

GUIDELINES FOR THE MONITORING OF POWER QUALITY STANDARDS FOR DISTRIBUTION UTILITIES

Topic/Issue	Comments/Suggestions	Reference Provision
GUIDELINES	<p><u>EDWIN B. CANO</u></p> <ol style="list-style-type: none"> 1. LDVV is emphasized as the main voltage quality indicator. Voltage swells, voltage sags, voltage unbalance and harmonics are given little importance. These power quality problems are more frequent in distribution systems especially to industrial and commercial customers connected at three-phase supply. Suggestion: adopt the Institute of Electrical and Electronics Engineers (IEEE) accepted voltage quality indices in the paper “Indices for Assessing Utility Distribution System RMS Variation Performance”, [1]. These IEEE indices are focused on all voltage problems. 2. There was no statement about the instrument that will be used for testing. I assume the instrument that will be used for measurements is a Power Quality Analyzer, for duration and magnitude can only be read by such instrument. The instrument, Power Quality Analyzer, which will be used for testing/measurement, must be of calibrated status. This will give good standing for the measurement and the instrument. The standard must emphasize the word “calibrated” with regards to the instrument. <p><u>CEDC</u> For small Distribution Utilities, there could be problems regarding shortage in manpower and resources to conduct a</p>	<p>Pursuant to Section 43 (b) of Republic Act No. 9136, Rule 3 Section 4 (g) of its Implementing Rules and Regulations, and Articles 3.2 and 5.2 of the Philippine Distribution Code (PDC), the Energy Regulatory Commission (ERC) hereby adopts and promulgates the following Guidelines for the Enforcement of Power Quality Standards.</p>

	<p>monthly voltage survey of all connection points. What might be practicable is to measure selected connection points in a feeder or circuit. The selected connection points shall then be changed from month to month until such time that all customers will be covered by this voltage survey. By doing so, the distributor would be able to immediately make the necessary adjustments like changing the tap changer setting of the distribution transformers to be able to meet the prescribed voltage variation limits.</p>	
Scope	<p><u>THERMOSCAN SERVICES, INC.</u> Suggest addition of a category "f" - "f" – Customer and/or End User A person or entity supplied with electric service under a contract with a Distributor or Supplier. Any person or entity requiring the supply and delivery of electricity for its own use.</p>	<p>Article 2. Section 1. Scope. These Guidelines shall apply to: a) Privately-owned Distribution Utilities; b) Electric Cooperatives; c) Local government unit owned-and-operated Distribution Utilities; d) Entities duly authorized to own, operate and maintain Distribution facilities within the economic zones; and e) Other duly authorized entities engaged in the Distribution of Electricity.</p>
Definition of Terms	<p><u>THERMOSCAN SERVICES, INC.</u> Suggest inclusion of definition of harmonics and Non-linear equipment or devices as paragraph "g" and "k", respectively: "g" – Harmonics shall be defined as sinusoidal voltages and currents having Frequencies that are integral multiples of the fundamental frequency. "k" – Non-Linear Equipment or Device. A component in an electrical installation utilizing silicon controlled rectifiers (SCRs) or similar switching power supplies that distort the sine waveform and produce harmonic currents or voltages that are integer multiples of the fundamental.</p>	<p>Article 2. Section 2. Definition of Terms.</p>
VOLTAGE VARIATION	<p><u>BENECO</u> This is on the assumption that the delivery voltage at the</p>	<p>Article 3. Voltage Variation</p>

	<p>connection point of the DU and NPC/TRANSCO/GENCO are within the power quality standards provided in Chapter 3.2 of the Philippine Grid Code. What happens if the power quality standards are not met at the connection point of the DU and NPC/TRANSCO/GENCO (not the DU's fault) that resulted to variations at connection point of the DU and its customers? Will the DU be penalized?</p>	
Nominal Voltage	<p><u>MERALCO</u> Meralco maintains several nominal voltages in its franchise area. Is a list of these nominal voltages necessary? Some of the nominal voltages we are maintaining are:</p> <ul style="list-style-type: none"> - 230 / 115 volts for old accounts with dual voltage service - 216 / 125 volts for Network Area - 34.5 kV for distribution lines - 69 KV and 110 KV for subtransmission lines 	<p>Article 3. Section 1. Nominal Voltage. Each Distributor shall adopt a standard Nominal Voltage or voltages which are consistent with the design of the Distribution System for its entire service area and for each of the districts, zones, or work centers into which the Distribution Systems are divided.</p>
Limits	<p><u>EDWIN B. CANO</u> The monitoring of voltage at the Connection Points, which is defined in the standard as the points where MV customers are connected/metered or the primary of the distribution transformers (DT) in the case of low voltage customers is too much in terms of monitoring points. There are many and maybe thousands of DTs installed in a franchise area so these monitoring points may not be realistic. In the paper "RMS Voltage Variation Statistical Analysis for a Survey of Distribution System Power Quality Performance", [2], a site selection process was arranged for voltage monitoring points. I suggest this procedure. I have attached the paper [2] for your verification. Another thing is that monitoring must be done by load classification (i.e. industrial, commercial and residential). This will be helpful to both DU and customer since voltage level and quality will be different from the</p>	<p>Article 3. Section 2. Limits. Each Distributor shall ensure that no under-voltage or over-voltage is present at the connection point of any User during normal operating conditions. For this standard, connection points shall be considered as the points where medium voltage customers are connected/metered or the primary of the distribution transformers in the case of low voltage customers.</p> <p>A Long Duration Voltage Variation is an Under-Voltage if the RMS Value of the voltage is less than or equal to 90 percent of the nominal voltage.</p> <p>A Long Duration Voltage Variation is an Over-voltage if the RMS Value of the voltage is greater than or equal to 110 percent of the nominal value.</p>

	<p>different types of loads.</p> <p><u>DLPC</u> Definition of Connection Point. This should be defined clearly as this has been used a lot of times in the guidelines. We can use the definition used in the PDC.</p> <p><u>VECO</u> For this standard, connection points shall be considered as the points where medium voltage customers are connected/metered or the primary of the distribution transformers in the case of low voltage customers.</p> <p><u>MERALCO</u> For Clarification What will be the connection points for customers connected to 69KV and 115 kV since this section only covers medium voltage (above 1 kV up to 34.5kV) and low voltage (1 kV and below) customers?</p>	
<p>Measurement Procedures</p>	<p><u>EDWIN B. CANO</u> The section presents DU personnel makes the measurements without any third party or technical witness or ERC representative. See Philippine Distribution Code (PDC) Section 7.9.1.3. I suggest there would be some kind of a person who will provide check and balance to the testing; it would be helpful if Institute of Integrated Electrical Engineers (IIEE) member/representative will be commissioned to witness the testing.</p> <p><u>VECO</u></p>	<p>Article 3. Section 3. Measurement Procedures. A Distributor shall make voltage measurements for detecting variations at the metering point or at a convenience outlet of a Medium Voltage customer.</p> <p>The voltage at the primary of a distribution transformer, which serves as connection point for Low Voltage customers, can be measured at the metering point or at a convenience outlet of the first customer served by the distribution transformer.</p> <p>The voltage at the primary of a distribution transformer can</p>

