



December 7, 2004

Mr. J. R. Gonzalez, Manager
Safety Branch
Oregon Public Utility Commission
550 Capital Street, N.E., Suite 215
Salem, OR 97310-1380

Dear Mr. Gonzalez:

PacifiCorp hereby requests Oregon Public Utility Commission approval of the Company's revised Metering Policy for the State of Oregon, dated December 7, 2004.

The Company's Metering Policy for the State of Oregon was approved by the Commission effective January 1, 2001. The Policy contains and makes reference to PacifiCorp's comprehensive metering business policies and procedures necessary to comply with Oregon Administrative Rule 860-023-0015 *Testing Gas and Electric Meters* and the requirements of the *Oregon Public Utility Commission Electric Utility Metering Policy* as adopted by the Oregon Public Utility Commission on July 20, 2000 with an effective date of January 1, 2001. The proposed changes to the Metering Policy for the State of Oregon address periodic meter testing parameters in accordance with updated national standards for electric meters.

PacifiCorp is following prudent utility practice as well as industry-accepted standards in the owning and maintaining of its electric metering systems. Industry standards followed are *ANSI C12.1 – 2001 American National Standard for Electric Meters – Code for Electricity Metering*, *ANSI/ASQC Z1.9 1993 Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming*, the ANSI version of MIL-STD-414 (variables), *ANSI C12.11 – American National Standard for Instrument Transformers for Revenue Metering*, and *ANSI C57.13 – American National Standard Requirements for Instrument Transformers*.

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In addition to the proposed change to the Company's Metering Policy to reflect current ANSI standards, the Company is also proposing to operate the meter testing program on a fiscal year basis effective April 1, 2005, similar to the fiscal year basis used for the Company's Service Quality Measures, as approved by the Commission.

Should you have any questions regarding this matter, please contact me at 503-813-7408.

Sincerely,

Carole Rockney, Director
Customer & Regulatory Liaison

Attachment

Cc: Douglas Marx – 290 NTO
Lauren Pananen – 300 LCT

PACIFICORP

METERING POLICY

FOR THE

STATE OF OREGON

**PACIFICORP POLICIES AND PROCEDURES RELATING TO THE
METERING BUSINESS IN THE STATE OF OREGON**

**Revised
December 7, 2004**

Prepared by

PacifiCorp Metering Assets and Technology

**Douglas L. Marx, PE
Lauren W. Pananen, PE**

PACIFICORP POLICIES AND PROCEDURES RELATING TO THE METERING BUSINESS IN THE STATE OF OREGON

1. SCOPE

- 1.01 This document contains PacifiCorp's metering business policy and procedures necessary to meet the requirements of the *Oregon Public Utility Commission Electric Utility Metering Policy*.

2. GENERAL

- 2.01 The intent of the company's metering policies, procedures and practices is to properly apply, install and maintain meters and metering devices to ensure accuracy of customer billings.
- 2.02 The company will install and maintain accurate and reliable customer metering systems in compliance with prudent utility practice in a manner that is traceable and in conformance with national standards.
- 2.03 The company has established procedures/programs for continuing surveillance of its metering systems and customer service facilities to determine and take appropriate action concerning hazards, failures and defects associated with metering systems and customer service facilities.
- 2.04 All company employees and company contractors who perform work associated with customer metering systems shall be trained and be alert in the normal course of their daily work to identify and report safety, security, revenue, and other metering defect issues.
- 2.05 This document references the following documents:
- *7B.4 – Revenue Test Program* from PacifiCorp's *Engineering Handbook – Metering*.
 - *7B.8 – New Residential Meter Verification Policy* from PacifiCorp's *Engineering Handbook – Metering*.
 - *7C.3 – Instrument-Rated Metering Verification* from PacifiCorp's *Engineering Handbook – Metering*.
 - *7H – Reference Standards* from PacifiCorp's *Engineering Handbook – Metering*.
 - *ANSI C12.1-2001 Code for Electricity Metering*.
 - *ANSI C12.11 – American National Standard for Instrument Transformers for Revenue Metering*.
 - *ANSI C57.13 – American National Standard Requirements for Instrument Transformers*.
 - *ANSI/ASQC Z1.9-1993 Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming*.
 - *Electric Utility Service Equipment Requirements Committee Manual*
 - *Oregon Public Utility Commission Electric Utility Metering Policy* adopted by the Oregon Public Utility Commission on July 20, 2000, to become effective on January 1, 2001.
- 2.06 Definitions of specialized terminology used in this document:
Commission: Oregon Public Utility Commission.
Company: PacifiCorp.
Defective Meter Group: An identified group or subgroup of meters that has exceeded (failed) the threshold criteria for two (2) consecutive years.
High Maintenance Meter Group: An identified group of meters, from a single manufacturer, that suffers premature failures due to manufacturer defects. Also, an identified group of meters, produced by one or more manufacturers, which are failing at an unacceptable rate due to normal

use. In addition, meters that were manufactured using now considered obsolete technology, which, in the determination of the company, is excessively difficult and expensive to maintain.
Homogeneous Meter Group: A group of meters produced by the same manufacturer, having a related type (model) designation, of the same design, having the same relationship of parts without significant design or manufacturing process modifications.

Instrument Transformer Ratio: The ratio of the magnitude of the primary quantity (voltage or current) to the magnitude of the corresponding secondary quantity.

Meter Multiplier: Meter multiplier is the product of the voltage transformer ratio, if used, and current transformer ratio (i.e. VT 60:1 x CT 120:1 = 7200). The product of the instrument transformer ratios is used to determine the true power flowing in an electric service when this ratio is multiplied by the kWh registration of a meter connected to the instrument transformer secondary terminals.

Periodic Testing: A procedure the company maintains in addition to the Sample Testing program requiring a site meter test on a set time interval. The frequencies of these tests are set according to the customer load level and/or meter type.

Sample Testing: A procedure that specifies the number of meters from a homogeneous lot or population (meter model or type grouping) to be tested; the meters to be tested are selected randomly; and the results of the tests are analyzed according to minimum acceptability criteria.

Threshold Criteria: A lot or population of meters which exceeds (“fails”) the acceptability criteria of *ANSI/ASQC Z1.9, Part II, Double Specification Limit, Paragraph B 12.1.1*; Acceptable Quality Level (AQL) of 2.5%, inspection level of GII.

Uniquely Defective Meter: A meter with accuracy performance characteristics beyond 5 percent registration with such performance, unrelated to its design or manufacturing process, resulting from either physical damage or an electrical experience. A uniquely defective meter shows individual performance characteristics and is not representative of the homogeneous meter group population.

3. IN-SERVICE SAMPLE-TESTING, EVALUATION AND FAILED METER RETIREMENT PROGRAMS

3.01 The company will conduct an in-service sample-testing program. Each year, a random sample of in-service company electric meters not included in the periodic site verification program will be selected from each homogeneous meter model group including any meter group that has been declared defective and is being retired. All meter populations selected for sample testing shall be grouped by meter manufacturer and meter model as well as by significant design or manufacturing process modification. National standards:

- *ANSI C12.1-2001 Code for Electricity Metering* shall be used as minimum requirements for the in-service random Sample Testing program.
- *ANSI/ASQC Z1.9-1993 Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming* shall be used to determine sampling quantities and acceptability criteria for the in-service random Sample Testing program.

3.02 All in-service sample meter tests will be analyzed annually. The weighted average values (Method 1 or Method 3, as appropriate, of *ANSI C12.1*) will be used in the sampling analysis to determine whether the meter lot exceeds the threshold criteria.

3.03 If the threshold criterion is exceeded, the following procedure will be implemented:

- The company will establish a focused performance evaluation on the meter model and any subgroups of the failed homogeneous group. The annual Sample Testing program, scheduled before the failure was identified, will be completed. Accuracy trend analysis and evaluation on the failed group and identified subgroups will be reevaluated. An evaluation of design and/or manufacture deficiencies will be performed on the failed meter model group and identifiable subgroups.
- If, for the second consecutive year, the threshold criterion is exceeded, the meter group or identified subgroup will be declared defective. The annual Sample Testing program for the

defective meter group, scheduled before the second year of exceeding the threshold criteria was identified, will be completed.

- The company will implement a corrective action (retirement) program for the identified defective meter group. The defective meter group will be removed from service in four (4) years from the date it was declared defective unless otherwise approved by the Commission.
- Annual random sample testing of the defective meter group will continue until the group is removed from service.

4. IN-SERVICE METERING SITE INSPECTION, TESTING, MAINTENANCE AND VERIFICATION PROGRAMS

4.01 The company has an in-service periodic metering site inspection, testing, maintenance and verification program in place. The program for customer metering installations with multipliers of 40 or greater is designed to ensure proper equipment application as well as correct system installation, operation, security, and safety.

- The periodic site verification includes testing the meter accuracy as well as an examination looking for any evidence of tampering, theft or unsafe conditions. The verification visit validates proper wiring, instrument transformer ratios and instrument transformer burden performance as well as billing multipliers. The sites are selected and scheduled for 1 to 16-year periodic inspection depending on meter multiplier.
- The in-service periodic metering site inspection, testing, maintenance and verification program will be carried out as detailed in the company's work practice *7B.4 – Revenue Test Program*.

4.02 The company has an in-service meter site inspection program as part of its routine monthly meter reading visits. Personnel look for broken or damaged meters, broken meter seals, evidence of tampering or diversion and safety items that may affect the public.

4.03 The company requires all transformer-rated metering systems to be tested, inspected and verified after installation.

- The transformer-rated meter site verifications will be carried out as detailed in company's work practice *7C.3 – Instrument-Rated Metering Verification*.

5. METER TEST RECORDS

5.01 The meter test data will be retained for at least the last three (3) tests on each meter.

6. UNIQUELY DEFECTIVE METER ANALYSIS

6.01 All tested meters with an as-found accuracy error greater than 5% shall be considered uniquely defective, and immediately removed from service at the time of the test. Uniquely defective meter test data will not be used as part of the annual Sample Testing program threshold criteria analysis.

6.02 A complete list shall be maintained of all uniquely defective meters found by serial number, district location and description of defect.

6.03 Company's Metering Asset and Technology group shall evaluate annually the uniquely defective meter list developed from the previous year sample-testing program. The analysis will contain a focused examination of any logical subgroups in the uniquely defective meter groups such as geographic areas, serial number failure groupings and meter age as well as revenue loss risk analysis and the results of consultation with the meter manufacturers involved.

7. HIGH MAINTENANCE METER EVALUATION AND RETIREMENT PROGRAM

- 7.01 Company's Metering Asset and Technology group shall evaluate annually the Sample and Periodic Test Programs as well as the Uniquely Defective Meters to determine if a retirement program should be established for any identifiable High Maintenance Meter Groups, models or subgroups.
- 7.02 The evaluation will recognize meters with design or manufacturing deficiencies that demonstrate an excessive number of premature failures or are developing a history of poor performance. The evaluation also includes the analysis of design or manufacturing deficiencies that could eventually lead to accuracy or meter failure problems.
- 7.03 A meter group identified as a high maintenance meter group will be removed from service under a prudent retirement program determined by the company.

8. WATT-HOUR STANDARDS AND STANDARDIZING EQUIPMENT

- 8.01 The company's Metering Asset and Technology group shall maintain a certification program for watt-hour standards as specified in ANSI C12.1-2001 Section 3 and the work practices outlined in company *Engineering Manual 7H -Reference Standards*.
- 8.02 The company maintains a basic watt-hour reference standard that is calibrated annually with National Institute of Standards Technology (NIST) or an approved testing laboratory traceable to NIST. The company will maintain traceability to NIST by using the work practices as specified in company *Engineering Manual 7H.5 – Corporate Watt-hour Standard Procedure*.
- 8.03 The company establishes a correction factor between the basic reference standard and the company's portable standards (Metering Assets and Technology group's Coordinator's standards) every four (4) months. The portable standards have an accuracy of $\pm 0.05\%$ or less, and are used to calibrate/re-certify the field working standards annually to an accuracy of $\pm 0.1\%$.

9. IN SERVICE PERFORMANCE OF METERS AND METERING DEVICES

- 9.01 In service meters and metering devices shall be maintained with an accuracy performance as specified in *ANSI C12.1-2001 Code for Electricity Metering*.

10. NEW METER QUALITY ASSURANCE

- 10.01 New meters purchased by the company shall meet the minimum standards established in *ANSI C12.1-2001 Code for Electricity Metering*.
- 10.02 The company requires 100% testing of new meters purchased. All new single-phase and three-phase meters shall be tested by the manufacturer before being shipped to the company. The manufacturer shall provide the company with certified test data for all new meters received by the company.
- 10.03 The company has a random validation quality assurance testing program for new residential type meters. The validation quality assurance program will be carried out as detailed in company's work practice *7B.8 – New Residential Meter Verification Policy*.
- 10.04 The company has a 100% quality assurance-testing and validation program for new instrument-rated three-phase meters. The company, within 90 days of installation, tests all new single and three-phase instrument-rated meters and verifies proper application and installation.

- 10.05 Any discovered problems with new meter quality or accuracy will be acted upon immediately. The company will work with its suppliers to correct any deficiencies indicated. The company will take corrective action to remove any meters with identifiable design defect or in-service problem.

11. NEW INSTRUMENT TRANSFORMER QUALITY ASSURANCE

- 11.01 New instrument transformers purchased by the company comply with the latest revisions of *ANSI C12.11 – American National Standard for Instrument Transformers for Revenue Metering* and *ANSI C57.13 – American National Standard Requirements for Instrument Transformers*.
- 11.02 The company requires 100% testing of new instrument transformers purchased. The manufacturer tests all new current and voltage instrument transformers before they are shipped to the company.
- 11.03 The instrument transformer manufacturer provides the company with certified test data for all new instrument transformers received by the company. Test results must be within $\pm .3\%$ at full load for each instrument transformer to be accepted and placed into service.

12. ELECTRIC SERVICE REQUIREMENTS

- 12.01 Specific applications of the Electric Utility Service Equipment Requirements Committee Manual are described in the company's Oregon electric service requirements publication.

13. SECURITY AND REVENUE PROTECTION

- 13.01 The company requires all demand resets, meters and metering device enclosures to be sealed or locked in order to prevent unauthorized access, entry or adjustment and to maintain the integrity of the metering systems. The metering seals and locking devices are conspicuously placed and reasonably permanent.
- 13.02 The company maintains password protections on all programmable meters to prevent unauthorized adjustment, programming or data acquisition.
- 13.03 The company has practices in place to identify and detect evidence of tampering and current diversion. Qualified personnel are assigned the responsibility to investigate identified suspicious situations.

14. ANNUAL METERING MANAGEMENT REVIEW

- 14.01 The company will annually evaluate in November of each year the currency of its metering policies, practices and procedures with updated national and state regulations, standards and guidelines.
- 14.02 The company will maintain documentation of a management review program to ensure compliance with Commission regulations and established company policies and directives.

15. ANNUAL METERING CERTIFICATION REPORT TO THE OREGON PUBLIC UTILITY COMMISSION

- 15.01 The company will complete annually a metering certification report to the Commission as required by the *Oregon Public Utility Commission Electric Utility Metering Policy*.
- 15.02 The report will contain the information required in Section S of the *Oregon Public Utility Commission Electric Utility Metering Policy* for the entire company and for Oregon only.