

DEPARTMENT OF REGULATORY AGENCIES

STATE OF HAWAII

TITLE VII - PUBLIC UTILITIES COMMISSION

STANDARDS FOR ELECTRIC UTILITY SERVICE
IN THE STATE OF HAWAII

General Order No. 7

DEPARTMENT OF REGULATORY AGENCIES

STATE OF HAWAII

TITLE VII - PUBLIC UTILITIES COMMISSION

STANDARDS FOR ELECTRIC UTILITY SERVICE IN THE STATE OF HAWAII

General Order No. 7

Table of Contents

PART I GENERAL

<u>RULE</u>		<u>PAGE</u>
1.1	Authorization of rules	1
1.2	Application of rules	1
1.3	Definitions	2

PART II RECORDS AND REPORTS

2.1	Location of records	3
2.2	Retention of records	3
2.3	Data to be filed with the Commission	3
2.4	Other records	5

PART III GENERAL REQUIREMENTS

3.1	Disposition of electricity	6
3.2	Meter reading sheets, cards, or billing register	6
3.3	Meter reading interval	7
3.4	Condition of meter and equipment	7
3.5	Demand meter registration	7
3.6	Temporary service	7
3.7	Line extension plan	8

PART IV CUSTOMER RELATIONS

<u>RULE</u>		<u>PAGE</u>
4.1	Customer information	8
4.2	Establishment and re-establishment of credit	9
4.3	Customer bill forms	10
4.4	Customer records	11
4.5	Adjustment of bills	12
4.6	Reasons for denying service	14
4.7	Insufficient reasons for denying service	15
4.8	Estimated demand	15
4.9	Customer complaints	15

PART V ENGINEERING

5.1	Requirement for good engineering practice	15
5.2	Acceptable standards	16
5.3	Adequacy of supply	17
5.4	Inspection of electric plant	

PART VI INSPECTIONS AND TESTS

6.1	Utility inspections and tests	17
6.2	Instrument transformer and generating station meter tests	20
6.3	Test procedures and accuracies	20
6.4	Facilities and equipment for meter testing	20
6.5	Records of meters and associated metering devices	21
6.6	Meter test records	21

PART VII STANDARDS OF QUALITY OF SERVICE

7.1	Standard frequency	21
7.2	Voltage limits	21
7.3	Voltage surveys and records	22
7.4	Equipment for voltage measurements	23
7.5	Interruptions of service	24

PART VIII SAFETY

8.1	Acceptable standards	24
8.2	Protective measures	24
8.3	Safety program	24
8.4	Grounding of secondary distribution system	25

DEPARTMENT OF REGULATORY AGENCIES
TITLE VII PUBLIC UTILITIES COMMISSION
STANDARDS FOR ELECTRIC UTILITY SERVICE IN THE STATE OF HAWAII

(GENERAL ORDER NO. 7)

PART I. GENERAL

1.1 AUTHORIZATION OF RULES

Chapter 104-15, Revised Laws of Hawaii, provides that the Commission shall have the power to make such rules as it deems necessary in the public interest and in the exercise of its powers and jurisdiction to carry out the provisions of Chapter 104 and any other law relating to the Commission.

1.2 APPLICATION OF RULES

The following rules shall apply to any electric utility operating within the State of Hawaii, under the jurisdiction of the Public Utilities Commission of the State of Hawaii.

- a. These rules are intended to promote safe and adequate service to the public, to provide standards for uniform and reasonable practices by utilities, and to establish a basis for determining the reasonableness of such demands as may be made by the public upon the utilities.
- b. If unreasonable hardship to a utility or to a customer results from the application of any rule herein prescribed, application may be made to the Commission for the modification of the rule or for temporary or permanent exemption from its requirements.
- c. The adoption of these rules shall in no way preclude the Commission from altering or amending them, or from making such modifications with respect to their application as may be found necessary to meet exceptional conditions.
- d. These regulations shall in no way relieve any utility from any of its duties under the laws of this State.
- e. No electric utility shall deviate from these rules without specific authorization from the Commission except as herein provided. The rules herein established shall take precedence over all rules filed or to be filed by electric utilities insofar as inconsistent therewith. Rules now on file and inconsistent with the rules herein established shall be properly revised and refiled thirty (30) days from the effective date of this order.

- f. Each electric utility may of its own accord establish uniform non-discriminatory rules more favorable to its customers than the rules herein established.
- g. The rules herein established shall take precedence over all orders, general or special heretofore made by the Commission, insofar as said orders may be inconsistent with these rules.

