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COMPANY NAME: PacifiCorp d/b/a Pacific Power

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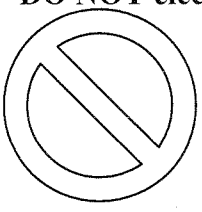

- Annual Fee Statement form and payment remittance or
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PACIFIC POWER
A DIVISION OF PACIFICORP

825 NE Multnomah, Suite 2000
Portland, Oregon 97232

February 28, 2014

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
3930 Fairview Industrial Dr. S.E.
Salem, OR 97302-1166

Attn: Filing Center

RE: PacifiCorp's Metering Assets and Technology Annual Report for 2013

PacifiCorp d/b/a Pacific Power submits for filing its Metering Assets and Technology Annual Report for 2013 in compliance with OAR 860-023-0015.

The company respectfully requests that data requests regarding this matter be addressed to:

By E-mail (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, OR 97232

Please direct informal questions to Gary Tawwater, Regulatory Affairs Manager, at (503) 813-6805.

Sincerely,

R. Bryce Dalley /AS
R. Bryce Dalley
Vice President, Regulation

Enclosure

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

Metering Assets and Technology

PACIFICORP 2013

METERING ASSETS and TECHNOLOGY

ANNUAL REPORT

For the period January 1 – December 31, 2013

Pacific Power and Rocky Mountain Power Divisions

Serving areas of

California, Idaho, Oregon, Utah, Washington and Wyoming

February 17, 2014

Submitted by:

Blaine Andreasen

Blaine Andreasen, Managing Director of Metering

Prepared by:

Metering Assets and Technology Department

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PacifiCorp 2013

METERING ASSETS and TECHNOLOGY ANNUAL REPORT

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Report on PacifiCorp Metering for the period January 1, 2013 – December 31, 2013

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2013 Report on PacifiCorp Metering

Programs and Procedures to Maintain the Accuracy of Metering

1. SCOPE

1.1. This document contains information describing the programs and procedures that PacifiCorp performs to maintain the accuracy and reliability of its electrical metering system. The meter has been called the 'cash register' of the company, and for that reason, its accuracy and reliability must be ensured. The appendixes of this report contain the data that has been collected, sorted and analyzed specifically to determine the condition, accuracy and reliability of the company's large billing metering population. Providing confidence in the metering system is important to the company, to the various state commissions and agencies responsible for reviewing utility operations, and of course, to every customer of PacifiCorp.

1.2. This document describes the procedures for ensuring the accuracy and reliability of newly purchased meters before they are placed in service.

1.3. Descriptions of the designs of the two in-service scheduled meter-testing programs: sample and periodic, are contained in this report. The appendixes of this document contain the results of these two annual in-service scheduled meter-testing and inspection programs. These programs are:

- Sample testing and evaluation of randomly selected meters and associated metering installations. This program generally applies to residential and small commercial customers.
- Periodic testing, inspection and verification of customer metering installations on a set-time interval. This program generally applies to larger commercial, industrial, and agricultural customers.

1.4. This report describes and relies upon nationally recognized publications for the initial valid test-program design. Application of the standards from these publications to the meter testing program results determines whether a meter model or group passes or fails.

1.5. This document contains descriptions of company policies and procedures that

apply to meters that no longer meet accuracy and reliability standards.

1.6. This document contains the procedural requirements for the testing and maintenance of the company's hierarchy of standardizing equipment utilized to verify the accuracy of the field test equipment that is ultimately responsible for ensuring the accuracy of the company's customer metering population.

1.7. Other company programs that relate to metering are also described. These programs may relate to energy theft programs or to new technologies designed to bring efficiency to the reading of meters. New types of test equipment and changes in testing programs are also described.

1.8. In summary, this document contains status reports regarding:

- new meter quality assurance
- in-service testing, inspections and verifications
- defective meter analysis
- meter retirement programs
- watt-hour standards maintenance
- energy theft and revenue protection programs
- new technologies
- metering plans for next year

2. GENERAL

2.1. This document references the following company internal work practices from *Metering Handbook* and *Metering Operations Practices and Procedures (MOPP)*; see Appendix G for selections.

- *MOPP Chapter 3 – Reference Standards*
- *MOPP Chapter 3 Section 1.4 – Corporate Watt-hour Standard Procedure*
- *MOPP Chapter 7 Section 1 – New Residential Meter Verification Policy*
- *MOPP Chapter 7 Section 3 – Meter Testing*
- *MOPP Chapter 7 Section 4 – In-Service Meter Test Program*
- *MOPP Chapter 9 Section 3 – Metering Equipment Retirement*

2.2. This document references the following nationally recognized metering standards:

- Edison Electric Institute – *Handbook for Electricity Metering, 10th Edition* – a guide for terminology and for determining homogeneous meter groupings.

- ANSI C12.1 – *2008 Code for Electricity Metering* – a guide for the testing program design, average registration calculations, and for the testing of standardizing equipment.
- ANSI/ASQC Z1.9 – *2008 Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming* – to determine lot sizes and acceptability criteria for the in-service meter sample-testing program.

3. DEFINITIONS

Acceptability criteria: Accuracy performance characteristics of a homogeneous meter group population. The acceptability criteria are specified by ANSI/ASQC Z1.9*, Part II, Double Specification Limit, Paragraph B 12.1.1;* Acceptable Criterion; Table B-3 Acceptable Quality Level of 2.50%; Table A-2 Inspection Level of G II. See Appendix A – *Sample Meter Test Analysis by Variables – ANSI Z1.9,* for each selected meter group's performance.

As-found condition code (AFCC): This two-letter code describes the condition of the meter installation as initially found by the meterman. The Customer Service System has a field to enter this code for each meter tested. See Appendix D sections 1 and 2 – *Uniquely Defective/As-found Condition Codes*.

Average percentage registration: Per ANSI C12.1–2008; 5.1.5.1 Method 1; FL=full load, LL=light load; weighted percentage registration = (4FL+LL)/5.

Billing multiplier: A multiplier applied to the meter's displayed energy and demand reads. For most meters, residential and small commercial, the billing multiplier is one. Larger installations have an instrument transformer ratio boosting the multiplier, see Instrument Transformers.

Customer Service System (CSS): The company mainframe system designed to manage metering, billing and other data.

Company: PacifiCorp, which is composed of Pacific and Rocky Mountain Power divisions. Pacific Power serves within the states of California, Oregon and Washington. Rocky Mountain Power serves within the states of Utah, Idaho and Wyoming.

Energy theft: Unauthorized manipulation of a metering service designed to alter consumption data; illegal consumption of electrical energy. Tampering with meter adjustments to cause the meter to not fully register consumption or altering the meter wiring to by-pass registration of the meter are two methods of energy theft.

Failed meter group: A meter group, meter model or serial number range of a meter model that has failed the sample testing criteria for two consecutive years per *MOPP Chapter 9 Section 3.3 – Retirement Policy: Failed Statistical Sampling Test Program Meters*. Failure is defined under ANSI/ASQC Z1.9-*2008 Sampling Procedures and Tables for Inspection by Variables*. Any failed meter groups are presented in Appendix A – *Sample Meter Test Analysis by Variables – ANSI Z1.9*. A meter group or model that passes in subsequent years will remain a failed sample.

High maintenance meter group: A meter group that is failing at an unacceptable rate or is excessively difficult to maintain, per *MOPP Chapter 9 Section 3.4 – Retirement Policy: High Maintenance Meters*.

Homogeneous meter group: A group, model or serial number range of meters produced by a manufacturer with the same model designation of the same design or with the same manufacturing process continuity.

Instrument transformer: Includes current and voltage transformers utilized to meter high currents of 200 amperes + and voltages of 600 volts +. For example, to meter a customer requiring 400 amperes at 12,000 volts requires transforming the 400 amperes to 5 and 12,000 volts to 120. An instrument-rated type meter installed in conjunction with the instrument transformers can then accurately meter the consumption. This customer would have a billing multiplier applied to his meter readings of 400/5 x 12,000/120 = 8,000.

Meterman: PacifiCorp craft designation for personnel trained to inspect, wire and test meters and associated metering equipment.

Obsolete meter group: Meter group found to be defective mechanically or electrically and failing at a determined higher than normal rate. Age (wear) or outdated design and materials may cause failure rate.

Periodic Test Program: Meters selected for testing and site verification on a time interval. The time interval may be determined by load, energy consumption, billing multiplier, or some combination of these quantities.

Sample Test Program: Meter samples randomly selected for testing within each homogeneous group. Meters included in the Periodic Test Program are precluded from selection in the Sample Test Program. Test results are analyzed according to ANSI Z1.9.

Site verification: Verifying wiring, instrument transformer ratio, and taking phase angle measurements at the customer-metering site.

Special problem meter group: A group that suffers failure due to manufacturer defects per *MOPP Chapter 9 Section 3.5 – Retirement Policy: Special Problem Meters*

Uniquely defective meter: A meter with unusable test results, including meters with broken covers, missing test data, test results outside of 10%, and meters that are inaccessible for testing. See definition for as-found condition code.

4. NEW METER QUALITY ASSURANCE

4.1. The company requires the meter manufacturers to provide test data for all new meters purchased, *MOPP Chapter 7 Section 3 – Meter Testing*. The meter manufacturers test all new single and polyphase meters before being shipped to the company and provide certified test data for these meters. The company analyzes the new meter certified test data to ensure that accuracy specifications are met.

4.2. For new residential type meters, *MOPP Chapter 7 Section 1 – New Residential Meter Verification Policy,* the company has an additional Quality Assurance (QA) sample evaluation and testing program. The company's Meter Test Facility and certain field meter shops are selected to inspect and test a pallet of 96 or more new residential meters on a rotational basis. If a quantity of meters does not meet the accuracy and analysis criteria, the entire shipment may be rejected and returned to the manufacturer. The manufacturer's facilities will come under greater scrutiny by company personnel for quality control.

Quality assurance testing is conducted in order to assure:

- The quality of the new meters delivered meets company expectations and specifications.
- Meter transport and handling is not causing accuracy loss or other problems.
- The accuracy standardization process between the company and the manufacturer agrees.

4.3. For all new instrument-rated meters, the company has a QA evaluation and testing program to verify accuracy. All new single-phase and polyphase instrument-rated meters are tested either before or within 90 days of installation.

5. IN-SERVICE METER TESTING PROGRAMS – SAMPLE and PERIODIC

5.1. SELECTION CRITERIA CHANGES

- The company continues to have two in-service meter testing programs: the Sample Meter Test Program and the Periodic Meter Test Program. The program selection is based on the billing multiplier divisions. The two meter programs with billing multiplier divisions and quantities are:

Test Program	Multiplier Division	Quantity Selected
Sample	less than 40	6498 meters
Periodic	equal to or greater than 40	4679 meters

- All meters selected for testing are posted on CSS as in the past. For better balance and planning of daily work, scheduled meter tests are distributed to the metermen via the company's Single-Person-Scheduling (SPS) system. The SPS system can efficiently allocate quantities of meters on a daily basis within each meterman's designated work area.

5.2. SAMPLE METER TEST PROGRAM

- The sample testing program will continue to follow the statistical sampling and analysis techniques described in the American National Standard, ANSI/ASQC Z1.9, which selects the number of meters to be tested in homogeneous groups and describes the steps for analysis.

- Random samples of in-service electric meters with billing multipliers less than 40 are selected. The meters are divided into homogeneous meter groups. Manufacturer, model, and manufacturer's serial number are utilized to group the meter populations selected for sample testing and subsequent analysis. The test results are analyzed as outlined by:
  - ANSI C12.1 – *2008 Code for Electricity Metering* which provides the requirements for the sample testing program and average percentage registration definition as described in *Method 1 – weighted-average values*.
  - ANSI/ASQC Z1.9 – *2008 Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming,* which provides sampling quantities and acceptability criteria for the various meter groupings.

- As in prior years, the sample meter groups tend to be self-contained with most having billing multipliers of one and set on either residential or small commercial customers. Meters with a billing multiplier of 40 or greater are included in the Periodic Meter Test Program.

- The quantities of sample meters for the total company and for each state are shown in Appendix B – *Sample Meter Populations*. The percentage of total meter populations is also provided.

- Meter accuracy evaluation results are included in Appendix A – *Sample Meter Test Analysis by Variables – ANSI Z1.9.* A graphical representation of the results is included in Appendix C – *Sample Meter Test Histogram Graphs*.

- The number of sample meter tests scheduled and completed is shown in Appendix E – *Scheduled Meter Test Counts.*

- Examples of evaluation results for past years:
  - For more than two consecutive years GE models I-14, I-16 and I-20 did not meet ANSI Z1.9 criteria and failed the Sample Meter Test Program. These meter models were already listed with instructions to "retire the meter whenever a site is visited and to retire any in stock". PacifiCorp's retirement program helps ensure removal of these meters from service on a timely basis.

- For two consecutive years, 2010 and 2011, the Westinghouse model D5S meters did not meet ANSI Z1.9 criteria and failed the Sample Meter Test Program. This meter model is listed with instructions to "retire the meter whenever a site is visited and to retire any in stock". PacifiCorp's retirement program helps ensure removal of these meters from service on a timely basis.

- For two consecutive years, 2011 and 2012, the General Electric model EV meters did not meet ANSI Z1.9 criteria and failed the Sample Meter Test Program. This meter model is listed with instructions to "retire the meter whenever a site is visited and to retire any in stock". PacifiCorp's retirement program helps ensure removal of these meters from service on a timely basis.

5.3. PERIODIC METER TEST PROGRAM

- The company's periodic testing and site verification program is generally derived from American National Standard, ANSI C12.1-2008, Appendix D, with specific company selection criteria based on meter billing multiplier.

- The periodic testing and site verification program is divided into 2-, 8- and 16-year test intervals based on billing multiplier. This program is designed to ensure proper and accurate metering equipment operation for customers with larger billing multipliers. Meters with billing multipliers less than 40 are included in the Sample Meter Test Program.

Test Interval	Multiplier Division
2-Year	greater than or equal to 600
8-Year	greater than or equal to 80 and less than 600
16-Year	greater than or equal to 40 and less than 80

- At each meter site, the company meterman conducts an inspection, looking for any evidence of deterioration, wiring problem, tampering, theft or unsafe conditions. Site verification tests are performed to verify wiring, instrument transformer ratios and burden performance, current to voltage phase relationships or power factor, and meter accuracy. The Customer Service

System (CSS) is also reviewed to verify correct tariff, metering multiplier and other information that ensures accurate billing.

- For the number of periodic meter tests scheduled and completed see Appendix E – *Scheduled Meter Test Counts*.

6. UNIQUELY DEFECTIVE METER ANALYSIS

6.1. When visiting the sample and periodic test meter sites, the meterman assigns "as-found condition codes" based on what is determined to be the initial condition of the metering installation.

6.2. These two-letter as-found condition codes are analyzed and evaluated for trends as part of a Uniquely Defective Meter Analysis Program; see Appendix D sections 1 and 2 – *Uniquely Defective/As-found Condition Codes*. The company's Metering Assets and Technology group evaluates the Uniquely Defective/As-found Condition meter lists developed from the sample and periodic testing programs.

6.3. The evaluation process is intended to identify meter groups with design or manufacturing problems as well as those developing a history of poor performance. The evaluation includes the analysis of design or manufacturing deficiencies that could eventually lead to accuracy or meter failure problems. Meter groups with problems are identified and, if appropriate, incorporated into a retirement program.

6.4. The analysis includes examination of any logical sub-groups within homogeneous groups, geographic areas, serial number ranges, meter age and consultations with the meter manufacturers.

7. METER RETIREMENT PROGRAMS

7.1. The company's Metering Assets and Technology group evaluates the Sample Test Program, Appendix A, as well as the Uniquely Defective/As-found Condition Codes for both the Sample and Periodic Test Programs, Appendix D sections 1 and 2, to determine if a retirement program should be established for any identifiable meter groups, models or subgroups.

7.2. Some meter models and groups are given a meter retirement code in which a meter, within the model or group definition, is to be removed from service whenever the meter site is visited by a journeyman meterman or single phase specialist and to retire any of these meters that remain in stock. Meters with this retirement code are Appendix G, *MOPP Chapter 9 Section 3.*

8. WATT-HOUR STANDARDS

8.1. The company's Metering Assets and Technology department maintains a certification program for watt-hour standards as specified in ANSI C12.1 – *2008 Section 3* and the PacifiCorp *MOPP Chapter 3 Section 1*.

8.2. The company maintains a basic watt-hour reference standard, the RD-22 Reference Standard, that is certified annually with an approved testing laboratory traceable to the National Institute of Standards and Technology (NIST). The RD-22 Reference Standard is kept at the Portland Meter Engineering Shop and is maintained and operated by the local meterman.

8.3. The company certifies portable reference standards to the company's transfer standard every three months, as specified in the PacifiCorp *MOPP Chapter 3 Section 1.4 - PacifiCorp Watt-hour Standard Procedure.* These portable standards have an accuracy rating of 0.025% and are carried by the Metering Assets and Technology department's metering administrators to recertify each meterman's test board standard annually to an accuracy rating of 0.05%.

9. ENERGY THEFT and REVENUE PROTECTION

9.1. The Metermen submit a report on metering problems that may have resulted in a billing error. The type of meter problem, calculated dollar losses, and the resolution on collection of the losses are documented.

9.2. Each meterman has access to an instrument, which can be used to detect illegal taps in underground services. The instrument is plugged into the customer's meter socket and readings are taken and interpreted.

10. 2013 METERING (January 1, 2013 to December 31, 2013)

10.1. Off-site Meter Reading (OMR) – The meter department continues its policy to install AMR-type meters as replacements, in new installations, in high-growth, densely populated areas in addition to difficult-to-access locations throughout California and Oregon service areas. These meters transmit a register value which is received by the meter reader's handheld devices as the reader follows the route past these residences and businesses, no longer needing to access the backyards to deal with dogs or other annoyances. The additional cost of the remotely read meters can be recouped by the time saved in reading these meters.

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

ELSTER (ABB/Westinghouse)

Group	Note	Lot Size[2]	Sample Size[4]	Meter Tests	Tests not Cmpl[11]	Outside 10%[11]	Mean Bar X[5]	Std Dev Sigma	Q_U[6]	Q_L[6]	% P_U[7]	% P_L[7]	% P[8]	% M[9]	M-P	Pass / Fail[10]	Failed Model List[12]
ALPHA		19308	200	479	0	4	99.996	0.318	6.302	6.279	0.004	0.004	0.008	4.390	4.382	Pass	**N**
ALPHA+		3954	125	144	0	1	99.993	0.059	34.016	33.768	0.003	0.003	0.006	4.670	4.664	Pass	**N**
ALPHA-1		11268	200	220	0	2	99.993	0.462	4.346	4.316	0.004	0.004	0.008	4.390	4.382	Pass	**N**
D4		19482	200	211	0	0	99.909	0.742	2.819	2.575	0.229	0.482	0.711	4.390	3.679	Pass	**N**
D5		18427	200	208	0	2	99.560	0.910	2.681	1.714	0.345	4.320	4.665	4.390	-0.275	Fail	**Failed**
		72439	925	1262	0	9											

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

GENERAL ELECTRIC

Group	Note	Lot Size[2]	Sample Size[4]	Meter Tests	Tests not Cmpl[11]	Outside 10%[11]	Mean Bar X[5]	Std Dev Sigma	Q_U[6]	Q_L[6]	% P_U[7]	% P_L[7]	% P[8]	% M[9]	M-P	Pass / Fail[10]	Failed Model List[12]
EV		485	32	33	0	0	100.050	0.163	11.994	12.610	0.000	0.000	0.000	5.980	5.980	Pass	**N**
I-50		3076	80	86	0	0	99.875	0.432	4.916	4.336	0.002	0.002	0.004	4.830	4.826	Pass	**N**
I-60		9760	125	128	0	1	99.729	0.472	4.807	3.661	0.003	0.008	0.011	4.670	4.659	Pass	**N**
I-70		213121	500	516	0	2	99.872	0.497	4.281	3.766	0.004	0.007	0.011	4.390	4.379	Pass	**N**
I-210		1709	80	84	0	0	100.044	0.167	11.701	12.232	0.002	0.002	0.004	4.830	4.826	Pass	**N**
KV		20573	200	368	0	12	100.007	1.362	1.464	1.474	7.190	7.050	14.240	4.390	-9.850	Fail	**Failed**
KV2C		50905	315	327	0	2	99.924	0.439	4.724	4.378	0.004	0.004	0.008	4.390	4.382	Pass	**N**
VM-N		1104	50	92	0	1	100.107	0.360	5.256	5.849	0.001	0.001	0.002	5.210	5.208	Pass	**N**
V-N		2939	80	79	1	3	99.892	0.723	2.914	2.615	0.140	0.385	0.525	4.830	4.305	Pass	**N**
		303672	1462	1713	1	21											

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

LANDIS + GYR (Siemens/L&G/Duncan)

Group	Note	Lot Size[2]	Sample Size[4]	Meter Tests	Tests not Cmpl[11]	Outside 10%[11]	Mean Bar X[5]	Std Dev Sigma	Q_U[6]	Q_L[6]	% P_U[7]	% P_L[7]	% P[8]	% M[9]	M-P	Pass / Fail[10]	Failed Model List[12]
MQS		20	3	20	0	0	100.136	0.344	5.415	6.206	0.000	0.000	0.000	7.590	7.590	Pass	**N**
MS		71488	315	332	0	2	99.919	0.270	7.716	7.113	0.004	0.004	0.008	4.390	4.382	Pass	**N**
MT		376	32	32	0	2	99.824	0.434	5.015	4.205	0.000	0.000	0.000	5.980	5.980	Pass	**N**
MX		66446	315	328	0	4	99.803	0.527	4.167	3.420	0.004	0.027	0.031	4.390	4.359	Pass	**N**
		138330	665	712	0	8											

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

ITRON (Schlumberger/Sangamo)

Group	Note	Lot Size[2]	Sample Size[4]	Meter Tests	Tests not Cmpl[11]	Outside 10%[11]	Mean Bar X[5]	Std Dev Sigma	Q_U[6]	Q_L[6]	% P_U[7]	% P_L[7]	% P[8]	% M[9]	M-P	Pass / Fail[10]	Failed Model List[12]
CENTRON		1235680	800	890	0	2	100.008	0.144	13.859	13.974	0.004	0.004	0.008	4.390	4.382	Pass	**N**
J3S		6618	125	132	0	0	99.506	0.621	4.017	2.425	0.003	0.712	0.715	4.670	3.955	Pass	**N**
J4S		34390	200	209	0	0	99.816	0.558	3.913	3.255	0.004	0.050	0.054	4.390	4.336	Pass	**N**
J5S		11500	200	204	0	6	99.771	0.420	5.312	4.222	0.004	0.004	0.008	4.390	4.382	Pass	**N**
SENTINEL		1658	80	83	0	0	100.033	0.067	29.200	30.180	0.002	0.002	0.004	4.830	4.826	Pass	**N**
SS		3080	80	88	0	2	100.105	0.490	3.870	4.300	0.002	0.002	0.004	4.830	4.826	Pass	**N**
		1292926	1485	1606	0	10											

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

Notes:

For Notes 2-10 refer to ANSI/ASQ Z1.9-2008:

2 Lot size is the number of in-service sample meters for a particular meter model or group in all PacifiCorp areas at the beginning of the last test year. If lot size is less than 100 no sample is taken. These, generally older meters with small lots, are targeted for removal.

3 Table A-2 for 'Code Letter' under 'General II' column as determined by 'Lot Size' (not displayed).

4 Table B-2 for 'Sample Size' as determined by 'Sample Size Code Letter'.
Each letter code is increased of 5% to account for incomplete tests, unable to test, and for tests outside +/-10%.

5 Mean or Bar X is calculated using the weighted average formula; % Registration = (4xFull Load + Light Load)/5.

6 Q_U and Q_L are the calculated upper and lower quality indicies; Q_u = (102% - Bar X) / Sigma; Q_L = (Bar X - 98%) / Sigma

7 Table B-5; for P_U and P_L, 'Estimate of Percent Non-Conforming'.

8 Total of the Estimate for Percent Non-Conforming; $P = P_U + P_L$.

9 Table B-3; for %M, 'Max allowable percent non-conforming' at 'Acceptable Quality Levels (normal inspections)' of '2.50'.

10 If Q_U or Q_L<0;

11 'Incomplete' and 'Outside 10%' accuracy tests are counted but not used in the analysis calculations.
'Incomplete Tests' are missing test data or have zeros entered.
'Outside 10%' tests for full or light load have test data that is less than 90% or greater than 110% registration.

12 'Failed' means that the meter model has failed the Sample Test Program for 2-consecutive years, see Appendix A_2.

'OR' means that the meter model shall be retired in Oregon service areas.

Appendix A_1
PacifiCorp 2013
Sample Test Analysis by Variables - ANSI Z1.9

Meter Models that Failed Sample Test Program

Manufacturer	Model	Serial # Range	1999[2]	2000	2001	2002	2003	2004	2006FY	2007FY	2007	2008	2009	2010	2011	2012	2013	Failed Model
Duncan	MK	all			yes													
GE	***I-14,16,20***	***all***			yes				***yes***	***yes***	yes	*	*	*	*			yes
GE	I-30	all				yes												
GE	EV	all													yes	yes		yes
GE	KV	all															yes	
Sangamo	J2	all	yes															
Sangamo	J3	all																
Westinghouse	***C***	***all***		yes		***yes***	***yes***	yes	yes	yes	yes	*	*	*	*			yes
Westinghouse	D	all																
Westinghouse	D3	all																
Westinghouse	D4	all																
Westinghouse	***D5***	***all***												*yes*	*yes*	*yes*	*yes*	yes

Notes:
1. ANSI Z1.4 criteria determined failure for the years 1997 and 1998
2. ANSI Z1.9 criteria determined failure for the years 1999 and later
3. ***'Failed Models'*** have failed the Sample Test Program, per ANSI Z1.9, for two consecutive years
*. Field population too low to select valid sample size. Meters have been removed from testing samples.
†. No meters remain in the field.

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

TOTAL COMPANY

Manufacturer	Model	Count	% of Company Total	% of Company Population
Elster/ABB/Westinghouse	A3	4,118	0.2315%	100.0000%
	AB1	739	0.0415%	100.0000%
	ABS-5U	8,471	0.4762%	100.0000%
	ALPHA	1,462	0.0822%	100.0000%
	ALPHA+	10,213	0.5742%	100.0000%
	ALPHA-1	18,755	1.0544%	100.0000%
	D2S	17,763	0.9986%	100.0000%
General Electric	D4S	194	0.0109%	100.0000%
	D5S	1,731	0.0973%	100.0000%
	UNKN	2,800	0.1574%	100.0000%
	EV-2,3,4,5,6	9,324	0.5242%	100.0000%
	I-210	208,387	11.7151%	100.0000%
	I-50,55	6,823	0.3836%	100.0000%
	I-60	17,894	1.0060%	100.0000%
	I-70	497	0.0279%	100.0000%
	KV,KV2	385	0.0216%	100.0000%
	KV2C	9,823	0.5522%	100.0000%
	KV2C+	341	0.0192%	100.0000%
	KV2CE	5,195	0.2921%	100.0000%
	KV2CS	3	0.0002%	100.0000%
	KVE	2,723	0.1531%	100.0000%
	KVS	782	0.0440%	100.0000%
Itron/Schlumberger/Sangamo	UNKN	656	0.0369%	100.0000%
	V-2,3,6,9,62,63,64,65,66	1,259,925	70.8304%	100.0000%
	VM-62,62,64,65,66,612	6,313	0.3549%	100.0000%
	C1S	33,193	1.8660%	100.0000%
	CENTRON	10,920	0.6139%	100.0000%
	J3S	4	0.0002%	100.0000%
	J4S	1,609	0.0905%	100.0000%
	J5S	2,818	0.1584%	100.0000%
Landis & Gyr/Siemens/L&G/Duncan	P30,PW	69,776	3.9227%	100.0000%
	SENTINEL	187	0.0105%	100.0000%
	SL2,3,4,5,6,12,S5DA	64,960	3.6519%	100.0000%
	MQS	2	0.0001%	100.0000%
Unknown	MS	6	0.0003%	100.0000%
	Total	1,778,792	100.0000%	100.0000%

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

CALIFORNIA

Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	361	0.7865%	8.7664%
	ABS-5U	2	0.0044%	0.2706%
	ALPHA	540	1.1764%	6.3747%
	ALPHA+	153	0.3333%	10.4651%
	ALPHA-1	99	0.2157%	0.9694%
	D4S	173	0.3769%	0.9224%
	D5S	1,910	4.1610%	10.7527%
General Electric	EV-2,3,4,5,6	3	0.0065%	1.5464%
	I-210	185	0.4030%	10.6875%
	I-50,55	21	0.0457%	0.7500%
	I-60	12	0.0261%	0.1287%
	I-70	13,810	30.0858%	6.6271%
	KV,KV2	540	1.1764%	7.9144%
	KV2C	1,401	3.0522%	7.8294%
	KV2C+	111	0.2418%	22.3340%
	KV2CE	4	0.0087%	1.0390%
	KV2CS	430	0.9368%	4.3775%
	KVE	-	0.0000%	0.0000%
	KVS	96	0.2091%	1.8479%
	UNKN	-	0.0000%	0.0000%
	V-2,3,6,9,62,63,64,65,66	151	0.3290%	5.5454%
	VM-62,62,64,65,66,612	13	0.0283%	1.6624%
Itron/Schlumberger/Sangamo	C1S	32	0.0697%	4.8780%
	CENTRON	9,970	21.7202%	0.7913%
	J3S	-	0.0000%	0.0000%
	J4S	2,021	4.4029%	6.0886%
	J5S	1,217	2.6513%	11.1447%
	P30,PW	-	0.0000%	0.0000%
	SENTINEL	7	0.0152%	0.4351%
	SL2,3,4,5,6,12,S5DA	194	0.4226%	6.8843%
Landis & Gyr/Siemens/L&G/Duncan	MS	6,085	13.2565%	8.7208%
	MT	12	0.0261%	6.4171%
	MX	6,349	13.8316%	9.7737%
	2510	-	0.0000%	0.0000%
Unknown	UNKN	-	0.0000%	0.0000%
	Total	45,902	100.0000%	2.5805%

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

IDAHO

Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	214	0.2957%	5.1967%
	ABS-5U	0	0.0000%	0.0000%
	ALPHA	1291	1.7838%	15.2402%
	ALPHA+	210	0.2902%	14.3639%
	ALPHA-1	8298	11.4658%	81.2494%
	D4S	1921	2.6543%	10.2426%
	D5S	137	0.1893%	0.7713%
General Electric	EV-2,3,4,5,6	65	0.0898%	33.5052%
	I-210	3	0.0041%	0.1733%
	I-50,55	443	0.6121%	15.8214%
	I-60	2109	2.9141%	22.6190%
	I-70	13238	18.2916%	6.3526%
	KV,KV2	1264	1.7465%	18.5256%
	KV2C	2888	3.9905%	16.1395%
	KV2C+	43	0.0594%	8.6519%
	KV2CE	0	0.0000%	0.0000%
	KV2CS	2095	2.8948%	21.3275%
	KVE	0	0.0000%	0.0000%
	KVS	1473	2.0353%	28.3542%
	UNKN	0	0.0000%	0.0000%
	V-2,3,6,9,62,63,64,65,66	76	0.1050%	2.7910%
	VM-62,62,64,65,66,612	94	0.1299%	12.0205%
Itron/Schlumberger/Sangamo	C1S	0	0.0000%	0.0000%
	CENTRON	27252	37.6554%	2.1630%
	J3S	0	0.0000%	0.0000%
	J4S	822	1.1358%	2.4764%
	J5S	84	0.1161%	0.7692%
	P30,PW	0	0.0000%	0.0000%
	SENTINEL	994	1.3735%	61.7775%
	SL2,3,4,5,6,12,S5DA	240	0.3316%	8.5167%
Landis & Gyr/Siemens/L&G/Duncan	MS	2901	4.0085%	4.1576%
	MT	12	0.0166%	6.4171%
	MX	4203	5.8075%	6.4701%
	2510	2	0.0028%	100.0000%
Unknown	UNKN	0	0.0000%	0.0000%
	Total	72,372	100.0000%	4.0686%

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

OREGON

Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	3,523	0.6178%	85.5512%
	ABS-5U	737	0.1292%	99.7294%
	ALPHA	6,182	1.0842%	72.9784%
	ALPHA+	991	0.1738%	67.7839%
	ALPHA-1	1,782	0.3125%	17.4484%
	D4S	16,645	2.9191%	88.7497%
	D5S	15,713	2.7556%	88.4592%
General Electric	EV-2,3,4,5,6	38	0.0067%	19.5876%
	I-210	1,206	0.2115%	69.6707%
	I-50,55	2,332	0.4090%	83.2857%
	I-60	7,185	1.2601%	77.0592%
	I-70	181,040	31.7495%	86.8768%
	KV,KV2	4,525	0.7936%	66.3198%
	KV2C	11,618	2.0375%	64.9268%
	KV2C+	312	0.0547%	62.7767%
	KV2CE	381	0.0668%	98.9610%
	KV2CS	6,760	1.1855%	68.8181%
	KVE	341	0.0598%	100.0000%
	KVS	3,588	0.6292%	69.0664%
	UNKN	3	0.0005%	100.0000%
	V-2,3,6,9,62,63,64,65,66	2,460	0.4314%	90.3415%
	VM-62,62,64,65,66,612	646	0.1133%	82.6087%
Itron/Schlumberger/Sangamo	C1S	624	0.1094%	95.1220%
	CENTRON	137,907	24.1852%	10.9457%
	J3S	6,302	1.1052%	99.8258%
	J4S	30,327	5.3185%	91.3656%
	J5S	9,581	1.6802%	87.7381%
	P30,PW	-	0.0000%	0.0000%
	SENTINEL	11	0.0019%	0.6837%
	SL2,3,4,5,6,12,S5DA	2,262	0.3967%	80.2697%
Landis & Gyr/Siemens/L&G/Duncan	MS	60,695	10.6443%	86.9855%
	MT	163	0.0286%	87.1658%
	MX	54,330	9.5280%	83.6361%
	2510	-	0.0000%	0.0000%
Unknown	UNKN	3	0.0005%	50.0000%
	Total	570,213	100.0000%	32.0562%

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

UTAH

Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	20	0.0024%	0.4857%
	ABS-5U	-	0.0000%	0.0000%
	ALPHA	407	0.0493%	4.8046%
	ALPHA+	44	0.0053%	3.0096%
	ALPHA-1	34	0.0041%	0.3329%
	D4S	15	0.0018%	0.0800%
	D5S	3	0.0004%	0.0169%
General Electric	EV-2,3,4,5,6	81	0.0098%	41.7526%
	I-210	222	0.0269%	12.8250%
	I-50,55	4	0.0005%	0.1429%
	I-60	13	0.0016%	0.1394%
	I-70	289	0.0350%	0.1387%
	KV,KV2	307	0.0372%	4.4995%
	KV2C	862	0.1045%	4.8173%
	KV2C+	8	0.0010%	1.6097%
	KV2CE	-	0.0000%	0.0000%
	KV2CS	378	0.0458%	3.8481%
	KVE	-	0.0000%	0.0000%
	KVS	36	0.0044%	0.6930%
	UNKN	-	0.0000%	0.0000%
	V-2,3,6,9,62,63,64,65,66	31	0.0038%	1.1385%
	VM-62,62,64,65,66,612	20	0.0024%	2.5575%
Itron/Schlumberger/Sangamo	C1S	-	0.0000%	0.0000%
	CENTRON	821,608	99.5717%	65.2109%
	J3S	8	0.0010%	0.1267%
	J4S	23	0.0028%	0.0693%
	J5S	38	0.0046%	0.3480%
	P30,PW	4	0.0005%	100.0000%
	SENTINEL	408	0.0494%	25.3574%
	SL2,3,4,5,6,12,S5DA	109	0.0132%	3.8680%
Landis & Gyr/Siemens/L&G/Duncan	MS	90	0.0109%	0.1290%
	MT	-	0.0000%	0.0000%
	MX	77	0.0093%	0.1185%
	2510	-	0.0000%	0.0000%
Unknown	UNKN	3	0.0004%	50.0000%
	Total	825,142	100.0000%	46.3878%

Appendix B

PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

WASHINGTON

Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	-	0.0000%	0.0000%
	ABS-5U	-	0.0000%	0.0000%
	ALPHA	6	0.0047%	0.0708%
	ALPHA+	2	0.0016%	0.1368%
	ALPHA-1	-	0.0000%	0.0000%
	D4S	1	0.0008%	0.0053%
	D5S	-	0.0000%	0.0000%
General Electric	EV-2,3,4,5,6	1	0.0008%	0.5155%
	I-210	88	0.0692%	5.0838%
	I-50,55	-	0.0000%	0.0000%
	I-60	5	0.0039%	0.0536%
	I-70	6	0.0047%	0.0029%
	KV,KV2	49	0.0385%	0.7182%
	KV2C	570	0.4481%	3.1854%
	KV2C+	11	0.0086%	2.2133%
	KV2CE	-	0.0000%	0.0000%
	KV2CS	97	0.0763%	0.9875%
	KVE	-	0.0000%	0.0000%
	KVS	2	0.0016%	0.0385%
	UNKN	-	0.0000%	0.0000%
	V-2,3,6,9,62,63,64,65,66	1	0.0008%	0.0367%
	VM-62,62,64,65,66,612	3	0.0024%	0.3836%
Itron/Schlumberger/Sangamo	C1S	-	0.0000%	0.0000%
	CENTRON	126,283	99.2814%	10.0231%
	J3S	3	0.0024%	0.0475%
	J4S	-	0.0000%	0.0000%
	J5S	-	0.0000%	0.0000%
	P30,PW	-	0.0000%	0.0000%
	SENTINEL	63	0.0495%	3.9155%
	SL2,3,4,5,6,12,S5DA	1	0.0008%	0.0355%
Landis & Gyr/Siemens/L&G/Duncan	MS	5	0.0039%	0.0072%
	MT	-	0.0000%	0.0000%
	MX	-	0.0000%	0.0000%
	2510	-	0.0000%	0.0000%
Unknown	UNKN	-	0.0000%	0.0000%
	Total	127,197	100.0000%	7.1508%

Appendix B

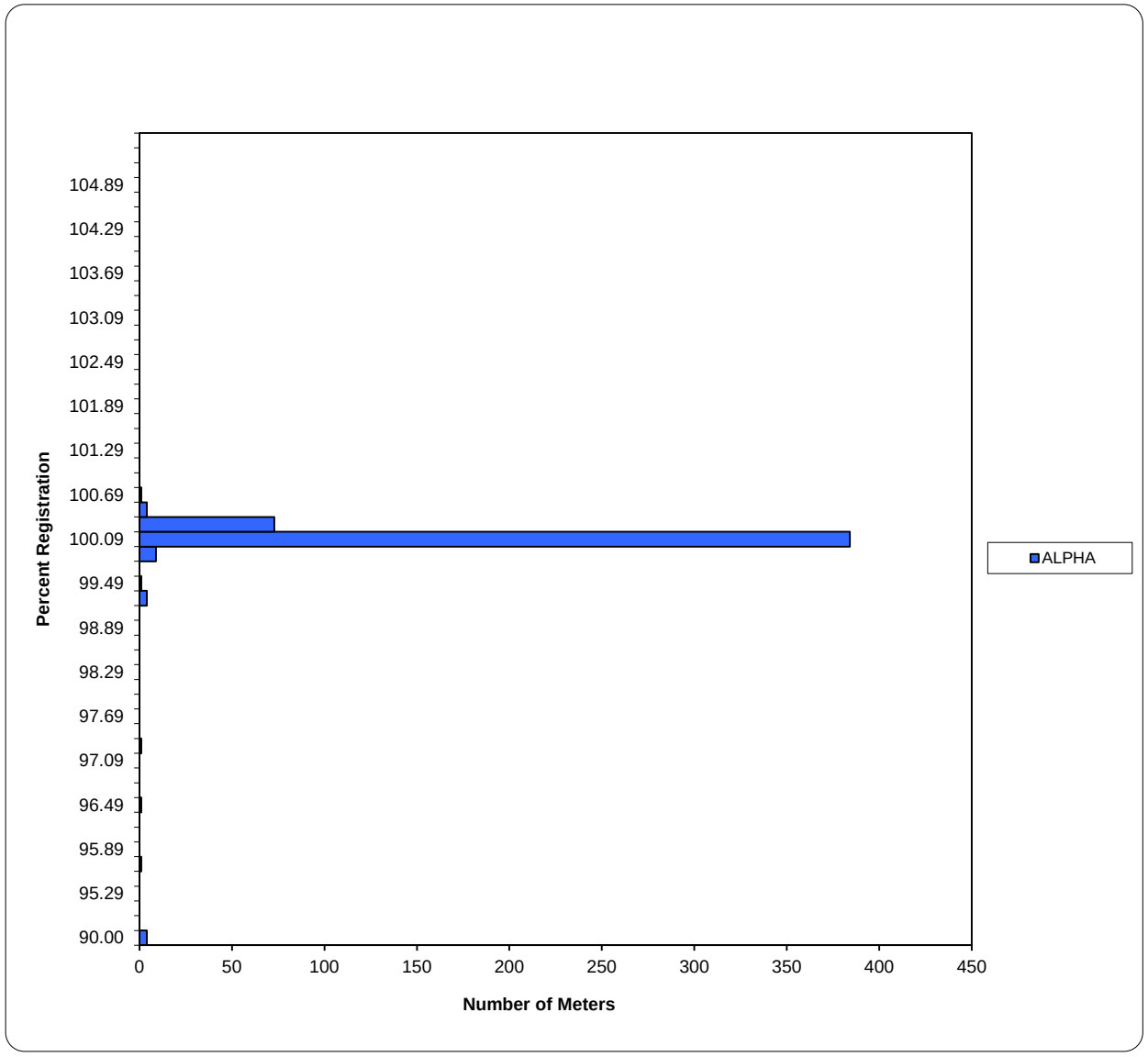
PacifiCorp 2013

Sample Meter Populations as of December 31, 2013

WYOMING

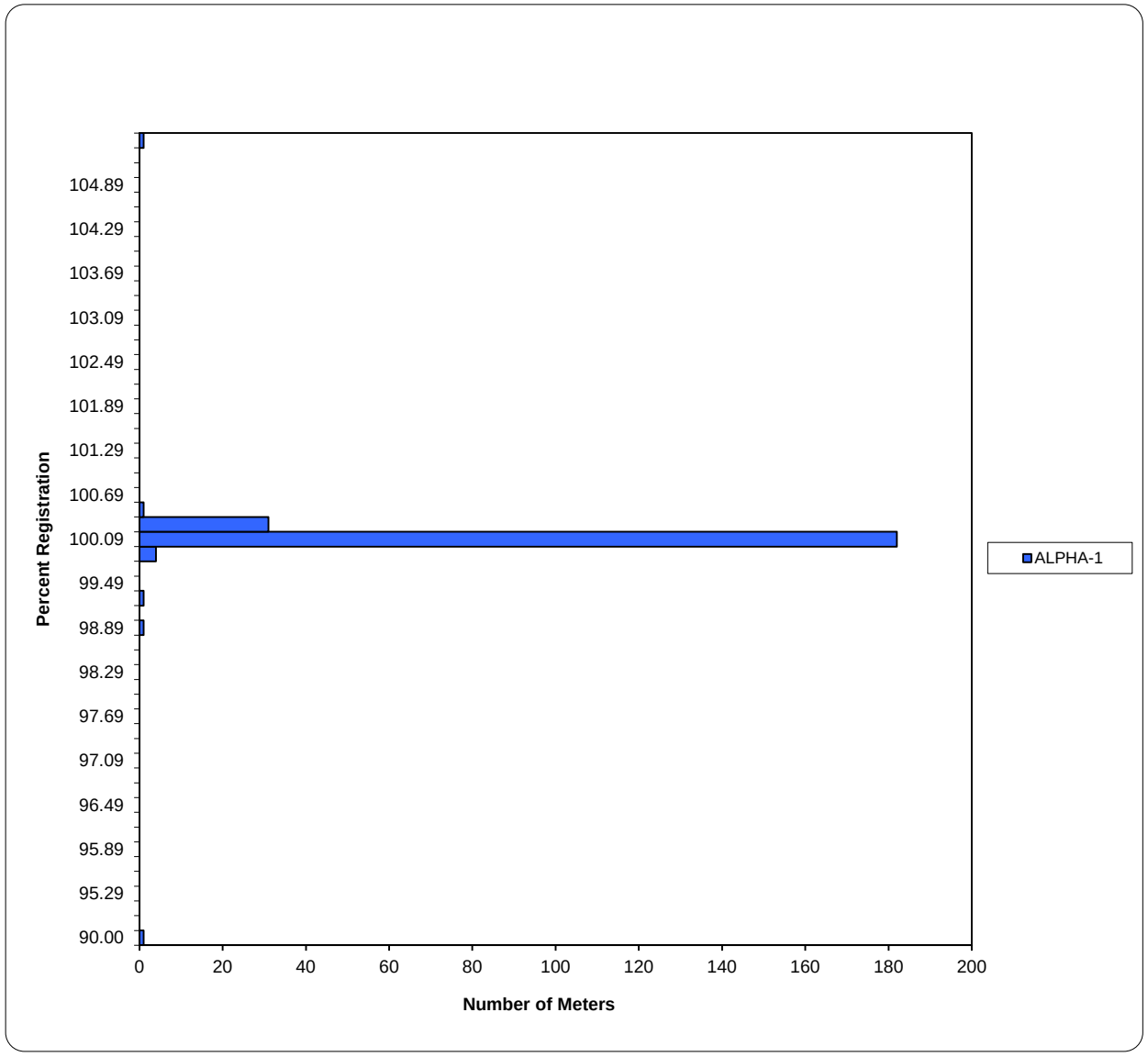
Manufacturer	Model	Count	% of State Total	% of Company Population
Elster/ABB/Westinghouse	AB1	-	0.0000%	0.0000%
	ABS-5U	-	0.0000%	0.0000%
	ALPHA	45	0.0326%	0.5312%
	ALPHA+	62	0.0449%	4.2408%
	ALPHA-1	-	0.0000%	0.0000%
	D4S	-	0.0000%	0.0000%
	D5S	-	0.0000%	0.0000%
General Electric	EV-2,3,4,5,6	6	0.0043%	3.0928%
	I-210	27	0.0196%	1.5598%
	I-50,55	-	0.0000%	0.0000%
	I-60	-	0.0000%	0.0000%
	I-70	4	0.0029%	0.0019%
	KV,KV2	138	0.1000%	2.0226%
	KV2C	555	0.4023%	3.1016%
	KV2C+	12	0.0087%	2.4145%
	KV2CE	-	0.0000%	0.0000%
	KV2CS	63	0.0457%	0.6414%
	KVE	-	0.0000%	0.0000%
	KVS	-	0.0000%	0.0000%
	UNKN	-	0.0000%	0.0000%
	V-2,3,6,9,62,63,64,65,66	4	0.0029%	0.1469%
	VM-62,62,64,65,66,612	6	0.0043%	0.7673%
Itron/Schlumberger/Sangamo	C1S	-	0.0000%	0.0000%
	CENTRON	136,905	99.2310%	10.8661%
	J3S	-	0.0000%	0.0000%
	J4S	-	0.0000%	0.0000%
	J5S	-	0.0000%	0.0000%
	P30,PW	-	0.0000%	0.0000%
	SENTINEL	126	0.0913%	7.8310%
	SL2,3,4,5,6,12,S5DA	12	0.0087%	0.4258%
Landis & Gyr/Siemens/L&G/Duncan	MS	-	0.0000%	0.0000%
	MT	-	0.0000%	0.0000%
	MX	1	0.0007%	0.0015%
	2510	-	0.0000%	0.0000%
Unknown	UNKN	-	0.0000%	0.0000%
	Total	137,966	100.0000%	7.7562%

Meter Model Group: ALPHA Weighted Avg.



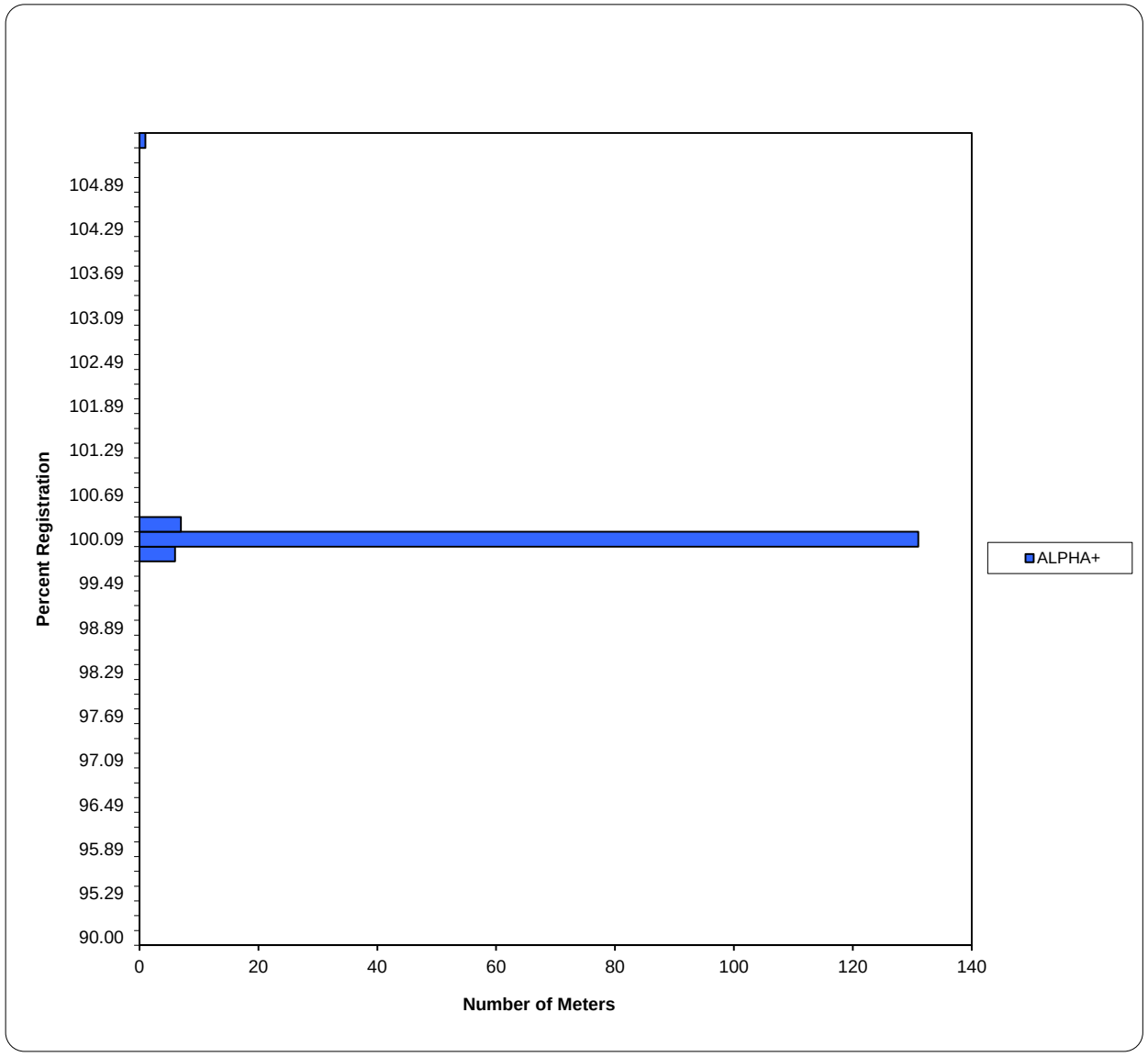
Percent Registration		# of Meters
Low	High	
0.00	90.00	4
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	1
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	1
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	1
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	4
99.30	99.49	1
99.50	99.69	0
99.70	99.89	9
99.90	100.09	384
100.10	100.29	73
100.30	100.49	4
100.50	100.69	1
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Meter Model Group: ALPHA-1 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	1
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	1
98.90	99.09	0
99.10	99.29	1
99.30	99.49	0
99.50	99.69	0
99.70	99.89	4
99.90	100.09	182
100.10	100.29	31
100.30	100.49	1
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	1

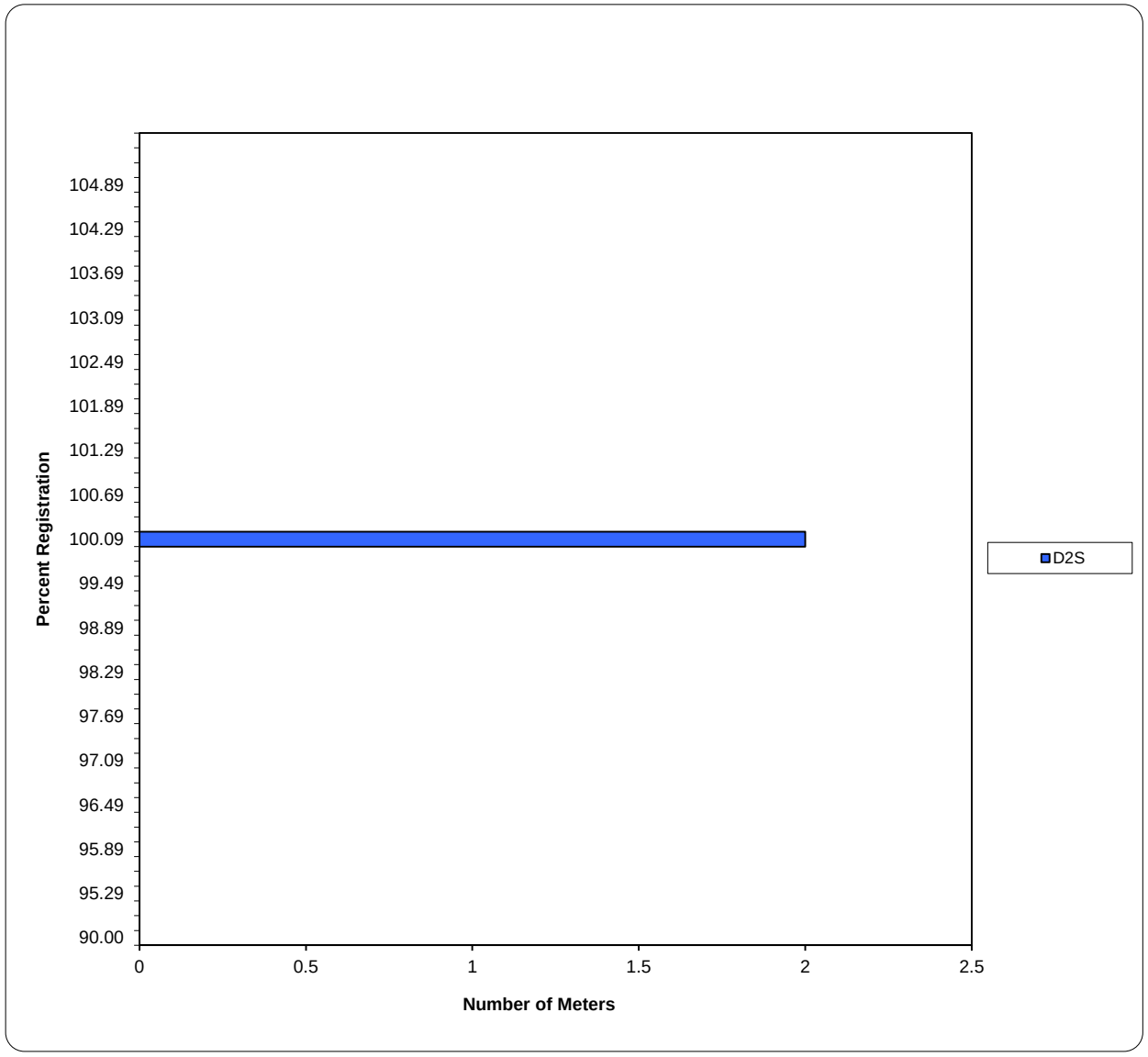
Meter Model Group: ALPHA+ Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	0
99.70	99.89	6
99.90	100.09	131
100.10	100.29	7
100.30	100.49	0
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	1

Appendix C
PacifiCorp 2013

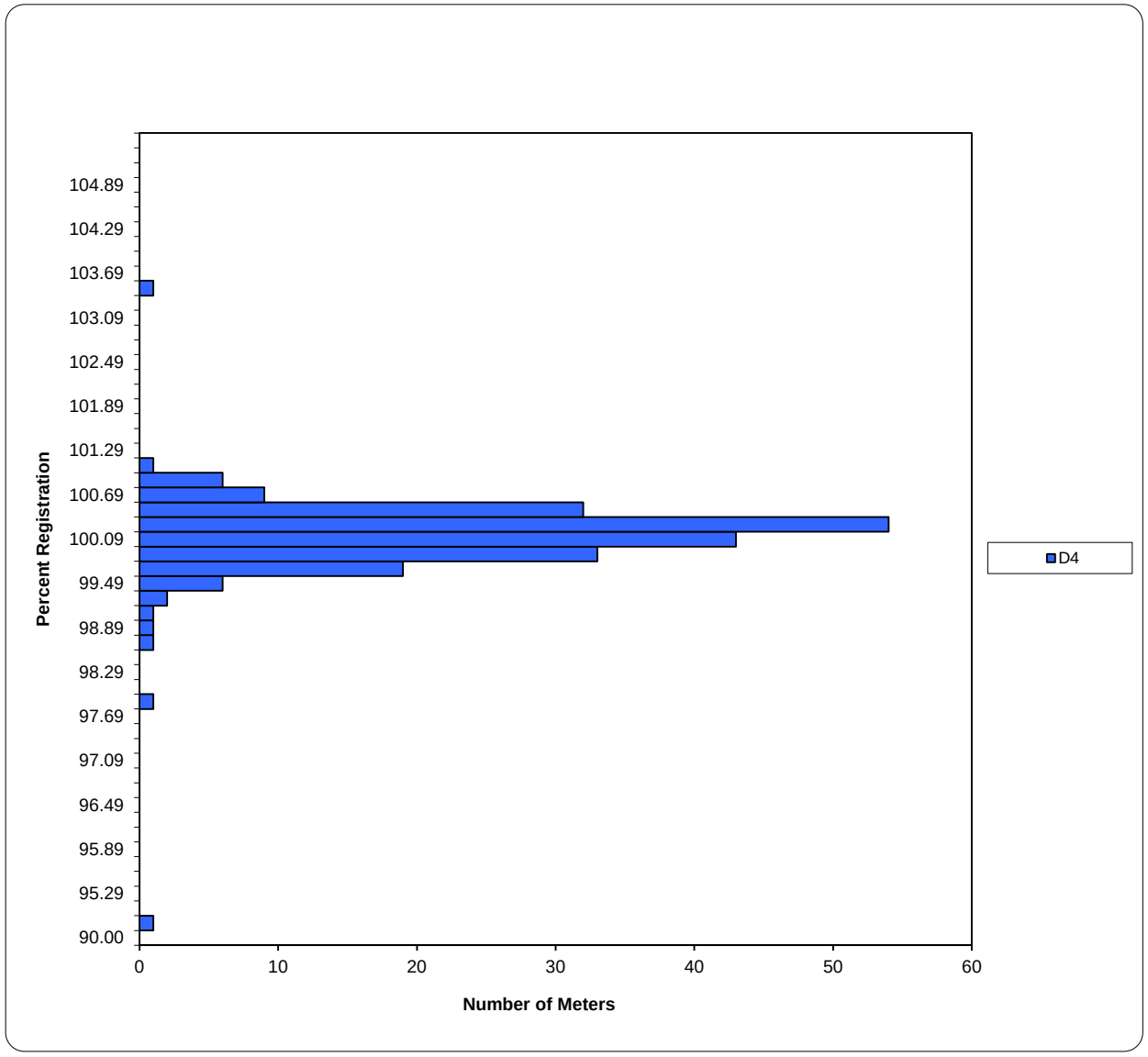
Meter Model Group: D2S Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	0
99.70	99.89	0
99.90	100.09	2
100.10	100.29	0
100.30	100.49	0
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

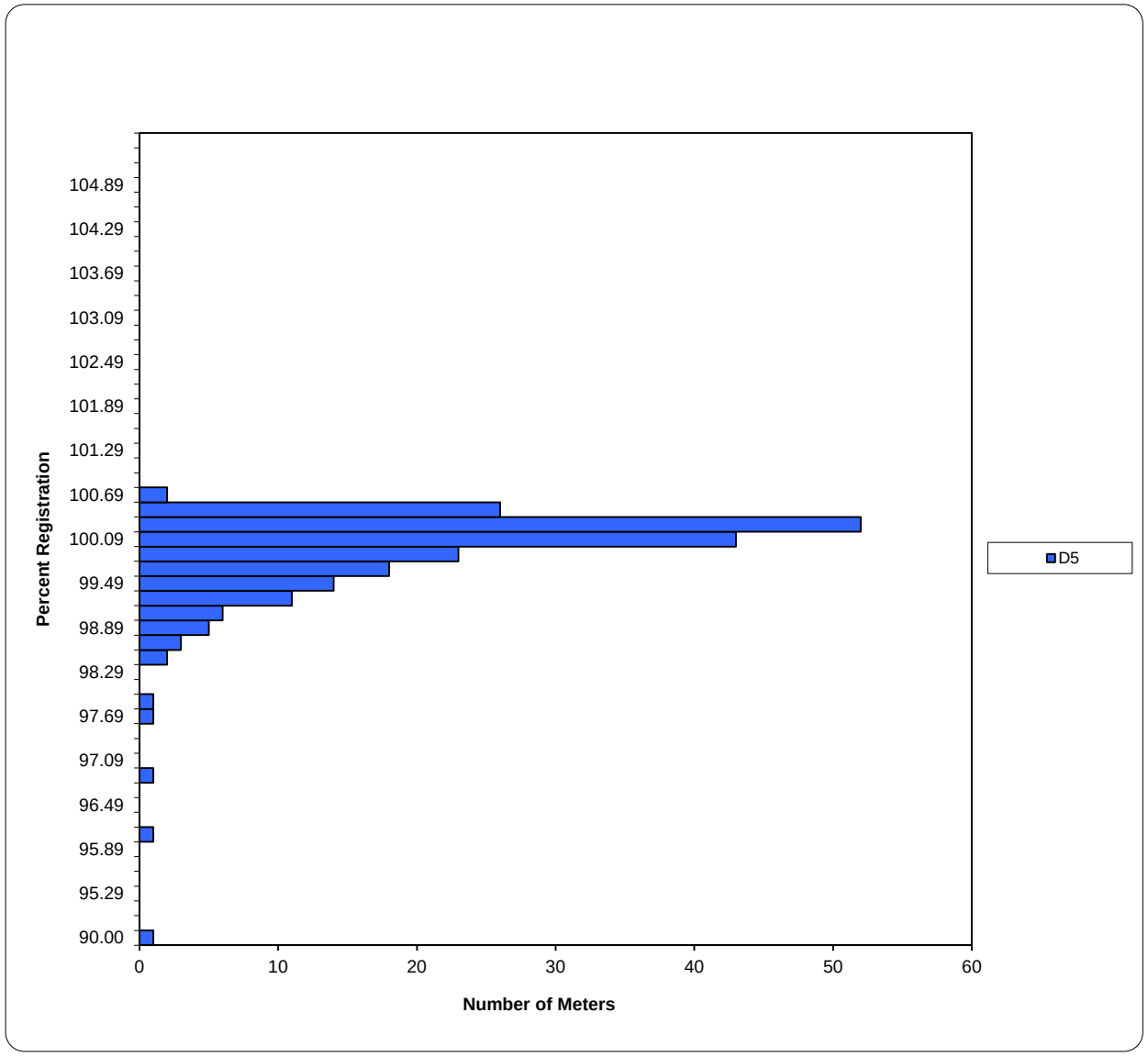
Appendix C
PacifiCorp 2013

Meter Model Group: D4 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	1
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	1
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	1
98.70	98.89	1
98.90	99.09	1
99.10	99.29	2
99.30	99.49	6
99.50	99.69	19
99.70	99.89	33
99.90	100.09	43
100.10	100.29	54
100.30	100.49	32
100.50	100.69	9
100.70	100.89	6
100.90	101.09	1
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	1
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

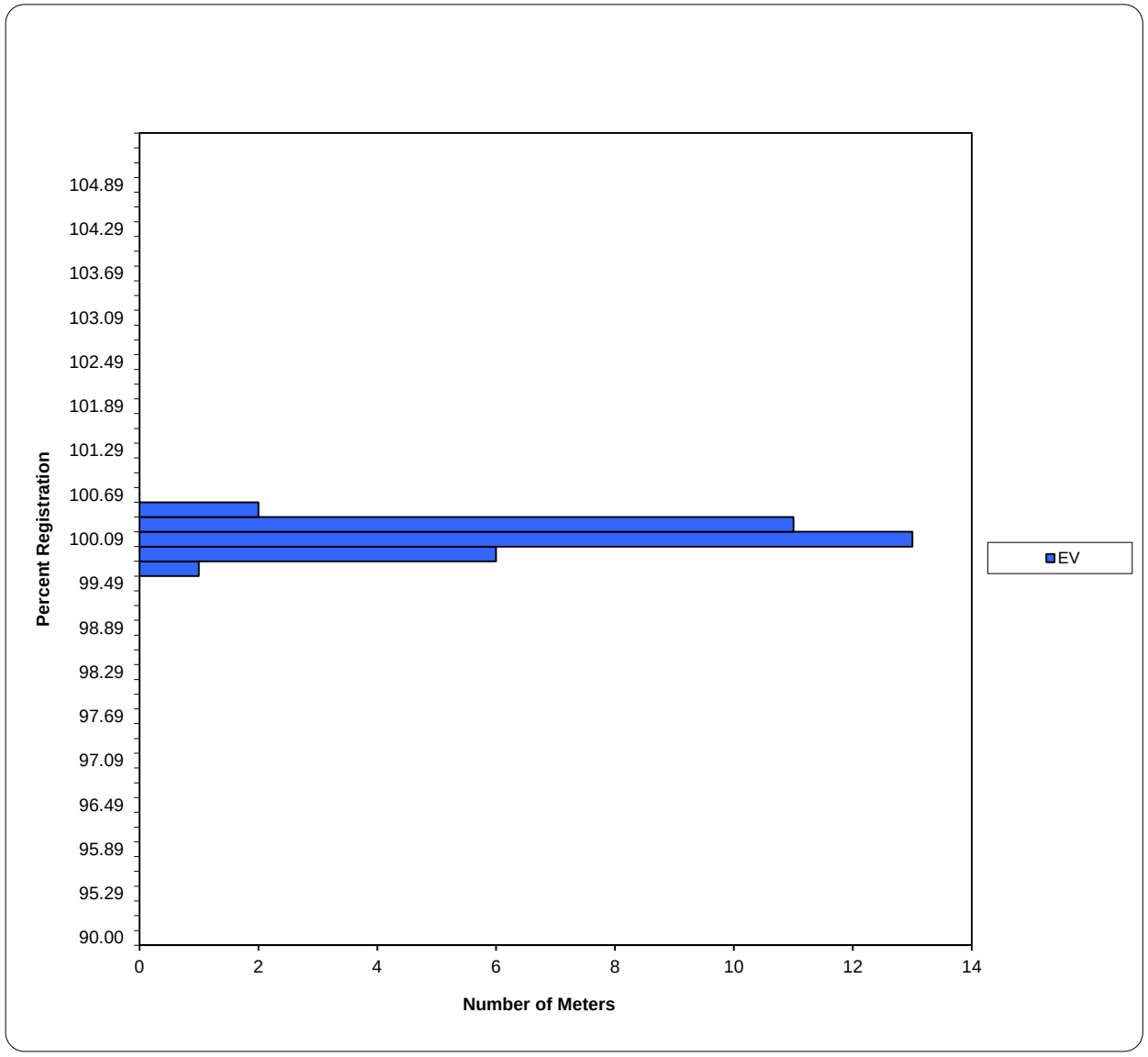
Meter Model Group: D5 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	1
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	1
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	1
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	1
97.70	97.89	1
97.90	98.09	0
98.10	98.29	0
98.30	98.49	2
98.50	98.69	3
98.70	98.89	5
98.90	99.09	6
99.10	99.29	11
99.30	99.49	14
99.50	99.69	18
99.70	99.89	23
99.90	100.09	43
100.10	100.29	52
100.30	100.49	26
100.50	100.69	2
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

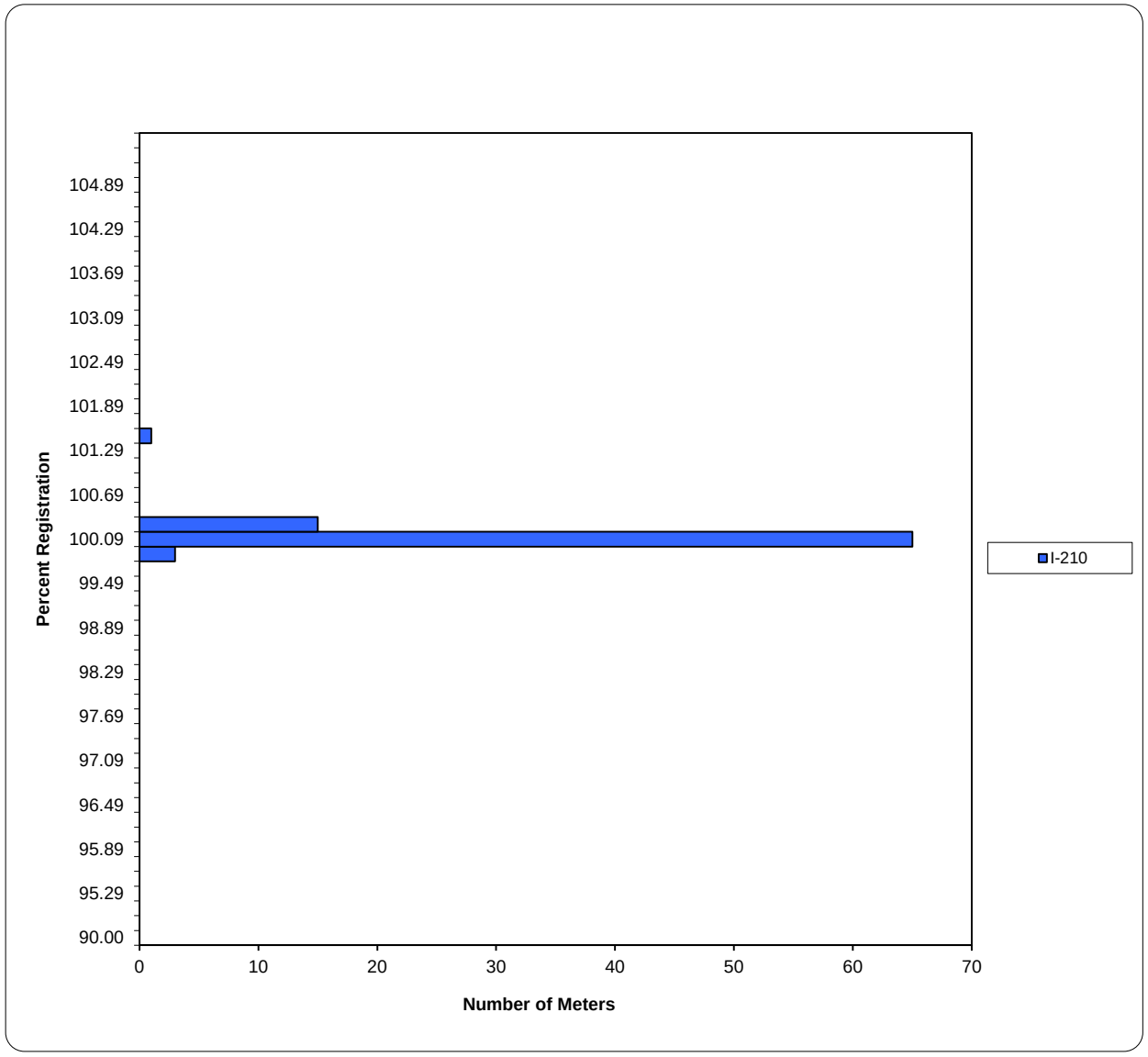
Appendix C
PacifiCorp 2013

Meter Model Group: EV Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	1
99.70	99.89	6
99.90	100.09	13
100.10	100.29	11
100.30	100.49	2
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

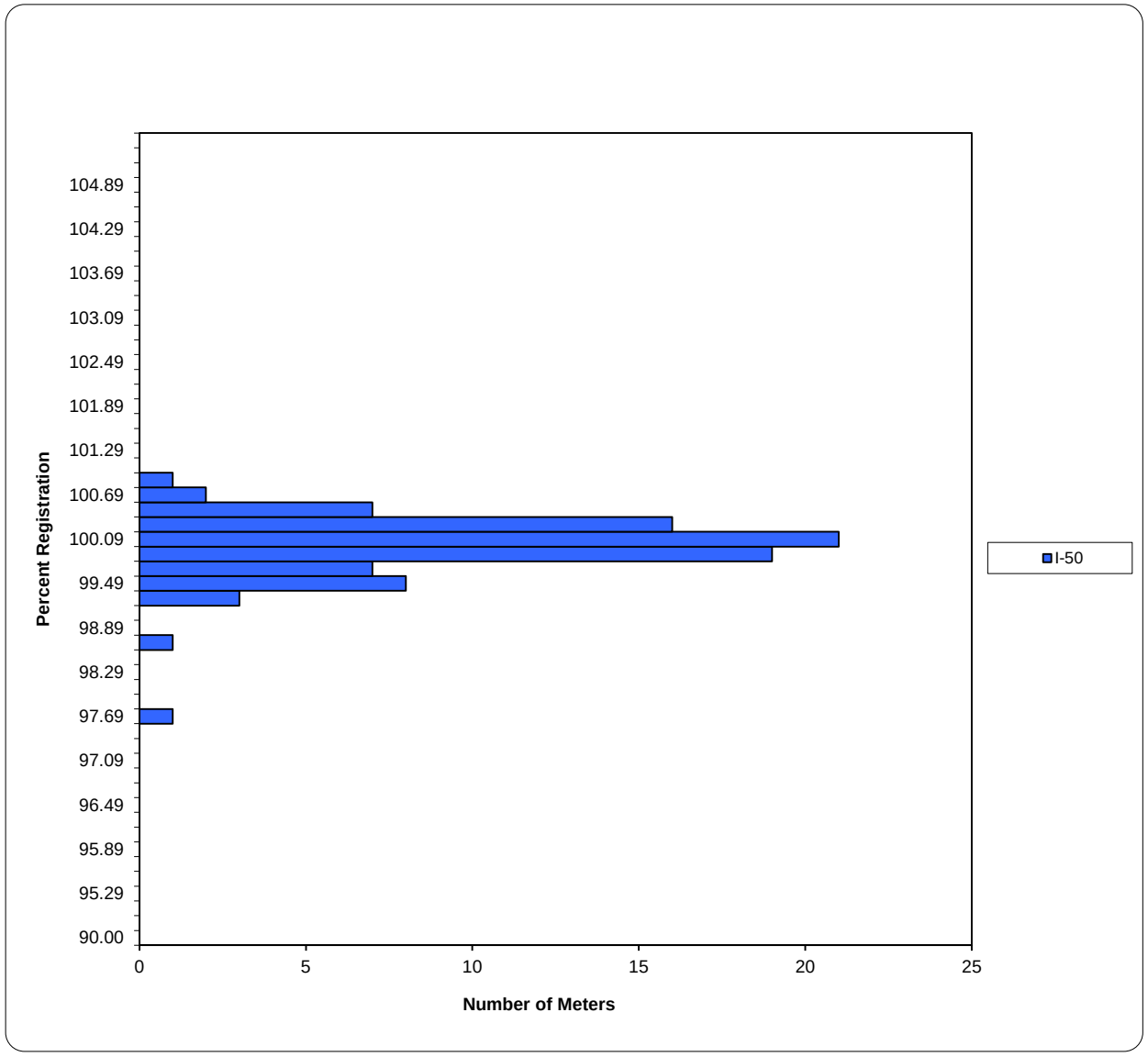
Meter Model Group: I-210 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	0
99.70	99.89	3
99.90	100.09	65
100.10	100.29	15
100.30	100.49	0
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	1
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

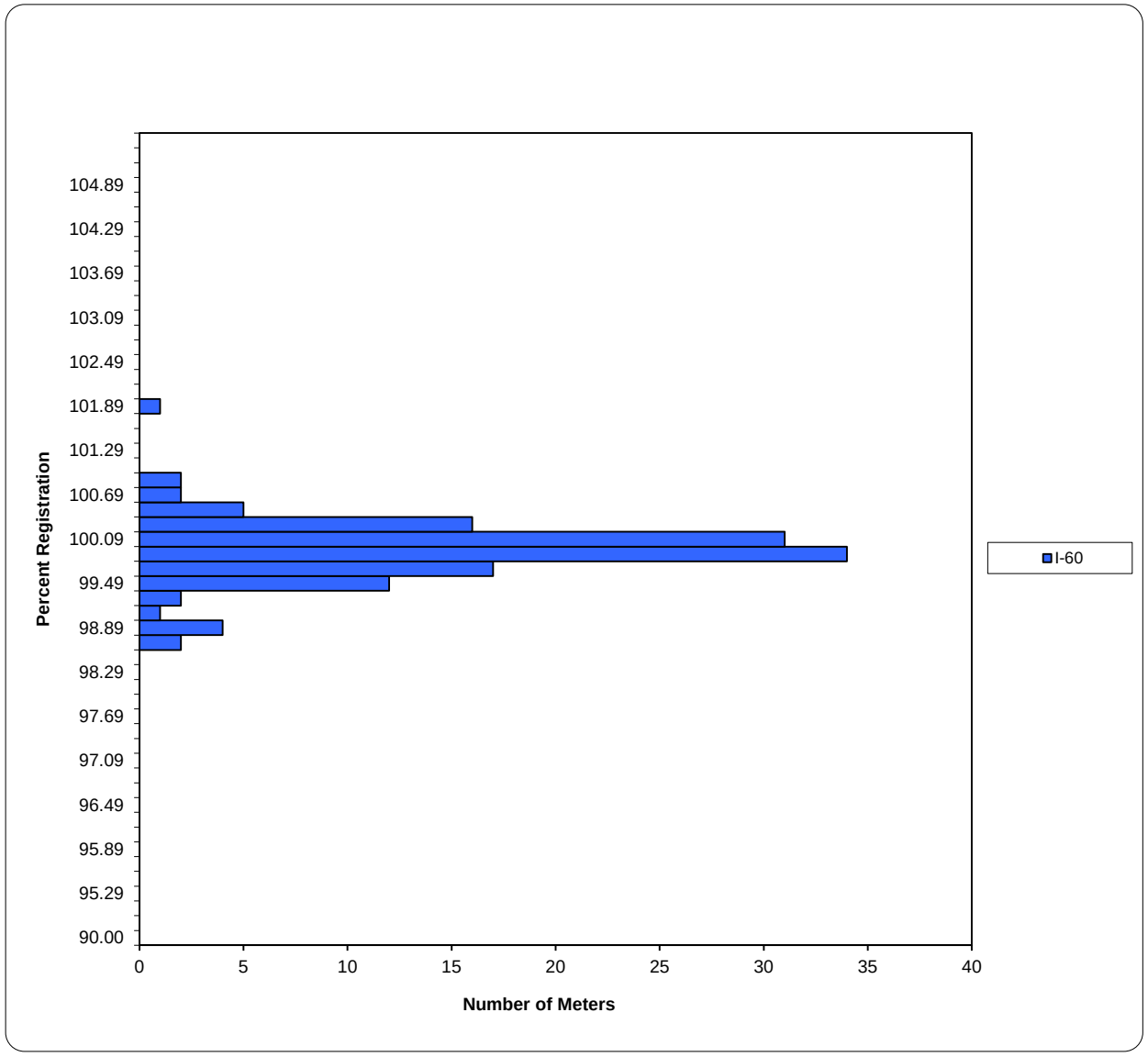
Meter Model Group: I-50 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	1
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	1
98.70	98.89	0
98.90	99.09	0
99.10	99.29	3
99.30	99.49	8
99.50	99.69	7
99.70	99.89	19
99.90	100.09	21
100.10	100.29	16
100.30	100.49	7
100.50	100.69	2
100.70	100.89	1
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

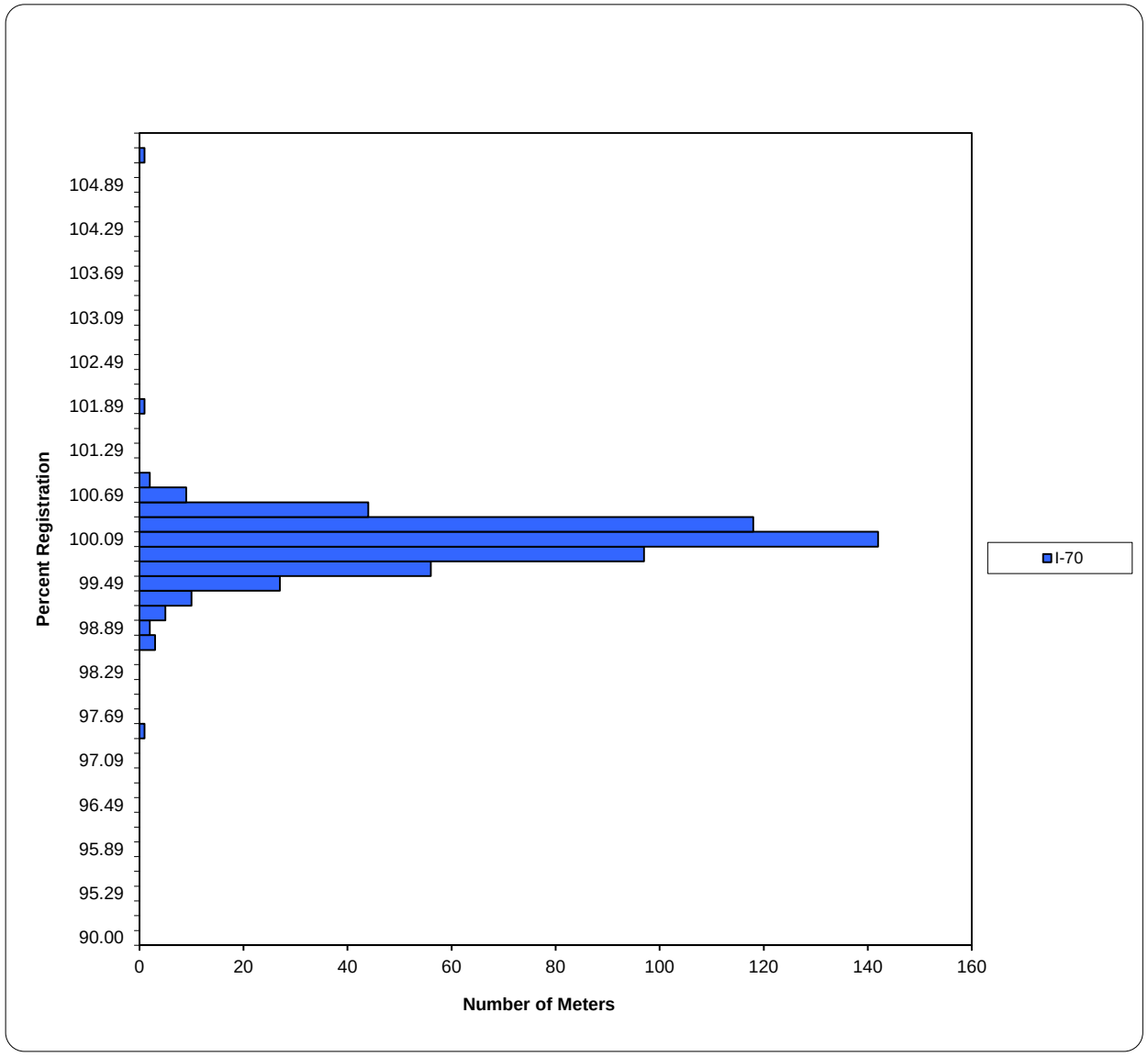
Meter Model Group: I-60 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	2
98.70	98.89	4
98.90	99.09	1
99.10	99.29	2
99.30	99.49	12
99.50	99.69	17
99.70	99.89	34
99.90	100.09	31
100.10	100.29	16
100.30	100.49	5
100.50	100.69	2
100.70	100.89	2
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	1
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

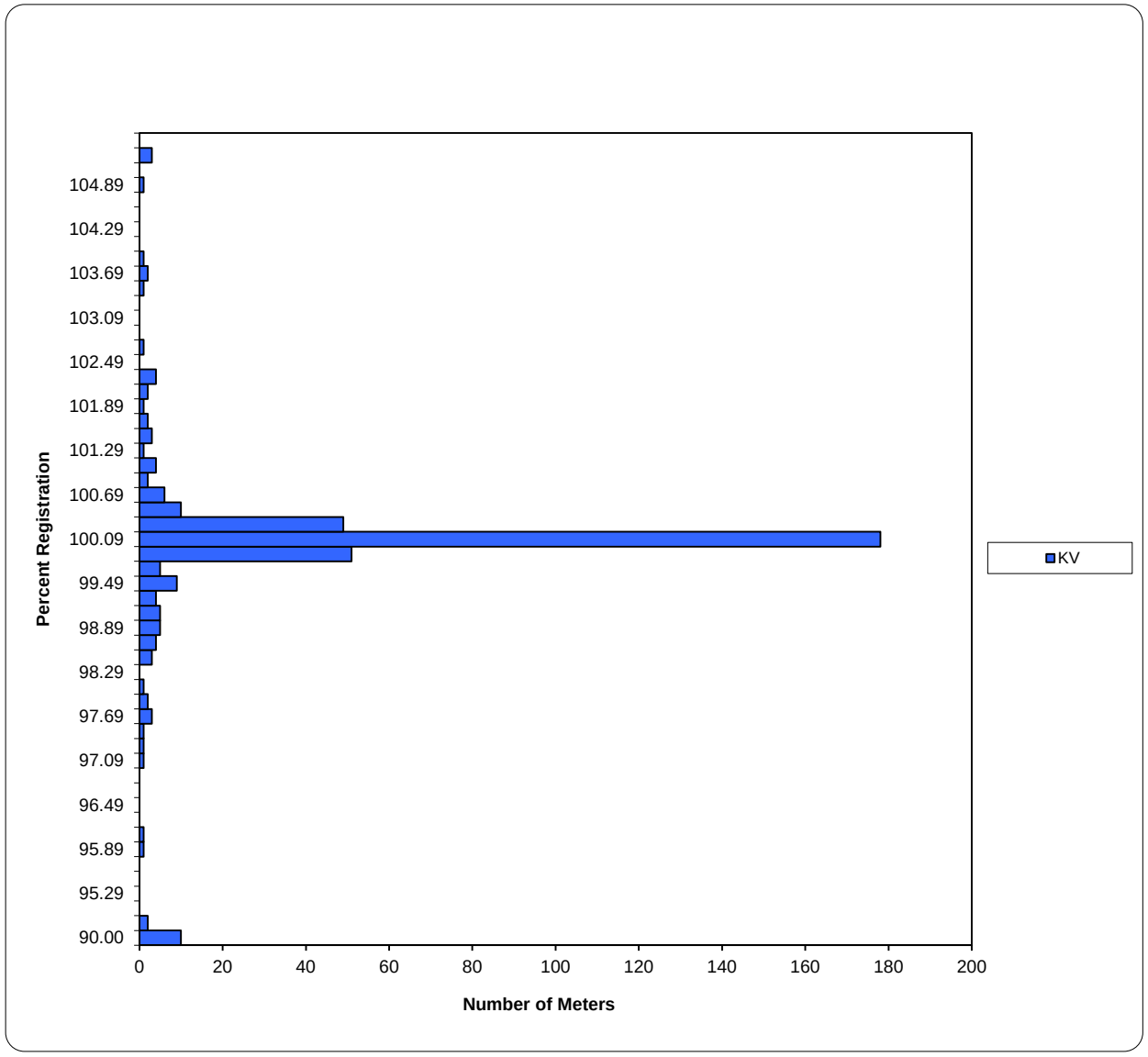
Meter Model Group: I-70 Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	1
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	3
98.70	98.89	2
98.90	99.09	5
99.10	99.29	10
99.30	99.49	27
99.50	99.69	56
99.70	99.89	97
99.90	100.09	142
100.10	100.29	118
100.30	100.49	44
100.50	100.69	9
100.70	100.89	2
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	1
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	1
110.00	∞	0

Appendix C
PacifiCorp 2013

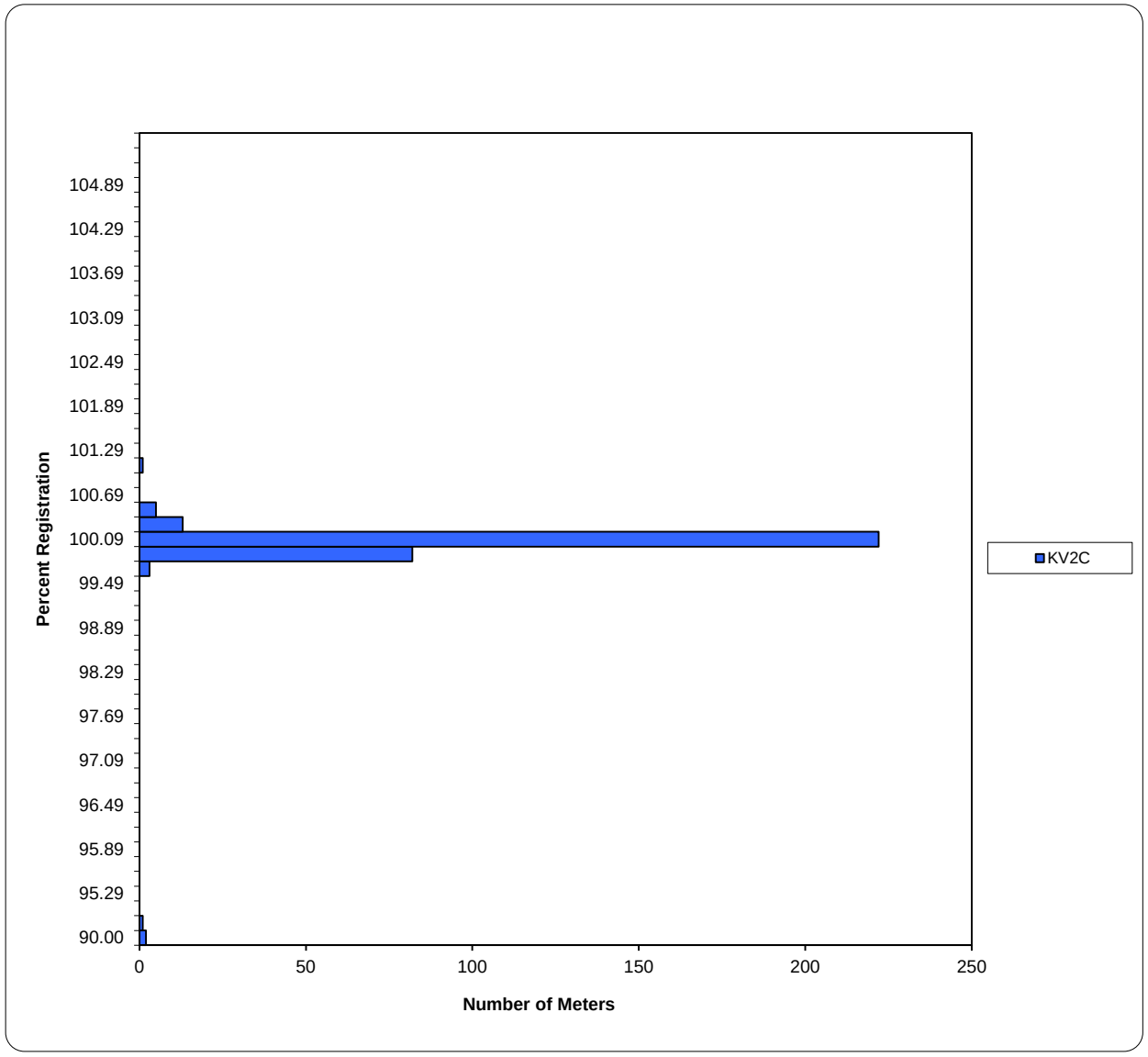
Meter Model Group: KV Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	10
90.01	94.99	2
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	1
95.90	96.09	1
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	1
97.10	97.29	1
97.30	97.49	1
97.50	97.69	3
97.70	97.89	2
97.90	98.09	1
98.10	98.29	0
98.30	98.49	3
98.50	98.69	4
98.70	98.89	5
98.90	99.09	5
99.10	99.29	4
99.30	99.49	9
99.50	99.69	5
99.70	99.89	51
99.90	100.09	178
100.10	100.29	49
100.30	100.49	10
100.50	100.69	6
100.70	100.89	2
100.90	101.09	4
101.10	101.29	1
101.30	101.49	3
101.50	101.69	2
101.70	101.89	1
101.90	102.09	2
102.10	102.29	4
102.30	102.49	0
102.50	102.69	1
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	1
103.50	103.69	2
103.70	103.89	1
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	1
104.90	105.00	0
105.01	109.99	3
110.00	∞	0

Appendix C
PacifiCorp 2013

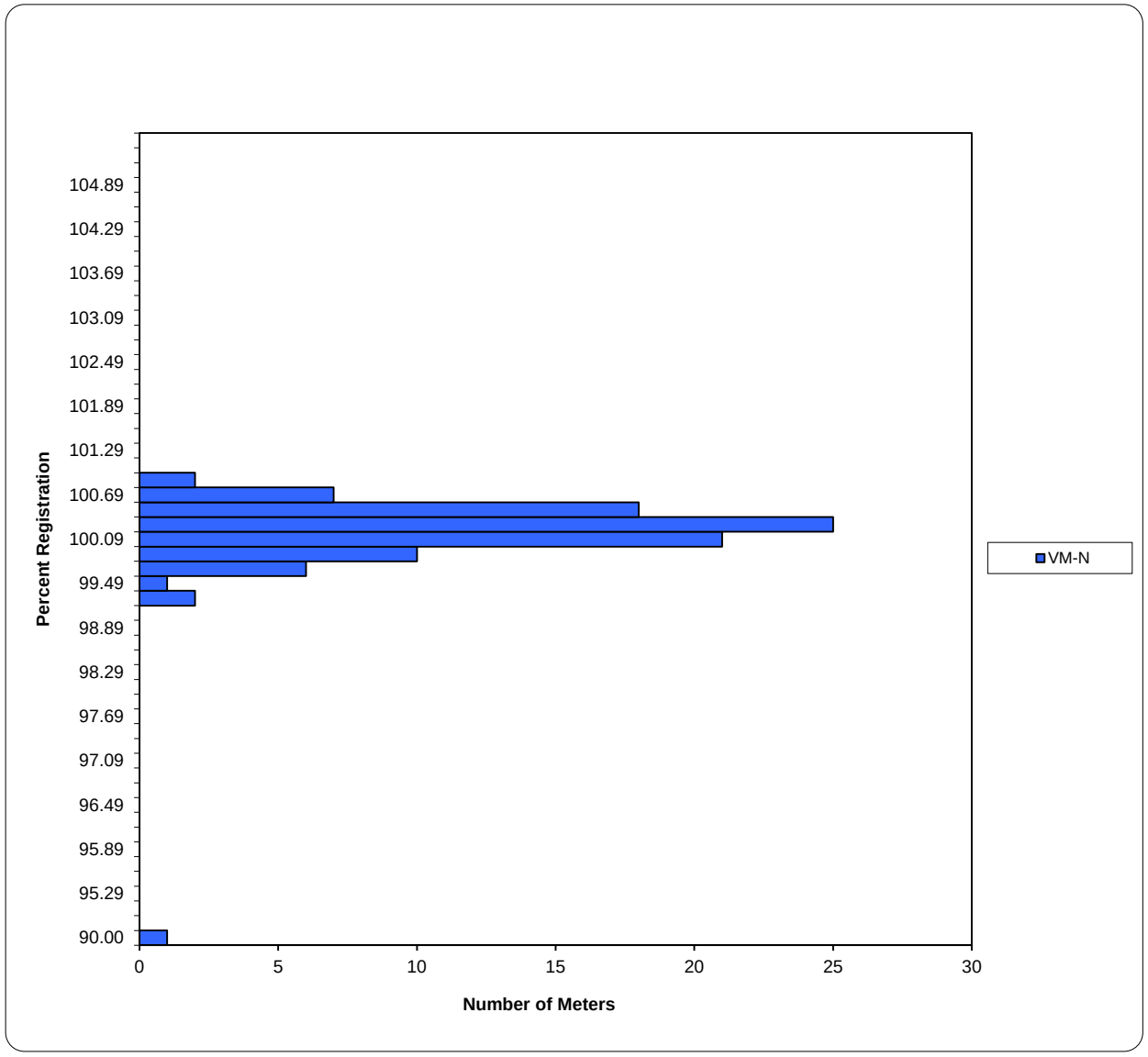
Meter Model Group: KV2C Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	2
90.01	94.99	1
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	3
99.70	99.89	82
99.90	100.09	222
100.10	100.29	13
100.30	100.49	5
100.50	100.69	0
100.70	100.89	0
100.90	101.09	1
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

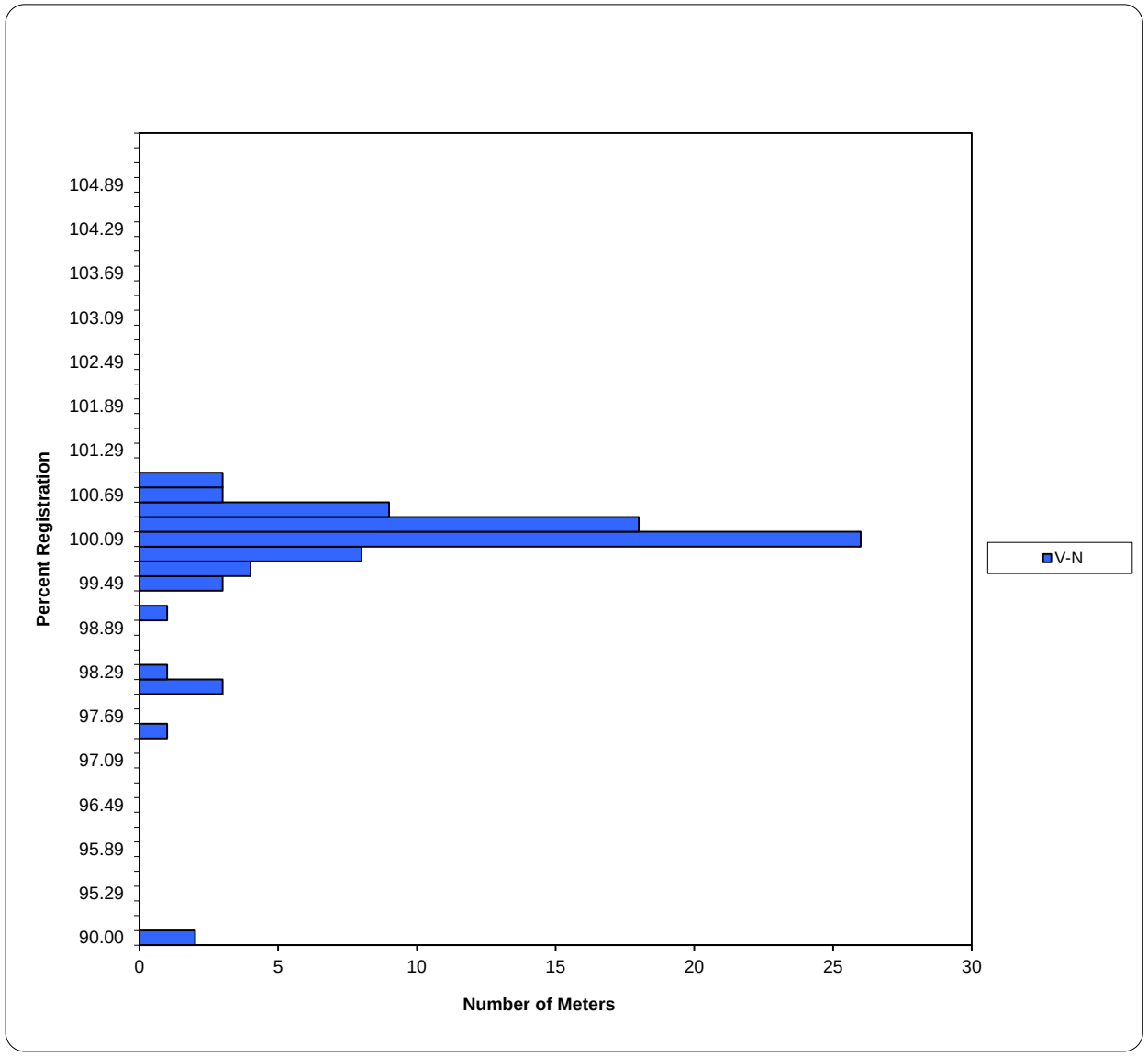
Appendix C
PacifiCorp 2013

Meter Model Group: VM-N Weighted Avg.



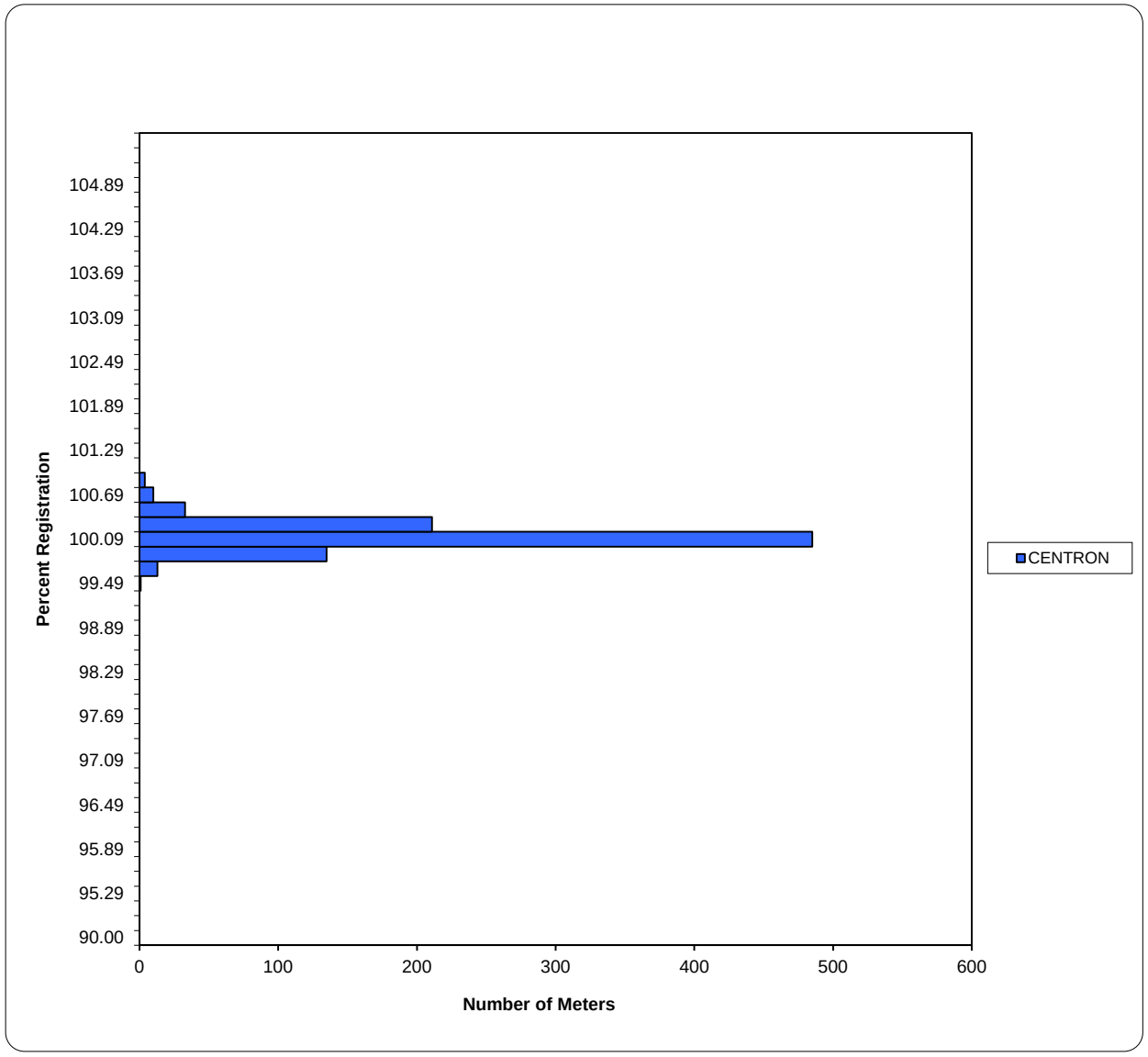
Percent Registration		# of Meters
Low	High	
0.00	90.00	1
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	2
99.30	99.49	1
99.50	99.69	6
99.70	99.89	10
99.90	100.09	21
100.10	100.29	25
100.30	100.49	18
100.50	100.69	7
100.70	100.89	2
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Meter Model Group: V-N Weighted Avg.



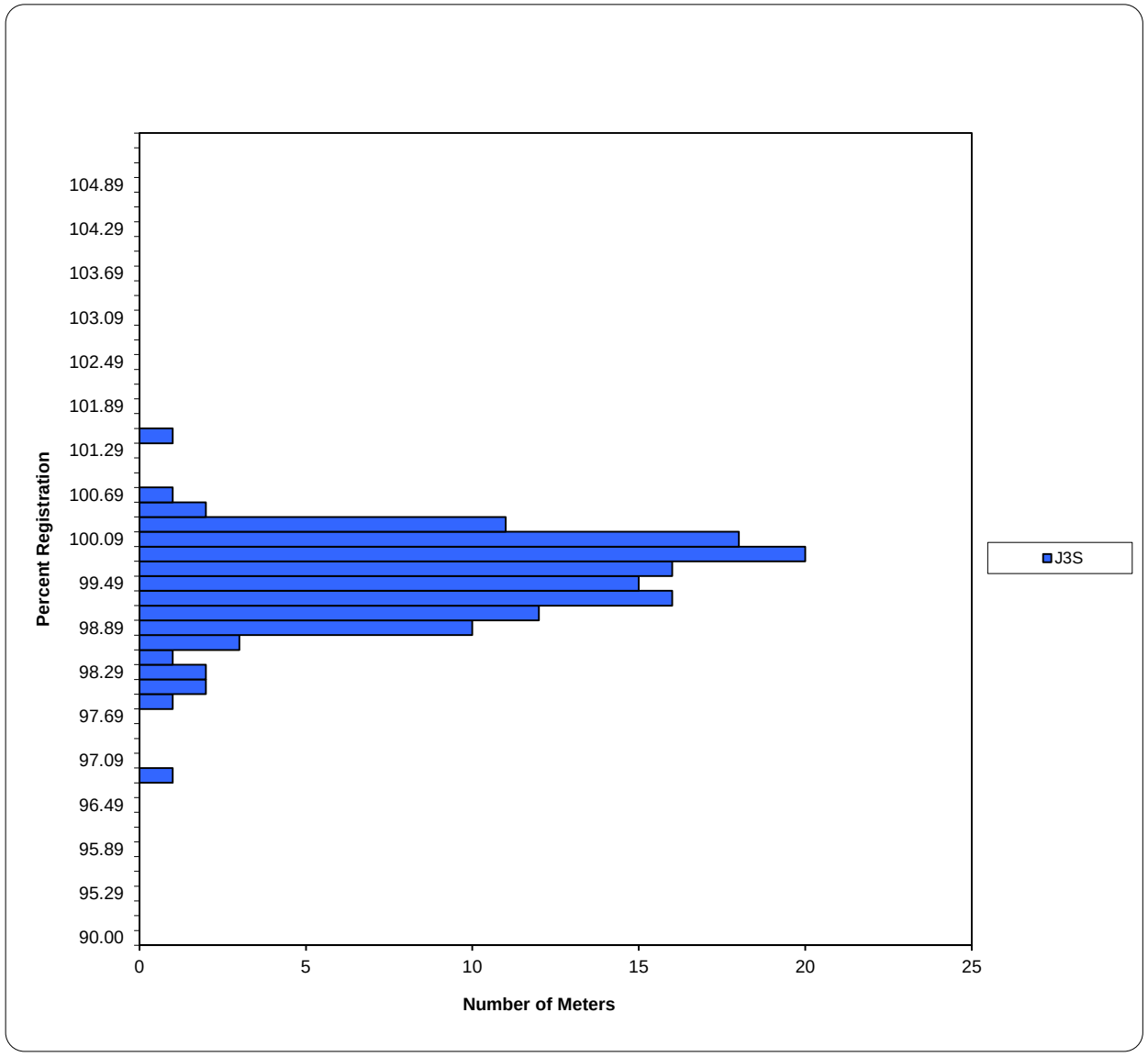
Percent Registration		# of Meters
Low	High	
0.00	90.00	2
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	1
97.50	97.69	0
97.70	97.89	0
97.90	98.09	3
98.10	98.29	1
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	1
99.10	99.29	0
99.30	99.49	3
99.50	99.69	4
99.70	99.89	8
99.90	100.09	26
100.10	100.29	18
100.30	100.49	9
100.50	100.69	3
100.70	100.89	3
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Meter Model Group: CENTRON Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	1
99.50	99.69	13
99.70	99.89	135
99.90	100.09	485
100.10	100.29	211
100.30	100.49	33
100.50	100.69	10
100.70	100.89	4
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

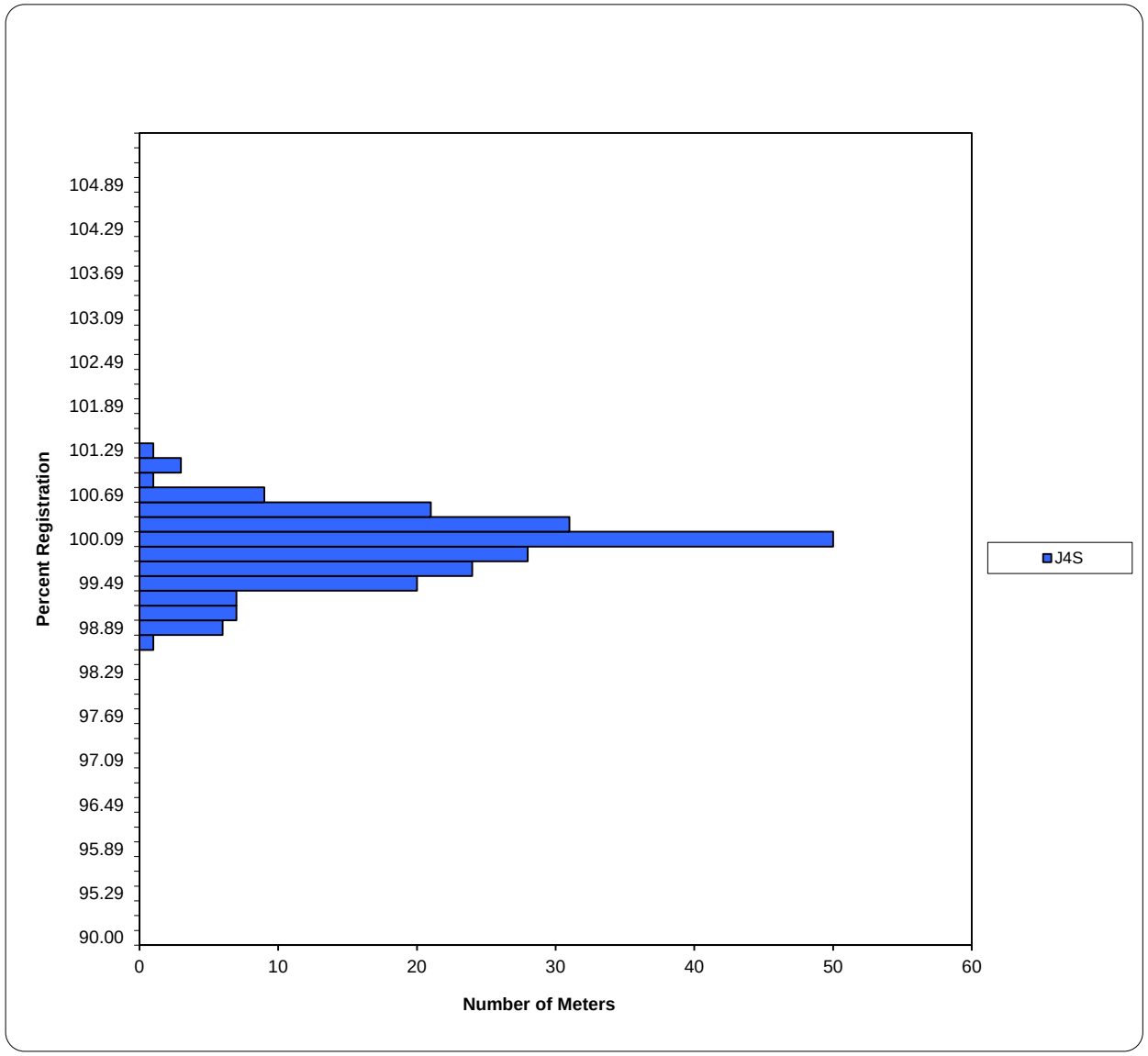
Meter Model Group: J3S Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	1
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	1
97.90	98.09	2
98.10	98.29	2
98.30	98.49	1
98.50	98.69	3
98.70	98.89	10
98.90	99.09	12
99.10	99.29	16
99.30	99.49	15
99.50	99.69	16
99.70	99.89	20
99.90	100.09	18
100.10	100.29	11
100.30	100.49	2
100.50	100.69	1
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	1
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

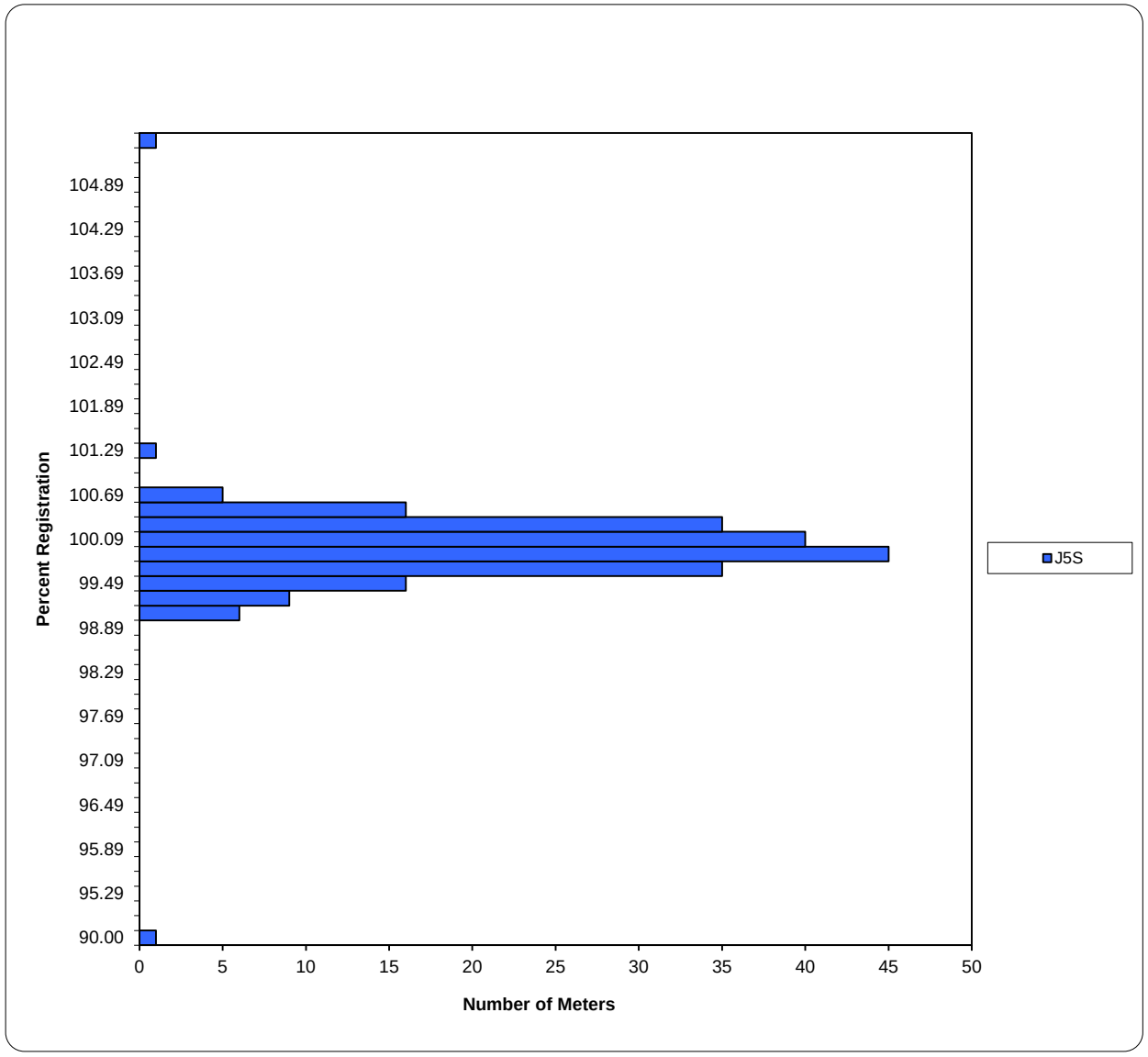
Meter Model Group: J4S Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	1
98.70	98.89	6
98.90	99.09	7
99.10	99.29	7
99.30	99.49	20
99.50	99.69	24
99.70	99.89	28
99.90	100.09	50
100.10	100.29	31
100.30	100.49	21
100.50	100.69	9
100.70	100.89	1
100.90	101.09	3
101.10	101.29	1
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

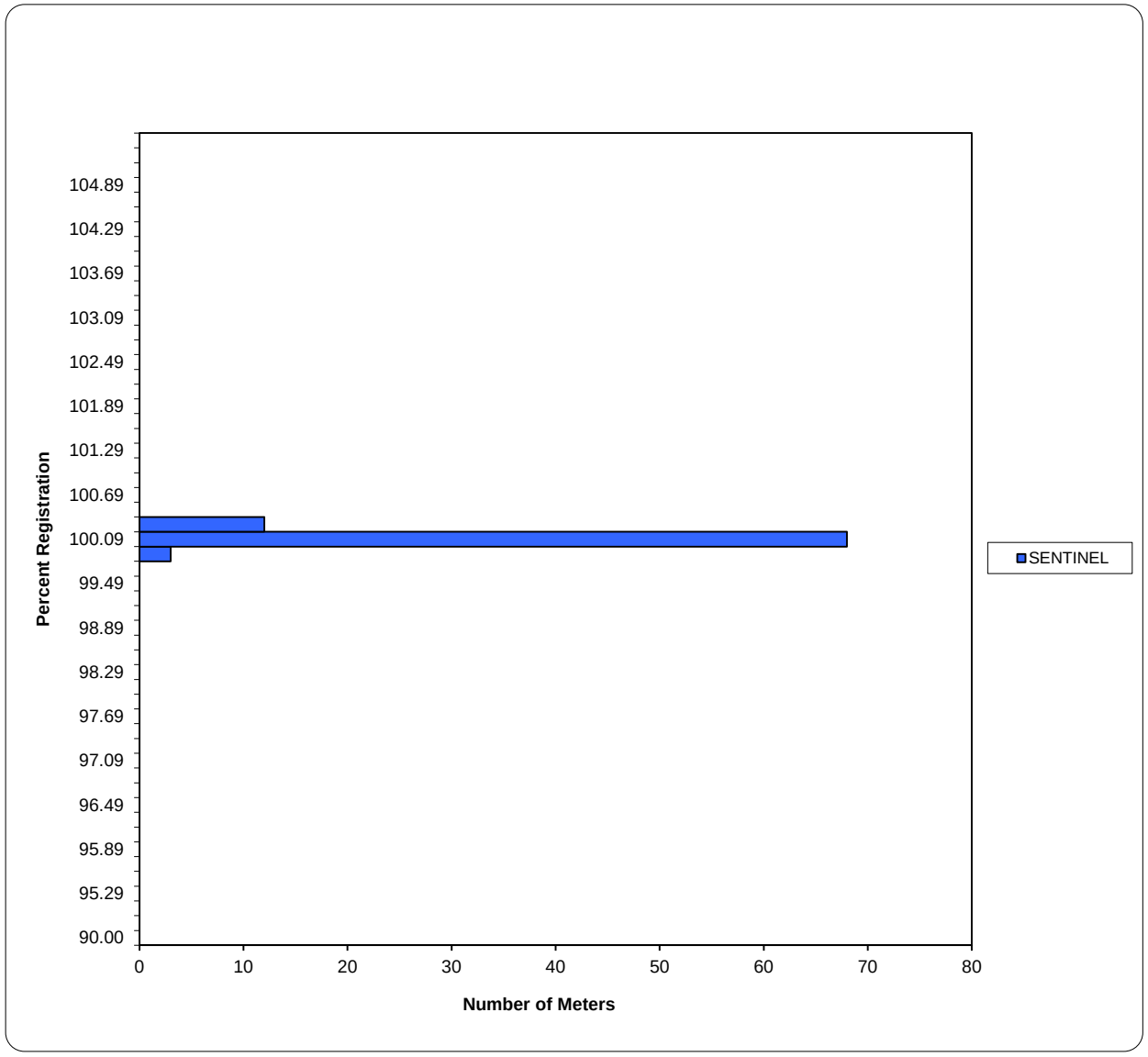
Appendix C
PacifiCorp 2013

Meter Model Group: J5S Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	1
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	6
99.10	99.29	9
99.30	99.49	16
99.50	99.69	35
99.70	99.89	45
99.90	100.09	40
100.10	100.29	35
100.30	100.49	16
100.50	100.69	5
100.70	100.89	0
100.90	101.09	0
101.10	101.29	1
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	1

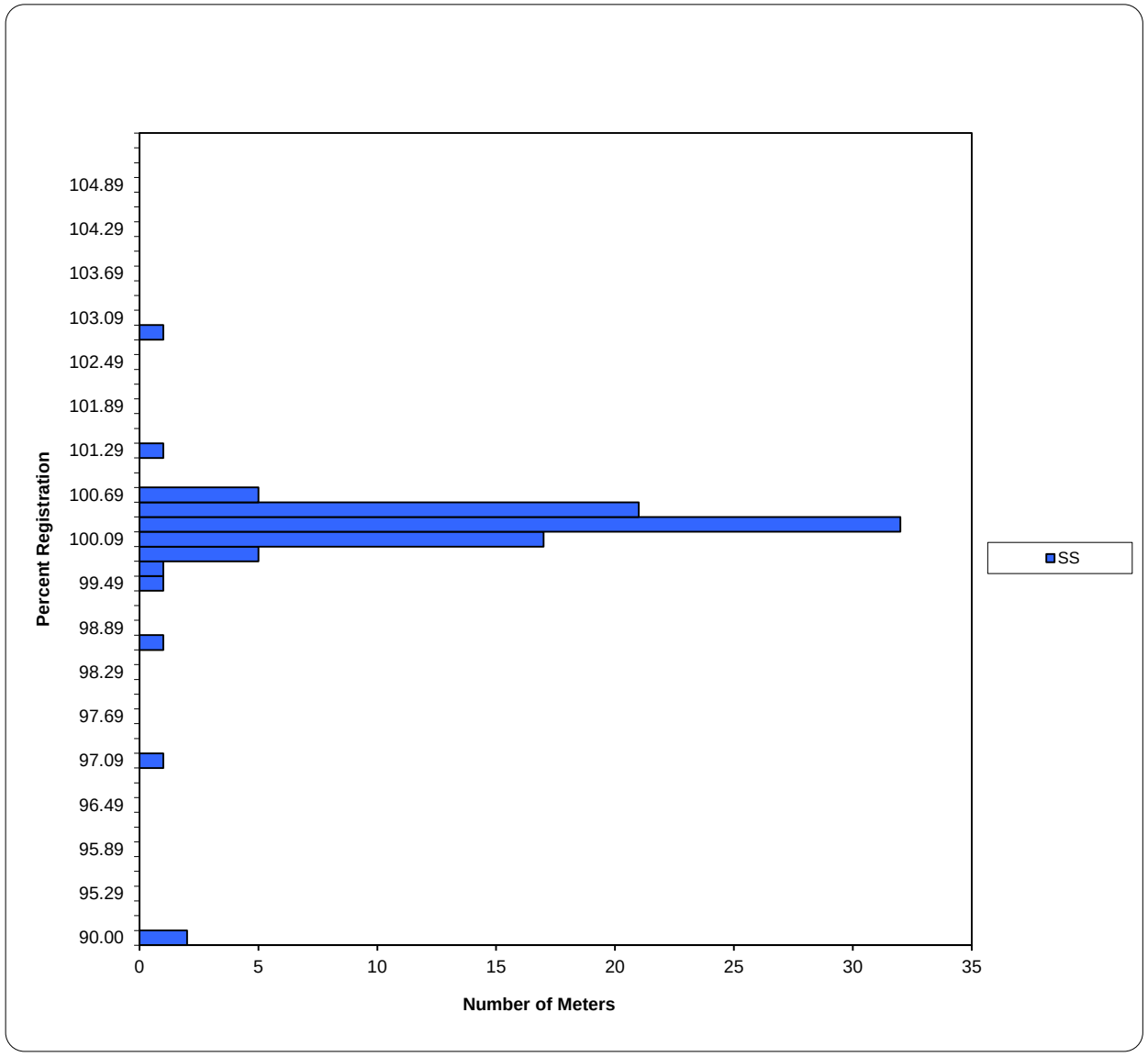
Meter Model Group: SENTINEL Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	0
99.70	99.89	3
99.90	100.09	68
100.10	100.29	12
100.30	100.49	0
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

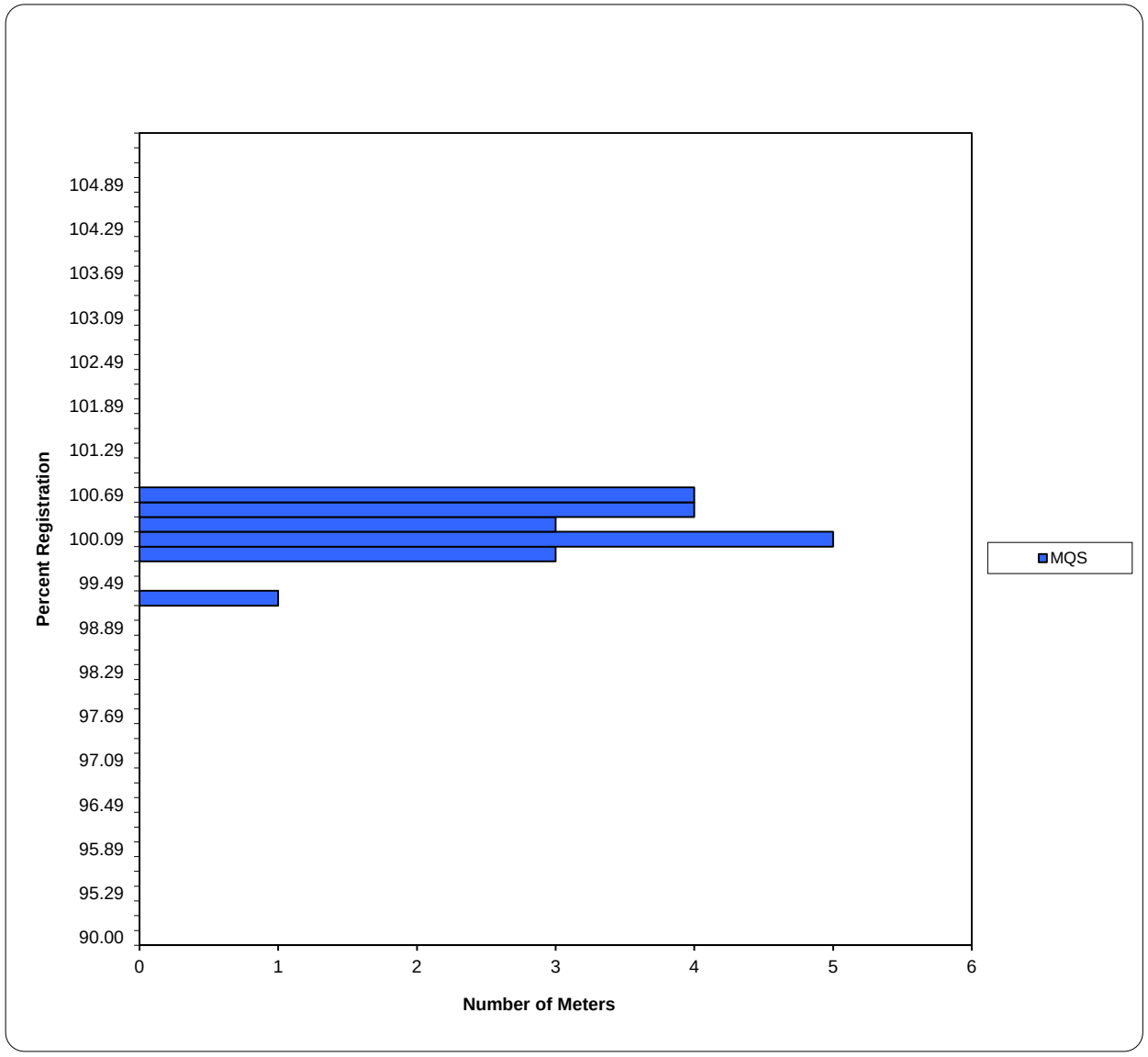
Meter Model Group: SS Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	2
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	1
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	1
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	1
99.50	99.69	1
99.70	99.89	5
99.90	100.09	17
100.10	100.29	32
100.30	100.49	21
100.50	100.69	5
100.70	100.89	0
100.90	101.09	0
101.10	101.29	1
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	1
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

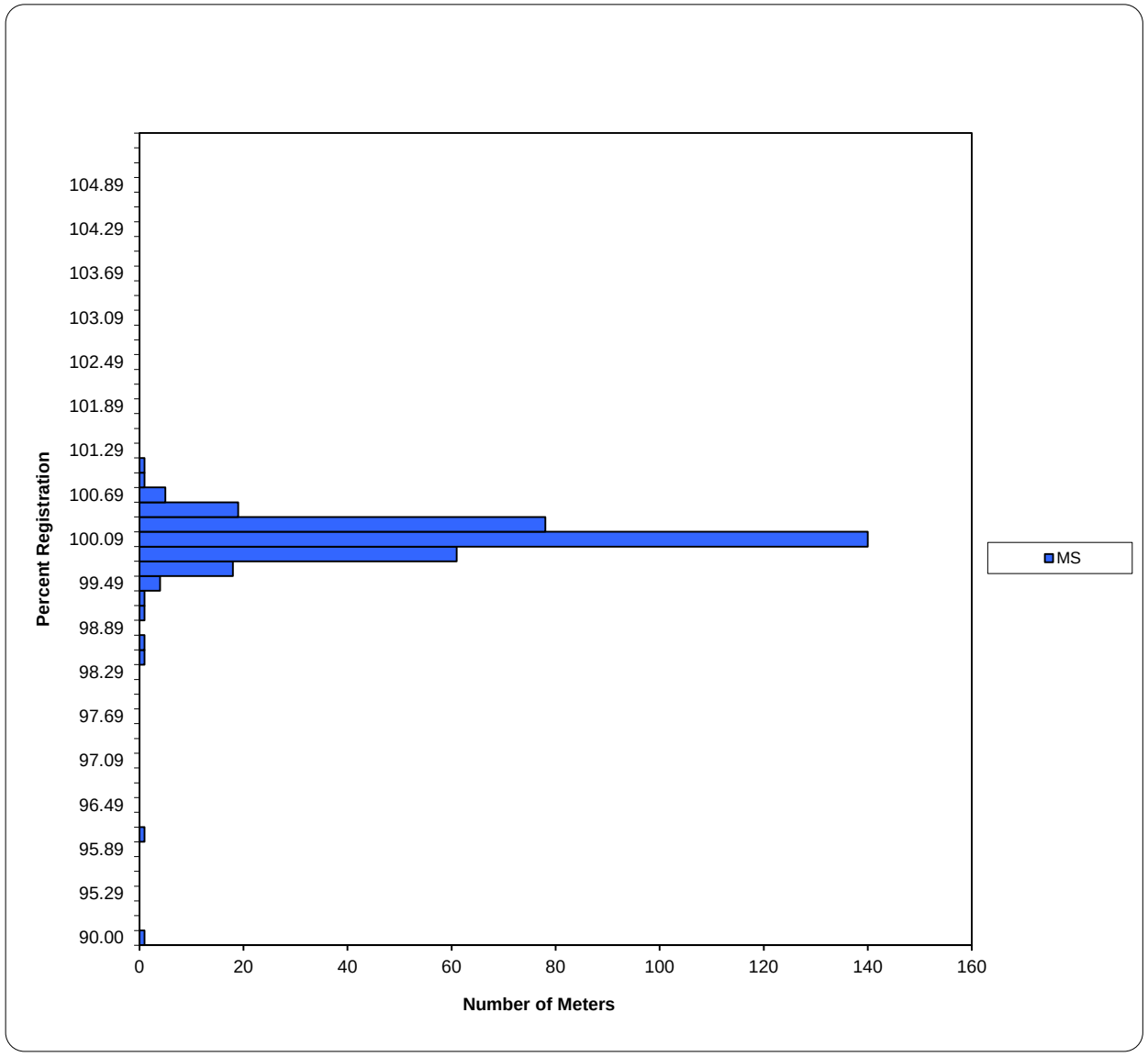
Meter Model Group: MQS Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	0
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	1
99.30	99.49	0
99.50	99.69	0
99.70	99.89	3
99.90	100.09	5
100.10	100.29	3
100.30	100.49	4
100.50	100.69	4
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

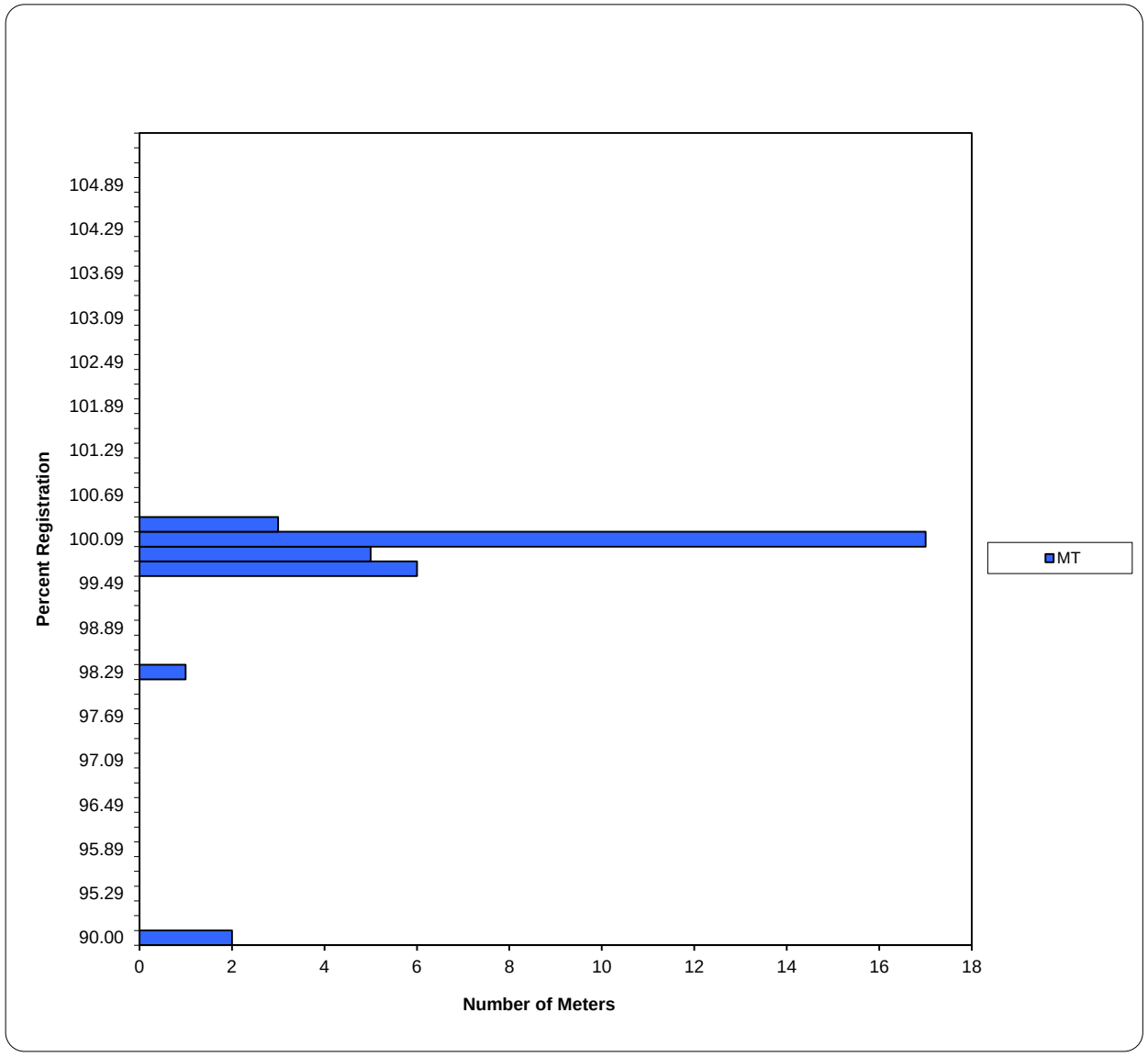
Appendix C
PacifiCorp 2013

Meter Model Group: MS Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	1
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	1
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	1
98.50	98.69	1
98.70	98.89	0
98.90	99.09	1
99.10	99.29	1
99.30	99.49	4
99.50	99.69	18
99.70	99.89	61
99.90	100.09	140
100.10	100.29	78
100.30	100.49	19
100.50	100.69	5
100.70	100.89	1
100.90	101.09	1
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

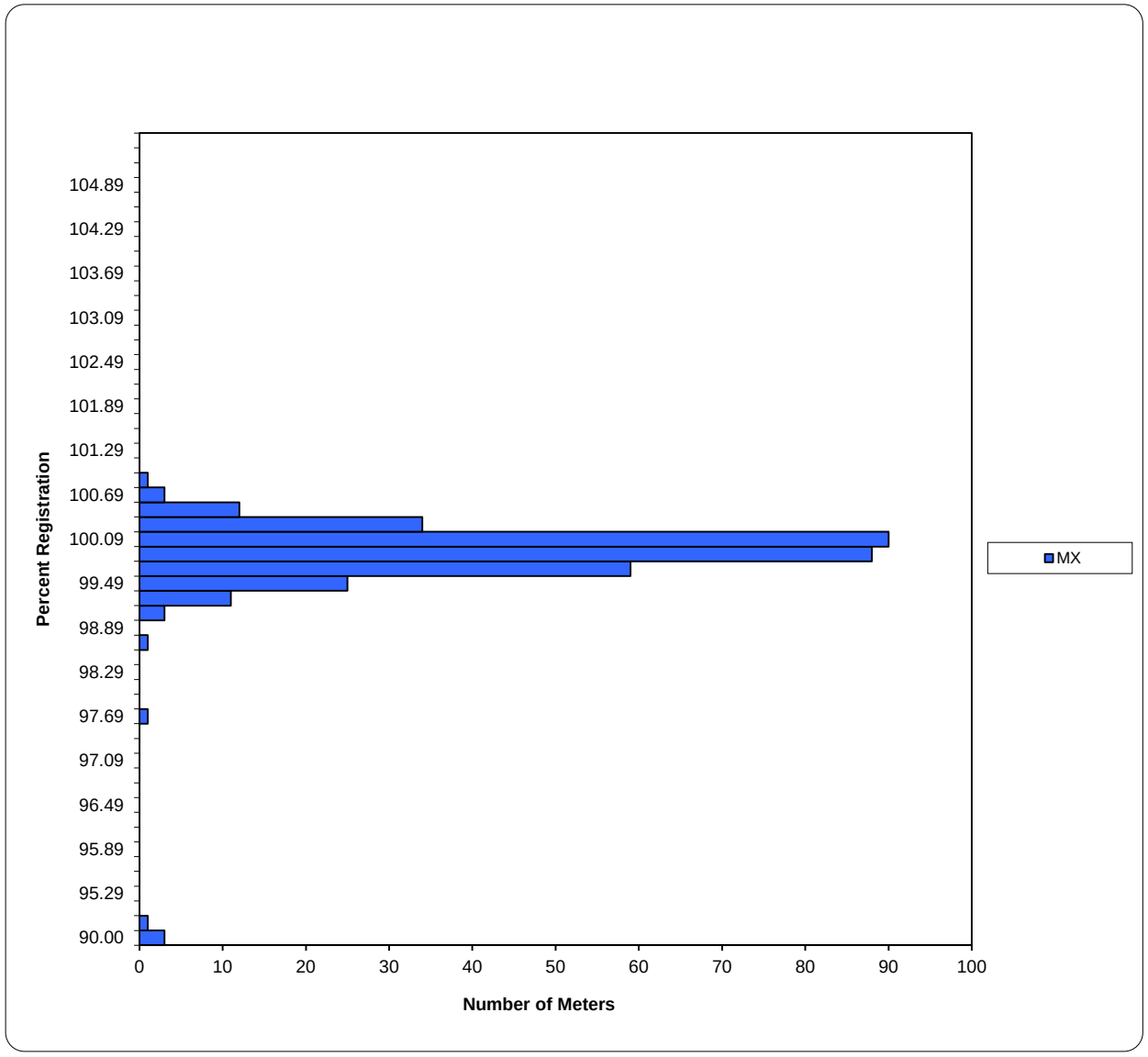
Meter Model Group: MT Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	2
90.01	94.99	0
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	0
97.70	97.89	0
97.90	98.09	0
98.10	98.29	1
98.30	98.49	0
98.50	98.69	0
98.70	98.89	0
98.90	99.09	0
99.10	99.29	0
99.30	99.49	0
99.50	99.69	6
99.70	99.89	5
99.90	100.09	17
100.10	100.29	3
100.30	100.49	0
100.50	100.69	0
100.70	100.89	0
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix C
PacifiCorp 2013

Meter Model Group: MX Weighted Avg.



Percent Registration		# of Meters
Low	High	
0.00	90.00	3
90.01	94.99	1
95.00	95.09	0
95.10	95.29	0
95.30	95.49	0
95.50	95.69	0
95.70	95.89	0
95.90	96.09	0
96.10	96.29	0
96.30	96.49	0
96.50	96.69	0
96.70	96.89	0
96.90	97.09	0
97.10	97.29	0
97.30	97.49	0
97.50	97.69	1
97.70	97.89	0
97.90	98.09	0
98.10	98.29	0
98.30	98.49	0
98.50	98.69	1
98.70	98.89	0
98.90	99.09	3
99.10	99.29	11
99.30	99.49	25
99.50	99.69	59
99.70	99.89	88
99.90	100.09	90
100.10	100.29	34
100.30	100.49	12
100.50	100.69	3
100.70	100.89	1
100.90	101.09	0
101.10	101.29	0
101.30	101.49	0
101.50	101.69	0
101.70	101.89	0
101.90	102.09	0
102.10	102.29	0
102.30	102.49	0
102.50	102.69	0
102.70	102.89	0
102.90	103.09	0
103.10	103.29	0
103.30	103.49	0
103.50	103.69	0
103.70	103.89	0
103.90	104.09	0
104.10	104.29	0
104.30	104.49	0
104.50	104.69	0
104.70	104.89	0
104.90	105.00	0
105.01	109.99	0
110.00	∞	0

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	483	DA - Dial Alignment	1	0.21%
			DB - Display bad - Electronic	18	3.73%
			FT - Failed Test	2	0.41%
			OA - Out Of Accuracy	10	2.07%
			ER - Error Code Problem	1	0.21%
	ALPHA+	145	DB - Display bad - Electronic	2	1.38%
			FM - Foreign Matter	1	0.69%
	ALPHA-1	222	DB - Display bad - Electronic	2	0.90%
			FM - Foreign Matter	12	5.41%
			OA - Out Of Accuracy	2	0.90%
			ER - Error Code Problem	2	0.90%
	D4	211	FT - Failed Test	1	0.47%
			OA - Out Of Accuracy	23	10.90%
	D5	210	FT - Failed Test	9	4.29%
			OA - Out Of Accuracy	58	27.62%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	EV	33	OA - Out Of Accuracy	1	3.03%
	I-210	84	OA - Out Of Accuracy	1	1.19%
	I-50	86	DA - