCO
may liwanag ang buhay

Project Name : Permanent Loadshift prior to next RP filing

Brief Description : The project pertains to the transfer the loads of North Port Transformer Bank No.2 to adjoining banks particularly Tutuban 83-MVA Bank No. 2 and North Port Bank No. 6 and without replacement of North Port Transformer Bank No.2

	2016 Year 0	2017 Year 1	2018 Year 2	2019 Year 3	2020 Year 4	2021 Year 5	2022 Year 6	2023 Year 7	2024 Year 8	2025 Year 9	2026 Year 10	2027 Year 11	2028 Year 12	2029 Year 13
(Peso amounts in thousands)														
CASH INFLOWS														
Operational Savings	13,690.60	13,690.60	13,690.60	13,690.60										
Avoided cost														
Additional Revenue						-								
Intangible benefits														
	13,691	13,691	13,691	13,691	0	0	0	0	0	0	0	0	0	0
CASH OUTFLOWS														
Investment					59,942.31	-			-	-	-	-	-	-
Maintenance cost	126.27	126.27	3,246.90	3,246.90										
Dislocation cost	139	-	-	-	-	-	-	-	-	-	-	-	-	-
Intangible cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Tax Effect	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	266	126	3,247	3,247	59,942	0	0	0	0	0	0	0	0	0
NET CASH FLOWS	13,425	13,564	10,444	10,444	(59,942)	0	0	0	0	0	0	0	0	0

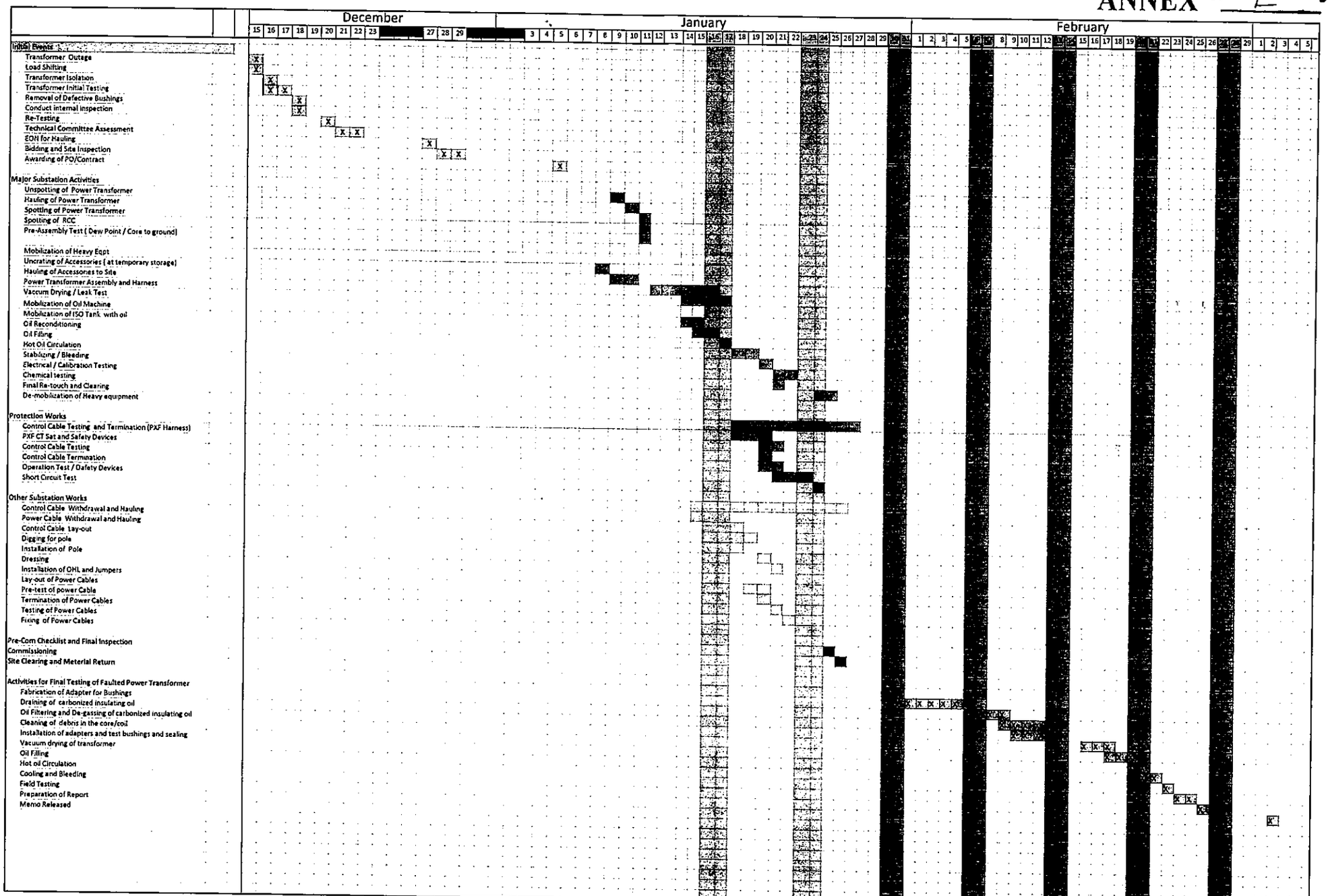
	30 years
WACC	14.97%

IRR	**8.76%**
NPV	**(8,002.21)** (in thousands)
B / C	**0.82**

2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ANNEX "E"

Initial Gantt Chart for the Replacement of North Port Bank 2



ANNEX " B

SUBSTATION PREVENTIVE MAINTENANCE PROCEDURE *POWER TRANSFORMER TEST REPORT*	PM-DSSB-251.02 Rev. Code: 01	Page 1 of 1
	Effectivity Date: February 25, 2011	

Location: NORTH PORT S/S PXF Unit No.: 2 Date Tested: DECEMBER 16, 2015

Make: PAUWELS Serial No.: 98.4.0785 Class: ONAN/ONAF1-2 Type: ORV-50/230

MVA (11) 50/66.67/83.33 Voltage Rating: 110/34.5/13.8KV Oil Temp.: 35°C Wdg. Temp.: 35°C

Tested by: EM, FT, AB, EMZ Weather: NIGHTWORK Ambient Temp.: 25°C % Rel. Humidity: 90

Witnessed by: Mr. J. ECO ( ) PMT ( ) Serviced ( ) Reconditioned ( ) New (/) Faulted ( ) Others

INSULATION POWER FACTOR TEST

Winding	Cap.	mA	watts	% IPF @ ___°C	% IPF @ 20°C
H - G					
X - G					
Y - G	— NOT CONDUCTED —				
H - X					
X - Y					
Y - H					

INSULATION RESISTANCE (meg-ohms)

	Aft. 1 min.		Aft. 10 min		
	500 V	2500 V	500 V	2500 V	P.I.
H - G		4.62			
X - G		2986			
Y - G		4900			
H - X		2800			
X - Y		6320			
Y - H		5230			

TESTS ON THE INSULATING OIL

DBV	IFT	NN	COLOR	% IPF @ 20 °C	WATER CONTENT

TCG Content =

Key Gases that Exceeded Normal Limit

( ) H_2	( ) O_2	( ) C_2H_2	( ) C_2H_6
( ) CO	( ) CO_2	( ) C_4H_4	( ) None

Interpretation:

EXCITING CURRENT MEASUREMENT (mA)

Wndg.	2.5KV	5.0KV	7.5KV	10kv
H H				
H H	— NOT CONDUCTED —			
H H				

TTR TEST: As Fnd Tap:

Winding	As Fnd.	Comp.	% Ratio
— NOT CONDUCTED —			

LOADING

Year			
Max. Load			
Max. Temp.			

LIGHTNING ARRESTERS

Phase	mA	watts
PRIM.A		
PRIM. B		
PRIM. C		
SEC. A		
SEC. B		
SEC. C		
TERT. A		
TERT. B		
TERT. C		

WINDING RESISTANCE

Wndg.	at ___	at 75°C

FULL VOLTAGE EXCITATION

Winding	Core Loss (Watts)

Winding	I ex (amperes)

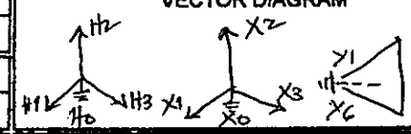
CORE-TO-GRD. INS. RES. (meg-ohms)

at 500V		at 2500V	

VISUAL INSPECTION

Oil Level	LOW OIL LEVEL
Oil Leaks	TOP OF PXF
Dehydrator	OK
Cooling Fans	OK
N_2 Pressure	—

VECTOR DIAGRAM



NO.	Oil Level HI	Oil Level LO	BUSHINGS mA	BUSHINGS watts	BUSHINGS % IPF @ ___°C	BUSHINGS % IPF @ 20°C	Hot Collar mA	Hot Collar watts	BUSHING DATA Make	BUSHING DATA Serial Number	BUSHING DATA Factory % IPF
H1											
H2	BROKEN										
H3											
H0											
X1											
X2	BROKEN										
X3											
X0											
Y1											
Y2 Y0	BROKEN										
Y3											

OIL-CONSERVATION METHOD

( ) Gas-Blanketed / Sealed

(/) Conservator ( ) Other ___

GENERAL CONDITIONS	good	satisfactory	poor	corrosion
Insulating Oil				
Winding Tap-Changer				
Winding Insulation				
Bushings				
Lightning Arresters				
Cooling Fans				

Instruments Used: MG-582

REMARKS: Tested after transformer differential tripping. Results of initial test (with damaged primary and secondary bushings) and visual inspection are as follows: 1.) Relatively low insulation resistance on primary to ground (H-G), 2.) Carbonized insulating oil of on-load tap changer (OLTC), 3.) Carbonized insulating oil of the main tank. Recommended for replacement of damage bushings

Received by: ___ Checked by: ___ Approved by: ___

Retention: EQUIPMENT LIFE

ANNEX "B-1"

SUBSTATION PREVENTIVE MAINTENANCE PROCEDURE *POWER TRANSFORMER TEST REPORT*	PM-DSSB-251.02 Rev. Code: 01	Page 1 of 1
	Effectivity Date: February 25, 2011	

Location: NORTH PORT S/S — PXF Unit No.: 2 — Date Tested: December 20, 20[illegible]

Make: PAUWELS — Serial No.: 98.4.0785 — Class: ONAN-ONAF 1-2 — Type: ORV-50/230

MVA / ~~KVA~~ (1 1) 50/66.67/83.33 — Voltage Rating: 119/34.5/13.8KV — Oil Temp.: 35°C — Wdg. Temp.: 35°C

Tested by: EM, GV, PM, ED — Weather: Fair — Ambient Temp.: 32°C — % Rel. Humidity: 60

Witnessed by: Mr. J. Eco — ( ) PMT ( ) Serviced ( )Reconditioned ( ) New (✓) Faulted ( ) Others

INSULATION POWER FACTOR TEST

Winding	Cap.	mA	watts	% IPF @ ___°C	% IPF @ 20°C
H-G					
X-G					
Y-G	– NOT CONDUCTED –				
H-X					
X-Y					
Y-H					

INSULATION RESISTANCE (meg-ohms)

	Aft. 1 min.		Aft. 10 min		
	500 V	2500 V	500 V	2500 V	P.I.

TESTS ON THE INSULATING OIL

DBV	IFT	NN	COLOR	% IPF @ 20 °C	WATER CONTENT
39	34.7	–	0.5		1.7

TCG Content = 7.31%

Key Gases that Exceeded Normal Limit

(✓) H_2	( ) O_2	(✓) C_2H_2	( ) C_2H_6
( ) CO	( ) CO_2	(✓) C_2H_4	( ) None

Interpretation: Arching w/ high discharge current and temperature (see separate report)

EXCITING CURRENT MEASUREMENT (mA)

Wndg.	2.5KV	5.0KV	7.5KV	10kv
H H				
H H				
H H				

TTR TEST: As Fnd Tap: 1 (121,000V)

Winding	As Fnd.	Comp.	% Ratio
H_0H_1-X_0X_1	3.157	3.507	90.014
H_0H_2-X_0X_2	3.497	3.507	99.708
H_0H_3-X_0X_3	3.494	3.507	99.622

LOADING

Year			
Max. Load			
Max. Temp.			

LIGHTNING ARRESTERS

Phase	mA	watts
PRIM. A		
PRIM. B		
PRIM. C		
SEC. A		
SEC. B		
SEC. C		
TERT. A		
TERT. B		
TERT. C		

WINDING RESISTANCE

Wndg.	at 35°C	at 75°C
H_0H_1	70.5mΩ	81.0mΩ
H_0H_2	169.2mΩ	194.3mΩ
H_0H_3	168.8mΩ	193.9mΩ
X_0X_1	10.87mΩ	12.62mΩ
X_0X_2	10.65mΩ	12.37mΩ
X_0X_3	10.69mΩ	12.41mΩ

FULL VOLTAGE EXCITATION

Winding	Core Loss (Watts)

Winding	I ex (amperes)

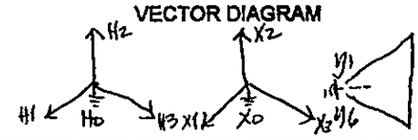
CORE-TO-GRD. INS. RES. (meg-ohms)

at 500V		at 2500V	

VISUAL INSPECTION

Oil Level	LOW OIL LEVEL
Oil Leaks	TOP OF PXF
Dehydrator	OK
Cooling Fans	OK
N_2 Pressure	–

VECTOR DIAGRAM



NO.	Oil Level HI	Oil Level LO	BUSHINGS mA	BUSHINGS watts	BUSHINGS % IPF @ ___°C	BUSHINGS % IPF @ 20°C	Hot Collar mA	Hot Collar watts
H1								
H2								
H3								
H0								
X1								
X2								
X3								
X0								
Y1								
Y2								
Y3								

BUSHING DATA

Make	Serial Number	Factory % IPF

OIL-CONSERVATION METHOD

( ) Gas-Blanketed / Sealed

(✓) Conservator ( ) Other ___

GENERAL CONDITIONS	good	satis	poor	corrit
Insulating Oil				
Winding Tap-Changer				
Winding Insulation				
Bushings				
Lightning Arresters				
Cooling Fans				

Instruments Used: TTR-30, TO-4

REMARKS: Tested without primary and secondary bushings. Results of winding resistance and turns ratio are as follows: 1.) relatively low winding resistance on H_0H_1 winding 2.) Low % turns ratio on H_0H_1-X_0X_1 windings. For final test after replacement of damage bushings and reconditioning of insulating oil.

Received by: _____ Checked by: _____ Approved by: _____

Retention: EQUIPMENT LIFE

ANNEX "B-2"

SUBSTATION PREVENTIVE MAINTENANCE PROCEDURE *POWER TRANSFORMER TEST REPORT*	PM-DSSB-251.02 Rev. Code: 01	Page 1 of 1
	Effectivity Date: February 25, 2011	

Location: NORTH PORT S/S PXF Unit No.: 2 Date Tested: February 24, 2016

Make: PAUWELS Serial No.: 98.4.0785 Class: ONAN/ONAF1-2 Type: ORV-50/230

MVA KVA(I) I) 50/66.67/83.33 Voltage Rating: 110/34.5/13.8kV Oil Temp.: 35°C Wdg. Temp.: 35°C

Tested by: EM, GV, PM, ED Weather: FAIR Ambient Temp.: 32°C % Rel. Humidity: 57

Witnessed by: Mr. J. ECO ( ) PMT ( ) Serviced ( ) Reconditioned ( ) New (✓) Faulted ( ) Others

INSULATION POWER FACTOR TEST

Winding	Cap.	mA	watts	% IPF @ 35 °C	% IPF @ 20°C
H - G		17.0	18.0	10.6	5.40
X - G		6.1	1.1	1.803	0.92
Y - G		63	9.2	1.460	0.74
H - X		33	5.4	1.636	0.83
X - Y		59	10.8	1.831	0.93
Y - H		0.48	0.055	1.222	0.62

INSULATION RESISTANCE (meg-ohms)

Aft. 1 min. 500 V	Aft. 1 min. 2500 V	Aft. 10 min 500 V	Aft. 10 min 2500 V	P.I.
	4.62			
	2984			
	4900			
	2800			
	6320			
	5230			

TESTS ON THE INSULATING OIL

DBV	IFT	NN	COLOR	% IPF @ 20 °C	WATER CONTENT

TCG Content =

Key Gases that Exceeded Normal Limit

( ) H_2	( ) O_2	( ) C_2H_2	( ) C_2H_6
( ) CO	( ) CO_2	( ) C_4H_4	( ) None

Interpretation:

EXCITING CURRENT MEASUREMENT (mA)

Wndg.	2.5KV	5.0KV	7.5KV	10kv
H_0H_1	- H164 EXCITING CURRENT -			
H_0H_2				
H_0H_3				

TTR TEST: As Fnd Tap: 1 (121.000V)

Winding	As Fnd.	Comp.	% Ratio
H_0H_1-X_0X_1	3.457	3.507	90.014
H_0H_2-X_0X_2	3.497	3.507	99.708
H_0H_3-X_0X_3	3.494	3.507	99.622

LOADING

Year				
Max. Load				
Max. Temp.				

LIGHTNING ARRESTERS

Phase	mA	watts
PRIM. A		
PRIM. B		
PRIM. C		
SEC. A		
SEC. B		
SEC. C		
TERT. A		
TERT. B		
TERT. C		

WINDING RESISTANCE

Wndg.	at 35°C	at 75°C
H_0H_1	70.5mΩ	81.0mΩ
H_0H_2	169.2mΩ	194.3mΩ
H_0H_3	168.8mΩ	193.9mΩ
X_0X_1	10.87mΩ	12.62mΩ
X_0X_2	10.65mΩ	12.37mΩ
X_0X_3	10.69mΩ	12.41mΩ

FULL VOLTAGE EXCITATION

Winding	Core Loss (Watts)

Winding	I ex (amperes)

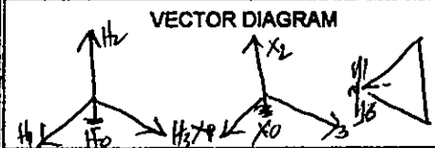
CORE-TO-GRD. INS. RES. (meg-ohms)

at 500V		at 2500V	

VISUAL INSPECTION

Oil Level	LOW OIL LEVEL
Oil Leaks	TOP OF PXF
Dehydrator	OK
Cooling Fans	OK
N_2 Pressure	—

VECTOR DIAGRAM



NO.	Oil Level HI	Oil Level LO	BUSHINGS mA	BUSHINGS watts	BUSHINGS % IPF @ °C	BUSHINGS % IPF @ 20°C	Hot Collar mA	Hot Collar watts
H1								
H2								
H3			NOT CONDUCTED					
H0								
X1			W/ TEMPORARY BUSHINGS					
X2	o	/	ONLY					
X3								
X0								
Y1								
Y2 Y6								
Y3								

BUSHING DATA

Make	Serial Number	Factory % IPF

OIL-CONSERVATION METHOD

( ) Gas-Blanketed / Sealed

(✓) Conservator ( ) Other

GENERAL CONDITIONS	good	satisfi	poor	orit
Insulating Oil				
Winding Tap-Changer				
Winding Insulation				
Bushings				
Lightning Arresters				
Cooling Fans				

Instruments Used: DTC-1K, MG-584, TTR-30, TD-4

REMARKS: Final test after replacement of all damage bushings and reconditioning of oil. Below is the summary of findings:

1.) low % ratio (90.014%) at H_0H_1-X_0X_1 wdg., 2.) low wdg. resistance at H_0H_1 wdg., 3.) High exciting current on H_0H_1 wdg. 4) High %IPF at primary to ground (H-G) wdg. Above transformer is declared defective and recommended for replacement.

Received by: _____ Checked by: _____ Approved by: _____

Retention: EQUIPMENT LIFE

Republic of the Philippines **ANNEX "C"**
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. _____

MANILA ELECTRIC COMPANY (MERALCO),

Applicant.
x----------x

JUDICIAL AFFIDAVIT
OF ENGR. JOSE MARI P. MELENDRES

I, **JOSE MARI P. MELENDRES**, Filipino, of legal age, married and with office address at 4th floor, Technical Services Building, Ortigas Avenue, Barangay Ugong, Pasig City, Philippines after being sworn to in accordance with law, fully conscious that I am answering the questions under oath and with knowledge that I may face criminal liability for false testimony and perjury, hereby depose and state THAT:

Q1: What are your professional and educational qualifications?

A1: I am a licensed Professional Electrical Engineer. I passed the PEE Board Examination in 2004.

I have a Bachelor of Science degree in Electrical Engineering from Mapua Institute of Technology and a Master of Science in Electrical Engineering from University of the Philippines.

Q2: Where are you presently employed?

A2: I am presently employed at Manila Electric Company (MERALCO) as Vice President and Head of the Sub-transmission Services Office. Prior to that, I held the following positions: (a) Head of Substation Services Asset Management (SSAM) effective April 11, 2011 and (b) Head of Substation since April 1, 2006.

Q3: How long have you been employed by MERALCO?

A3: I have been employed by MERALCO for thirty-two (32) years.

Q4: What are your duties and responsibilities as Vice President and Head of MERALCO's Sub-transmission Services Office?

A4: The following, among other things, are my principal duties and responsibilities:

My major responsibilities as Sub-transmission Services Head include the Sub-transmission Lines, Substation, Power System Protection, SCADA and Testing. As Substation Services Asset Management Head, I manage Sub-transmission Process Management, Maintenance Planning and Performance Management and Development of Sub-transmission Standards. Basically as Head of Sub-transmission Office, my responsibilities include the construction, commissioning, operation, testing and maintenance of all MERALCO sub-transmission lines, substations, protective relays and SCADA.

Q5: Are you familiar with the Application of MERALCO entitled, "**IN THE MATTER OF THE APPLICATION FOR APPROVAL OF THE EMERGENCY INSTALLATION OF ONE (1) 83 MVA POWER TRANSFORMER AT NORTH PORT SUBSTATION**"?

A5: Yes. I am familiar with said Application as I have participated in the preparation of the said Application as well as its supporting documents.

Q6: What is the legal basis for filing of the instant Application?

A6: 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.

Further, 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.

Q7: What is the Application all about?

A7: In brief, the Application seeks the Honorable Commission's approval of the emergency installation of one (1) 83 MVA, 115 kV– 34.5 kV, three-phase power transformer with On-Load Tap Changer (OLTC) as a replacement for the North Port Substation's defective Power Transformer Bank No. 2. A copy of the Emergency CAPEX Project Information Summary is hereto attached as Annex "A".

(The witness showed and identified the original copy of the above-mentioned document to the counsel.)

Q8: What is the emergency Capital Expenditure project that is subject of the instant Application?

A8: The emergency CAPEX pertains to the installation of one (1) 83 MVA, 115 kV – 34.5 kV, three-phase power transformer with On-Load Tap Changer (OLTC) as a replacement for the North Port Substation's defective Power Transformer Bank No. 2.

As a background, 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, Power Transformer Bank Nos. 3, 4 and 5 are drawing power from Bank Nos. 1, 2 and 6.

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).

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.

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 H1H0 windings and low % turn ratio on H0H1-X0X1 windings, and confirmed that there was a need to replace the bushings and recondition the insulating oil.

Attached as Annexes "B" and "B– 1" are the results of the said tests on Power Transformer Bank No.2.

(The witness showed and identified the original copies of the above-mentioned documents to the counsel.)

Considering the failure of the North Port Power Transformer Bank No. 2, its load had to be transferred 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.

With such a setup, the North Port Bank No. 6 had to be operated above critical level at 80.1%. This may adversely affect the quality of electric service to the various major and vital customers in the area such as University of Santo 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.

As stop-gap measures to the possible adverse effects of load shifting to customers in the area and distribution system, Applicant temporarily installed and used an available 83 MVA Power Transformer to replace the North Port Power Transformer Bank No. 2 so that the latter power transformer can be pulled out for further testing and in order to normalize the level of quality of electric service of the affected customers in the City of Manila.

The new Power Transformer was energized on 26 January 2016.

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.

On 24 February 2016, a final test was conducted on the power transformer with replaced bushings. The result of the final test was released on 03 March 2016 where the Power Transformer Bank No. 2 was declared defective since the measured turns ratio of 90.01% on H0H1-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.

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

Attached as Annex "B-2" is the result of the final test on Power Transformer Bank No.2.

(The witness showed and identified the original copy of the above-mentioned document to the counsel.)

Q9: Why was there a need to implement the emergency project?

A9: The immediate implementation of the project was necessary for the following reasons:

a. Power Transformer Bank No.2 failed the above-mentioned tests. It was found defective and needed to be replaced;

b. The tripping out of North Port Power Transformer Bank No. 2 necessitated the transfer of its loads to adjacent power transformers with 115kV-34.5 kV rating such as North Port 133 MVA Bank No. 6 and Tutuban 83 MVA Bank No. 2. Load shifting caused the North Port Bank No. 6 to be loaded above the critical level of 80.1% that can adversely affect the quality of electric service to the customers in Manila. Shown below are the projected 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

c. As shown in the tables, the implementation of the project resulted to a lower system loss in the affected area at 8,229,062 kWh

as compared to when the same is not implemented at 8,479,172 kWh; and

d. The implementation of the project restored the normal distribution line flexibility and ultimately ensure the reliability of the distribution system.

Q10: What was the cost of the emergency project?

A10: 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 EIGHT EIGHT & 98/100 (Php54,762,388.98).** This amount also includes costs of transformer oil, taxes, duties, brokerage, trucking services and installation. The immediate implementation of the project is necessary for the following reasons.

Q11: Can you tell us why you are executing this Judicial Affidavit?

A11: I am executing this Judicial Affidavit to attest to the truthfulness and veracity of the foregoing statements and in support of MERALCO's Application.

IN WITNESS WHEREOF, I have hereunto affixed my signature this 4th day of April 2016 at Pasig City, Philippines.

JOSE MARI P. MELENDRES
Affiant

Republic of the Philippines)
City of Pasig)S.S.

ATTESTATION

I, **ADRIAN REX C. DIMALANTA**, of legal age, Filipino, with business address 7th floor, Lopez Building Ortigas Avenue, Barangay Ugong, Pasig City after being duly sworn depose and say:

1. I conducted the direct examination of **ENGR. JOSE MARI P. MELENDRES**, the witness to testify on matters in support of the Application entitled "**IN THE MATTER OF THE APPLICATION FOR APPROVAL OF THE EMERGENCY INSTALLATION OF ONE (1) 83 MVA POWER TRANSFORMER AT NORTH PORT SUBSTATION,**" at the afore-mentioned business address;

2. I have faithfully recorded the questions asked and the corresponding answers that were given by the witness; and

3. Neither I nor any other person then present or assisting him coached the witness regarding his answers.

IN WITNESS WHEREOF, I have hereunto set my hand this 4th day of April 2016 at Pasig City.

ADRIAN REX C. DIMALANTA
Affiant

SUBSCRIBED AND SWORN to before me this 7th day of April 2016 by affiant **ENGR. JOSE MARI P. MELENDRES** who showed his SSS ID with No.0368772229 and **ATTY. ADRIAN REX C. DIMALANTA** who exhibited his SSS No. 3421328300.

Doc. No. 283;
Page No. 58;
Book No. III;
Series of 2016.

ATTY. MONICA M. MARTIN
NOTARY PUBLIC
Pasig, Pateros, Taguig & San Juan
Issued on July 13, 2015 at Pasig City
until December 31, 2016
Roll No. 55693; IBP No. 1023726; 01/08/16; RSM Chapter
PTR No. 1473411; 01/21/16; Pasig City
7th Floor, Lopez Bldg., Ortigas Ave., Pasig City

MERALCO

ORTIGAS AVENUE, PASIG CITY
0300 PHILIPPINES

ANNEX "D"

SECRETARY'S CERTIFICATE

I, WILLIAM S. PAMINTUAN, a duly elected, qualified and incumbent Assistant Corporate Secretary of the Manila Electric Company (MERALCO), a corporation duly organized and existing under and by virtue of the laws of the Philippines, do hereby certify that:

At the regular meeting of the Board of Directors of the Company duly convened and held on February 23, 2015, at which meeting a quorum was present, acted throughout and voted, the following resolution amending the resolution of the Board on January 27, 2014 on the same subject, was approved and that said amendatory resolution is in full force and effect on the date hereof:

"RESOLVED, that the Board of Directors of the Manila Electric Company (MERALCO) authorize, as it hereby authorizes, Messrs. MANUEL V. PANGILINAN, Chairman, OSCAR S. REYES, President & Chief Executive Officer, SIMEON KEN R. FERRER, Corporate Secretary, ALFREDO S. PANLILIO, Senior Vice President, Head, Customer Retail Services and Head, Corporate Communication, RAMON B. SEGISMUNDO, Senior Vice President & Head, Human Resources & Corporate Services, ROBERTO R. ALMAZORA, Senior Vice President, RAFAEL L. ANDRADA, First Vice President & Treasurer, RUBEN B. BENOSA, First Vice President & Head, Corporate Logistics, Ms. IVANNA G. DELA PEÑA, First Vice President & Head, Regulatory Management Office, WILLIAM S. PAMINTUAN, First Vice President, Assistant Corporate Secretary, Compliance Officer and Head, Legal and Corporate Governance, RONNIE L. APEROCHO, First Vice President & Head, Networks, MARTHYN S. CUAN, Vice President & Head, Corporate Information and Technology, JOSE RONALD V. VALLES, Vice President and Head, Regulatory Affairs, MARIA ZARAH R. VILLANUEVA-CASTRO, Senior Assistant Vice President & Head, Corporate Legal Services, HORATIO ENRICO M. BONA, Assistant Vice President & Head, Litigation Team 2, RAUL G. CORALDE, Assistant Vice President & Head, Litigation Team 1, MICHELLE O. DELOS SANTOS-BONA, Assistant Vice President & Head, Legal Operations Support, EUGENE JUDE DENIS GERARD E. ALABANZA, Senior Manager & Head, Litigation Team 3, CORNELIO MANUEL C. DICCION, Manager & Legal Counsel, and any lawyer or employee of MERALCO that any of them may designate, name or appoint:

(1) to represent the Company, in the institution, prosecution, and defense of any claim, complaint, action, proceeding, petition, application, protest, suit, or case, for or against the Company, before any court, prosecutor's office, regulatory, quasi-judicial, or administrative body, agency, or office of the national or any local government;

(2) to sign, execute, and deliver in connection therewith the necessary or appropriate complaint, petition, application, position paper, memorandum, all types of pleadings and motions, verifications, affidavit-complaint, counter-affidavit, affidavit of merit, affidavit of desistance, affidavit of witness, and all other affidavits of whatever nature, certificate of non-forum shopping,

powers of attorney, certifications, and all other instruments as may be necessary or proper;

(3) to represent the Company or to designate, name, and appoint a representative or an attorney-in-fact in behalf of the company during the investigation, inquest, preliminary investigation, preliminary conference, pre-trial, mediation, conciliation, arbitration, trial, execution, and all other stages of or incidents related to the case, proceeding or action; to negotiate, enter into, and agree to an amicable settlement, compromise agreement, plea bargaining, admissions or stipulations of fact or documents, simplification of issues, limitation on the number of witnesses, alternative modes of dispute resolution, withdrawal, dismissal or waiver of claim or action; and to perform and execute any and all actions or deeds as may aid in the prompt disposition of such cases, proceedings, or actions filed in behalf of or against the Company;

"RESOLVED, FURTHER, that any previous resolution of the Board of Directors on the same subject matter that is inconsistent herewith shall be deemed terminated, superseded and revoked."

Pursuant to the above resolutions, it is hereby certified that MERALCO is authorized to file the Application, entitled "IN THE MATTER OF THE APPLICATION FOR APPROVAL OF THE EMERGENCY INSTALLATION OF ONE (1) 83 MVA POWER TRANSFORMER AT NORTH PORT SUBSTATION," with the Energy Regulatory Commission (ERC), and that Mr. Ronnie L. Aperocho, Senior Executive Vice President and Head, Networks, is an authorized representative and signatory of the Company with respect to the aforesaid Application.

WITNESS THE SIGNATURE of the undersigned as such officer of the Company and its corporate seal hereunto affixed on this 30 MAR 2016 day of March 2015.

WILLIAM S. PAMINTUAN
Assistant Corporate Secretary

SUBSCRIBED AND SWORN to before me this 30 MAR 2016 day of March 2015, affiant exhibited to me his Taxpayer Identification Number (TIN) 146-473-562, issued by the Bureau of Internal Revenue (BIR) as his competent evidence of identity.

Doc. No. 299;
Page No. 62;
Book No. II;
Series of 2016.

ATTY. RAYMOND B. YAP
NOTARY PUBLIC
Pasig, Patorns, Taguig & San Juan
Issued on April 6, 2015 at Pasig City
until December 31, 2016
Roll No. 55889; IBP No. 1023728; 01/08/16; Capiz
PTR No. 1473414; 01/21/16; Pasig City
7th Floor, Lopez Bldg., Ortigas Ave., Pasig City

Republic of the Philippines
SANGGUNIANG PANLUNGSOD
City Government of Pasig

ACKNOWLEDGEMENT

This is to acknowledge the receipt of a copy of Manila Electric Company's (MERALCO) verified Application entitled "IN THE MATTER OF THE APPLICATION FOR APPROVAL OF THE EMERGENCY INSTALLATION OF ONE (1) 83 MVA POWER TRANSFORMER AT NORTH PORT SUBSTATION", with **attached Annexes**, being served by MERALCO, prior to its filing with the Energy Regulatory Commission (ERC).

This acknowledgement is being issued upon the request of MERALCO for whatever legal intents and purposes it may served.

Issued this **7th** day of **April 2016** at Pasig City.

LOIDA U. VILLANUEVA
Acting City Council Secretary

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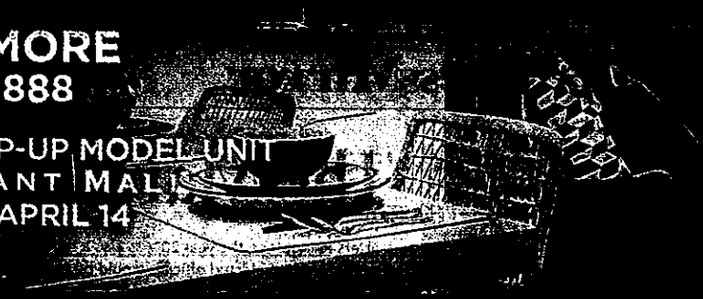

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'In-city relocation best way to address housing backlog'

BusinessMirror@10

By Jovee Marie N. dela Cruz

LAWMAKERS and multisector stakeholders are one in saying that the way forward to addressing the rising housing backlog

5.5M

The estimated housing backlog in the country today

BM Reports Extra

THE MARCOS CHRONICLES

'shore dealings thrust into Panama Papers spotlight

l HSBC Holdings anks hardest-hit amid on customers' illicit e now starring in a nts detailing how they thousands of offshore

through reputable financial institutions, which are bound by so-called Know Your Customer laws, the group quoted her as saying.

Asked about details of the ICIJ story, UBS Spokesman Marsha Askins said the bank decided to end the relationship with the law firm years ago.

"Your question refers to services concerning the setup and administration of offshore companies using third-party providers, which UBS proactively decided to discontinue in 2010," she said in a written statement. "This process happened in stages and has been completed."

HSBC, in a statement, said it works closely with authorities to fight financial crime and implement sanctions.

"Our policy is clear that offshore accounts can only remain open either where clients have been thoroughly vetted [including due diligence, Know Your Customer, source of wealth, and tax transparency checks], where authorities ask us to maintain an account for the purposes of monitoring activity, or where an account has been frozen based on sanctions obligations," the bank said.

Journalists working with the consortium pored through millions of pages of documents leaked from the law firm to piece together what they alleged was a global web of shell companies that helped hide wealth of world leaders and criminals, among others. The records outlined the creation of more than 200,000 offshore companies in all, according to the ICIJ. Almost 15,600 shells were registered by more than 500 banks in recent decades, according to its analysis.

While companies that shield owners' identities can be used legally, they can also be tools for hiding assets, laundering funds or evading taxes. The US, among other countries, require banks doing business in the country to perform certain levels of due diligence on their clients to understand who the beneficial owners of such structures may be. Still, the revelations may complicate relations between banks in developed nations and those in still developing countries, said Peter Hahn, a professor at London's Institute of Financial Services.

"Leading bank chairman and CEOs will have a tough night's sleep worrying and wondering about whether their organization have touched these deals regardless of whether their activities were legal or how long ago they happened," Hahn said. *Bloomberg News*

s probe banks candal spreads

ate with any legal probe resulting from the data leak, Agence France-Presse reported. The reports allege that politicians, criminals nd celebrities worldwide have used banks nd shell companies to hide their finances.

"This leak is proof that, despite explicit bank-

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. _____

MANILA ELECTRIC COMPANY (MERALCO),
Applicant.
x----------x

APPLICATION

Applicant **MANILA ELECTRIC COMPANY (MERALCO)**, through the undersigned counsel, and to this Honorable Commission, most respectfully avers that:

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 H0H1-X0X1 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%

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;
- **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.

Pasig City, 04 April 2016.

MANILA ELECTRIC COMPANY
Applicant
Lopez Building,
Ortigas Avenue,
Barangay Ugong, Pasig City

By:

JOSE RONALD V. VALLES
Roll of Attorneys No. 42281
PTR No. 1473406; 01/21/16; Pasig City
IBP No. 1023722; 01/08/16; RSM
MCLE Compliance No. V-0002590; 9 June 2014

FRANCIS DINO S. ANTONIO
Counsel for Applicant
Roll of Attorneys No. 48145
PTR No. 1473407; 01/21/16; Pasig City
IBP No. 1023724; 01/08/16; RSM
MCLE Compliance No. V-0004808; 6 November 2014

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MONICA M. MARTIN
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PTR No. 1473411; 01/21/16; Pasig City
IBP No. 1023726; 01/08/16; RSM
MCLE Compliance No. V-0002591; 9 June 2014

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Ortigas Avenue, Barangay Ugong, Pasig City
Tel no. 1622-2260; Fax No: 1622-3550
Email: regulatory.legal.admin@meralco.com.ph

Republic of the Philippines)
City of Pasig) S.S.

VERIFICATION
and CERTIFICATION ON NON-FORUM SHOPPING

I, RONNIE L. APEROCHO, of legal age, married, with office address at Manila Electric Company, Technical Services Building, Meralco Center, Ortigas Avenue, Pasig City, hereby state under oath that:

1. I am the First Vice President and Head of Networks, Manila Electric Company, who is authorized to represent it in this

through reputable financial institutions, which are bound by so-called Know Your Customer laws, the group quoted her as saying.

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probe banks andal spreads

with any legal probe resulting from the a leak, Agence France-Presse reported. e reports allege that politicians, criminals d celebrities worldwide have used banks d shell companies to hide their finances. "This leak is proof that, despite explicit bank- laws against tax evasion, criminal uses and ney laundering, the global offshore shell ne business remains open for the wealthy well connected," Mark Williams, a lecturer oston University and author of *Uncontrolled* , a book on the rise and fall of Lehman thers Holdings Inc., said in an email. "More ressive enforcement needs to be exercised nst those firms that aid and abet." finma, the Swiss regulator, said in an ail it intends to "clarify" the extent to ch Swiss banks may have used the serv- of Mossack Fonseca and whether banks ited Swiss provisions or banking super- ry rules. Shell companies and offshore ings can be legal. fore than 500 banks in all requested that sack Fonseca and a predecessor firm cre- nell companies for their clients from 1977 ugh the end of 2015, according to the These included HSBC Group Plc. Credit e and UBS AG, according to a summary iled by the group. The banks, in com- s, denied any wrongdoing. ne Dutch central bank, which is looking trust companies and the potential for y laundering in professional soccer, ake the Panama files into account in the , the Finance Ministry said. *Bloomberg News*

Applicant.

x----------x

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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

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

Pasig City, 04 April 2016.

MANILA ELECTRIC COMPANY
Applicant
Lopez Building,
Ortigas Avenue,
Barangay Ugong, Pasig City

By:

JOSE RONALD V. VALLES
Roll of Attorneys No. 42281
PTR No. 1473406; 01/21/16; Pasig City
IBP No. 1023722; 01/08/16; RSM
MCLE Compliance No. V-0002590; 9 June 2014

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PTR No. 1473407; 01/21/16; Pasig City
IBP No. 1023724; 01/08/16; RSM
MCLE Compliance No. V-0004608; 6 November 2014

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Republic of the Philippines)
City of Pasig) S.S.

VERIFICATION
and CERTIFICATION ON NON-FORUM SHOPPING

I, RONNIE L. APEROCHO, of legal age, married, with office address at Manila Electric Company, Technical Services Building, Meralco Center, Ortigas Avenue, Pasig City, hereby state under oath that:

1. I am the First Vice President and Head of Networks, Manila Electric Company, who is authorized to represent it in this Application as per the attached Secretary's Certificate (Annex "D");

2. I have caused the preparation of the instant Application and read the contents thereof, and I attest that the allegations herein contained are true and correct based on my personal knowledge and on authentic records;

3. I have not commenced any other action or proceeding involving the same issues in the Supreme Court, the Court of Appeals or any court, tribunal, or quasi-judicial agency and, to the best of my knowledge, no such other action or claim is pending therein; and,

4. Should I hereinafter learn that the same or a similar action or claim has been filed or is pending in the Supreme Court, the Court of Appeals or any court, tribunal, or quasi-judicial agency, I shall report the said fact within five (5) days from discovery thereof to this Honorable Commission.

RONNIE L. APEROCHO
Affiant

SUBSCRIBED and SWORN to before me this ____ day of APR 05 2016 2016, affiant exhibited to me his SSS ID No. 03-15624854 issued in the Philippines.

Doc. No. 260;
Page No. 57;
Book No. II;
Series of 2016.

ATTY. MONICA M. MARTIN
NOTARY PUBLIC
Appointment No. 6 Until December 31, 2016
Roll No. 55693; IBP No. 1023726; 01/08/16; RSM Chapter
PTR No. 1473411; 01/21/16; Pasig City

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

ACCOUNTABLE FORM NO. 51 (ORIGINAL)
Revised January, 1992

Official Receipt of the Republic of the Philippines

0006496

No. 0006496

Date 4/8/2016

Agency ENERGY REGULATORY COMMISSION Fund 101

Payor Manila Electric Company (MERALCO)

Nature of Collection	Account Code	Amount
Filing Fee	4-02-01-130	₱ 700.00
~~UFLRF~~	~~2-99-99-999~~	~~10.00~~
~~2016 SCMD 0013~~ TOTAL		₱ 710.00

Amount in Words seven hundred ten pesos only

	Drawee Bank	Number	Date
☒ Cash			
☐ Check			
☐ Money Order			

Received the amount stated above.

MILA A. MIRANDA
Cashier II

Collecting Officer

NOTE: Write the number and date of this receipt on the back of check or money order received.

STATEMENT OF ACCOUNT

ENERGY REGULATORY COMMISSION
http://www.erc.gov.ph
Pacific Center Building
San Miguel Ave, Pasig City
Phone 689-5372 loc.5378 Fax 638-4519

STATEMENT NO : 2016-SCMD-0913

BILL TO : MANILA ELECTRIC COMPANY (MERALCO)
Ortigas Avenue, Pasig City

DATE ISSUED : April 07, 2016

DUE DATE : April 12, 2016

PARTICULARS	AMOUNT
In the matter of the application for Approval of the Emergency Installation of one (1) 83 MVA Power Transformer at North Port S/S(Revenue Code: 4-02-01-010)	700.00
UPLRF(Revenue Code: 4-02-01-010)	10.00
TOTAL AMOUNT (PhP)	710.00

SEVEN HUNDRED TEN PESOS

Approved by : ATTY. ALFREDO P. VERGARA JR.
OIC, LEGAL SERVICE

Approved by : ATTY. FLORESINDA B. DIGAL
DIRECTOR III, ROS

Attested by : ZYWEEN A. SEVILLENO
BILLING SECTION