

FLORIDA PUBLIC SERVICE COMMISSION  
Capital Circle Office Center @ 2540 Shumard Oak Boulevard  
Tallahassee, Florida 32399-0850

MEMORANDUM

January 23, 1997

TO: DIRECTOR, DIVISION OF RECORDS AND REPORTING (BAYO)

FROM: DIVISION OF APPEALS (BELLAK) *RCB DES*  
DIVISION OF ELECTRIC & GAS (KUGGER, MATLOCK) *ORL SWM RKT*  
DIVISION OF RESEARCH & REGULATORY REVIEW (HEWITT) *PD*

RE: DOCKET NO. 961379-BG - PROPOSED AMENDMENT OF RULES 25-6.022, 25-6.052, 25-6.054, 25-6.055, 25-6.056, 25-6.058, AND REPEAL OF RULES 25-6.053 AND 25-6.057, F.A.C.

AGENDA: FEBRUARY 4, 1997 - REGULAR AGENDA - RULE PROPOSAL - INTERESTED PERSONS MAY PARTICIPATE

RULE STATUS: PROPOSAL MAY BE DEFERRED

SPECIAL INSTRUCTIONS: S:\PSC\EAG\WP\961379.RCM

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CASE BACKGROUND

In June of 1995, Florida Power and Light Company proposed that Commission Rules 25-6.052 through 25-6.058 be revised to reflect the current standards contained in the **American National Standard for Electric Meters - Codes for Electric Metering**. This document is also referred to as **ANSI C12.1 - 1995** ("ANSI Standard") and is published by the National Electrical Manufacturers Association. The latest edition was approved by the American National Standards Institute in June, 1995. The previous edition dated from June, 1988.

Staff has worked with the utilities in developing proposed amendments to Rules 25-6.022 and 25-6.052 through 25-6.058. A workshop on the proposed rules was held on April 22, 1996.

Rules 25-6.052 through 25-6.058 govern the testing of electric meters by the investor-owned electric utilities. Rule 25-6.022 governs the retention of records of meter tests. Information from meter tests is useful in assessing the effectiveness of meter testing programs. Therefore, changes to Rule 25-6.022 are also recommended.

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FPSC-RECORDS/REPORTING

Although the Statement of Estimated Regulatory Costs (SERC) identified some transactional costs to implement the amendments, and some additional costs to the Commission as well, it was also noted that most affected companies indicated that the long-run cost savings should exceed the costs to implement. Staff noted in its Rulemaking Request that, in comparison to the current rules, implementation would in some instances improve accuracy and in others, maintain the same accuracy level while reducing costs.

The specific statutory authority for these proposed rule amendments and repeals is found in Section 366.05(1):

... the Commission shall have power to prescribe fair and reasonable rates and charges, classifications, standards of quality and measurements, and service rules to be observed by each public utility; ... [e.s.]

Rules 25-6.022, 25-6.053, 25-6.054 and 25-6.055 implement this statutory provision as well. Rules 25-6.052, 25-6.055, 25-6.056, 25-6.057 and 25-6.058 implement Section 366.05(3):

The Commission shall provide for the examination and testing of all meters used for measuring any product or service of a public utility. [e.s.]

#### The Commission Rules and ANSI C12.1 - 1995

**ANSI C12.1 - 1995** reflects changes in the electric metering industry. In the past, the Commission's rules have reflected the contents of ANSI Standards where possible. However, rule revisions have not always been made as the ANSI Standard has been revised.

Unlike previous editions of the ANSI Standard, the latest edition is significantly changed from its predecessor. Contents of the Standard regarding test methods have been deleted altogether. As in the past, it is not intended that the Commission's rules either totally duplicate the contents of the ANSI Standard or defer entirely to the Standard, and the proposed Rules do cover some aspects of meter testing which do not appear in the ANSI Standard. **ANSI C12.1 - 1995** is, however, used as a reference for significant amendments to the proposed rules.

#### DISCUSSION OF ISSUES

**ISSUE 1:** Should the Commission propose the attached amendments to **Rule 25-6.022 - Records of Metering Devices and Metering Device Tests?**

**RECOMMENDATION:** Yes. The attached amendments to Rule 25-6.022 list additional data items resulting from meter tests which are to be maintained by the utilities. These additional items are intended to serve staff in reviewing more types of sampling plans.

**STAFF ANALYSIS:** There are several types of meter tests for which records are maintained. Utilities perform tests on customers' meters when the utility or the customer suspects that a meter is inaccurate. Utilities also perform acceptance tests on new meters and in-service tests on meters after installation. Manufacturers perform tests on meters shipped to the utilities and provide the utilities with the results. The changes to Rule 25-6.056(5)(c) allow the utilities to use results provided by manufacturers in place of results from utility-performed acceptance tests. Amended Rules 25-6.022(3) and 25-6.022(4) distinguish between the results of acceptance tests and in-service tests. Amended rule 25-6.022(3) lists results of one-hundred percent tests provided by manufacturers among the test results to be maintained by the utility.

Acceptance tests are performed when meters are purchased, and may be performed either on all of the meters in an entire purchase or on a sample of meters in a purchase. In-service tests are performed on meters after installation. They may be performed either on all of the meters in an entire population of meters (periodic tests) or on a sample of meters in a population (annual in-service tests). The additional items listed in the proposed rule are summary items. These items are aggregate measures of meter accuracy for groups of meters or metering equipment.

The aggregate items appearing in the present rule may be used in assessing the level of accuracy in a population of meters which are acceptance tested or in-service tested. They may also be used to judge the effectiveness of a sampling plan, provided that the sampling plan is an "attributes" sampling plan. Test results from "variables" sampling plans give more aggregate information than is listed in the current rule. For most meter populations, variables sampling plans require smaller sample sizes than attributes sampling plans. The additional items will be used in judging the effectiveness of variables sampling plans. The data items appearing in the amended rule are to demonstrate that the overall level of meter accuracy is acceptable and to provide adequate data for reviewing proposed sampling plans. Amended Rules 25-6.056(5) and 25-6.056(6) allow the extension of random sampling programs to more types of meters than the present rules. The level of data in the proposed amendments to Rule 25-6.022 is necessary to ensure a continuation of present meter accuracy.

**ISSUE 2:** Should the Commission propose the attached amendments to Rule 25-6.052 - Test Procedures and Accuracies of Consumption Metering Devices?

**RECOMMENDATION:** Yes. Amended Rule 25-6.052 combines three of the present rules, updates parts of the present rules, and provides a means for replacing parts of the present rules which are no longer covered in the ANSI Standard.

**STAFF ANALYSIS:** Amended Rule 25-6.052 is a combination of the present Rule 25-6.052 - **Test Procedures and Accuracies of Meters**, Rule 25-6.057 - **Methods of Meter Test**, and Rule 25-6.053 - **Requirements As to Use of Instrument Transformers**. Instrument transformers are within the scope of amended Rule 25-6.052. Existing Rules 25-6.052 and 25-6.057 both contain materials which may be termed meter "test methods". Rule 25-6.057 covers only single-phase and polyphase watt-hour meters. Rule 25-6.052 covers single-phase and polyphase watt-hour meters, and demand meters and registers.

The criteria for accurate meter performance contained in the present rules are retained in amended Rules 25-6.052(1) and 25-6.052(2). The criterion for accurate meter performance is added for electronic demand meters. Amended Rule 25-6.052(3) - **Meter Equipment Test Procedures** contains three general characteristics to be included in test procedures where they apply.

Amended Rule 25-6.052(4) - **Test Procedures** requires that the utilities submit their test procedures to the Division of Electric and Gas for review and approval. It lists the types of metering equipment covered by the rule. Instrument transformers, previously addressed in Rule 25-6.053, are listed among the equipment types covered. Amended Rule 25-6.052(4)(b)(5) - **Description of the general steps involved** lists the procedure by which the utilities are to submit proposed test procedures, the process by which the Division of Electric and Gas is to review and either approve or disapprove those procedures, and the process for appeal to the Commission for procedures which are not approved.

Rule 25-6.052(4) is new and is to replace the lengthy procedures presently in Rules 25-6.052 and 25-6.057. The proposed rule could not be simply rewritten to reflect the contents of the new ANSI Standard, as the new standard does not contain the test procedures which appeared in previous editions. Staff believes that a ratepayer should be able to learn about a utility's obligations to ensure accurate metering either by reading a rule or by reviewing a filing. The utilities are of the opinion that meter testing procedures are too numerous to be listed in a document such as the ANSI Standard or in the Commission's Rules. The utilities also maintain that test procedures are likely to be revised and that petitioning for changes in the Commission's Rules is unnecessarily burdensome and costly. Rule 25-6.052(4) as amended

serves as a way of satisfying both the staff's position regarding documentation of the utilities' obligation to ensure accurate metering and the utilities' position regarding flexibility.

**ISSUE 3:** Should the Commission propose the repeal of Rule 25-6.053 - Requirements As to Use of Instrument Transformers?

**RECOMMENDATION:** Yes. The substance of existing Rule 25-6.053 has been moved into amended Rule 25-6.052.

**STAFF ANALYSIS:** Amended Rule 25-6.052 covers meters and metering equipment, including instrument transformers. Rule 25-6.053 should be deleted because the language addressing instrument transformers is now in Rule 25-6.052. There is no need for a separate rule.

**ISSUE 4:** Should the Commission propose the attached amendments to Rule 25-6.054 - Laboratory Standards?

**RECOMMENDATION:** Yes. Rule 25-6.054 is amended to reflect the contents of the new ANSI Standard.

**STAFF ANALYSIS:** In amended Rule 25-6.054(1)(a), watthour meters to be used as basic reference standards (previously termed "laboratory standard watt-hour meters") have tighter accuracy tolerances than in the present rule. Amended Rule 25-6.054(1)(b) requires that for utilities with more than one basic reference standard watthour meter, the percent registrations be compared at frequent intervals to ensure that they are in agreement. A major difference between the document ANSI C12.1 - 1995 and amended Rule 25-6.054(1) is the number of basic reference standards to have available. Section 3.6.1 of ANSI C12.1 - 1995 states that, ideally, the utility should have at least three basic reference standards. Because of their cost, the proposed rule requires only one. Amended Rule 25-6.054(2) requires that the utilities establish traceability of their watthour standards to the national standards each year and lists the methods for establishing traceability. Amended Rule 25-6.054(3) requires that basic reference standard watthour meters with excessive variation in percent registration be corrected or their use discontinued. Amended Rule 25-6.054(4) requires that historical performance records be maintained by the utilities for comparisons made between basic reference standards and the national standard and for comparisons made between different basic reference standards.

**ISSUE 5:** Should the Commission propose the attached amendments to Rule 25-6.055 - Portable Standards?

**RECOMMENDATION:** Yes. This rule is amended to reflect the contents of the new ANSI Standard as applied to the field testing of customers' meters.

**STAFF ANALYSIS:** Amended Rule 25-6.055(1) requires that portable standards (presently termed "portable standard watt-hour meters" or "shop standards") be compared with a basic reference standard once a year rather than once a week, and it requires tighter accuracy tolerances than does the present rule. The frequency and tolerances are taken from the new ANSI Standard. Amended Rule 25-6.055(2) mirrors 25-6.054(3) in requiring the utility to correct or discontinue the use of any standard showing excessive variation. Amended Rule 25-6.055(3) requires that historical performance records be maintained by the utilities for comparisons made between portable standards and basic reference standard watt-hour meters.

**ISSUE 6:** Should the Commission propose the attached amendments to Rule 25-6.056 - Metering Device Test Plans?

**RECOMMENDATION:** Yes. Rule 25-6.056 is amended extensively, but should provide the Commission and the utilities with a workable way to test metering devices more economically.

**STAFF ANALYSIS:** Amended Rules 25-6.056(1) through 25-6.056(4) list the conditions under which the utilities test meters and metering equipment. Amended Rule 25-6.056(4) states that the meters and metering equipment covered by this rule are the same as those listed in amended Rule 25-6.052(4)(a).

The present Rules 25-6.056(3)(c) through 25-6.056(3)(i) list the types of meters that may be "acceptance" tested and "in-service" tested using random sampling plans approved by the Commission. "Acceptance tests" are tests done on newly purchased meters. There are two types of "in-service" tests: 1) "annual" in-service tests, performed each year on a sample of meters, and 2) "periodic" in-service tests, performed on an entire population of meters at a multiple-year interval. The number of years between in-service tests varies by type of meter. In the present rules, the number of years allowed between periodic in-service tests varies from two to sixteen years. Under the present rules, self-contained single-phase and polyphase watt-hour meters may be acceptance tested and in-service tested using approved random sampling plans. All other types of meters must be acceptance tested and in-service tested on a one-hundred percent basis. Amended Rules 25-6.056(5) and 25-6.056(6) allow the utilities to use approved random sampling plans for acceptance testing and in-service testing for all types of metering equipment. Amended Rule 25-6.056(5)(c) allows the utilities to use results of one-hundred

percent tests provided by manufacturers in place of utility performed acceptance test results. Amended Rule 25-6.056(6)(b) requires that for meters for which approved random sampling plans are not used, a periodic testing schedule be approved by the Commission.

Random sampling plans to be used for acceptance testing and in-service testing purposes, and periodic testing schedules to be used for in-service testing purposes, are to be submitted by the utilities and reviewed by the Commission staff. Amended Rule 25-6.056(7) lists the information required in a proposed random sampling plan. Amended Rule 25-6.056(8) lists what staff is to consider in reviewing proposed random sampling plans and proposed in-service testing schedules. Amended Rule 25-6.056(9) states that the utilities must present a proposed random sampling plan for each type of metering equipment for which it intends use such a plan. Utilities must also submit a proposed in-service testing schedule for each population of meters for which the use of a random sampling plan is not proposed. Amended Rule 25-6.056(10) presents the process by which a utility may petition the Commission for approval of sampling plans not approved by staff.

As self-contained single-phase and polyphase watt-hour meters are acceptance tested and in-service tested under the present rules, four approved sampling plans are currently in use:

- 1) Military Standard - Sampling Procedures and Tables for Inspection by Variables for Percent Defective (Military Standard 414);
- 2) Military Standard - Sampling Procedures and Tables for Inspection by Attributes (Military Standard 105D);
- 3) American National Standard - Sampling Procedures and Tables for Inspection by Variables for Percent Defective; and
- 4) An attributes sampling plan designed and used by Florida Power and Light Company.

The Military Standards were published by United States Department of Defense. The American National Standard is an updated version of Military Standard 414 that is published by the American Society for Quality Control. The "standards" are used in many industries for acceptance testing a variety of products. Each lists required sample sizes and acceptance criteria for several "acceptable quality levels." Within each acceptable quality level, each standard gives the required sample size and acceptance criteria to use within broad ranges of population size.

An acceptable quality level corresponds to the maximum percent defective to be stated in a sampling plan's null hypothesis according to Amended Rule 25-6.056(7)(c). As acceptance tests are done, there is another percent defective stated in the plan's alternative hypothesis, and each of the two percents defective are accompanied by a probability. Amended Rule 25-6.056(7)(c) requires that the alternative-hypothesis percent defective and the two probabilities also be stated in proposed sampling plans. No official presentation of the standards presents these additional items. They are, however, important to consider in choosing the variation of the plan to use and in approving or disapproving a proposed sampling plan.

A sampling plan's hypothesized percents defective and the probabilities are of interest for two reasons: 1) they describe the ability of the sampling plan to detect the presence of inaccurate meters; and 2) they determine the sample size required for testing the accuracy of the meters in a population. If the utilities always use one of the sampling plans listed above for acceptance testing and in-service testing, staff will be able to determine the hypothesized percent defective in each hypothesis and the accompanying probabilities. Should a utility propose that one of the sampling plans listed above be used for testing a piece of equipment other than single-phase or polyphase watt-hour meters, the utility may present evidence that the proposed plan's ability to detect the presence of inaccurate meters is greater than the ability assessed by staff. Should a utility propose any other type of sampling plan, then the utility would be responsible for providing all of the necessary information available through use of the four standard sampling plans.

Proposed sampling plans for testing electric meters other than single-phase and polyphase watt-hour meters taken from the standards will not be automatically approved because of their source or because of their previous use for sampling other types of meters. They will be approved or disapproved based on their hypothesized percents defective and their accompanying probabilities, which are determined by the particular application of the standard, along with the information listed in amended Rule 25-6.056(8).

The amended Rules 25-6.056(7), 25-6.056(8), and 25-6.056(9) should provide a degree of flexibility which the utilities may wish to exercise in the future. Most of the meter sampling plans used in the past have been from one of the four standards. However, this may not be the choice of each utility in the future. Should a utility wish to propose a sampling plan from another source, it would be approved or disapproved based on the same considerations given those from one of the standards. It would be the



responsibility of the utility making the proposal to include the necessary information in the proposal. By including the information required by amended Rule 25-6.056(7), a plan not from one of the standards could be analyzed by staff according to amended Rule 25-6.056(8) and approved or disapproved according to amended Rule 25-6.056(9) in the same way as a plan that is based on one of the standards.

The Military Standard 414 and the American National Standard provide a variety of variables sampling plans. For each sampling plan included in Military Standard 414 and the American National Standard, there are two ways to measure variability: the "standard deviation method" and the "range method". All of the plans approved in recent years have used the standard deviation method. Should a utility wish to propose a plan using the range method or any other method of measuring variability, amended Rule 25-6.056(7) (d) requires the utility to justify the method proposed.

Periodic in-service testing schedules for meters not in-service tested using random sampling plans are also within the scope of amended Rules 25-6.056(6) through 25-6.056(10). In Section 5.1.4.3.1 of the new ANSI Standard, schedules similar to those appearing in the present Rule 25-6.056(3) are replaced with the following, which is listed as an example: a) meters without surge-proof magnets - 8 years; b) meters with surge-proof magnets - 16 years. Staff does not believe that a utility would want to test every piece of equipment containing a surge-proof magnet only once in every sixteen years. Rather, because of the considerations listed in amended Rule 25-6.056(8), which can affect large amounts of revenue, it would seem that a utility would want to test some types of meters more frequently than others. Amended Rules 25-6.056(6) through 25-6.056(10) therefore are not in agreement with Section 5.1.4.3.1 of the latest ANSI Standard. Staff's position, however, is that the utilities should submit prudent, realistic periodic test plans along with sound sampling plans, even if PSC requirements exceed standard criteria in some areas.

**ISSUE 7:** Should the Commission propose the repeal of Rule 25-6.057 - Methods of Meter Test?

**RECOMMENDATION:** Yes. The substance of the current Rule 25-6.057 has been moved into amended Rule 25-6.052.

**STAFF ANALYSIS:** Amended Rule 25-6.052 covers methods of testing meters. Therefore, Rule 25-6.057 may be repealed.

**ISSUE 8:** Should the Commission propose the attached amendments to Rule 25-6.058 - Determination of Average Meter Error?

DOCKET NO. 961379 - EG  
January 23, 1997

**RECOMMENDATION:** Yes. The attached amendments to Rule 25-6.058 reflect changes in the ANSI Standard and provide for the calculation of meter error for solid-state meters.

**STAFF ANALYSIS:** When a meter's accuracy is tested, the error for meters used on varying loads is expressed as a weighted average if the error in percent registration varies over the load range of the meter. The present Rule 25-6.058 gives loads, expressed in percentages of rated test amperes, at which to obtain the light load and heavy load measurements. The rule presents weights to assign to the light and heavy load measurements. Weights are different for single-phase meters and polyphase meters. Amended Rule 25-6.058 allows the utilities to calculate average meter error for single-phase wathour meters as a simple average of the errors at light and heavy loads. The amended rule also allows utilities to test meter error at a single point in the load range for totally solid-state single-phase and polyphase meters when the error at the single point is representative of the meter's error over the entire load range.

**ISSUE 9:** If no requests for hearing or comments are received, should the above-listed rule amendments and repeals be filed with the Secretary of State and this docket closed?

**RECOMMENDATION:** Yes.

**STAFF ANALYSIS:** The following summarizes the benefits of the amendments/repeals listed above:

a. To utilities:

Rule 25-6.022 - greater analytical ability

Rule 25-6.052 - more flexibility

Rule 25-6.056 - greater analytical ability, more flexibility, less turnaround time for requests for approval of sampling plans.

Rule 25-6.057 - more flexibility

Rule 25-6.058 - more flexibility, less cost

b. To ratepayers:

Rule 25-6.054 - more accuracy

DOCKET NO. 961379 - EG  
January 23, 1997

Rule 25-6.055 - more accuracy

Rule 25-6.056 - reducing costs in this area will ultimately  
result in lower rates.

c. To Commission staff:

Rule 25-6.022 - greater analytical ability

Rule 25-6.056 - greater analytical ability

RCM  
Attachments

1  
2           **25-6.022 Record of ~~Meters and Meter Tests~~ Metering Devices**  
3 **and Metering Device Tests.**

4           (1) For all types of utility-performed tests, a test record  
5 shall be made whenever a unit of metering equipment is tested, but  
6 need not be retained after the equipment is again tested. The  
7 record shall show information to identify the unit and its  
8 location; equipment with which the unit is associated; the date of  
9 the test; reason for the test; readings before and after the test;  
10 if the meter creeps, a statement as to the rate of creeping; a  
11 statement of the "as found" accuracy; indications showing that all  
12 required checks have been made; a statement of repairs made, if  
13 any; and identification of the person making the test. The  
14 completion of each test will signify the "as left" accuracy falls  
15 within the required limits specified in Rule 25-6.052, unless the  
16 meter is to be retired.

17           (2) Each utility shall keep a record for each unit of metering  
18 equipment showing the date the unit was purchased, if available;  
19 the utility's identification; associated equipment; essential name  
20 plate data; date of test; results of "as found" test; and location  
21 where installed with date of installation.

22           ~~(3) Each utility shall maintain its meter test records in such~~  
23 ~~a manner that the following information is readily available to the~~  
24 ~~Commission on request.~~

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CODING: Words underlined are additions; words in  
~~struck through~~ type are deletions from existing law.

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2 ~~(a) The time elapsed between meter tests.~~

3 ~~(b) The type of meter, such as single phase or polyphase~~  
4 ~~watt-hour meter.~~

5 ~~(c) The number of meters which the full load "as found" tests~~  
6 ~~indicate falls within each of the following accuracy~~  
7 ~~classifications:~~

8 1. ~~Under 98.0%~~

9 2. ~~98.0% to 102.0%~~

10 3. ~~Over 102.0%~~

11 ~~(d) For those meters tested under an approved statistical~~  
12 ~~sampling plan, provision (c) shall be maintained by type or age~~  
13 ~~groups.~~

14 (3) Records of Tests for Incoming Purchases. Regardless  
15 whether the newly purchased metering equipment is tested under a  
16 Random Sampling Plan, each utility shall maintain and make  
17 available to the Commission for each purchase of new meters and  
18 associated devices made during the calendar or fiscal year, the  
19 following information:

20 (a) Type of equipment, including manufacturer, model number,  
21 and any features which will subsequently be used to classify the  
22 units purchased into a population of units for in-service tests;

23 (b) The number of units purchased;

24 (c) The total number of units tested;

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2 (d) The number of units tested measuring each percent  
3 registration recorded;

4 (e) Average percent registration;

5 (f) Standard deviation about the average percent registration  
6 (population or sample standard deviation);

7 (g) Results regarding whether the units tested meet the  
8 utility's acceptance criteria; and

9 (h) If a utility does not perform its tests for incoming  
10 purchases, the data provided by equipment manufacturers concerning  
11 units tested on a 100 percent basis by the manufacturer, with the  
12 manufacturer's test results used as a basis for acceptance testing,  
13 shall also be retained.

14 (4) Records of Periodic and Annual In-Service Meters Tests.  
15 Each utility shall maintain test records for each periodic and  
16 annual in-service test of electric meters and associated devices in  
17 such a manner that the information listed in paragraphs (4)(a)  
18 through (h) is readily available to the Commission on request.  
19 These data shall be maintained for units of metering equipment  
20 tested under approved Random Sampling Plans and for units tested  
21 under periodic testing programs, and shall be summarized on an  
22 annual basis.

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2       (a) Type of equipment, including manufacturer, model number,  
3 and any features which are currently used to classify the units  
4 tested into a population of units for in-service tests;

5       (b) The number of units in the population;

6       (c) The total number of units tested;

7       (d) The number of units tested measuring each percent  
8 registration recorded;

9       (e) Average percent registration;

10       (f) Standard deviation about the average percent registration  
11 (population or sample standard deviation);

12       (g) Results showing whether the units tested under an approved  
13 random sampling program meet the utility's acceptance criteria; and

14       (h) A statement of the action to be taken to make further  
15 tests or replace inaccurate units, when the units tested under an  
16 approved random sampling program do not meet the acceptance  
17 criteria.

18       (i) The information regarding units tested during the year but  
19 not tested under a Random Sampling Plan or a periodic testing  
20 program need not be maintained as listed in paragraphs (4)(a)  
21 through (h) or be summarized on an annual basis.

22       Specific Authority 366.05(1) FS.

23       Law Implemented 366.05(1) FS.

24       History--New 7-29-69, Formerly 25-6.22.

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3           **25-6.052 Test Procedures and Accuracies of Meters Consumption**  
4 **Metering Devices.**

5           ~~(1) Watt hour Meters. The performance of an in service~~  
6 ~~watt hour meter is considered to be acceptable when the meter disk~~  
7 ~~does not creep and when the average percentage registration is not~~  
8 ~~more than 102% nor less than 98%, calculated in accordance with~~  
9 ~~USAS C12.~~

10           ~~(2) Watt hour Meter Test Procedures. The following procedures~~  
11 ~~shall apply to the testing and adjusting of meters and/or~~  
12 ~~associated devices.~~

13           ~~(a) The test of any unit of metering equipment shall consist~~  
14 ~~of a comparison of its accuracy with the accuracy of a standard.~~

15           ~~(b) Adjustment limits. When a test of a singlephase watt hour~~  
16 ~~meter indicates that the error in registration exceeds 1% at either~~  
17 ~~light load or heavy load, at unity power factor, the percentage~~  
18 ~~registration shall be adjusted to within these limits or error as~~  
19 ~~closely as practicable to the condition of zero error. When a test~~  
20 ~~of a polyphase watt hour meter indicates that the error in~~  
21 ~~registration exceeds 1% at either light load or heavy load, at~~  
22 ~~unity power factor, or exceeds 2% at heavy load at approximately~~  
23 ~~0.5 power factor lag, the percentage registration of the meter~~

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2 ~~shall be adjusted to within these limits of error as closely as~~  
3 ~~practicable to the condition of zero error.~~

4 ~~(c) Meters shall not "creep", i.e., there shall be no~~  
5 ~~continuous rotation of the moving element of a meter at a speed in~~  
6 ~~excess of one revolution in ten minutes when the meter load has~~  
7 ~~been removed and voltage is applied to the potential elements of~~  
8 ~~the meter.~~

9 ~~(3) Demand Meters and Registers.~~

10 ~~(a) The performance of a demand meter or register shall be~~  
11 ~~acceptable when the error of registration does not exceed 4% in~~  
12 ~~terms of full scale value, when tested at any point between 25% and~~  
13 ~~100% of full scale value.~~

14 ~~(b) When a test of a demand meter or register indicates that~~  
15 ~~the error in registration exceeds plus or minus 4% in terms of~~  
16 ~~full scale value, the demand meter or register shall be adjusted to~~  
17 ~~within plus or minus 2% of full scale value. When a timing element~~  
18 ~~also serves to keep a record of the time of day at which the demand~~  
19 ~~occurs, it shall be adjusted if it is found to be in error by more~~  
20 ~~than plus or minus two minutes per day.~~

21 ~~(c) Demand meters which are direct driven shall be tested at~~  
22 ~~a load point no less than 50% of full scale. However, they may be~~  
23 ~~tested at a lower scale point if conditions warrant.~~

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2 ~~Tests shall be continuous for at least one demand interval~~  
3 ~~unless results over a portion of an interval can be accurately~~  
4 ~~determined.~~

5 ~~(d) Demand meters which are actuated by pulses shall be tested~~  
6 ~~by transmitting enough pulses to cause the meter to register at a~~  
7 ~~load point no less than 50% of full scale. If a pulse actuated~~  
8 ~~demand meter is equipped with a device which records the number of~~  
9 ~~pulses received by the meter, and if there is frequent and accurate~~  
10 ~~comparison of such record with the number of kilowatt hours~~  
11 ~~registered on the associated watt hour meter, then it is not~~  
12 ~~necessary to make a periodic field test of the demand meter.~~

13 ~~(e) Demand meters shall be adjusted to indicate zero under~~  
14 ~~no load conditions, and shall be checked to ascertain that the~~  
15 ~~meter resets to zero.~~

16 ~~(f) Impulse devices associated with demand meters must be~~  
17 ~~checked for proper operation.~~

18 ~~(g) The total time interval, including reset time, must be~~  
19 ~~accurate with 0.5%, except that when a timing element also serves~~  
20 ~~to keep a record of the time of day at which the demand occurs, it~~  
21 ~~shall be adjusted if it is found to be in error by more than plus~~  
22 ~~or minus two minutes per day.~~

23 ~~(4) Lagged Demand Meters. Lagged demand meters shall be tested~~  
24 ~~and adjusted as prescribed in USAC C12.~~

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CODING: Words underlined are additions; words in  
~~struck through~~ type are deletions from existing law.

1  
2       (1) Watthour Meters. The performance of an in-service  
3 watthour meter shall be acceptable when the meter does not creep  
4 and the average percent registration is not more than 102 percent  
5 nor less than 98 percent, calculated in accordance with Rule 25-  
6 6.058.

7       (2) Demand Meters and Registers.

8       (a) The performance of a mechanical or lagged demand meter or  
9 register shall be acceptable when the error of registration does  
10 not exceed four percent in terms of full-scale value, when tested  
11 at any point between 25 percent and 100 percent of full-scale  
12 value.

13       (b) The performance of an electronic demand meter or register  
14 shall be acceptable when the error of registration does not exceed  
15 two percent of reading, when tested at any point between 10 percent  
16 and 100 percent of full-scale value.

17       (c) Demand meters shall indicate zero under no-load  
18 conditions.

19       (3) Meter Equipment Test Procedures.

20       (a) The test of any unit of metering equipment shall consist  
21 of a comparison of its accuracy with the accuracy of a standard.

22       (b) Watthour meters and associated devices shall be tested for  
23 accuracy and adjusted in accordance with in ANSI C12.1 - 1995.

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CODING: Words underlined are additions; words in  
~~struck-through~~ type are deletions from existing law.

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2       (c) Totally solid-state meters that compute demand from  
3 watthour meter registration and programmed demand algorithms shall  
4 be tested and adjusted in accordance with ANSI C12.1 - 1995.  
5 Demand registration need not be tested, provided the meter has been  
6 inspected to contain the correct demand algorithm whenever watthour  
7 registration is tested.

8       (4) Test Procedures.

9       (a) Each utility shall submit its test procedures for review  
10 and approval for all types of metering equipment, including:

- 11           1. Single-phase watthour meters;  
12           2. Polyphase watthour meters;  
13           3. Demand meters;  
14           4. Pulse initiating meters;  
15           5. Pulse recorders;  
16           6. Time-of-use meters; and  
17           7. Instrument Transformers.

18       (b) Test procedures shall contain the following for each type  
19 of metering device covered:

- 20           1. Adjustment limits;  
21           2. Test points;  
22           3. Test duration;  
23           4. Type of test - single-phase test, polyphase test,  
24 etc.; and

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1  
2           5. Description of the general steps involved.

3           (c) Any changes to a previously approved test procedure must  
4 be submitted to the Commission's Division of Electric and Gas for  
5 approval. Adding a meter type to a previously approved test  
6 procedure is a change which requires approval.

7           (d) Review of Proposed Test Procedures. Except where a  
8 utility has requested a formal ruling by the Commission, within 90  
9 days after submission, the Division of Electric and Gas shall  
10 review each utility's proposed test procedures to determine whether  
11 they satisfy the criteria set forth in subsections (4)(a) and (b)  
12 above and shall notify the utility in writing of its decision  
13 accepting or rejecting the proposed procedures. If a proposed  
14 procedure is rejected, the written notice of rejection shall state  
15 clearly the reasons for rejecting the proposed procedure. If a  
16 utility's proposed procedure is rejected, the utility shall submit  
17 a revised procedure to the Commission within 60 days after  
18 receiving the notice of rejection. Where a utility has requested  
19 staff review of its procedures and a procedure has been rejected,  
20 the utility may petition the Commission for approval of the  
21 procedure. If a utility has not submitted a satisfactory procedure  
22 within six months following the submission of the initially  
23 proposed procedure, the Commission may prescribe by order a  
24 procedure for the utility.

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CODING: Words underlined are additions; words in  
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1  
2 Specific Authority 366.05(1) FS.

3 Law Implemented 366.05(3) FS.

4 History--Amended 7-29-69, Formerly 25-6.52.

5  
6  
7 ~~25-6.053 Requirements As to Use of Instrument Transformers.~~

8 ~~(1) All current and potential transformers shall be tested for~~  
9 ~~accuracy in accordance with the procedures prescribed in American~~  
10 ~~Standards Institute Code USAS C57.13.~~

11 ~~(2) Any utility unable to perform the above test due to lack~~  
12 ~~of proper equipment may have its instrument transformers tested by~~  
13 ~~another utility whose testing equipment conforms to the~~  
14 ~~requirements of the Commission.~~

15 ~~(3) In lieu of utility testing of instrument transformers, the~~  
16 ~~Commission accepts the certificate of test as furnished by the~~  
17 ~~manufacturer.~~

18 ~~(4) Current or potential transformers shall not be installed~~  
19 ~~if their accuracy does not fall within the 0.6 accuracy class as~~  
20 ~~described in USAS C57.13.~~

21 ~~(5) The results of the last test of instrument transformers~~  
22 ~~shall be kept on record.~~

23 Specific Authority 366.05(1) FS.

24 Law Implemented 366.05(1) FS.

25  
CODING: Words underlined are additions; words in  
~~struck through~~ type are deletions from existing law.

1  
2 History--Amended 7-29-69, Formerly 25-6.53.  
3  
4

5 **25-6.054 Laboratory Testing Equipment Standards.**

6 (1) Each utility shall have available one or more ~~laboratory~~  
7 ~~working standard watt hour meters~~ watthour meters to be used as  
8 basic reference standards. The watthour meters must have an  
9 adequate capacity and voltage range to test all to check each of  
10 the portable standard watt hour meters (shop standards) portable  
11 standards used by the utility and must meet the requirements  
12 described in Rule 25-6.055(1).

13 (a) ~~Laboratory working standard watt hour meters~~ Watthour  
14 meters used as basic reference standards shall not be in error by  
15 more than plus or minus ~~0.3%~~ at loads and voltages at which they  
16 are to be used, 0.05 percent at 1.00 power factor or by more than  
17 0.10 percent at 0.50 power factor. and Watthour meters shall not be  
18 used to check or calibrate portable standard ~~watt hour~~ watthour  
19 meters (shop standards) unless the laboratory working standard  
20 basic reference standard watt hour watthour meter has been checked  
21 and adjusted, if necessary, to ~~such~~ the prescribed accuracy within  
22 the preceding twelve months.

23 (b) ~~Each laboratory working standard watt hour meter shall~~  
24 ~~have a calibration history record available.~~ The percent  
25

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1  
2 registration of each basic reference standard watthour meter shall  
3 be compared with the percent registration of all other basic  
4 reference standard watthour meters used by the utility at frequent  
5 intervals.

6 ~~(2) Each utility shall have available laboratory indicating~~  
7 ~~working standards to check each of the portable indicating~~  
8 ~~standards described in Rule 25-6.055(2).~~

9 ~~(a) Laboratory indicating working standards shall not be in~~  
10 ~~error by more than plus or minus 0.25% of scale indication at~~  
11 ~~commonly used scale deflection, and shall not be used to check or~~  
12 ~~calibrate portable indicating shop instruments unless the~~  
13 ~~laboratory indicating working standard has been checked and~~  
14 ~~adjusted, if necessary, within the preceding twelve months.~~

15 ~~(b) Each laboratory indicating working standard shall have a~~  
16 ~~calibration record available.~~

17 (2) Each utility shall establish traceability of its watthour  
18 standard to the national standards at least annually using one of  
19 the following methods:

20 (a) Through the Measurement Assurance Program (MAP) in which  
21 the National Institute of Standards and Technology (NIST) has  
22 provided a transport standard; or

23 (b) Through a transport standard which is of the same nominal  
24 value and of quality equal to the basic reference standards that  
25

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1  
2 are sent to NIST or to an independent laboratory approved by the  
3 Commission.

4 ~~(3) Once each year, one laboratory working standard watt hour~~  
5 ~~meter and one laboratory indicating working standard shall be~~  
6 ~~submitted to a testing agency as approved by the Commission for a~~  
7 ~~check for accuracy.~~

8 (3) If excessive variation in the percent registration of a  
9 watthour meter used as a basic reference standard is observed in  
10 the comparisons in Section 25-6.054(1b) and Section 25-6.054(2b),  
11 the utility shall investigate the source of the variation. If the  
12 cause of the excessive variation cannot be corrected, use of the  
13 watthour meter as a basic reference standard shall be discontinued.

14 (4) Each utility shall maintain historical performance records  
15 for each watthour meter used as a basic reference standard for the  
16 following types of comparisons:

17 (a) Comparisons of basic reference standards with national  
18 standards; and

19 (b) Intercomparisons made with other basic reference  
20 standards.

21 Specific Authority 366.05(1) FS.

22 Law Implemented 366.05(1) FS.

23 History--New 7-29-69, Amended 4-13-80, 5-13-85, Formerly  
24 25-6.54.

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CODING: Words underlined are additions; words in  
~~struck-through~~ type are deletions from existing law.

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3       **25-6.055 Portable Standards.**

4       (1) Each utility shall have one or more ~~portable standard~~  
5 ~~watt hour meters (shop standard)~~ of watthour meters to be used as  
6 portable standards, which shall have adequate capacity and voltage  
7 range ~~adequate~~ to test all ~~watt hour~~ watthour meters used by the  
8 utility for billing purposes.

9       (a) All portable standard ~~watt hour~~ watthour meters, ~~(shop~~  
10 ~~standard)~~ when regularly used, shall be compared with a ~~laboratory~~  
11 ~~working standard~~ basic reference standard once a ~~week~~ year. ~~or at~~  
12 ~~such intervals as approved by this Commission, on a commonly used~~  
13 ~~current and voltage range. A complete check should be made every~~  
14 ~~three months. Such equipment infrequently used shall be compared~~  
15 ~~before use.~~

16       (b) Each portable standard ~~watt hour~~ watthour meter ~~(shop~~  
17 ~~standard)~~ shall be adjusted, if necessary, so that its accuracy  
18 will be within plus or minus ~~0.3%~~ at all voltages and loads at  
19 which the standard may be used 0.10 percent at 1.00 power factor  
20 and within plus or minus 0.20 percent at 0.50 power factor.

21       ~~(2) Each utility shall have one or more portable indicating~~  
22 ~~shop standards of various types as required to determine the~~  
23 ~~quality of service being rendered to customers, and to calibrate~~  
24 ~~instruments used in field work.~~

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CODING: Words underlined are additions; words in  
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2 ~~(a) Portable indicating shop standards shall not be in error~~  
3 ~~by more than plus or minus 0.5% of indication at full scale~~  
4 ~~deflection.~~

5 ~~(b) Each portable indicating shop standard shall be adjusted,~~  
6 ~~if necessary, at quarterly intervals, and those in constant use~~  
7 ~~should be checked at least every two weeks.~~

8 ~~(3) Each portable standard shall be accompanied at all times~~  
9 ~~by a certificate or calibration card, duly signed and dated, on~~  
10 ~~which are recorded the corrections required to compensate for~~  
11 ~~errors found at the customary test points at the time of the last~~  
12 ~~previous test.~~

13 ~~(4) For standards used in survey work and for routine or~~  
14 ~~general operating information, the limits of accuracy as specified~~  
15 ~~above need not prevail, but such instruments shall be within the~~  
16 ~~range of accuracy necessary to obtain reliable data.~~

17 (2) If excessive variation in the percent registration of a  
18 watthour meter used as a portable standard is observed in the  
19 comparisons in Section 25-6.055(1), the utility shall investigate  
20 the source of the variation. If the cause of the excessive  
21 variation cannot be corrected, use of the watthour meter as a basic  
22 reference standard shall be discontinued.

23 (3) The calibration history of each standard shall be made  
24 available to the Commission upon request.

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1  
2 Specific Authority 366.05(1) FS.

3 Law Implemented 366.05(1), (3) FS.

4 History--New 7-29-69, Amended 5-13-85, Formerly 25-6.55.  
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7 **25-6.056 ~~Periodic Meter Tests~~ Metering Device Test Plans.**

8 (1) The test of any unit of metering equipment shall consist  
9 of a comparison of its accuracy with a standard of known accuracy.  
10 Units not meeting the accuracy or other requirements of Rule  
11 25-6.052 at the time of the test shall be corrected to meet such  
12 requirements and adjusted to within the required accuracy ~~and~~ as  
13 close to 100% percent accurate as practicable or their use  
14 discontinued.

15 (2) All metering device tests shall be retained by the utility  
16 and made available to the Commission pursuant to Rule 25-6.022.

17 ~~(3)~~ New instrument transformers shall be tested before  
18 initial installation. Instrument transformers which have been  
19 removed from service shall be tested prior to reinstallation if the  
20 reason for removal, ~~or~~ physical appearance, or record of  
21 performance gives cause to doubt its reliability.

22 ~~(4)~~ All ~~watt-hour~~ metering equipment listed in Rule  
23 6.052(4)(a) meters and demand meters associated with them shall be  
24 tested:  
25

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~~struck-through~~ type are deletions from existing law.

1  
2 (ab) When they are suspected by the utility of being  
3 inaccurate or damaged; and

4 (ba) Before initial and each successive installation, either  
5 by the utility or the manufacturer, with the exception of ~~watt-hour~~  
6 ~~meters~~ units of metering equipment which are statistically sample  
7 tested by the utility under an approved Random Sampling Plan.

8 ~~(c) New single phase and polyphase, self-contained watt-hour~~  
9 ~~meters shall be tested, either on a one hundred percent (100%)~~  
10 ~~basis or a statistically sampled basis under an approved Random~~  
11 ~~Sampling Plan, upon receipt from the manufacturer.~~

12 ~~(d) In service, single phase and polyphase, self-contained~~  
13 ~~watt-hour meters may be sample tested under an approved Random~~  
14 ~~Sampling Plan.~~

15 ~~(e) In service, single phase and polyphase self-contained~~  
16 ~~watt-hour meters which are not included in an approved Random~~  
17 ~~Sampling Plan, and single phase and polyphase meters used with~~  
18 ~~instrument transformers Plan shall be tested periodically according~~  
19 ~~to the following schedule:~~

20 ~~1. meters with surge proof magnets at least once in~~  
21 ~~sixteen (16) years.~~

22 ~~2. meters without surge proof magnets at least once in~~  
23 ~~eight (8) years.~~

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2 ~~(f) In service block interval demand register equipped~~  
3 ~~watt hour watt hour meters shall be tested periodically according to~~  
4 ~~the following schedule:~~

5 ~~1. meters with surge proof magnets at least once in~~  
6 ~~twelve (12) years.~~

7 ~~2. meters without surge proof magnets at least once in~~  
8 ~~eight (8) years.~~

9 ~~(g) Block interval graphic watt hour demand meters shall be~~  
10 ~~tested at least once in two (2) years.~~

11 ~~(h) Lagged demand meters shall be tested at least once in~~  
12 ~~eight (8) years.~~

13 ~~(i) Pulse recorders and pulse operated demand meters used for~~  
14 ~~billing in combination with pulse initiator equipped watt hour~~  
15 ~~meters shall be tested at least once in two (2) years. If a~~  
16 ~~comparison is made between the watt hour meter registration and the~~  
17 ~~recording registration each billing period, and the recorder~~  
18 ~~registration agrees within one percent (1%) of that registered by~~  
19 ~~the associated watt hour meters the schedule for pulse recorders~~  
20 ~~and pulse operated demand meters should be as follows:~~

21 ~~1. Meters with surge proof magnets at least once in~~  
22 ~~sixteen (16) years.~~

23 ~~2. Meters without surge proof magnets at least once in~~  
24 ~~eight (8) years.~~

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2 ~~If the recorder meter registration checks do not agree within~~  
3 ~~one percent (1%), the demand metering equipment should be tested.~~

4 (5) Acceptance Testing. Tests for all new units of metering  
5 equipment may be performed according to one of three plans:

6 1. On a 100 percent basis, with testing performed by the  
7 utility;

8 2. On a statistically sampled basis under an approved  
9 Random Sampling Plan, with testing performed by the utility;

10 or

11 3. On a 100 percent basis, with testing performed by the  
12 manufacturer and the test results for each unit provided by  
13 the manufacturer and maintained by the utility.

14 (6) In-Service Testing.

15 (a) In-service metering devices may be sample tested under an  
16 approved Random Sampling Plan.

17 (b) In-service metering devices which are not included in an  
18 approved Random Sampling Plan shall be tested periodically. The  
19 periodic testing schedule for equipment not included in an approved  
20 Random Sampling Plan must be approved by the Commission.

21 (7) Random Sampling Plans and Periodic In-Service Testing  
22 Schedules Submitted for Approval.

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2 (a) Commission approved Random Sampling Plans may be used to  
3 accept or reject shipments of newly purchased equipment and to  
4 estimate the average accuracy of equipment in service.

5 (b) Random Sampling Plans published by the United States  
6 Department of Defense or by The American Society for Quality  
7 Control, or any other sampling plans which have been approved by  
8 the Commission prior to the effective date of this rule need not be  
9 re-approved for the types of equipment for which they were  
10 approved.

11 (c) Each Random Sampling Plan submitted for approval shall  
12 include, at a minimum, the following information:

13 1. Plans to more closely monitor populations of  
14 equipment in service for which estimates indicate accuracy  
15 problems, to determine if units in the population need to be  
16 adjusted or replaced (in-service sampling plans).

17 2. A statement of the plan's statistical design and the  
18 rationale for using the plan in lieu of testing 100 percent of  
19 the units in the population.

20 3. A precise statement of the plan's null hypothesis and  
21 alternative hypotheses, the probability of committing Type I  
22 error and Type II error, and the criteria for accepting or  
23 rejecting the null hypothesis.

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2 (d) "Variables" sampling plans may use either of the "known  
3 variability" or the "unknown variability" acceptance criteria. The  
4 acceptance criteria shall be appropriately modeled. Variables  
5 sampling plans shall use the population standard deviation to  
6 measure variability unless the proposed plan is accompanied by  
7 adequate justification for using another parameter.

8 (8) The analysis of a proposed Random Sampling Plan, or a  
9 proposed periodic in-service testing schedule where applicable,  
10 shall include assessments of the plan's ability to detect the  
11 presence of inaccurate equipment, the economy of testing only a  
12 sample of the units in the population, the impact of having  
13 inaccurate units used for billing purposes, the number of units in  
14 the population, and the historical performance of the type of  
15 equipment covered by the proposed plan.

16 (9) Approval of Sampling Plans and In-Service Testing  
17 Schedules. All utilities subject to this rule shall submit to the  
18 Commission's Division of Electric and Gas a proposed Random  
19 Sampling Plan for each population of metering devices for which it  
20 intends to use a random sampling plan for acceptance testing or for  
21 in-service testing, and a proposed periodic testing schedule for  
22 each population of metering devices for which it does not submit a  
23 proposed in-service random sampling plan. Sampling plans and in-

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1  
2 service testing schedules must be reviewed and approved prior to  
3 their use.

4 (10) Review of Proposed Test Plan. As used in this  
5 subsection, the word "plan" includes periodic testing schedules as  
6 well as Random Sampling Plans. Except where a utility has requested  
7 a formal ruling by the Commission, within 90 days after submission,  
8 the Division of Electric and Gas shall review each utility's plan  
9 to determine whether it satisfies the criteria set forth in  
10 subsections (7) and (8) above and shall notify the utility in  
11 writing of its decision accepting or rejecting the proposed plan.  
12 If a proposed plan is rejected, the written notice of rejection  
13 shall state clearly the reasons for rejecting the proposed plan.  
14 If a utility's proposed plan is rejected, the utility shall submit  
15 a revised plan to the Commission within 60 days after receiving the  
16 notice of rejection. Where a utility has requested staff review of  
17 its plan and the plan has been rejected, the utility may petition  
18 the Commission for approval of the initially proposed plan. If a  
19 utility has not submitted a satisfactory plan within six months  
20 following the submission of the initially proposed plan, the  
21 Commission may prescribe by order a plan for the utility.

22 Specific Authority 366.05(1) FS.

23 Law Implemented 366.05(3) FS.

24 History--New 7-29-69, Amended 4-13-80, Formerly 25-6.56.

25  
CODING: Words underlined are additions; words in  
~~struck-through~~ type are deletions from existing law.

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2  
3 ~~25-6.057 Methods of Meter Test.~~

4 ~~(1) In all tests of watt hour meters where comparison of~~  
5 ~~revolutions is made, at least nine (9) revolutions shall be taken~~  
6 ~~at heavy load and two separate checks shall be made. The accuracy~~  
7 ~~of the meter under test shall be the average accuracy determined~~  
8 ~~from the two checks and they must agree within .2 of 1%. If,~~  
9 ~~however, watt hour meters are tested on electronic test equipment,~~  
10 ~~only one revolution and one check need be made.~~

11 ~~(2) If the watt hour meter has a contact device other than a~~  
12 ~~solid state pulse initiator which operates a demand mechanism, the~~  
13 ~~disk revolutions when testing should be multiples of the number of~~  
14 ~~revolutions per contact in order to take account of the varying~~  
15 ~~friction which may be present during the movement of the contact~~  
16 ~~cam from one contact to the next.~~

17 ~~(3) Polyphase meters shall be tested by one of the following~~  
18 ~~three methods:~~

19 ~~(a) Single phase test with voltage coils in parallel and~~  
20 ~~current coils in series.~~

21 ~~(b) Individual element test with voltage coils all~~  
22 ~~simultaneously energized from the same or different phases. The~~  
23 ~~current shall be of such magnitude that heavy load test current on~~  
24 ~~each element will be between 0.5 N and 1 N times the rated current~~

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CODING: Words underlined are additions; words in  
struck-through type are deletions from existing law.

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2 ~~of the meter but not more than twice the rated current, and the~~  
3 ~~light load current shall be 0.1 N times the rated current of the~~  
4 ~~meter. (N equals the number of elements in the polyphase watt hour~~  
5 ~~meter.)~~

6 ~~The average of the registration for each element shall be~~  
7 ~~taken as the meter registration at heavy or light load,~~  
8 ~~respectively.~~

9 ~~(c) Polyphase test with a polyphase portable standard~~  
10 ~~watt hour meter. The opposition method of testing for balance is~~  
11 ~~satisfactory for adjusting purposes only, and then only if properly~~  
12 ~~made to avoid error due to anti creep holes in disk. It must be~~  
13 ~~made with at least full load current through the meter. The~~  
14 ~~opposition check must be followed up with an individual element~~  
15 ~~test according to method (b) above, to ascertain the registration~~  
16 ~~of each element where such registration must be obtained. Means~~  
17 ~~for obtaining 50% lagging power factor shall be provided for the~~  
18 ~~method used.~~

19 Specific Authority 366.05(1) FS.

20 Law Implemented 366.05(3) FS.

21 History--Amended 7-29-69, Formerly 25-6.57.

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CODING: Words underlined are additions; words in  
~~struck through~~ type are deletions from existing law.

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2       **25-6.058 Determination of Average Meter Error.** Whenever a  
3 metering installation is tested and found to exceed the accuracy  
4 limits, the average error shall be determined in one of the  
5 following ways:

6       (1) If the metering installation is used to measure a load  
7 which has practically constant characteristics, such as a  
8 street-lighting load, the meter shall be tested under similar  
9 conditions of load and the accuracy of the meter "as found" shall  
10 be considered as the average accuracy.

11       (2) If a single-phase metering installation is used on a  
12 varying load, the average error shall be ~~the weighted algebraic~~  
13 ~~average of the error at approximately 10% and at approximately 100%~~  
14 ~~of the rated test amperes of the meter, the latter being given a~~  
15 ~~weighting of 4 times the former.~~ determined in one of the following  
16 ways:

17       (a) The weighted algebraic average of the error at  
18 approximately 10 percent and at 100 percent of the rated test  
19 amperes for the meter, the latter being given a weight of four  
20 times the former;

21       (b) The simple average of the error at approximately 10  
22 percent and at approximately 100 percent of the rated test amperes  
23 of the meter, each being given an equal weight; or

24  
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CODING: Words underlined are additions; words in  
~~struck-through~~ type are deletions from existing law.

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2 (c) A single point, when calculating the error of a totally  
3 solid state meter, and the single point is an accurate  
4 representation of the error over the load range of the meter.

5 (3) If a polyphase metering installation is used on a varying  
6 load, the average error shall be ~~the weighted algebraic average of~~  
7 ~~its error at light load (approximately 10% rated test amperes)~~  
8 ~~given a weighting of 1, its error at heavy load (approximately 100%~~  
9 ~~rated test amperes) and 100% power factor given a weighting of 4,~~  
10 ~~and at heavy load (approximately 100% rated test amperes) and 50%~~  
11 ~~lagging power factor given a weighting of 2.~~ determined in one of  
12 the following ways:

13 (a) The weighted algebraic average of its error at light load  
14 (approximately 10 percent rated test amperes) given a weight of  
15 one, its error at heavy load (approximately 100 percent rated test  
16 amperes) and 100 percent power factor given a weight of four, and  
17 at heavy load (approximately 100 percent rated test amperes) and 50  
18 percent lagging power factor given a weight of two; or

19 (b) A single point, when calculating the error of a totally  
20 solid state meter, and the single point is an accurate  
21 representation of the error over the load range of the meter.

22 Specific Authority 366.05(1) FS.

23 Law Implemented 366.05(3) FS.

24 History--Amended 7-29-69, Formerly 25-6.58.

25  
CODING: Words underlined are additions; words in  
~~struck through~~ type are deletions from existing law.

M E M O R A N D U M

November 12, 1996

TO: DIVISION OF APPEALS (BELLAK)

FROM: DIVISION OF RESEARCH AND REGULATORY REVIEW (HEWITT *CBH PD AM*)

SUBJECT: STATEMENT OF ESTIMATED REGULATORY COSTS FOR PROPOSED CHANGES TO RULES 25-6.022, RECORD OF METERS TEST, 25-6.025, TEST PROCEDURES AND ACCURACIES OF METERS, 25-6.054, LABORATORY TESTING EQUIPMENT, 25-6.055, PORTABLE STANDARDS, 25-6.056, PERIODIC METER TESTS, 25-6.058, DETERMINATION OF AVERAGE METER ERROR, AND REPEAL OF RULES 25-6.053, REQUIREMENTS AS TO USE OF INSTRUMENT TRANSFORMERS, AND 25-6.057, METHODS OF METER TEST, FAC

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SUMMARY OF THE RULE

Currently, the above-referenced rules contain the requirements for electric utility meter testing, record keeping, and standards for testing. The proposed changes would make the rules generally consistent with the **American National Standard for Electric Meters - Codes for Electric Metering, (ANSI C12.1 - 1995)**, although the rules do not reflect the exact contents of the national standards. ANSI C12.1 - 1995 includes procedures for: (1) New and In-Service Meter and Instrument Transformer Tests; (2) Standards Testing and Certification; (3) Periodic Testing; (4) Random Sample Testing; and (5) Required Vendor Testing. In addition, the proposed rule changes would clarify the types of meters and testing equipment covered, require the utility to collect and maintain additional documentation, prescribe the requirements for seeking approval of meter testing

procedures, allow the sample testing of all types of meters, and allow the use of manufacturers' test results for new meters. Finally, the contents of two existing rules would be moved to 25-6.052, FAC.

#### ESTIMATED NUMBER AND DESCRIPTION OF INDIVIDUALS AND ENTITIES REQUIRED TO COMPLY

Electric Investor Owned Utilities (IOUs) would be required to comply with the proposed rules regarding testing meters. There are five electric IOUs regulated by the Commission in Florida.

#### DIRECT COSTS TO THE AGENCY AND OTHER STATE OR LOCAL GOVERNMENT ENTITIES

There would be additional costs to the Commission with an increase in paperwork and staff time. Additional staff time would be necessary to review and approve the utilities' initial testing plans and review documentation concerning random testing. Additional records kept by the utilities would be available for Commission information requests, but the additional cost to draw upon the data is unknown at this time. There would also be ongoing annual costs to review related meter testing documentation and to approve new testing plans and procedures.

No other state or local government entities should have additional costs as a result of the proposed rules.

#### ESTIMATED TRANSACTIONAL COSTS TO INDIVIDUALS AND ENTITIES REQUIRED TO COMPLY

There would be additional utility time and costs to comply with the proposed rule changes. Although there would be some transactional costs to implement the amendments, most affected companies indicated that the long-run cost savings should exceed the costs to implement. Utility companies are very concerned about the accuracy of their meters because, in effect, the meters are the cash register for their service; an inaccurate meter can result in lost



revenues to the company.

Tampa Electric Company (TECO) estimated that the total one-time cost of the rule changes would be \$18,000, and total recurring annual costs would be \$10,500. Total costs for the period 1997 through 2005 would be \$102,000, with savings over the same period of \$61,000. Thus, Tampa Electric estimates net losses from the proposed rules changes. Tampa Electric suggested that the ANSI C12.1 - 1995 standards would be sufficient to achieve the goals of the proposed rule changes.

Florida Public Utilities Company stated that it would be generally in compliance after the rule revisions. There would be some minor changes in the operational and testing areas but no major additional costs in these areas. The major change expected would be in the administration of the program. The cost to familiarize staff and file test procedures would be approximately \$4,000 initially and \$2,500 annually to comply with the additional report filings. There would be some benefit of accumulating additional information on the accuracies of the different types of meters currently in use, which could aid in identifying reliability problems in certain types of meters. Florida Public Utilities stated that the additional costs may offset the benefits. Existing data and experience have shown that there have been no problems with meter accuracies for the equipment now in service.

Gulf Power reported that its record keeping meets most of the new requirements for newly purchased meters which are sample tested and for meters which are in-service sample tested. There would have to be some expansion of these practices to include all new meters and meters included in the periodic test program. Modifying test forms, creating new test forms, and new data collection would cause one-time administrative and labor costs which would be minimal. Utilization of manufacturer's test results would greatly reduce the time and labor costs currently expended to perform acceptance testing on new meters. The annual labor savings is estimated to be significant. If the record

keeping requirement could be performed by the manufacturer, some of the additional administrative costs could be avoided.

Florida Power Corporation (FPC) indicated that the proposed revisions would require reprogramming the computer system to accommodate new testing procedures. Mainframe reprogramming would cost between \$72,000 and \$108,000 in the initial year. The additional record keeping and submission of test procedures by meter and associated equipment type would require additional manpower of as much as one-half of one man year at a rate of \$30,000, plus additional labor to maintain the records at an annual rate of \$20,000. An outside consulting source could be required to completely review and ensure FPC compliance to new testing and sampling procedures. The consulting time is estimated at 800 to 1200 hours and could range from \$80,000 and \$120,000 initially. The total initial estimated cost for programming and consultant review would be \$182,000 to \$258,000, with subsequent costs of \$20,000 per year. The most significant additional benefits would be labor savings in the areas of handling, transporting, and testing of three-phase meters. The approximate total benefits of \$252,236 would be realized during the initial year and each subsequent year.

Florida Power & Light Company (FPL) reported that the proposed rule changes would create additional direct costs for preparation and filing of formal meter test procedures and plans, including approximately \$20,000 for the preparation and submission of Metering Device Test Procedures with all the detail required, and an estimated \$5,000 for the modification of computer programs to implement new test plans. The direct costs associated with each subsequent filing for future procedures and plans for approval by the Commission would be an estimated \$10,000.

FPL estimated that the direct savings associated with the use of manufacturer's meter test data for new meters would be approximately \$64,000, annually. The direct savings associated with the use of statistical sample

testing for most in-service meters are estimated to be approximately \$335,000, annually. The direct savings associated with improved procedures for demand testing solid state meters would be negligible initially, but would become significant as solid state meters gradually replace electromechanical meters currently in use. There would be indirect benefits from aligning the metering rules with the American National Standard of Electric Meters, ANSI C12.1 - 1995.

#### IMPACT ON SMALL BUSINESSES, SMALL COUNTIES, OR SMALL CITIES

No impact on small businesses is foreseen, as none of the affected utilities qualify as a small business as defined by s. 288.703, F.S. No impact is foreseen on small counties and cities as defined in s. 120.52, F.S. Therefore, there would be no need for tiered rule requirements.

#### REASONABLE ALTERNATIVE METHODS

The affected utilities generally believe the proposed rule changes would be beneficial. However, the proposed changes may go beyond what is necessary to accomplish the goal of accurate meter testing and reporting.

Tampa Electric Company has been involved in the development of the new meter testing plan to simplify the meter testing rules by making compliance to ANSI C12.1 - 1995 standard the guideline by which all meter testing would be performed. TECO stated that it had originally expected that the proposed rule amendments would not require additional time and money to submit and gain approval from the Commission for existing practices, increase its historical data retention, increase the Commission's workload, and increase the cost of existing meter testing activities. TECO believes that the original proposal to codify the use of ANSI C12.1 - 1995 is far superior and less burdensome on the utilities and Commission staff. TECO estimated that this alternative would eliminate its \$18,000 one-time start up cost and reduce its ongoing costs from \$10,500 to

\$1,500 annually. Most of TECO's costs associated with the proposed rule amendments would be incurred because of the requirements to submit for approval, meter test plans that are already defined by ANSI C12.1 - 1995. With the alternative, the Commission would also save the costs of reviewing and approving test plans from all the regulated electric utilities, although Commission staff may not have the same comfort level without the additional requirements.

Gulf Power Company suggested that instead of requiring the average percent registration and standard deviation results to be calculated for all meters tested, that to simply record the "as-found" and "as-left" test results for each meter tested would be useful. In addition, Gulf Power suggested that each utility should have a copy of its test procedures available upon request and that any test procedure be automatically approved if it complies with the ANSI C12 - 1995 guidelines. Also, electric utilities currently use established statistical standards programs, and it would be unreasonable to require that utilities prove or justify use of these standards after all the years of successful results.

FPL also proposes that the requirements for filing formal Metering Device Test Procedures and Plans described in FAC 25-6.052(4) and 25-6.056(7) to (10) be eliminated, because the detail required for procedures and plans exceeds those in ANSI C12.1 - 1995. The formal filings and review would not increase protection for customers and the utilities regarding meter testing but would simply add cost, time, and complexity. Every time something significant changes in meter technology, these filings would have to be made at a cost of \$20,000 initially, and \$10,000 for each subsequent filing. Therefore, ANSI C12.1 - 1995 should be used as the reference document for the rule instead of duplicating much of it in the Florida Administrative Code.

CBH:tf/e-meter.tnf