1.3 DEFINITIONS

The following words and terms, when used in these rules, shall have the meaning indicated below:

- a. The word "utility" means any electric company or any person, firm or corporation engaged as a public utility in producing, transmitting, distributing or furnishing electric service for sale or re-sale for domestic, commercial, industrial or other purposes.
- b. The word "commission" shall be construed to mean the Public Utilities Commission of the State of Hawaii.
- c. The word "customer" shall be construed to mean any person, group of persons, firm, corporation, association, institution, agency of the federal, state or local government or civic body in whose name electric service is rendered by an electric utility. Each utility shall include in its tariff, definitions in detail of the qualification requirements of customers for the several classes of utility service available.
- d. The word "tariff" shall be construed to mean the entire body of rates, charges, definitions, rules and regulations including those services contained in special contracts and supplemental tariffs adopted and filed by the utility and authorized by the Commission.
- e. The word "service" or "electric service" shall, unless otherwise specifically designated, be construed to mean electrical energy generated, transmitted, distributed or furnished by any electric utility.
- f. "Premises" means a piece of land or real estate, including buildings and other appurtenances thereon.
- g. "Electric plant" includes all real estate, fixtures and property owned, controlled, operated or managed in connection with or to facilitate the production, generation, transmission, delivery or furnishing of electricity for light, heat or power.
- h. "Meter" means, unless otherwise qualified, any device or instrument that measures or registers or records the integral of an electrical quantity with respect to time.

i. "Interruption of service" means any disturbance of the electric service where power to customers is interrupted for any reason for any length of time.

j. The abbreviations used, and their meaning, shall be as follows:

KW Kilowatts
KWH or KWhr Kilowatt hour
KVA Kilovolt amperes

PART II. RECORDS AND REPORTS

2.1 LOCATION OF RECORDS

All records required by these rules or necessary for the administration thereof, shall be kept within this State, unless otherwise authorized by the Commission. These records shall be available for examination by the Commission or its authorized representatives at all reasonable hours.

a. Complete tariff schedules, contract forms, rules and regulations, etc., as approved by the Commission, shall be on file in each business office of the utility and shall be open for inspection by the public.

2.2 RETENTION OF RECORDS

Unless otherwise specified by the Commission, all records required by these rules shall be preserved for the period of time specified in the current edition of the National Association of Railroad and Utilities Commissioners' publication "Regulations to Govern the Preservation of Records of Electric, Gas and Water Utilities."

2.3 DATA TO BE FILED WITH THE COMMISSION

The utility shall file with the Commission the following documents and information, and shall maintain such documents and information in a current status.

a. A copy of the utility's tariff, which shall include:

1. A copy of each schedule of rates for service, together with the applicable riders.

2. A copy of the utility's rules, or terms and conditions, describing the utility's policies and practices in rendering service. These rules shall include:

a.) A list of available voltages.

b.) The list of the items which the utility furnishes, owns, and maintains and are included in the regular rates for service such as meters, meter socket, service entrance, etc.

- c.) A statement indicating the minimum number of days allowed for payment of the gross amount of the customer's bill before service will be discontinued for non-payment.
- d.) The utility's line extension plan as required in Rule 3.7:
- b. A copy of the utility's rules, if any, published or furnished by the utility for the use of engineers, architects, electrical contractors, etc., covering meter and service installations.
- c. A copy of each type of customer bill form.
- d. A map or maps showing the utility's operating area. Maps shall be revised annually unless revision is unnecessary, in which event the utility shall notify the Commission that the map on file is current. The map or maps shall show generating stations, transmission lines with voltages and principal substations.
- e. The name, title, address, and telephone number of the person who should be contacted in connection with:
 - 1. General management duties.
 - 2. Customer relations (complaints).
 - 3. Engineering operations.
 - 4. Meter tests and repairs.
 - 5. Emergencies during non-office hours.
- f. A report of each accident in connection with the operation of the utility's electric plant. Prompt notice of fatal accidents shall be given to the Commission by telephone or telegraph.
- g. Capital Improvements.
 - 1. The utility shall, by January 1 of each year, file with the Commission, a report (in a form approved by the Commission) of its projected capital improvements program expenditures budget for the ensuing five years which shall include, in considerable detail, the capital improvements program expenditures budget approved by management for the first year of the five-year period.
 - 2. Proposed capital expenditures for any single project related to plant replacement, expansion or modernization, in excess of \$500,000 or 10 per cent of the total plant in service, whichever is less, shall be submitted to the Commission for review at least 60 days prior to the commencement of construction or commitment for expenditure, whichever is earlier. If the Commission determines, after hearing on the matter, that any portion of the proposed project provides facilities which are unnecessary or are unreasonably in excess of probable future requirements for utility purposes, then the

utility shall not include such portion of the project in its rate base. If the utility subsequently convinces the Commission that the property in question has become necessary or useful for public utility purposes, it may then be included in the rate base. Failure of the Commission to act upon the matter and render a decision and order within 90 days of filing by the utility shall allow the utility to include the project in its rate base without the determination by the Commission required by this rule. The data submitted under this rule shall be in such form and detail as prescribed by the Commission.

h. Reports of electric service.

1. Each utility shall file the following regular reports:

a.) Monthly and Annual Financial Report and Statistical Information on Utility Operations.

2. Reports shall be due in the Commission's offices within the time limits set below, unless otherwise required:

a.) Monthly reports - thirty (30) days after close of period.

b.) Annual reports - ninety (90) days after close of period.

i. A photograph or drawing showing the identifying symbol or symbols, if any are used, to mark the utility's line supports.

2.4 OTHER RECORDS

a. A suitable map or maps shall be kept on file at a suitable location, which map or maps shall at all time show the primary voltages, number of phases and primary conductor size. In lieu of maps, a card record or other suitable means may be used.

b. There shall be available such information relative to the distribution system as will enable the utility representative to furnish necessary information regarding the rendering of service to existing and prospective customers.

c. There shall be provided for each generation plant and substation an accurate ground plan drawn to a suitable scale, showing the entire layout of the plant or station, the location, size and character of plant equipment, major transmission lines, connections, switches and other facilities used for the production and delivery of electric service, all properly identified.

d. Station Records.

