

অসম



ৰাজপত্ৰ

THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্তৃত্বৰ দ্বাৰা প্ৰকাশিত

PUBLISHED BY AUTHORITY

নং 34 দিশপুৰ, শুক্ৰবাৰ, 4 ফেব্ৰুৱাৰী, 2005, 15 মাঘ, 1926 (শক)
No. 34 Dispur, Friday, 4th February, 2005, 15th Magha, 1926 (S.E.)

GOVERNMENT OF ASSAM
ASSAM ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

The 5th August, 2004

DISTRIBUTION LICENSEES' STANDARDS OF PERFORMANCE

No. AERC. /2004/7.-- In exercise of powers conferred under Section 181(1) and 181(2) (za) and (zb) of the Electricity Act, 2003 read with Sections 57, 58, 59 and 86(1) (i) of the Act and all powers enabling in this behalf, and after previous publication, the Assam Electricity Regulatory Commission hereby makes the following Regulations, regarding the Distribution Licensees' Standards of Performance as under:-

1. Short title, commencement and interpretation:-

- (1) These Regulations may be called the Assam Electricity Regulatory Commission (Distribution Licensees' Standards of Performance) Regulations, 2004.
- (2) These Regulations shall be applicable to all Distribution Licensees engaged in supply of electricity to the public within the state of Assam.
- (3) These Regulations shall be applicable to all Trading Licensees engaged in the sale of electricity to open access consumers for the performance standards in relation to customer billing only.
- (4) This Regulation shall come into force with effect from their publication in the Assam Gazette.

2. Definitions:-

In this regulation, unless the context otherwise requires:-

- i. "Act" means the Electricity Act 2003 (Central Act No.36 of 2003);

- ii. "AERC" or "Commission" means the Assam Electricity Regulatory Commission constituted under section 17 of the Electricity Regulatory Commissions Act, 1998 and which continues to be so under section 82 of the Electricity Act, 2003 (no.36 of 2003);
- iii. "Area of Supply" means the area within which a distribution licensee is authorised by his license to supply electricity;
- iv. "ASEB" means the Assam State Electricity Board constituted before the commencement of the Electricity Act 2003 under section 5 of the Electricity (Supply) Act, 1948;
- v. "Consumer" means any person who is supplied with electricity for his own use by a licensee or the Government or by any other person engaged in the business of supplying electricity to the public under this Act or any other law for the time being in force and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of a Licensee, the Government or such other person, as the case may be.

The term shall also include persons who have applied for an electrical connection, persons whose supply have not yet commenced even after connection have been provided or whose electricity has been disconnected for non payment of dues etc, but whose connecting service lines/electrical apparatus has not been physically dismantled or whose agreement has not been terminated;

- vi. "Distribution Code or Code" means the set of rules, requirements, procedures, and standards approved by the Commission governing electric utilities in the operation and maintenance of their distribution systems, and which defines and establishes the relationship of the distribution systems with the facilities or installations of the parties connected thereto;
- vii. "Distribution Licensee" means a licensee authorized by the Commission under section 14 of the Act to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply and includes ASEB and any of its successor entity deemed with a distribution license under the provisions of section 131 of the Act;
- viii. "Distribution System" means the system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and the point of connection to the installation of the consumers;
- ix. "Grid Code" means the set of rules, requirements, procedures specified by the Commission under clause (h) of sub-section (1) of section 86 of the Act for the Assam State Transmission System, covering all material technical aspects relating to connections to and the operation of the Grid, the use of a Distribution System, or (in so far as relevant to the operation and use of a Distribution System) the operation of electric lines and electrical plant connected to the Distribution System, the Distribution Systems, or the system of any Supplier, and shall include the Interim Grid Code;
- x. "IEGC" means the Indian Electricity Grid Code approved by Central Electricity Commission and shall include any Grid Code specified by Central Commission under clause (h) of sub-section (1) of section 79 of the Act;

- xi. "Licensee" means a person who has been granted a license by the Commission under the Act and include ASEB and any of its successor entity under the provisions of section 131 of the Act
- xii. "Open Access Consumer" means a consumer who is eligible to receive supply of electricity from a person other than the distribution licensee of his area of supply.
- xiii. "Rules" means the Indian Electricity Rules, 1956 and any rules made under the Act.
- xiv. "SLDC" means the State Load Dispatch Centre established under sub-section (1) of section 31 of the Act located in the control room of the Transmission Licensee operating round the clock for the purpose of managing the integrated operation of power system and coordinating the state generation, transmission, distribution and load requirements with the Regional Load Dispatch Centre;
- xv. "Schedule" means the Schedules attached to these regulations;
- xvi. "Trading Licensee" means a person who has been granted by the Commission under section 14 of the Act a Trading Licence to undertake electricity trading in the State of Assam and shall include Deemed Licensee for the purpose.

Words and expressions used but not defined herein, shall have meaning assigned to them in the Electricity Act, 2003, and the Indian Electricity Rules 1956.

3. Standards of Performance

- (1) The Standards specified in Schedule-I shall be the Guaranteed Standards of Performance, being the minimum standards of service that a licensee shall achieve and maintain in the discharge of his obligations as a Licensee.
- (2) The Standards specified in the Schedule-II shall be the Overall Standards of Performance, which the Licensee shall seek to achieve in the discharge of his obligations as a Licensee.
- (3) The Commission may specify different dates for applicability of different performance standards specified in Schedule-II by a general or special order.
- (4) The Commission may from time to time add, alter, vary, modify or amend the contents of the Schedule-I and Schedule-II, by a general or special order passed by the Commission.

4. Compensation:-

- (1) If the Licensee fails to meet the Standards of Performance as specified in Schedule-I, the Licensee shall pay to the affected person, the compensation as indicated against each of the Standards of Performance in Schedule-I.
- (2) The Licensee concerned shall pay the compensation referred to under sub-clause (1) above within ninety days of the failure of the Guaranteed Standard of Performance either through adjustment against existing, current and/or future bills for supply of electricity or in such manner as the Commission may direct.

- (3) The Licensee shall maintain the record of compensation payable under sub-clause (1) above showing the name & address of affected person, amount of compensation payable and actually paid, mode of adjustment of compensation in bill as per sub-clause (2) in each case. The Licensee on demand shall furnish such records to the Commission.
- (4) The liability of compensation under sub-clauses (1) above shall be applicable to supply of electricity in the urban areas from the month subsequent to the month in which this Regulation comes into effect and in the other areas from such date the Commission may direct by an order issued for the purpose.

5. Information on Standards of Performance

- (1) The Licensee shall furnish to the Commission, in monthly reports and a consolidated annual report for each financial year, the following information as to the Guaranteed Standards of Performance:
 - (a) The levels of performance achieved by the Licensee with reference to those specified in Schedule – I to this regulation;
 - (b) The number of cases in which compensation were payable under clause 4 above, and the aggregate amount of the compensation paid and payable by the Licensee;
 - (c) The number of claims made by the consumer against the Licensee for failure to meet the Guaranteed Standards of Performance and the action taken by the Licensee including the reasons as to delay in payment, or non-payment of compensation for such claims.
- (2) In the consolidated annual report, the Licensee shall report on the measures taken by the Licensee to improve performance areas covered by Guaranteed Standards and Licensee's assessment of the targets to be imposed for the ensuing year.
- (3) The monthly reports under sub-clause (1) shall be furnished to the Commission within 15 days of the close of the month and the annual report under the said sub-clause (1) shall be furnished to the Commission within 30 days of the close of the financial year.
- (4) The Licensee shall furnish to the Commission, in a report for every quarter and in a consolidated annual report for each financial year, the following information as to the Overall Standards of Performance:
 - (a) The level of performance achieved with reference to those specified in Schedule II to this regulation; and,
 - (b) The measures taken by the licensee to improve performance in the areas covered by Overall Standards and licensee's assessment of the targets to be imposed for the ensuing year.
- (5) The Quarterly reports under sub-clause (3) shall be furnished to the Commission within 15 days of the close of the quarter and the annual report under the said sub-clause (3) shall be furnished to the Commission within 30 days of the close of the financial year.
- (6) The Commission shall, at such intervals as it may deem fit, direct the

Licensee or otherwise arrange for the publication of the information furnished by licensees under this regulation in such form and manner as the Commission consider it to be appropriate.