<p>The voltage at the primary of a distribution transformer can be computed, by multiplying the measured voltage at the metering point or at the convenience outlet of the first customer served by the distribution transformer with the nominal primary voltage, divided by the nominal secondary voltage.</p> <p>Comments: how is this done?</p> <p><u>MERALCO</u> Include the customer main switch in the allowed voltage measurement locations for both medium voltage and low voltage customers.</p> <p>The computation of the primary voltage of a DT using the measured secondary voltage is relatively easy to comply with since the prevailing tap-position of the DT is disregarded. If we are required to account for the taps in the computation, the results may show that we are not compliant in the voltage requirements in some areas. Another problem is that the taps of the transformers are not always visible externally. This will require a database for the tap setting of our more than 100,000 installed DTs.</p> <p><u>CEPALCO</u></p> <ol style="list-style-type: none">1. The proposal to measure every month the voltage variations at the secondary side of ALL distribution transformers will be costly to implement. We suggest that for low voltage customers the measurements of secondary voltages of distribution transformers shall be limited to an adequate sample of distribution transformers located at strategic locations in each substation feeder. The suggested locations of	<p>be computed, by multiplying the measured voltage at the metering point or at the convenience outlet of the first customer served by the distribution transformer with the nominal primary voltage, divided by the nominal secondary voltage.</p>
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	<p>distribution transformers for voltage variation measurements are the following; (a) at points close to the substation, (b) at the ends of several (say 3 or more depending on the length of the main primary distribution line) radial feeders connected to the main feeder between the distribution substation and the farthest end of the main feeder, and (c) at the points of the primary distribution line farthest from the substation.</p> <ol style="list-style-type: none"> 2. It is also recommended that measurement for voltage variations of distribution transformers be allowed at the secondary leads of a distribution transformer, or within one of the first sections of secondary distribution lines emanating from the distribution transformer, in addition to those enumerated in the draft Guidelines. 3. The computation for the primary voltage of a distribution transformer based on measured secondary voltage must also take into consideration the actual turns ratio and the present tapping of the distribution transformer so that the primary voltage can be correctly calculated. 	
Probability Level	<p><u>DLPC</u> This probability is okay as long as the utility has the data for all connection points. Having this data is not practical considering that a utility has thousands of connection points. DLPC alone has more than 10,000 connection points.</p> <p><u>MERALCO</u> Obtaining this information will require massive resources for Meralco, which currently has 639 distribution feeders and around 93,700 transformer locations within its franchise area First option:</p>	Article 3. Section 4. Probability Level. Each Distributor shall be allowed a probability level, of not lower than 95 percent, that all connection points for each feeder should have measurements of voltages within the limits specified in Section 3.2.3.3 of the PDC.

	<p>Measurement of voltages shall be at the substation busses read twice every month. This will involve 197 busses and translate into 4728 readings every year.</p> <p>Second option: Measurement at the nearest and farthest connection points of every feeder read twice a year. This translates to around 1,278 points and 2,556 readings every year.</p> <p>Third option: A more practical approach is to conduct voltage measurements at randomly selected locations along the feeder to get the voltage profile of the feeder. Meralco have been doing this in the past and this methodology was also used and accepted by ERC (ERB) before.</p>	
<p>Voltage Outside the Limits not Considered a Violation</p>	<p><u>EDWIN B. CANO</u> Voltage variations during scheduled maintenance of DU equipment must be planned that no voltage variation must be experience during maintenance activity. Maintenance of equipment are DUs' responsibility as part of their asset management. In this light, they must be responsible that no under or over voltage must be felt at convenience outlets. Suggestion: Omit item (c) from the list.</p> <p><u>DLPC</u></p> <ol style="list-style-type: none"> 1. To avoid confusion, the low power factor should be clearly defined. 2. There is a need to define what is the unbalance operation. Will it be based on the PDC or otherwise? 3. Voltage Outside the limits caused by Grid Operations due to generation deficiency or transmission constraints or other reasons related Transmission problems should 	<p>Article 3. Section 5. Voltage Outside the Limits not Considered a Violation. Voltage outside the limits specified in Section 2 shall not be considered a violation of this rule when such variations:</p> <ol style="list-style-type: none"> a) Arise from operation of the affected customer's equipment at low power factor; b) Arise from unbalance operation of the affected customer's equipment; or c) Arise from scheduled maintenance on equipment.

not be considered a violation of the utility.

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For clarification:

1. How low should be the power factor?
2. How much unbalance?
3. Scheduled maintenance on equipment by the customer, distribution utility or TransCo?

Add in the Exceptions:

1. Arise from the operation of Customer's loads in excess of their contracted capacity with the distributor
2. Arise from the presence of illegally tapped/connected services

CEDC

With regards to Section 5 of Article III in the Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities, it should also include as not a violation, when the voltage variation outside the limit is caused by failure by the generation or sub-transmission company to provide the prescribe supply voltage to the Distributor.

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	<p>Revise (a) and (b) to read as follows: a) Arise from operation of the affected customer's equipment at power factors below 85 percent; b) Arise from greater than 2.5 percent unbalance operation of the affected customer's equipment; or</p>	
Voltage Surveys	<p><u>ILPI</u> Monthly testing on the voltage <i>at all connection points</i> in each feeder is very stiff. It is suggested that this will be done on a quarterly basis.</p> <p><u>DLPC</u> This is not practical. Utilities has thousands of connections and measuring the voltage of these connections will entail significant costs and will eventually affect the rates of customers and the efficiency of the utility.</p> <p>There are also connection points where both residential and commercial customers share one transformer where the peak load of the latter is the off peak of the former or vice versa. Thus measuring both the peak and off peak period will be impossible.</p> <p>DLP estimates that it will hire around 80 crews to measure monthly all its 10,000 connection points. Each crew has to carry of PQ equipment capable of measuring all the parameters required.</p> <p>Suggestion. This can be done using simulation software,</p>	<p>Article 3. Section 6. Voltage Surveys. Each Distributor shall, for voltage survey purposes and to assure compliance with the voltage requirements, make a voltage test at all connection points in each feeder of the Distribution System: a) Once during or near a monthly peak period, and b) Once during or near a monthly off-peak period.</p>

	<p>which is more practical than the actual measurements.</p> <p><u>VECO</u> Article 3, section 2 defined the scope of connection point.</p> <p>a. Does this mean that we have to measure the voltages under each distribution transformer? b. Or will this be limited to customers connected to the medium voltage? c. What about the residential customers or those connected to the low voltage?</p> <p><u>MERALCO</u> Same comments and suggestions as in Section 4."All connection points" translate to more than 93,700 measurement locations.</p> <p>The peak and off-peak periods here are not clearly defined. What monthly peak or off peak are being referred to? System, feeder, customer type...</p> <p><u>BLCI</u> Comment: Each DU shall make a voltage test at all connection points in each feeder of the distribution system. Suggestion: Conducting voltage test at all connection points is time consuming, thus suggesting to conduct the minimum at the first and last transformer in every feeder and the first and last customer/connection point in subject transformer.</p>	
Required Records	<p><u>EDWIN B. CANO</u> Suggestion: kindly add the following to the required records; a. Duration of Test – time start and end of testing</p>	Section 7. Required Records. Records of voltage tests shall be sufficient to determine/indicate the following data/information:

	<ul style="list-style-type: none"> b. DU Testing Personnel – for obvious reasons c. Technical Witness/ERC Representative – as suggested above d. Instrument Used – this is obvious e. Instrument Calibration Due Date – as suggested above f. Feeder Load at time of Testing / Measurement – to indicate analysis for overvoltage or undervoltage g. Load Classification (Industrial, Commercial, Residential) - to indicate analysis for overvoltage or undervoltage h. Other Significant Distribution System/Feeder Operational Conditions – where does the power coming from, grid and/or embedded generator; is there a maintenance activity going on? i. Transformer Connection (Wye, Delta) – sometimes this has effect on voltage j. Instrument Recorded Events – the instrument, Power quality Analyzer can provide these pictures. 	<ul style="list-style-type: none"> a) Location b) Serving Substation c) Feeder or Circuit Number d) Nominal Voltages e) MV Customer or Transformer Number f) Number of connected Customers g) Measured Voltage h) Date and Time voltage test was conducted
<p>Quarterly Reports</p>	<p><u>DECORP</u></p> <p>At our current operating cost and procedures, we are able to conduct voltage and load surveys to all our 1,680 transformers twice each year. However, to comply with the guidelines, which requires twice (once during peak period and once during off-peak) monthly surveys of voltage, and monitoring and recording variations of other types of power quality standards (Art. IV, Sec. 1), we may opt to install electronic meters and current transformers for 3-phase transformer installation, and purchase portable power analyzer for 1-phase transformer installations. Such additional devices approximately cost as follows:</p> <p>1 unit G.E. KV2C, form 48A Bi-directional</p>	<p>Article 3. Section 8. Quarterly Reports. Records of monthly voltage tests shall be recorded in the prescribed format using Table-1PQ in Annex A and shall be submitted to the ERC in electronic copy using a Portable Document Format (PDF) or any other format that cannot be altered, on or before the end of the month following the quarter starting year 2005. To be included in the quarterly submission are the monthly load curve data of the Distribution System during the quarter.</p>

multi function meter, w/ site genie
monitoring system and comm port
complete w/ soft switches 120,000
3 units G.E. Current Transformer, 200:5A 15,540
135,540 x 260
35,240,400

3 units POWERMATRIX, Powermate
Model 330 System Analyzer 3,571,425
Electric Plant in Service (EPIS) 38,811,825
Cash Working Capital (2 mos.) 180,000
Total Rate Base 38,991,825
12% RORB 4,679,019
Operating Cost (Salaries: 6 personnel) 1,080,000
Revenue Requirement 5,759,019
Annualized kWh Sales 174,804,976
Rate Impact (P/kWh) 0.0329

Moreover, procuring and installing such devices would require some time. The requirement to submit reports starting first quarter of 2005 is too soon. We recognize that other DUs are more prepared than others. Therefore, we recommend the submission of quarterly reports to commence by "first quarter of 2005 but not later than first quarter of 2006." Moreover, reliability performance of DUs will only be evaluated by the Second Regulatory Period, as prescribed in the DWRG. We recommend to modify this section as follows: "Section 8. Quarterly Reports. Records of monthly voltage tests shall be recorded in the prescribed format using Table - 1PQ in Annex A and shall be submitted to the ERC in electronic copy using a Portable Document Format (PDF) or

	<p>any other format that cannot be altered, on or before the end of the month following the first quarter starting year of 2005, but not later than the first quarter of 2006. To be included in the quarterly submission are the monthly load curve data of the Distribution System during the quarter.”</p> <p><u>MERALCO</u> <i>To be modified based on the final provisions of Sections 4 and 6.</i></p>	
<p>Distributor’s Obligation to Monitor and Record Variations of Other Types of Power Quality Standards</p>	<p><u>VECO</u></p> <ol style="list-style-type: none"> 1. will “all connections points” refer to all distribution transformers? 2. will this mean that we have to measure every month the voltage at all transformer installations? <p><u>MERALCO</u> <i>Same comments as in Article III, Sections 4 & 6. Monitoring should be at substation busses only and less frequent than voltage surveys because of specialized equipment and analysis required.</i></p> <p><u>THERMOSCAN SERVICES, INC.</u></p> <p>a. Uncontrolled or rampant harmonic currents spawned by non-linear loads or components in User Systems flow back to the source and have a harmful effect on the Grid and Distribution Systems.</p> <p>Harmonic voltages result from harmonic currents when these interact with System impedances or when allowed to flow over long impedance paths.</p>	<p>Article 4. Section 1. Distributors Obligation to Monitor and Record Variations of Other Types of Power Quality Standards. The Distributor shall monitor and record variations of these other types of Power Quality standards; Voltage Sags, Voltage Swells, Voltage Unbalance, and Harmonics at all connection points to the Distribution System, to ensure that the Power Quality variations are within the limits specified in Section 3.2 of the PDC.</p>

b. The 5th harmonic, which is a negative sequence harmonic, produces a torque in the opposite direction of the normal. This negative torque can cause early breakdown of generators and similar rotating apparatus of Power Plants in the Grid. The 5th harmonic also assaults the secondary winding of power transformers shortening service life.

c. The 3rd Harmonic which is a negative sequence harmonic can cause sensitive electronic or computer controls to misoperate and create problems in the operation of the Grid and Distribution Systems.

d. The Grid and Distribution Systems will have to spend more because the KVA requirement increases with harmonic loading;

e. Increased Technical Losses
Because of the higher frequencies, the heating effect of harmonics can reach up to 5 times that of the fundamental (60 HZ). This increases the heat losses in all system components and may require the setting of a higher Loss Cap.

f. Personnel Safety
Uncontrolled Harmonics have caused and will continue to cause electrical fires specially in User Systems. By adopting a standard of 5% THD, the severity of the condition is lowered, bringing down the risk of fires and possible injury to personnel.

	<p>Other Power Quality Standards</p> <p>Harmonics Harmonics (as defined under Section 2, paragraph g, Article II) result from the use or operation of non-linear equipment or devices in the Grid, Distribution, and User Systems.</p> <p>THD/TDD As specified under the PDC, Chapter 3, Article 3.2, paragraph 3.2.4, the THD of the voltage and TDD of the current of User Systems shall not exceed 5%.</p> <p>Distributors as Customer/End User From the standpoint of the Grid Owner and System Operator, Distributors are loads and are User Systems. For this reason, they are covered by pertinent provisions under 3.2.4.4 and 3.2.4.5 of the PDC;</p> <p>Harmonic Measurement – Meters In addition to the requirements under 8.4 Chapter 8 (Metering Equipment Standards), Distributors shall provide for updated/upgraded meters which shall measure and locally display on real time, the THD levels of User Systems;</p> <p>Compliance Reporting End Users shall, within one (1) year from the date of the promulgation of these Rules, submit a Compliance Report to the ERC thru the Distributor. End Users shall adopt such harmonic mitigation programs or systems necessary for meeting or complying with the Standard of 5% THD/TDD on Harmonics.</p>	
Mitigation of the	<u>ILPI</u>	Article 4. Section 2. Mitigation of the Impact of Customer's

<p>Impact of Customer's Loads</p>	<p>If in any case that a power quality problem occurs, and is found out that the cause of the problem was due to a customer's load and is was found out that it have cause damaged to other customers, who will then be liable for the damaged incurred due to the said power quality problem?</p> <p><u>DLPC</u> We should consider implementing the design mitigation strategy to reduce impacts of the Customer's load causing PQ disturbance/s. This section is not clear on who should shoulder the investment required, should there be any, to mitigate the PQ problems, will it be the customer causing the PQ problem or will it be the utility?</p> <p><u>MERALCO</u> <i>Reword to:</i> <i>The customer shall ensure that its system shall not cause a problem on any of the Power Quality standards. If an evaluation shows that a Customer's loads cause a problem on any of the Power Quality standards the customer with the assistance of the Distribution Utility shall be required to implement a mitigating strategy to reduce the impacts of the Customer's loads with the cost to be shouldered by the customer.</i></p> <p><u>CEPALCO</u> Revise Section 2 to read as follows: Section 2. Mitigation of the Impact of Customer's Loads. If, in relation to a Power Quality complaint, an evaluation shows that a Customer's loads cause a problem on any of the Power Quality standards mentioned in the preceding section,</p>	<p>Loads. If in relation to a Power Quality complaint, an evaluation shows that a Customer's loads cause a problem on any of the Power Quality standards mentioned in the preceding section, the Distribution Utility in cooperation with the Customer causing the Power Quality problem shall be required to design mitigation strategy to reduce the impacts of the Customer's loads.</p>
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	<p>the Customer causing the Power Quality problem shall be required to design mitigation measures to reduce the impacts on the Distribution System of the Customer's loads, and the Customer shall coordinate with the Distribution Utility in the implementation of the same. In the event that the foregoing mitigation measures are not satisfactory, or the Customer cannot implement adequate mitigation measures, the Distribution Utility shall design and implement mitigation measures in coordination with the Customer, and the cost of the design and implementation of the mitigation measures shall be charged to the Customer. Customer loads causing serious disturbances cannot be satisfactorily mitigated.</p>	
<p>ANNEX B</p>	<p><u>MERALCO</u> <i>Formula for computing the Probability Level for each Feeder.</i></p> <p>Probability Level = $[(N_T - N_{OL})/N_T] \times 100\%$</p> <p><i>To be modified based on the final provisions of Article III, Sections 4 & 6.</i></p> <p><u>CEPALCO</u> COMMENT: The formula for computing Probability Level for each Feeder should also be changed to suit the limited number of sampled Connection Points (DTs) in a Feeder, as suggested above for Article III, Section 3.</p>	

GUIDELINES FOR THE MONITORING OF RELIABILITY STANDARDS FOR DISTRIBUTION UTILITIES

Topic/Issue	Comments/Suggestions	Reference Provision
RECORDING REQUIREMENTS	<p><u>EDWIN B. CANO</u> Required Records, (a) – The phrase “became aware” is too loose. A distribution operator must be aware at all times if there would be an outage. It can be understood from the statement that after one hour of outage and the operator “became aware” of the outage then the duration for the outage is just starting. Alarms are provided at DU substation so the statement must emphasize active and not passivity.</p>	<p>Article IV, Section 2 A) Starting date and time the Distribution Utility became aware of the Interruption;</p>
RELIABILITY INDICES	<p><u>ILPI</u> Reliability Indices</p> <p>There are inconsistencies in the definition specified in this section against Annex B – Formulas for Reliability Indices.</p> <p>SAIFI, SAIDI, and MAIFI are calculated using annual data while in Annex B uses figures on a monthly basis. Which of the two definitions will be considered?</p>	<p>Article III, Section 1 System Average Interruption Frequency Index (SAIFI) is the average number of Interruptions per Customer during the year. It is calculated by dividing the total annual number of sustained Customer power Interruptions by the average number of Customers served during the year.</p>

	<p><u>ILPI</u> It has been observed that the account number of customers has no relevance on the interruption report. Hence, it is suggested that the total number of customers affected be reflected in the table instead of the account number of each customer.</p>	Annex A, Table-1R
GENERAL PROVISIONS	<p><u>DLPC</u> Keeping of Records. Utility should be allowed to keep records of interruption of only up to 5 years. The utility shall have the option to discard or keep the records.</p>	<p>Article I, Section 2c Each Distribution Utility shall keep records of Interruptions of service on its primary Distribution System and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such Interruptions.</p>
DEFINITION OF TERMS	<p><u>DLPC</u> Definition of Adverse Weather. This definition should also include earthquakes and not just weather. However, since this definition is defined by PDC then there is also a need to revise the definition used in the PDC.</p>	<p>Article II, Section 2b “Adverse Weather” refers to a weather condition that result in abnormally high rate of Forced Outages for exposed Components while such condition persists, but does not qualify as a Major Storm Disaster. An Adverse Weather condition can be defined for a particular System by selecting the proper values and combinations of the weather conditions reported by the Weather Bureau including thunderstorm, wind velocity, precipitation, and temperature.</p>
SPECIFICATION OF DATA INCLUSIONS AND EXCLUSIONS	<p><u>DLPC</u> Specifications for data inclusion. The section does not mention about sub-transmission assets owned by DUs. Will this mean that interruption at this level will be excluded?</p>	<p>Article III, Section 2 Specification of Data Inclusions. A power Interruption shall include any Outage in the primary Distribution System, extending from the distribution substation to the distribution transformers, which may be due to the tripping action of protective devices during faults or the failure of primary distribution lines and/or transformers, and which results in the loss of service to one or more Customers or Users.</p>

<p>FILING REQUIREMENTS</p>	<p><u>DLPC</u> Five year historical data is not available. The required reporting format before was CIT/IFR which is kwhr based while the new reporting format (SAIFI/SAIDI) is customer based. Normalizing the former with the latter is not possible since no customer data corresponds to our IFR/CIT data.</p>	<p>Article V Section 1 Petition for Approval of Performance Targets. Every Distribution Utility shall file a petition for the approval of performance targets for SAIFI, SAIDI, and MAIFI before the end of the first semester of the year 2005. The targets shall be based on the applicant's 5-year historical data. The data shall be recorded using Table-1R in Annex A. For available historical data that were recorded in different formats, a Distributor shall be allowed to normalize the data in order to comply with the requirement using Table-1 in Annex A.</p>
<p>FILING REQUIREMENTS</p>	<p><u>DLPC</u> In connection with Art V Sec 1 comment, we would not be able to get accurate data since five year historical data is not available.</p> <p>Also, basing the performance target using the mean will not be fair. A utility who is not performing well with reliability will have an easy task to improve while utility with exceptional performance will have a hard time improving and will be costly in improving its reliability figure. This will penalize performer now and will reward poor performer.</p>	<p>Article V, Section 2 Setting of Performance Targets. Performance targets for each Distribution Utility shall be set using the mean of the complete five year or five year normalized historical data, with one standard deviation above and below the target to allow for normal fluctuations in performance.</p>
<p>ANNEX A</p>	<p><u>DLPC</u> The column for account no. of customers affected is impractical. A feeder having 10,000 customers connected to it has to be listed into this column. This will consume 100 pages of report just to report the 10,000 customers interrupted. Suggest that this column should be changed to no. of customers affected.</p>	<p>Table-1R, Annex A</p>

<p>RECORDING REQUIREMENTS</p>	<p><u>DECORP</u> “Required Records” The “date and time interruption was initiated” should be included, to distinguish it from “starting date and time the DU became aware of the Interruption.” Such will also give sense to “Duration of the Interruption”, which is the difference of the “date and time service was restored” and the “date and time interruption was initiated”, as defined in Art. II, Sec. 2 (n). We recommend to modify this section as follows:</p> <p>a) Starting date and time the Distribution Utility became aware of the Interruption; x x x i) Date and time Interruption was initiated; j) Date and time service was restored; k) Duration of the Interruption l) Whether the Interruption was scheduled or unscheduled.</p> <p>Moreover, Table -1R should also be modified to account for the “date and time interruption was initiated.”</p>	<p>Article IV, Section 2 Required Records. Records on interruptions shall be sufficient to determine the following:</p> <p>a) Starting date and time the Distribution Utility became aware of the Interruption;</p> <p>b) Location of the outage (town or city and Barangay or Subdivision);</p> <p>c) Circuit number(s) of the distribution circuit(s) affected;</p> <p>d) Number of Customers affected;</p> <p>e) Service account number or other unique identifier of each Customer affected;</p> <p>f) Description of the cause of the Interruption;</p> <p>g) Weather conditions at time of Interruption;</p> <p>h) System Component(s) involved (e.g., distribution substation, primary lines, distribution transformer, etc.)</p> <p>i) Date and time service was restored;</p> <p>j) Duration of the Interruption;</p> <p>k) Whether the Interruption was scheduled or unscheduled.</p>
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<p>FILING REQUIREMENTS</p>	<p><u>DECORP</u> “Petition for Approval of Performance Targets” Installing a functional Outage Management System (OMS), which will be used in normalizing our 5-year historical interruption data, may take considerable time. Activities implementing our past software applications, such as data gathering, software design and engineering, program coding or commercial software evaluation, software installation user training, and documentation, took 6 to 18-months. The deadline for filing the approval of performance targets for SAIFI, SAIDI and MAIFI specified in this section is too soon.</p> <p>However, we recognize that other DUs are more prepared than others. Therefore, we recommend the filing of performance targets should be “from third quarter of 2005 to second quarter of 2006.” Such will spread the workload of the Commission. Moreover, reliability performance of DUs will only be evaluated by the Second Regulatory Period, as prescribed in the DWRG. We recommend to modify this section as follows:</p> <p>“Section 1. Petition for Approval of Performance Targets. Every Distribution Utility shall file a petition for the approval of performance targets for SAIFI, SAIDI, and MAIFI before the end of the first semester of the year 2005 from third quarter of 2005 to second quarter of 2006. The targets shall be based on the applicant's 5-year historical data. The data shall be recorded using Table-1R in Annex A. For</p>	<p>Article V, Section 1 Petition for Approval of Performance Targets. Every Distribution Utility shall file a petition for the approval of performance targets for SAIFI, SAIDI, and MAIFI before the end of the first semester of the year 2005. The targets shall be based on the applicant's 5-year historical data. The data shall be recorded using Table-1R in Annex A. For available historical data that were recorded in different formats, a Distributor shall be allowed to normalize the data in order to comply with the requirement using Table-1 in Annex A.</p>
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	<p>available historical data that were recorded in different formats, a Distributor shall be allowed to normalize the data in order to comply with the requirement using Table-1 in Annex A.” In conjunction with the preceding discussion, we also recommend to modify Art. VI, Sec. 1 “Quarterly Reports” as follows:</p> <p>“Section 1. Quarterly Reports. Each Distribution Utility shall submit may start submitting quarterly</p> <p>Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the first quarter starting year of 2005, but not later than the first quarter of 2006, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI. The data shall be submitted in electronic copy using a Portable Document Format (PDF) or any other format that cannot be altered.”</p>	
ANNEX A	<p><u>BENECO</u> May we recommend that the <u>Number of Customers Affected</u> will be reported under column 9 instead of the <u>Account Number of the Customers Affected</u>. In the computation of the reliability indices the account numbers are not needed but rather the number of customers affected. Assuming there are 1000 account numbers affected then we will be encoding 1000 account numbers for this column alone. We suggest that if the Commission needs the Account Numbers and other relevant data of those affected during interruption, these should be reported in a separate table/database but not necessarily in the</p>	Annex A Table 1R

	interruption report table (table-1R).	
DEFINITION OF TERMS	<p><u>MERALCO</u> Adverse Weather” refers to a weather condition that result in abnormally high rate of Forced Outages for exposed Components while such condition persists, but does not qualify as a Major Storm Disaster. An Adverse Weather condition can be defined for a particular System by selecting the proper values and combinations of the weather conditions reported by the Weather Bureau including thunderstorm, wind velocity, precipitation, and temperature.</p> <p><i>A definite value should be given like 5% of the total number circuits in the area tripped simultaneously due to a wind velocity as reported in the locality.</i></p>	<p>Article II, Section 2. Adverse Weather” refers to a weather condition that result in abnormally high rate of Forced Outages for exposed Components while such condition persists, but does not qualify as a Major Storm Disaster. An Adverse Weather condition can be defined for a particular System by selecting the proper values and combinations of the weather conditions reported by the Weather Bureau including thunderstorm, wind velocity, precipitation, and temperature.</p>
	<p>Definition of Terms. “Major Storm Disaster” refers to a weather condition wherein the design limits of Equipment or Components are exceeded, and which results in extensive mechanical fatigue to or failure of</p> <p>Equipment, widespread Customer Interruption, and unusually long service restoration time.</p> <p><i>Remove “wherein the design limits of Equipment or Components are exceeded, and which results in extensive mechanical fatigue to or failure of Equipment,”</i> <i>Take into consideration the Public Storm Signal issued by PAGASA</i></p>	<p>Article II, Section 2 “Major Storm Disaster” refers to a weather condition wherein the design limits of Equipment or Components are exceeded, and which results in extensive mechanical fatigue to or failure of Equipment, widespread Customer Interruption, and unusually long service restoration time.</p>

<p>DEFINITION OF TERMS</p>	<p><u>MERALCO</u> Definition of Terms. “Sustained Outage” refers to a state of zero voltage of a Component that lasts greater than five (5) minutes.</p> <p><i>Replace with “Sustained Interruption” to distinguish it with “Momentary Interruption” and to qualify the definition for “Interruption Duration”</i></p>	<p>Article II, Section 2 “Sustained Outage” refers to a state of zero voltage of a Component that lasts greater than five (5) minutes.</p>
<p>SPECIFICATION OF DATA</p>	<p><u>MERALCO</u> Specification of Data Exclusions.</p> <p>f) Outages due to other events that the ERC shall approve after due notice and hearing.</p> <p><i>Modify bullet f and add bullets h & i as shown</i></p> <p><i>f) Outages due to other events that the ERC shall approve after due notice and hearing such as: earthquakes, floods, civil disturbances, coup d’etat</i></p> <p><i>h) Outages due Fire/conflagration</i></p> <p><i>i) Outages due to Third party action such as sabotage and vehicular accidents</i></p>	<p>Article III, Section 3 Specification of Data Exclusions. The following events shall be excluded in the calculation of the Reliability indices:</p> <p>a) Outages that occur on the secondary lines of the Distribution System;</p> <p>b) Outages due to generation, transmission line, or transmission substation failure;</p> <p>c) Planned or Scheduled Outages where the Customers or Users have been notified at least three (3) days prior to the loss of power;</p> <p>d) Outages that are initiated by the System Operator/Market Operator during the occurrence of Significant Incidents or the failure of their facilities;</p> <p>e) Outages caused by Adverse Weather or Major Storm Disasters which result in the declaration by the government of a state of calamity in the franchise area of the Distributor; and</p>

		f) Outages due to other events that the ERC shall approve after due notice and hearing.
RELIABILITY REPORTS	<p><u>MERALCO</u> Quarterly Reports. Each Distribution Utility shall submit quarterly Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the quarter starting year 2005, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI. The data shall be submitted in electronic copy using a Portable Document Format (PDF) or any other format that cannot be altered.</p> <p>The quarterly report should also include calculation of the average minutes of interruption per customer due to causes in each of the following categories: Power Supplier, Major Storm Disaster, Scheduled, and All Others.</p> <p>The Interruptions resulting from either scheduled or unscheduled outages on lines or substations owned by Transco are to be accounted for in the "power supplier" category.</p> <p><i>Modify Paragraph 2 to include the recommendations in Article III, Section 3:</i></p> <ul style="list-style-type: none"> - <i>Outages due to other events that the ERC shall approve after due notice and hearing such as: earthquakes, floods, civil disturbances, coup d' etat</i> - <i>Outages due Fire/conflagration</i> 	<p style="text-align: center;">Article VI, Section 1</p> <p>Section 1. Quarterly Reports. Each Distribution Utility shall submit quarterly Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the quarter starting year 2005, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI.</p> <p>The Interruptions resulting from either scheduled or unscheduled outages on lines or substations owned by Transco are to be accounted for in the "power supplier" category.</p> <p>The category "major storm disaster" represents service interruptions from conditions that cause many concurrent outages because of typhoon that exceed design assumptions for the lines.</p> <p>The category "scheduled" refers to interruptions resulting when a distribution transformer, line or Distributor owned substation is deliberately taken out of service at a selected time for maintenance or other reasons.</p> <p>The "all other" category includes outages primarily resulting from emergency conditions due to Equipment breakdown, malfunction or human error.</p>

	<p>- <i>Outages due to Third party action such as sabotage and vehicular accidents</i></p> <p>The category “major storm disaster” represents service interruptions from conditions that cause many concurrent outages because of typhoon that exceed design assumptions for the lines.</p> <p><i>Modify Paragraph 4 based on the recommendation in Article II, Section 2 using Public Storm Signal instead of design limits</i></p> <p>The category “scheduled” refers to interruptions resulting when a distribution transformer, line or Distributor owned substation is deliberately taken out of service at a selected time for maintenance or other reasons.</p> <p>The “all other” category includes outages primarily resulting from emergency conditions due to Equipment breakdown, malfunction or human error.</p>	
	<p><u>MERALCO</u> Interruption Reports Table – 1R</p> <p><i>For Clarification: Do we have to report each and every interruption? An interruption of a circuit may involve more than 50,000 account numbers or customers. Listing all affected accounts for every interruption would be impractical. Recommendation:</i></p>	

	<i>Replace "Acct. No. of Cust. Affected" column with No. of Customers Affected.</i>	
DEFINITION TERMS	<p><u>MERALCO</u> Definition of Terms. (i) "SAIDI" refers to the average customer-minutes of interruption per customer.</p> <p><i>Include sustained in the definition</i> (i) "SAIDI" refers to the average customer-minutes of sustained interruption per customer.</p>	<p>Article III, Section 1 System Average Interruption Duration Index (SAIDI) is the average Interruption Duration per Customer during the year. It is calculated by dividing the annual sum of customer-minutes of sustained power Interruptions by the average number of Customers served during the year.</p>
ANNEX A	<p><u>CEDC</u> As to Table-1R in Annex A, slight variations in the format should be allowed to suit the distributor concerned. Like in the case of distribution utilities operating in economic zones, which most likely has a small coverage area, the columns for "Town or City Affected" and "Barangay or Subdivision Affected" does not apply. In these cases, the circuit or feeder number should suffice.</p>	Annex A, Table 1-R
RELIABILITY INDICES	<p><u>BLCI</u> Comment: Computation of SAIFI and SAIDI is divided by average number of customers served during the year, since every DU is required to monitor monthly & submit quarterly to ERC, we recommend that the divisor is by average number of customers served during the month.</p>	<p>Article III, Section 1 System Average Interruption Duration Index (SAIDI) is the average Interruption Duration per Customer during the year. It is calculated by dividing the annual sum of customer-minutes of sustained power Interruptions by the average number of Customers served during the year.</p>
ANNEX A	<p><u>BLCI</u> Interruption Reports for Reliability Standards Comment: Clarification for sub-heading of column 9 whether we will include the "account numbers" of customers affected or "number" of customers affected only.</p>	Annex A, Table 1-R

<p>GENERAL PROVISION</p>	<p><u>CEPALCO</u> General Obligations of a Distribution Utility (c) Each Distribution Utility shall keep records of Interruptions of service on its primary Distribution System and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such Interruptions.</p> <p>COMMENTS: Delete the word “primary”. Replace the word “prevent recurrence” with the words “reduce the frequency and duration of occurrences”.</p>	<p>Article I, Section 2 c)Each Distribution Utility shall keep records of Interruptions of service on its primary Distribution System and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such Interruptions.</p>
<p>SPECIFICATION OF DATA EXCLUSIONS</p>	<p><u>CEPALCO</u> Specifications of Data Exclusions (e) Outages caused by Adverse Weather or Major Storm Disasters which result in the declaration by the government of a state of calamity in the franchise area of the Distributor; and</p> <p>COMMENTS: (1) Revise Section 3e to read as follows: “Outages caused by Adverse Weather or Major Storm Disasters which result in the outage of at least 20% of the customers of the Distribution Utility; and;” (2) We suggest that interruptions be excluded which are due to the deliberate interruption of portions of the primary distribution system for the purpose of ensuring safety during occurrences of fires or floods.</p>	<p>Article III, Section 3 Specification of Data Exclusions. The following events shall be excluded in the calculation of the Reliability indices: a)Outages that occur on the secondary lines of the Distribution System; b)Outages due to generation, transmission line, or transmission substation failure; c)Planned or Scheduled Outages where the Customers or Users have been notified at least three (3) days prior to the loss of power; d)Outages that are initiated by the System Operator/Market Operator during the occurrence of Significant Incidents or the failure of their facilities;</p>

		<p>e)Outages caused by Adverse Weather or Major Storm Disasters which result in the declaration by the government of a state of calamity in the franchise area of the Distributor; and</p> <p>f)Outages due to other events that the ERC shall approve after due notice and hearing.</p>
<p>RECORDING REQUIREMENTS</p>	<p><u>CEPALCO</u> Outage Management System (OMS). Each Distribution Utility shall maintain an automated outage management system (OMS) sufficient to determine a history of sustained electric service Interruptions experienced by each Customer. The OMS shall have the ability to access data for each Customer in order to determine a history of electric service Interruptions. Data shall also be sortable by each of the following factors:</p> <p>COMMENTS:</p> <p>(1) Delete the word “automated” in the first sentence; insert the words “with an electronic database” after “outage management system (OMS)”. In the second sentence, delete the words “for each Customer”.</p> <p>(2) We suggest that the Cause codes have field sizes of three characters (e.g. 001-human being; 002-lightning; 312-unknown), instead of a mix of two and three characters. We suggest the same field sizes of three characters for the Equipment Failed codes.</p>	<p>Article IV, Section 1 Outage Management System (OMS). Each Distribution Utility shall maintain an automated outage management system (OMS) sufficient to determine a history of sustained electric service Interruptions experienced by each Customer. The OMS shall have the ability to access data for each Customer in order to determine a history of electric service Interruptions. Data shall also be sortable by each of the following factors:</p> <p>a)Town/s or City/Cities affected, b)Barangay or Subdivision affected, c)Substation affected, d)Circuit Number. e)Service Account Number</p> <p>And in combination with the following factors:</p> <p>f)Number of Interruptions in reporting period, and</p>

		g)Number of hours of Interruptions in reporting period.
FILING REQUIREMENTS	<p><u>CEPALCO</u> Setting of Performance Targets. Performance targets for each Distribution Utility shall be set using the mean of the complete five year or five year normalized historical data, with one standard deviation above and below the target to allow for normal fluctuations in performance.</p> <p>COMMENTS: Delete the words “and below”, and replace the word “target” with the word “benchmark”. The Performance Target should be one standard deviation above the benchmark (the mean of five years of indices), not “above and below”. Only upper limits need to be established for the reliability indicators; SAIFI, SAIDI, and MAIFI figures below the benchmark indicate performances better than the benchmark.</p>	<p>Article V, Section 2 Setting of Performance Targets. Performance targets for each Distribution Utility shall be set using the mean of the complete five year or five year normalized historical data, with one standard deviation above and below the target to allow for normal fluctuations in performance</p>
RELIABILITY REPORTS	<p><u>CEPALCO</u> Quarterly Reports. Each Distribution Utility shall submit quarterly Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the quarter starting year 2005, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI. The data shall be submitted in electronic copy using a Portable Document Format (PDF) or any other format that cannot be altered.</p>	<p>Article VI, Section 1 Section 1. Quarterly Reports. Each Distribution Utility shall submit quarterly Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the quarter starting year 2005, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI. The Interruptions resulting from either scheduled or unscheduled outages on lines or substations owned by Transco are to be accounted for in the “power supplier” category.</p>

	<p>COMMENTS: Insert the words ‘and 12-month rolling values” so that the words in parentheses will read “presenting monthly data and 12-month rolling values”. Data reported for SAIFI, SAIDI, MAIFI should include the 12-month rolling values; the monthly values are highly variable and not very informative as to system performance.</p> <p>Interruption Reports COMMENTS: The column heading that reads “Acct No. of Cust. Affected” should be replaced with “No. of Cust. Affected”. It would be impractical to list the Account Numbers of customers affected by interruptions as this could be in the thousands.</p>	<p>The category “major storm disaster” represents service interruptions from conditions that cause many concurrent outages because of typhoon that exceed design assumptions for the lines.</p> <p>The category “scheduled” refers to interruptions resulting when a distribution transformer, line or Distributor owned substation is deliberately taken out of service at a selected time for maintenance or other reasons.</p> <p>The “all other” category includes outages primarily resulting from emergency conditions due to Equipment breakdown, malfunction or human error.</p>
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GUIDELINES FOR THE MONITORING OF QUALITY RELIABILITY INDEX (QRI)

Electric Cooperatives/Distribution Utilities	Comments/Suggestions	Reference Provision
	<p><u>EDWIN B. CANO</u> Weighting Factors for the Different Indices – May I ask what is the basis for the arrived weighting factors? There is so much weight given to System Performance on Voltage Variation Index</p>	<p>Article III, Section 4 Weighting Factors for the Different Indices. The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality: a) 25 % for SAIFI</p>

		<ul style="list-style-type: none"> b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI
	<p>Formula for computing SPVVI – The word “below” in the definition of SPVVI must have “and above” since limits are 90%= Voltage =110%. The formula of FBL shares the same suggestion/comment. Also, is there really a number “2” in the denominator of FBL formula? If so, where it was derived?</p>	<p style="text-align: center;">Annex A</p> <p>System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by the Distribution Utility. It is calculated by dividing the average number of feeders with probability levels below the allowable limit during a period by the total number of feeders in the Distribution System.</p> $SPVVI = F_{BL}/F_T$ <p>Where:</p> $F_{BL} = (\sum \text{Feeders with probability levels Below the allowable limit}) / 2$ $F_T = \text{total \# of feeders in the DS}$
<p>Davao Lights and Power Company Inc. (DLPC)</p>	<p>What is the basis of the formula for QRI? Please clarify the formula further of QRI as its addends has different units, SAIFI is in minutes, SAIDI is no of sustained interruptions/yr, MAIFI is no. of momentary interruptions/yr, and SPPVI is percentage. Please explain further using examples.</p> <p>What is the basis of the formula of SPPVI? Please explain further using examples.</p>	<p>Article III, Section 4</p> <p>Weighting Factors for the Different Indices. The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality:</p> <ul style="list-style-type: none"> a) 25 % for SAIFI b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI

<p>Iligan Light and Power Inc., (ILPI)</p>	<p>Weighting Factors for the Different Indices Please elaborate further the basis on the percent allocation of the weighting factors for the different indices. How were these percentages derived?</p>	<p>Article III, Section 4 Weighting Factors for the Different Indices. The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality: a) 25 % for SAIFI b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI</p>
	<p>Formula for Computing the SPVVI By definition, SPVVI is computed by dividing the average number of feeders with probability levels below the allowable limit during a period by the total number of feeders in the Distribution System, why is that in the computation of F_{BL} it is divided by two when in the definition says it is the average number of feeders? Is it correct to assume that the FEEDERS mentioned in the guideline refer only to the Main Feeders of each Utility?</p>	<p style="text-align: center;">Annex A</p> <p>System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by the Distribution Utility. It is calculated by dividing the average number of feeders with probability levels below the allowable limit during a period by the total number of feeders in the Distribution System.</p> <p style="text-align: center;">$SPVVI = F_{BL}/F_T$</p> <p>Where: $F_{BL} = (\Sigma \text{ Feeders with probability levels Below the allowable limit}) / 2$ $F_T = \text{total \# of feeders in the DS}$</p>
<p>Davao Lights and Power Company Inc. (DLPC)</p>	<p>What is the basis of the formula for QRI? Please clarify the formula further of QRI as its addends has different units, SAIFI is in minutes, SAIDI is no of sustained interruptions/yr, MAIFI is no. of momentary interruptions/yr, and SPPVI is percentage. Please explain further using examples.</p>	<p>Article III, Section 4 Weighting Factors for the Different Indices. The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality: a) 25 % for SAIFI b) 30 % for SAIDI</p>

	<p>What is the basis of the formula of SPPVI? Please explain further using examples.</p>	<p>c) 5 % for MAIFI d) 40 % for SPVVI</p>
<p>Visayan Electric Company, Inc. (VECO)</p>	<p>System Performance on Voltage Variation Index (SPVVI). System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by the Distribution System.</p> <p>Comments:</p> <ul style="list-style-type: none"> - What are the allowable nominal voltages for service voltages: 220/230 /240 or 440/460/480 volts? - We suggest that ERC (with the help of IIEE) should at least specify the acceptable nominal voltages in the country. - This becomes important in determining the allowable voltage variations 	<p>Article III, Section 2</p> <p>System Performance on Voltage Variation Index (SPVVI). System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by the Distribution System.</p>
<p>Dagupan Electric Corporation (DECORP)</p>	<p>“Benchmark for System Performance on Voltage Variation Index (SPVVI)”</p> <p>In conjunction with the discussion in item no. 3 above, we recommend to modify this section as follows: “Section 3. Benchmark for System Performance on Voltage Variation Index (SPVVI). Each</p>	<p>Article III, Sec. 3</p> <p>Benchmark for System Performance on Voltage Variation Index (SPVVI). Each Distribution Utility shall be required to conduct voltage tests at all connection points for each feeder in its Distribution System starting for the month of December 2004 but not later than December 2005, and submit to the ERC the records using the prescribed Table- 1PQ in Annex A</p>

	<p>Distribution Utility shall be required to conduct voltage tests at all connection points for each feeder in its Distribution System starting for the month of December 2004 but not later than December 2005, and submit to the ERC the records using the prescribed Table- 1PQ in Annex A of the Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities . The data shall be used as the basis for computing the benchmark for the System Performance on Voltage Variation Index (SPVVI).”</p>	<p>of the Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities . The data shall be used as the basis for computing the benchmark for the System Performance on Voltage Variation Index (SPVVI).</p>
<p>Benguet Electric Cooperative, Inc. (BENECO)</p>	<p><u>We can not find table -1pq in the Annex A of the PDF file of the guidelines, hence the following queries?</u></p> <p>Does this particular section refer only to the take-off points (connection point is not defined) of the feeders? What’s the frequency of measuring the voltages (every hour, 15 minutes)? Are we going to conduct voltage test daily (31 days) for month of December?</p>	<p>Article III, Sec. 3 Benchmark for System Performance on Voltage Variation Index (SPVVI). Each Distribution Utility shall be required to conduct voltage tests at all connection points for each feeder in its Distribution System starting for the month of December 2004 but not later than December 2005, and submit to the ERC the records using the prescribed Table- 1PQ in Annex A of the Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities . The data shall be used as the basis for computing the benchmark for the System Performance on Voltage Variation Index (SPVVI).</p>
<p>Manila Electric Company (MERALCO)</p>	<p>Definition of Terms. (i) “SAIDI” refers to the average customer-minutes of interruption per customer.</p> <p><i>Include sustained in the definition (i) “SAIDI” refers to the average customer-minutes of sustained interruption per customer</i></p>	<p>Article II, Section 2 (i) “SAIDI” refers to the average customer-minutes of interruption per customer.</p>
	<p>Benchmark for System Performance on Voltage Variation Index (SPVVI).</p>	<p>Article III, Section 3 Benchmark for System</p>

	<p>Each Distribution Utility shall be required to conduct voltage tests at all connection points for each feeder in its Distribution System for the month of December 2004, and submit to the ERC the</p> <p>records using the prescribed Table- 1PQ in Annex A of the "Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities". The data shall be used as the basis for computing the benchmark for the System Performance on Voltage Variation Index (SPVVI).</p> <p><i>Replace all connection points with distribution busses to align with the recommendation in the Guidelines for Monitoring PQ Standards for Distribution Utilities.</i></p>	<p>Performance on Voltage Variation Index (SPVVI). Each Distribution Utility shall be required to conduct voltage tests at all connection points for each feeder in its Distribution System starting for the month of December 2004 but not later than December 2005, and submit to the ERC the records using the prescribed Table- 1PQ in Annex A of the Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities . The data shall be used as the basis for computing the benchmark for the System Performance on Voltage Variation Index (SPVVI).</p>
	<p>Weighting Factors for the Different Indices.</p> <p>The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality:</p> <ul style="list-style-type: none"> a) 25 % for SAIFI b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI <p><i>A sample computation of QRI and an accompanying analysis should be requested. What should be the target level for QRI?</i></p>	<p style="text-align: center;">Article III, Section 4</p> <p>The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality:</p> <ul style="list-style-type: none"> a) 25 % for SAIFI b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI

	<p><i>Based on the formula, the QRI will be largely influenced by the SAIDI because of its higher weighting factor and its tendency to have the highest numeric value compared with the other indices.</i></p> <p><i>If ERC insists on using their voltage test methodology, the SPVVI is the most difficult data to get and Meralco might not be able to comply with the December 2004 requirement</i></p>	
<p>Bohol Light Company Inc. (BLCI)</p>	<p>Comment: System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by a DU. Our question is how to determine the allowable limit of probability levels in a DU?</p>	<p>Annex A</p> <p>System Performance on Voltage Variation Index (SPVVI) is the average percentage of the number of probability levels below the allowable limit experienced by the Distribution Utility. It is calculated by dividing the average number of feeders with probability levels below the allowable limit during a period by the total number of feeders in the Distribution System.</p> $SPVVI = F_{BL}/F_T$ <p>Where:</p> <p>$F_{BL} = (\Sigma \text{ Feeders with probability levels Below the allowable limit}) / 2$</p> <p>$F_T = \text{total \# of feeders in the DS}$</p>
<p>Cagayan Electric Power and Light Co., Inc. (CEPALCO)</p>	<p>Weighting Factors for Different Indices.</p> <p>COMMENT:</p> <p>(1) The percentage for SPVVI (Power Quality) should also be reduced to 20% and the remaining 80%</p>	<p>Article III, Section 4</p> <p>The following weighting factors which are based on the impact to the customers shall be applied correspondingly to each index for Reliability and Power Quality:</p>

	<p>for the Reliability Indices distributed proportionately for SAIFI, SAIDI and MAIFI. This is because Reliability is more important than Power Quality for most customers.</p> <p>(2) The formula for calculating ratings for the reliability indices should be set out. We suggest that the ratings for reliability performances in excess of the Targets be calculated as follows:</p> <p>SAIFI Rating (in percent) = $(100 - (100 \times ((SAIFl_a - SAIFl_t) / SAIFl_t))$</p> <p>Where, SAIFl_a is the Actual SAIFI for the year (or the rolling 12-month value), and SAIFl_t is the Target SAIFI as established in Article V, Section 2.</p> <p>The same formula would be used for SAIDI and MAIFI. Note that Actual SAIFI below the Target SAIFI would be rated 100 percent, regardless of how far below the Target is the actual performance. Where actual performances exceed the targets, the rating would be proportionate to the amount of excess.</p> <p>ADDITIONAL COMMENT: We believe that, in addition to monitoring the probabilistic reliability indices as set out in the Guidelines, the ERC should monitor also the deterministic reliability of distribution systems, in particular the (N-1) criterion for distribution substations and main feeders. We will submit a detailed proposal to this effect.</p>	<p>a) 25 % for SAIFI b) 30 % for SAIDI c) 5 % for MAIFI d) 40 % for SPVVI</p>
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