1. Each electric utility shall keep and preserve, for a period of at least twelve (12) months, an accurate record of the voltage maintained at each generating station or major transmission substation on its system. Such record may be kept in the form of recording meter charts.
2. Each electric utility shall keep and preserve, for a period of at least three (3) years, an accurate record of the operation of each generation station, as follows:
 - a. The gross kilowatt hours generated each day.
 - b. The net kilowatt hours generated each day.

PART III GENERAL REQUIREMENTS

3.1 DISPOSITION OF ELECTRICITY

- a. All electrical energy sold by a utility shall be on the basis of meter measurement unless otherwise authorized by the Commission.
- b. Wherever practicable, consumption of electricity within the utility itself, or by administrative units associated with it, shall be metered.

3.2 METER READING SHEETS, CARDS, OR BILLING REGISTER

- a. The meter reading sheets, cards, or billing register shall show:
 1. Customer's name, address, and rate schedule;
 2. Identifying number and/or description of the meter(s)
 3. Meter readings.
 4. If the reading has been estimated.
 5. Any applicable multiplier or constant.
- b. Each meter shall indicate clearly the kilowatt hours or other unit of electricity registered by such meter. In cases where the dial readings of a meter must be multiplied by a constant to obtain the kilowatt hours or other unit consumed, the proper constant to be applied shall be clearly marked on the consumer's bill. Where electricity is metered under other conditions, or quantity is determined by calculations from recording devices, the company shall, upon application from the customer, supply the customer with such information as will cover the conditions under which the quantity is determined.

- c. All charts taken from recording meters shall be marked with the date of the record, the meter number, customer's name and location and the chart multiplier.

3.3 METER READING INTERVAL

All meters, other than residential, shall be read monthly, except that authority may be obtained from the Commission for reading the meters at other than monthly intervals. Residential meters may be read bi-monthly. As nearly as practicable, utilities shall avoid sending a customer two successive estimated bills.

3.4 CONDITION OF METERS AND EQUIPMENT

- a. No meter shall be installed which is known to be mechanically or electrically defective, or to have incorrect constants or which has not been tested, and adjusted if necessary, in accordance with Rule 6.3. The capacity of the meter and the index mechanism should be consistent with the electric requirements of the customer.
- b. Each utility shall service and maintain all equipment it uses on customer's premises and shall correctly set and keep in proper adjustment any thermostats, clocks, relays, time switches or other devices which control the customer's service in accordance with the provisions in the utility's rate schedules.

3.5 DEMAND METER REGISTRATION

When a demand meter is used for billing, the installation should, whenever practical, be designed so that the highest annual demand reading used for billing should appear in the upper half of the meter's range.

3.6 TEMPORARY SERVICE

The utility shall, in its tariff, authorized by the commission, make provision for the rendering of temporary service to a customer. It shall make specific definition of temporary service and shall specify the terms and conditions under which temporary service may be re-classified as permanent service. The customer may be required to advance all the cost of installing and removing the service in excess of any salvage realized and maybe required to establish credit. In the event such service becomes permanent, provision must be made for adjustment of any advance for temporary service.

3.7 LINE EXTENSION PLAN

- a. The utility will construct, own, operate and maintain electric distribution lines and equipment only along public streets, roads and highways which the utility has the legal right to occupy, and on public lands and private property across which rights of way satisfactory to the utility may be obtained by the utility.
- b. Each utility shall file with the Commission as part of the company's rules, its policy on line extensions which shall be subject to Commission's approval. Any revisions as the utility may find necessary to incorporate in its policy shall be first submitted to the Commission for review and approval.

PART IV. CUSTOMER RELATIONS

4.1 CUSTOMER INFORMATION

Each utility shall:

- a. Maintain up-to-date maps, plans, or records of its entire transmission and distribution systems, with such other information as may be necessary to enable the utility to advise prospective customers, and others entitled to the information, as to the facilities available for serving any locality.
- b. Assist the customer or prospective customer in selecting the most economical rate schedule.
- c. Notify customers affected by a change in rates or schedule classification.
- d. Post a notice in a conspicuous place in each office of the utility where applications for service are received, informing the public that copies of the rate schedules and rules relating to the service of the utility, as filed with the Commission, are available for inspection.
- e. Inform its customers of any change made, or proposed to be made, in the character of the service supplied as would affect the efficiency or safety of operation of the appliances or equipment which may be in use by said customer.
- f. Adopt some means of informing its customers as to the methods of reading meters, either by printing on its bills a description of the method, or by customer request at any office where applications for service are received.
- g. Furnish such additional information as the customer may reasonably request.

4.2 ESTABLISHMENT AND RE-ESTABLISHMENT OF CREDIT

Each Applicant for service will be required to establish or re-establish his credit in one of the following manners before service will be rendered

a. Establishment of Credit

Credit shall be established when:

1. Applicant furnishes credit information or references satisfactory to the utility;
2. Applicant establishes a record of prompt payment for service for 12 consecutive months;
3. Applicant is the owner of the premises to be served by the company or the owner of other real estate within the limits of the company service; or is the owner with substantial equity in the premises to be served;
4. Applicant makes a cash deposit to secure payment of bills or service to be furnished by the company as provided in Rule 4.2c; or
5. Applicant furnishes a guarantor, satisfactory to the company, to secure payment of bills for the service requested.

b. Re-establishment of Credit

1. An applicant who previously has been a customer of the company and whose service has been discontinued for non-payment of bills, may be required before service is rendered to pay all amounts owing to the company and to re-establish credit as provided in Rule 4.2a.
2. A customer who fails to pay his bills before they become past due and who further fails to pay such bill within five days after the date of presentation of a discontinuance of service notice for non-payment of bills, may be required to pay such bills and re-establish his credit by depositing the amount prescribed in Rule 4.2c.

c. Customer Deposits

Each utility may require from any customer or prospective customer a deposit intended to guarantee payment of bills for service.

1. Such deposits shall not be less than \$10.00 nor more in amount than the maximum estimated charge for service for 2 consecutive months, or as may reasonably be required by the utility in cases involving service for short periods or special occasions.

2. Interest on Deposits

- a.) Simple interest on deposits at the rate of at least 6% per annum shall be paid by the utility to each customer required to make such deposit for the time it is held by the utility after credit is deemed established. If refund of deposit is made within 30 days of the establishment of credit, no interest payment is required. If the utility retains the deposit more than 30 days after the establishment of credit, payment of interest shall be made retroactive to the date of establishment of credit.
 - b.) Payment of the interest to the customer shall be made annually if requested by the customer, or at the time the deposit is returned.
 - c.) The interest shall be accrued annually.
 - d.) The deposit shall cease to draw interest on the date it is returned, on the date service is terminated, or on the date notice is sent to the customer's last known address that the deposit is no longer required.
3. Each utility shall keep records to show:
 - a.) The name and address of each depositor.
 - b.) The amount and date of the deposit.
 - c.) Each transaction concerning the deposit.
 4. Each utility shall issue a receipt of deposit to each customer from whom a deposit is received, and shall provide means whereby a depositor may establish his claim if his receipt is lost.
 5. The utility may retain the deposit as long as it feels it is necessary to insure payment of bills for service, provided it complies with Rule 4.2c 2.
 6. A record of each unclaimed deposit may be maintained for at least 3 years, during which time the utility shall make a reasonable effort to return the deposit.
 7. Unclaimed deposits, together with accrued interest, shall be credited to an appropriate account.

4.3 CUSTOMER BILL FORMS

The utility shall bill each customer as promptly as possible following the reading of his meter. The bill shall show:

- a. The reading of the meter at the beginning and at the end of the period for which the bill is rendered.
- b. The dates of the billing period.
- c. The quantity and kind of units metered.
- d. The applicable rate schedule, or identification of the applicable rate schedule. If the actual rates are not shown, the bill shall carry a statement to the effect that the applicable rate schedule is available for inspection at the business office of the utility.
- e. The amount of the bill.
- f. A distinct marking to identify an estimated bill.
- g. Any conversions from meter reading units to billing units, or any other factors, such as fuel adjustments used in determining the bill. In lieu of such information on the bill, a statement must be on the bill advising that such information can be obtained by contacting the utility's principal office, except that any multiplier used to determine billing units will be shown whenever used.
- h. Copies of all forms of bills, bill stubs and notices appertaining to the payment of bills shall be filed with the Commission as a part of the schedule of rates, rules and regulations then in force.

4.4 CUSTOMER RECORDS

The utility shall retain records as may be necessary to effectuate compliance with Rules 4.5 and 6.6, but not less than three years.

- a. Records for customers shall show where applicable:
 1. KWH meter reading.
 2. KWH consumption.
 3. KW meter reading.
 4. KW measured demand.
 5. KW billing demand.
 6. Total amount of bill.

4.5 ADJUSTMENT OF BILLS

a. General

Whenever a meter creeps or whenever a metering installation is found upon any test to have an average error of more than 2.0 per cent; or a demand metering installation more than 1.0 per cent in addition to the errors allowed under Accuracy of Demand Meters; and adjustment of bills for service for the period of inaccuracy shall be made in the case of over-registration and may be made in the case of under-registration. The amount of the adjustment shall be calculated on the basis that the metering equipment should be 100 per cent accurate with respect to the testing equipment used to make the test. For watthour meters, the average accuracy shall be the arithmetic average of the per cent registration at light load and at heavy load, giving the heavy load registration a weight of four and the light load registration a weight of one.

b. Determination of adjustment

1. For Defective Meter

a.) If the date when the error in meter registration began can be determined, such date shall be the starting point for determination of the amount of the adjustment except that adjustments due to slow meters is limited to the preceding 3-month period.

b.) If the date when the error in meter registration began cannot be determined, it shall be assumed that the error has existed for a period equal to one-half of the time elapsed since the meter was installed, or one-half of the time elapsed since the last previous test, whichever is lesser, (except as otherwise provided in paragraph 3 below, covering error in registration due to creep). In any case, adjustments due to slow meters shall be limited to the preceding 3 months and adjustments due to fast or creeping meters shall be limited to the preceding 6 months.

c.) The Commission may authorize deviations from the above specified time limitations applicable to adjustment of bills required by defective meters.

2. Recalculation of bills shall be on the basis of actual monthly consumption except that if service has been measured by self-contained single phase meters or three wire network meters and involves no billing other than for kilowatt-hours, the recalculation of bills may be based on the average monthly consumption determined from the most recent 36 months consumption data.

3. The error in registration due to creep shall be calculated by timing the rate of creeping and assuming that this creeping affected the registration of the meter for 25.0 per cent of the time since the meter was installed, or since the last previous test, whichever is later.
4. When the average error cannot be determined by test because of failure of part or all of the metering equipment, it shall be permissible to use the registration of check metering installations, if any, or to estimate the quantity of energy consumed based on available data. The customer must be advised of the failure and of the basis for the estimate of quantity billed. The same periods of error shall be used as defined in paragraphs above.

c. Refunds

1. If the recalculated bills indicate that more than \$1 is due an existing customer or \$2 is due a person no longer a customer of the utility, the full amount of the calculated difference between the amount paid and the recalculated amount shall be refunded.
2. Refunds shall be made to the two most recent consumers who received service through the meter found to be in error. In the case of a previous consumer who is no longer a customer of the utility, a notice of the amount due shall be mailed to such previous consumer at his last known address, and the utility shall upon demand made within 3 months thereafter refund the same.

d. Backbilling

1. If the recalculation of billing indicates that an amount due the utility is equal to or in excess of amounts set forth in paragraph c1 above as minimum refunds, the utility may bill the customer for the amount due.
2. Each utility may establish a policy whereby the minimum sum above which it will commence billing for amounts due to under-registration is in excess of the amounts set forth in paragraph c1 above as minimum refunds. In such cases the minimum sum established as the amount above which the utility will commence billing shall determine in all cases of under-registration whether the customer will be billed for the amount due the utility because of under-registration.

e. When a customer has been overcharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter or other similar reasons, the amount of the overcharge shall be adjusted, refunded or credited to the customer.

- f. When a customer has been undercharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter or other similar reasons, the undercharge should be billed to the customer if the amount is in excess of an amount or percentage which must be established.

4.6 REASONS FOR DENYING SERVICE

Service may be refused or discontinued for any of the reasons listed below. Unless otherwise stated, the customer shall be allowed a reasonable time in which to comply with the rule before service is discontinued. No service shall be discontinued on the day preceding or day or days on which the utility's business office is closed, except as provided in Rules 4.6a and 4.6b.

- a. Without notice in the event of a condition determined by the utility to be hazardous.
- b. Without notice in the event of customer use of equipment in such a manner as to adversely affect the utility's equipment or the utility's service to others.
- c. Without notice in the event of tampering with the equipment furnished and owned by the utility.
- d. Without notice in the event of unauthorized use.
- e. For violation of and/or non-compliance with the utility's rules on file with and approved by the Commission.
- f. For failure of the customer to fulfill his contractual obligations for service and/or facilities subject to regulation by the Commission.
- g. For failure of the customer to permit the utility reasonable access to its equipment.
- h. For non-payment of bill provided that the utility has made a reasonable attempt to effect collection and has given the customer written notice that he has at least 5 days, excluding Sundays and holidays, in which to make settlement on his account or have his service denied.
- i. For failure of the customer to establish credit as authorized by Rule 4.2.
- j. For failure of the customer to furnish such service equipment, permits, certificates, and/or rights-of-way, as shall have been specified by the utility as a condition to obtaining service, or in the event such equipment or permissions are withdrawn or terminated.
- k. For fraud against the utility.

4.7 INSUFFICIENT FOR DENYING SERVICE

The following shall not constitute sufficient cause for refusal of service to a present or prospective customer:

- a. Delinquency in payment for service by a previous occupant of the premises to be served.
- b. Failure to pay for merchandise purchased from the utility.
- c. Failure to pay for a different type or class of public utility service.
- d. Failure to pay the bill of another customer as guarantor thereof.
- e. Failure to pay a back bill rendered in accordance with Rule 4.5d.
- f. Failure to pay a bill to correct previous underbilling due to conditions contained in Rule 4.5.

4.8 ESTIMATED DEMAND

Upon request of the customer and provided the customer's demand is estimated for billing purposes, the utility shall measure the demand during the customer's normal operation and use the measured demand for billing. This requirement is not applicable to connected load type rate schedules.

4.9 CUSTOMER COMPLAINTS

- a. Each electric utility shall make a full and prompt investigation of all complaints made to it by its customers, either directly or through the Commission concerning its charges, practices, facilities or service.
- b. Each electric utility shall keep a chronological record of all complaints received which shall show in each case the name and address of the complainant, the date of receiving a complaint, the date and method of disposal, and name of service man responsible. The record shall be kept for a period of at least two (2) calendar years after the complaint has been adjusted.

PART V. ENGINEERING

5.1 REQUIREMENT FOR GOOD ENGINEERING PRACTICE

The electric plant of the utility shall be constructed, installed, removed, maintained and operated in accordance with accepted good engineering practice in the electric industry to assure, as far as reasonably possible, continuity of service, uniformity in the quality of service furnished, and the safety of persons and property.

- a. A record shall be kept by each electric utility of defective, unsafe, or hazardous conditions found upon inspection, or otherwise reported or ascertained involving life or property hazard or of interference with service, which record shall describe the location and circumstances of each apparently hazardous condition or possible service interference condition found or reported, and a statement showing the date and general character of its correction.

5.2 ACCEPTABLE STANDARDS

Unless otherwise specified by the Commission, the utility shall use the applicable provisions in the publications listed below as standards of accepted good practice.

- a. Hawaii State Public Utilities Commission, General Order No. 6, "Standards for Overhead Electric Line Construction and Maintenance" for overhead electric line construction. (Sept. 1962 revision)
- b. "National Electrical Code, NFPA No. 70, ASA C-1" for wiring beyond the service conductors. (1962 edition)
- c. "National Electrical Safety Code," as approved by the American Standards Association. for transmission and distribution facilities other than those covered in Paragraphs a and b above.
- d. "American Standard Code for Electricity Meters, ASA C-12" for meters and associated equipment. (1965 edition)
- e. "American Standard Requirements, Terminology and Test Code for Instrument Transformers, ASA C57.13" for instrument transformers. (1954 edition)

5.3 ADEQUACY OF SUPPLY

- a. The generation capacity of the utility's plant, supplemented by electric power regularly available from other sources, must be sufficiently large to meet all reasonably expectable demands for service and provide a reasonable reserve for emergencies. A Statement shall be filed annually with the Commission within 30 days after the close of the year indicating the adequacy of such capacity and the method used to determine the required reserve capacity which forms the basis for future requirements in generation, transmission, and distribution plant expansion programs required under Rule 2.3h.1.
- b. Where an electric utility has no generation capacity or limited generation capacity and purchases all or most of its electrical energy for resale to its utility customers, the utility must be assured that sufficient firm capacity is dedicated by the supplying company to assure the requirements of Rule 5.3a.

A statement as to the adequacy of such commitment and the method used by the utility to determine its reliability shall be filed with the Commission as required in Rule 5.3a.

5.4 INSPECTION OF ELECTRIC PLANT

Each utility shall adopt and file with the Commission a program of inspection of its electric plant in order to determine the necessity for replacement and repair. The frequency of the various inspections shall be based on the utility's experience and accepted good practice. Each utility shall keep sufficient records to give evidence of compliance with its inspection program.

PART VI. INSPECTIONS AND TESTS

6.1 UTILITY INSPECTIONS AND TESTS

Each utility shall make inspections, tests and adjustments of meters and associated metering devices in conformity with American Standard Code for Electricity Metering ASA C12-1965 as follows:

a. Pre-installation Inspections and Tests

Every meter and/or associated device shall be inspected and tested in the meter shop of the utility or testing laboratory approved by the Commission before being placed in service, and the accuracy of each meter shall be within prescribed tolerances.

1. If a meter is removed from a customer's premises, except for field testing, it must be returned to the meter shop of the utility or approved testing laboratory and must be inspected and tested as above, before it is again placed in service.

b. As-found tests

All meters and/or associated metering devices shall be tested before or after they are removed from the customer's premises. Such tests shall be made before the meters and/or associated metering devices are adjusted, repaired, or retired in conformity with ASA C12, Sections 8.1.4.2, 8.1.6.2.1, and 8.1.7.2.1.

c. Post-Installation Inspection and As-Left Tests

These inspections and tests are to be made to determine proper meter operation and wiring connections.

1. As-left tests shall be performed as required by ASA C12, Sections 8.1.4.3, 8.1.6.2.2, and 8.1.7.2.2.
2. Post-Installation inspections shall be performed as required by ASA C12, Section 8.1.6.2.3.

The following equipment is subject to post-installation inspection:

- (a) Meters with associated instrument transformers and phase shifting transformers.
- (b) Kilovar-hours meters.
- (c) Demand meters.
- (d) Direct current watt-hour meters.

d. Meter Testing on Request of Customer

- 1. Upon request by a customer and at no charge, the utility shall make a test of the meter serving him, provided that such tests need not be made more frequently than once in 12 months.
 - (a) The customer, or his representative, may be present when his meter is tested.
 - (b) A report of the results of the test shall be made to the customer within a reasonable time after the completion of the test, and a record of the report, together with a complete record of each test, shall be kept on file at the office of the utility.

e. In-service Performance Tests

1. General

In-service performance tests must be made in accordance with Sections 8.1, 8.2, 8.3, and Appendix D of ASA C12-1965. These tests may be made on the customer's premises or in the utility's meter shop. However, it is recommended that meters associated with instrument transformers, or phase shifting transformers, or those having mechanical contact devices, be tested on the customer's premises. Tests made for other purposes, such as request or referee tests shall not be considered as in-service performance tests, except those tested under a periodic test schedule.

- (a) All self-contained single phase meters and three wire net-work meters on a utility's system must be tested in accordance with a single program, which must be one of the following:
 - (1) at a fixed periodic interval (ASA C12 8.1.8.4)
 - (2) at a variable interval (ASA C12 8.1.8.5)

2. Periodic Interval Test Schedule

The periodic test schedule described in ASA C12 may be used for testing meters which prescribe the following intervals. In the test intervals specified, the word "years" means calendar years and the word "months" means calendar months. The basic periodic test interval shall not be longer than that prescribed:

(a) Alternating current watthour meters: (ASA C12 8.1.8.4)

(1) Meters used with instrument transformers

(a) Polyphase meters 4 years

(b) Single phase meters 8 years

(2) Self-contained polyphase meters 6 years

(3) Self-contained single phase meters and three wire network meters 8 years

(b) Direct current watthour meters: (ASA C12 Appendix D)

(1) Up to and including 8 KW 3 years

(2) Over 8 KW 1 year

(c) Var hour meters: Same as the schedule for watthour meters

(d) Demand meters: (ASA C12 8.2.3.1)

(1) Block-interval Non-recording demand meters, registers and associated control devices Same as the schedule for associated watt-hour meters, but not to exceed 8 years

(2) Block-interval graphic watthour demand meters 2 years

(3) Block-interval-pulse-operated recording demand meters 2 years

(4) Lagged-demand meters Same as the schedule for associated watt-hour meters

- (e) Secondary and Working Standards; and Instruments shall be checked, calibrated, or adjusted as provided in ASA C12, Section 4.

3. Variable Interval Plan

- (a) The variable interval plan described in ASA C12, Section 8.1.8.5, may be used for testing self-contained single-phase meters and three-wire network meters.

6.2 INSTRUMENT TRANSFORMER AND GENERATION STATION METER TESTS

- a. Instrument transformers shall be tested according to the requirements of ASA C12-1965 Sections 6.3 and 8.3.
 - 1. Prior to installation.
 - 2. When removed from service.
 - 3. Upon complaint.
 - 4. When there is evidence of damage.
 - 5. Whenever an approved check, such as the variable burden method in the case of current transformers, made whenever the meter is tested, indicates that a quantitative test is required.
- b. Generator output watt-meters and watthour meters in the utility's generating stations or meters used at locations where the utility purchases power from non-utilities or other utilities, must be tested according to a suitable schedule by comparison with the utility's working standards.

6.3 TEST PROCEDURE AND ACCURACIES

Meters and/or associated devices including instrument transformers, shall be tested according to standards prescribed in ASA C12-1965 Code for Meter Testing and ASA C57-13-1954 Test Code for Instrument Transformers, at the loads indicated and adjusted as close as practicable to zero error when found to exceed the tolerance prescribed.

- a. Any utility unable to perform the above test due to a lack of proper equipment may have its instrument transformers tested by another utility or authorized testing laboratory whose testing equipment conforms to the requirements of the Commission.

6.4 FACILITIES AND EQUIPMENT FOR METER TESTING.

Each utility shall maintain a meter shop for the purpose of inspecting, testing and repairing meters. The shop shall be open for inspection by the Commission at all reasonable times, and the facilities, equipment and the methods of measurements and testing may be inspected for

conformity to the Commission adopted standards. A utility may, however, have all or part of the required tests, repairs and adjustments made, or its portable testing equipment checked, by another utility or a testing laboratory, approved by the Commission having adequate and sufficient testing equipment to comply with these standards.

- a. Facilities, equipment and methods used in the meter shop shall conform to Section 4, ASA C-12-1965.

6.5 RECORDS OF METERS AND ASSOCIATED METERING DEVICES

Each utility shall maintain records of the following data, where applicable, for each meter and/or associated device until retirement:

- a. The complete identification -- number, type, voltage, amperes, number of wires, number of stators, disk constant (K_h), demand interval, and ratio.
- b. The dates of installation and removal from service, together with the location.
- c. Ratio and phase angle data for instrument transformers.

6.6 METER TEST RECORDS

Each utility shall maintain records of the last two tests made of any meter in service. Test records shall include the following:

- a. The date and reason for the test.
- b. The reading of the meter before making the test.
- c. The accuracy "as found" at light and heavy loads.
- d. The accuracy "as left" at light and heavy loads.
- e. Statement of repairs made, if any.

PART VII. STANDARDS OF QUALITY OF SERVICE

7.1 STANDARD FREQUENCY

The standard frequency for alternating current distribution systems shall be 60 cycles per second. The frequency shall be maintained within limits which will permit the satisfactory operation of customers' clocks connected to the system.

7.2 VOLTAGE LIMITS

Each utility shall adopt and file with the Commission as part of its tariff its nominal service voltages.

Voltage variations will normally be within the range specified in paragraphs a, b, and c, below. If the voltage is found to be

outside these ranges the company must immediately take steps to bring the voltage within these ranges, except as provided in paragraph d, below.

a. Secondary Voltages

For all retail service, except power service, the variations of voltage will normally be no more than 5 per cent above or below the nominal voltage. For retail power service the variation of voltage will normally be no more than 7-1/2% above or below the nominal voltage. Where 3-phase service is provided the utility shall exercise reasonable care to assure that the phase voltages are in balance.

b. Primary Voltages

For service rendered principally for industrial or power purposes the voltage variation will normally be no more than 5 per cent above or below the nominal voltage.

c. Transmission Voltages

For service rendered at a transmission voltage the variation of voltage will normally be no more than 10% above or 10% below the nominal voltage.

d. Exceptions to Voltage Requirements.

Voltage outside the limits specified above may be furnished when:

1. The customer, by contract, agrees to accept service with unregulated voltage.
2. The variations arise from the action of the elements.
3. The variations are infrequent fluctuations not exceeding 5 minutes' duration.
4. The variations arise from service interruptions.
5. The variations arise from temporary separation of parts of the system from the main system.
6. The variations are from causes beyond the control of the utility.
7. Such fluctuations are caused solely by the load of one particular customer which does not affect the voltage of other customers in the vicinity.

7.3 VOLTAGE SURVEYS AND RECORDS

- a. Voltage measurements shall be made at the utility's service terminals. For single phase service the measurement shall be made between the

grounded conductor and the ungrounded conductors. For 3 phase service the measurement shall be made between the phase wires.

- b. Each utility shall make a sufficient number of voltage measurements, using recording voltmeters, in order to determine if voltages are in compliance with the requirements as stated in Rule 7.2.
- c. All voltmeter records obtained under Rule 7.3b shall be retained by the utility for at least 1 year and shall be available for inspection by the Commission. Notations on each chart shall indicate the following:
 1. The location where the voltage was taken.
 2. The time and date of the test.
 3. The results of the comparison with an indicating voltmeter.

7.4 EQUIPMENT FOR VOLTAGE MEASUREMENTS

a. Standards

Each utility shall have at least one indicating voltmeter with a stated accuracy within 0.25% of full scale. This instrument must be maintained within its stated accuracy.

b. Working Instruments

1. Each utility shall have at least 2 indicating voltmeters with a stated accuracy within 1.0% of full scale.
2. Each utility must have at least 2 portable recording voltmeters with a stated accuracy within 2% of full scale.

c. Standards must be checked periodically at the National Bureau of Standards or at a laboratory acceptable to the Commission or at the manufacturer's laboratory or by comparison with a primary standard in the utility's meter laboratory. If the utility maintain primary standards, then these primary standards must be checked periodically at the National Bureau of Standards or at a laboratory acceptable to the Commission or at the manufacturer's laboratory.

d. Working instruments must be checked periodically (see Section 6.1e2) by comparison with a standard in the utility's meter shop.

e. Extreme care must be exercised in the handling of standards and instruments to assure that their accuracy is not disturbed.

f. Each standard shall be accompanied at all times by a certificate or calibration card, duly signed and dated, on which are recorded the corrections required to compensate for errors found at the customary test points at the time of the last previous test.

7.5 INTERRUPTION OF SERVICE

Each utility shall make reasonable efforts to avoid interruptions of service, but when interruptions occur, service shall be re-established within the shortest time practicable, consistent with safety.

- a. Each utility shall keep records of all planned and unplanned interruptions of service of more than one minute duration and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such interruptions. Such records should include the cause, date, time and duration of the interruption as well as corrective action taken and other pertinent information.
- b. Planned interruptions shall be made at a time that will cause the least inconvenience to customers and shall be preceded, if feasible, by adequate notice to those who will be affected.
- c. Each utility shall notify the Commission by telephone or telegram as soon as possible during normal working hours of any interruption of 1% or more of system peak load, but not less than 500 KW. Outages of more than 10% of system peak load, but not less than 750 KW shall be reported by telephone to the person or persons designated by the Commission at the earliest feasible moment. Interruptions of 1% or more of system peak load shall be reported to the Commission at least monthly on the PUC Form GO No. 7-7.5c (Revised). A copy of any written notice of planned interruption of service required by Rule 7.5b shall accompany the filing of PUC Form GO No. 7-7.5c if the planned interruption is of reportable magnitude. (1967)

PART VIII. SAFETY

8.1 ACCEPTABLE STANDARDS

As criteria of accepted good safety practice the Commission will use the applicable provisions of the standard listed in Section 5.2.

8.2 PROTECTIVE MEASURES

- a. Each utility shall exercise reasonable care to reduce the hazards to which its employees, its customers, and the general public may be subjected.
- b. The utility shall give reasonable assistance to the Commission in the investigation of the cause of accidents and in the determination of suitable means of preventing accidents.
- c. Each utility shall maintain a summary of all reportable accidents arising from its operations for a period of 5 years.

8.3 SAFETY PROGRAM

Each utility shall adopt and execute a safety program fitted to the size and type of its operations. As a minimum, the safety program should:

- a. Require employees to use suitable tools and equipment in order that they may perform their work in a safe manner.
- b. Instruct employees in safe methods of performing their work.

- c. Instruct employees who, in the course of their work are subject to the hazard of electrical shock, asphyxiation or drowning, in accepted methods of artificial respiration.

8.4. GROUNDING OF SECONDARY DISTRIBUTION SYSTEM

Unless otherwise specified by the Commission, each utility shall comply with Rule 5.2. In addition:

- a. Ground connections made by the utility should be tested for resistance at the time of installation unless multi-grounding is used.
- b. The utility shall establish a program of regular inspection so that all artificial grounds installed by it shall be inspected within reasonable periods of time. Defective grounds should be repaired immediately.
- c. The utility shall not be responsible or liable for the inspection of its customers' plans, wires, appliances, apparatus, or other equipment, but upon discovery of any violation of the appropriate standards or rules, the utility may refuse or disconnect service to the offending customer.