6. Exemption:-

- (1) The standards of performance specified in this regulation shall remain suspended during Force Majeure condition such as war, mutiny, civil commotion, riot, flood, cyclone, lightning, earthquake or other force and strike, lockout, fire affecting the Licensee's installations and activities.
- (2) The Commission may by a general or special order issued for the purpose, and after hearing the Licensee and such representatives of the affected consumer group as the Commission consider it to be appropriate, release the Licensee from the liability to compensate the consumers for any default in the performance of any standard, if the Commission is satisfied that such default is for reasons other than those attributable to the Licensee and further that the Licensee had otherwise duly made efforts to fulfill his obligations.

7. Issue of orders and directions:-

Subject to the provisions of the Electricity Act, 2003 and these Regulations, the Commission may, from time to time, issue orders and directions in regard to the implementation of these Regulations and procedure to be followed on various matters, which the Commission has been empowered by this regulation to direct, and matters incidental or ancillary thereto.

8. Power to remove difficulties:-

If any difficulty arises in giving effect to any of the provisions of these Regulations, the Commission may, by general or special order, do or undertake or direct the Licensee to do or undertake things, which in the opinion of the Commission are necessary or expedient for the purpose of removing the difficulties.

9. Power to Amend:-

The Commission may at any time add, vary, alter, modify or amend any of the provisions of these Regulations or the Schedules attached to these Regulations.

10. Repeal and Savings:-

- (1) Anything done or any action taken or purported to have been done or taken including any order, direction or notice made or issued by the Commission prior to issue of these regulations shall be valid.
- (2) As far as the licensee is concerned notwithstanding any thing contrary mentioned in the Guidelines for Redressal of Consumers Grievances issued by the Commission under Section 181 of Electricity Act 2003, these Regulations have overriding effect.
- (3) Nothing in these Regulations shall affect the rights and privileges of the consumers under any other law including the Consumer Protection Act, 1986.

SCHEDULE – I

GUARANTEED STANDARDS OF PERFORMANCE

(1) Consumer related services

Nature of Service / Standards	Guaranteed Standards- Maximum time limit for rendering service	Compensation payable to affected person
1. <u>Fuse-off /Fault Calls:</u>		
Cities/Towns	4 working hours	Rs. 5/- per consumer for every hour delay beyond 4 working hours subject to maximum Rs. 50/- per consumer per day.
Rural Areas	24 hours	Rs. 20/- per consumer per day beyond one day subject to maximum Rs. 50/- per consumer.
2. <u>Line Breakdowns:</u>		
Cities/Towns	(i) Where replacement of pole is not required: 24 Hrs. ii) Where replacement of pole is required: 48 Hrs.	Rs. 10/- per consumer per day for delay beyond one day, if the number of affected consumers are less than 50, and Rs. 5/- per consumer per day for affected consumers 50 or more subject to maximum Rs. 50/- per consumer. Rs. 10/- per consumer per day for delay beyond 48 hours, if the number of affected consumers are less than 50, and Rs. 5/- per consumer per day for affected consumers 50 or more subject to maximum Rs. 50/- per consumer.
Rural Areas	i) Where replacement of pole is not required: 24 Hrs. ii) Where replacement of pole is required: 72 Hrs.	Rs. 5/- per consumer per day for delay beyond one day subject to maximum Rs. 50/- per consumer. Rs. 5/- per consumer per day for delay beyond three day subject to maximum Rs. 50/- per consumer.
3. <u>Replacement of failed Distribution Transformer:</u>		
Cities/Towns	1 day	Rs. 20/- per consumer/day for delay beyond 1 day subject to maximum Rs. 100/- per consumer.

Rural Areas	5 days	Rs. 10/- per consumer/day for delay beyond 5 days subject to maximum Rs. 100/- per consumer.
4. <u>Replacement of damaged service line:</u>		
Require replacement at consumer's cost (fault in consumer's instillation)	3 days from the date of deposit of cost of service-wire by the consumer	Rs. 20/- per day for delay beyond 3 days subject to maximum Rs.100/- per consumer
Require replacement at licensee's cost (normal wear & tear)	3 days from the date of receipt of complaint	Rs. 10/- per day for delay beyond 3 days subject to maximum Rs.50/- per consumer
5. <u>Complaints about meters</u>		
LT Consumers		
Testing, Checking & Calibration for Correctness of Meter		
Urban Area	7 days from lodging of complaint.	Rs. 50/- per day for delay beyond 7 days subject to maximum Rs.200/- per consumer
Rural Area	15 days from lodging of complaint.	Rs. 50/- per day for delay beyond 15 days subject to maximum Rs.200/- per consumer
Defective/Stopped/Burnt Meter Replacement:		
Urban Area		
Replacement not attributable consumer	7 days	Rs. 50/- per day for delay beyond specified period subject to maximum Rs.200/- per consumer
Where the cost of the meter is recoverable from the consumer.	15 days after the receipt of payment.	Rs. 50/- per day for delay beyond specified period subject to maximum Rs.200/- per consumer
Where the consumer is required to supply the metering equipment.	15 days after supply of metering equipment.	Rs. 50/- per day for delay beyond specified period subject to maximum Rs.200/- per consumer
Rural Area:		
Replacement not attributable consumer	15 days	Rs. 50/- per day for delay beyond specified period subject to maximum Rs.200/- per consumer

Where the cost of the meter is recoverable from the consumer.	30 days after the receipt of payment.	Rs. 50/- per day for delay beyond specified period subject to maximum Rs.200/- per consumer
H.T. Consumers		
Replacement of stopped/defective meter or related equipments	Within 7 days after receipt of complaint provided meter is available with Licensee, otherwise within 3 months in any case.	Rs. 200/- per day for delay beyond specified period subject to maximum Rs.2000/- per consumer
Where the cost of the meter is recoverable from the consumer.	Within 15 days after receipt of complaint provided meter is available with Licensee, otherwise within 3 months in any case.	Rs. 200/- per day for delay beyond specified period subject to maximum Rs.2000/- per consumer
Where the consumer is required to supply the meter/equipment	30 days after delivery of metering equipment to Licensee's office.	Rs. 200/- per day for delay beyond specified period subject to maximum Rs.2000/- per consumer
Complaints about consumer's bills		
Urban Area	3 Days	Rs. 5/ per consumer per day delay subject to maximum Rs. 50/-
Rural Area	7 Days	Rs. 5/ per consumer per day delay subject to maximum Rs. 50/-

(2) Quality of Power Supply

The guaranteed standards for quality of power supply by the licensee in his area of supply are specified hereunder. Subject to availability of supply at inter-connection points with transmission system within the limits specified for transmission licensee, the Distribution Licensee shall ensure that quality of power supply meet the specified minimum guaranteed standards. The Licensee shall liable for payment of compensation to consumers as may be determine by the Commission for failure to meet the specified quality indicators

The compensation for quality of power supply under Schedule-I will be determined by Commission based on the consumer complaints received and claims made after the Commission holds an investigating hearing.

a. Voltage Variation Limits

Voltage Variation is defined as the deviation of the root-mean-square (RMS) value of the voltage from its nominal value, expressed in terms of percent. Voltage variation may be either of short duration or long duration.

A Short Duration Voltage Variation shall be defined as a variation of the RMS value of the voltage from nominal voltage for a time greater than one-half cycle of the power frequency but not exceeding one minute. A long duration Voltage variation shall be defined as the variation of the RMS value of the voltage from nominal voltage for a time greater than one minute.

For the purpose of these standards, the sustained variation in voltage exceeding one-minute duration shall be considered.

The Licensee shall ensure that long duration voltage variation at the point of commencement of supply to consumer as defined in Indian Electricity Rules, 1956, shall not vary from the declared voltage as below:

Type of supply and declared voltage	Variation maximum limit %	Variation minimum limit %
230 Volts single phase 50 Hz AC supply	6% of declared voltage	6% of declared voltage
400 Volts three phase 50 Hz AC supply	6% of declared voltage	6% of declared voltage
11000 Volts three phase 50 Hz AC supply	6% of declared voltage	9% of declared voltage
33000 Volts three phase 50 Hz AC supply	6% of declared voltage	9% of declared voltage

b. Neutral Voltage displacement

Unbalance in loads on three phases cause shifting of neutral from earth potential. Neutral displacement is applicable for transformers with 'Star Point' solidly grounded. Under "solidly" grounded conditions, the potential of neutral should be equal to earth i.e. zero. But in such conditions when the earthing of the star point is imperfect the star to ground offers small resistance. This results in flow of negative sequence currents (because $IR + IY + IB \neq 0$) through neutral to ground, thereby causing shift of neutral from its earth potential, which is the neutral voltage displacement.

Unbalance voltages and displacement of neutral will result in decreased efficiency, negative torque, leakage currents, vibrations and overheating. Severe unbalance and neutral displacement could lead to malfunctioning of some equipment. Some types of loads like X-ray machines; electric traction; induction and arc furnace may induce unbalance in the supply voltages and shift the voltage of neutral from earth potential.

The Distribution Licensee shall ensure that the neutral point voltage of the all 33/11 kV and 11/0.4 kV transformers with respect to earth will not have potential greater than 2% and 5% respectively of the no load phase-phase voltage of the transformer.

c. Frequency Deviation

Transmission Grid in the State normally operates, as an integral part of the North-Eastern Regional Grid and frequency management is the joint responsibility of all constituents of the NE Region. NERLDC in co-ordination with SLDC shall control frequency of the region in line with IEGC requirement.

The Rule 55 of the Indian Electricity Rules, 1956 specify that frequency of AC supply to a consumer shall not vary more than 3 percent of declared frequency.

The Licensees have statutory obligation to ensure that the frequency of supply voltage to consumer not varies more than (+/-) 3 per cent.

Limits as per IE Rules 1956	Frequency
Upper Limit	51.5 Hz
Lower Limit	48.5 Hz

The frequency band specified in the IEGC is normal operating range for efficient system operation. The licensee shall be monitor the frequency to ensure that frequency remains within the limits specified in IEGC and deviation in frequency beyond IEGC target range shall be taken up with SLDC for appropriate corrective measure.

Target range as per IEGC	
Upper Limit	50.5 Hz
Lower Limit	49.0 Hz

(3) Provision relating to safety and electricity supply

The ASEB/Distribution Licensee shall observe measures relating to safety and electricity supply as may be specified by the CEA in consultation with the State Government under section 53 of the Act.

The ASEB/Distribution Licensee shall observe the General Safety Requirements as laid down in IE Rules, 1956 for construction, installation, protection, operation and maintenance of electric supply lines and apparatus. The ASEB/ Distribution Licensee shall develop its Safety Manual taking into consideration the safety requirements for the construction, operation and maintenance of electrical plants and electric lines as laid down in IE Rules, 1956. The Safety Manual shall be updated by the Licensee based on the safety requirements for the construction, operation and maintenance of electrical plants and electric lines as may be specified by the Central Electricity Authority under Clause (c) of Section 73 of the Act.

ASEB/ Distribution Licensee shall designate suitable control persons as specified in Grid Code for coordination of safety procedures before work is taken up, during work, and after work is completed till the concerned system component is energized, both inside its own Distribution System and across a control boundary between Distribution System and that of any user.

SCHEDULE-II

OVERALL STANDARDS OF PERFORMANCE

(1) Consumer related services and efficiency indicators

Nature of Service / Standards	Guaranteed Standards- Maximum time limit for rendering service	Targeted level of standards of performance
6. <u>Fuse-off /Fault Calls:</u>		
Cities/Towns	4 working hours	99% of Fuse-off /Fault complaints received
Rural Areas	24 hours	99% of Fuse-off /Fault complaints received
7. <u>Line Breakdowns:</u>		
Cities/Towns	(i) Where replacement of pole is not required: 24 Hrs. ii) Where replacement of pole is required: 48 Hrs.	95% of Line Breakdowns complaints received 90% of Line Breakdowns complaints received
Rural Areas	i) Where replacement of pole is not required: 24 Hrs. ii) Where replacement of pole is required: 72 Hrs.	90% of Line Breakdowns complaints received 85% of Line Breakdowns complaints received
8. <u>Replacement of failed Distribution Transformer:</u>		
Cities/Towns	1 day	95% of number of transformers reported failed
Rural Areas	5 days	95% of number of transformers reported failed
9. <u>Replacement of damaged service line:</u>		
Require replacement at consumer's cost (fault in consumer's instillation)	3 days from the date of deposit of cost of service-wire by the consumer	99% of damaged service line complains received
Require replacement at licensee's cost (normal wear & tear)	3 days from the date of receipt of complaint	99% of damaged service line complains received
10. <u>Complaints about meters</u>		

LT Consumers		
Testing, Checking & Calibration for Correctness of Meter		
Urban Area	7 days from lodging of complaint.	90% of requests for testing & checking of meters received from consumers
Rural Area	15 days from lodging of complaint.	90% of requests for testing & checking of meters received from consumers
Replacement of defective/stopped meters		
Urban Area	Within 15 days	90% of defective/stopped meters
Rural Area	Within 30 days	90% of defective/stopped meters
Replacement of Burnt meters:		
Urban Area		
Replacement not attributable consumer	7 days	90% of burnt meters
Where the cost of the meter is recoverable from the consumer.	15 days after the receipt of payment.	90% of burnt meters
Where the consumer is required to supply the metering equipment.	15 days after supply of metering equipment.	95% of burnt meters
Rural Area:		
Replacement not attributable consumer	15 days	90% of burnt meters
Where the cost of the meter is recoverable from the consumer.	30 days after the receipt of payment.	90% of burnt meters

H.T. Consumers		
Replacement of stopped/defective meter or related equipments	Within 7 days after receipt of complaint provided meter is available with Licensee, otherwise within 3 months in any case.	99% of stopped/defective meter or related equipments
Where the cost of the meter is recoverable from the consumer.	15 days after the receipt of payment provided meter is available with Licensee, otherwise within 3 months in any case	100% of stopped/defective meter or related equipments where cost recoverable from consumer
Where the consumer is required to supply the meter/equipment	30 days after delivery of metering equipment to Licensee's office.	100% of stopped/defective meter or related equipments where cost deposited consumer
Complaints about consumer's bills		
Urban Area	3 Days	99% of complaints received
Rural Area	7 Days	99% of complaints received
% Failure of Transformers		
33/11 kV Power Transformers		Not exceeding 5% in a year of the number of transformers in service at the beginning of year
11/0.4 kV Distribution Power Transformers		Not exceeding 10% in a year of the number of transformers in service at the beginning of year
Stopped/Defective Meters		
% of Stopped/Defective Meters		Not exceeding 5 % of the meters installed
Efficiency Indicators		
% T & D Losses		Subject to Commission directions in ARR/Tariff Order

% Billing Efficiency		Annual Average of monthly billing efficiency not less than 95%. Where monthly billing efficiency = Number of consumer billed during month divided by number of consumers served by the Licensee at the beginning of month.
% Collection Efficiency		Annual Average of monthly collection efficiency not less than 95% Where monthly collection efficiency = Amount realized divided by the amount assessed during month.

(2) Standards related to quality, continuity and reliability of power supply

1. Voltage unbalance

In distribution system unbalance in supply voltages should be minimized such that it does not affect the performance of consumers equipment like motors and other gadgets connected to distribution supply system.

Unbalance in system voltage results in negative sequence voltage and zero sequence voltage, which affects the performance of electric system and connected equipment.

Voltage Unbalance is defined as the maximum deviation in voltage between two phases divided by the average of the phase voltages of all three phases, expressed in terms of percent.

$$\text{Voltage Unbalance} = \frac{\text{Deviation between highest and lowest phase voltage}}{\text{Average voltage of three phases}} \times 100$$

The total unbalance in system voltage at consumer connection point in terms of negative and zero sequence voltage shall not exceed the values given below:

Voltage Level	Limit of voltage unbalance	Implementation Stage
33 kV level	2%	As may be specified by the Commission by specific order
11 kV level	3%	As may be specified by the Commission by specific order

The Voltage unbalance shall be measured at sub-stations provided with measuring instruments having accuracy class within 1% limit.

2. Harmonics in supply voltage

Harmonics is defined as sinusoidal voltage and currents having frequency that are integral

multiple of the fundamental frequency.

Many loads in power system produce current and voltages at frequencies in multiple of the fundamental frequency. These multiple frequency voltage and currents are called Harmonics and their ratio to the fundamental frequency is called Harmonic Order. Harmonics affects system operation and reduces life of the equipments. Harmonics of odd order are more undesirable especially in Industrial sub-stations, the effect of harmonics are more severe. Some types of loads like Induction & Arc Furnace, electromagnetic equipment such as X-ray machines etc produce harmonics in supply voltages.

The Licensee shall ensure that the individual harmonic voltage order shall not exceed 1%. Harmonic measurement shall confirm to IEC Std. 1000-4-7 or IEEE Std. 519. The measurement of harmonic order in distribution system shall be on sample basis at an interval of 6 months at strategic such inter-connection points which it consider prone to harmonic voltage generation. The Licensee will compile a list of all metering points, which are prone to harmonic generation for taking remedial measures and shall furnish the report indicating corrective action. The Licensee shall take adequate measures to prevent harmonics induction in the distribution system from consumer load side equipments like Induction & Arc Furnace, electromagnetic equipment such as X-ray machines etc.

3. Service Reliability

Reliability of the distribution system operated by the Licensee shall be computed on the basis of number and duration of sustained interruptions in a year. In a power system, it may take a few minutes to restore power after transient faults or to reroute power in the network to restore supply to the affected area, where a large number of consumers are involved. Sustained interruptions of more than ten minutes duration shall be considered for judging the reliability of the system and temporary interruptions not exceeding ten minutes duration shall be ignored in computation.

Reliability standards of the Licensee shall be judged by the following two indices:

Consumers Average Interruption Frequency Index (CAIFI)

Consumers average interruption frequency index, which shall be calculated by dividing the total number of sustained interruptions to consumers in a year by the total number of consumers served. An interruption in supply to a consumer shall be considered as one interruption to one consumer. In case of failure of a line or transformer, number of interruptions shall be equal to the number of consumers affected. The index shall be expressed as number of interruptions per consumer per year and shall be calculated annually.

$$CAIFI = \frac{\sum (I * K)}{N}$$

Where

I = Number of interruptions exceeding 10 minutes at a time for the voltage class.

K = Number of Consumers whose power supply remained 'off' as a result of such interruption.

N = Total Number of Consumers in service at the beginning of year having that class of voltage supply

* Multiplication sign

CAIFI shall be calculated for a sub-station, for a circle and for the Licensee as a whole. The index shall be expressed in number of interruptions per consumer per year.

Consumers Average Interruption Duration Index (CAIDI)

Consumers average interruption duration index, which shall be calculated by dividing the total minutes of sustained interruption in supply to consumers in a year by the total number of consumers served. The index shall be expressed as number of minutes of interruption per consumer per year and shall be calculated annually.

$$\text{CAIDI} = \frac{\sum (P * K)}{N}$$

Where

- P = Duration of interruptions exceeding 10 minutes at a time for the voltage class.
 K = Number of Consumers whose power supply remained 'off' as a result of such interruption.
 N = Total Number of Consumers in service at the beginning of year having that class of voltage supply

* Multiplication sign

CAIDI shall be calculated for a sub-station, for a circle and for the Licensee as a whole. The index shall be expressed in interruption minutes per consumer per year.

While calculating the CAIFI and CAIDI indices, the following types of interruptions shall not be taken into account:

- (a) Planned outages
- (b) Temporary interruptions of duration less than ten minutes
- (c) Outages due to failure of upstream power system including generation and transmission network.
- (d) Outages due to Force Majeure reasons beyond the Licensee control like fire, earthquake, floods, storms, and riots.

The Licensee shall compile above data at each sub-station for calculating reliability indices. The Licensee shall compile monthly data for each Circle to ascertain Circle wise reliability indices of the system.

The Commission shall fix benchmark for standards of reliability on the basis of data collected for one year and revise the levels to be achieved from time to time for ensuring improvement in the performance of the Licensee.

(By the Order of the Commission)

**Sd/- ILLEGIBLE
 Secretary,
 Assam Electricity Regulatory Commission**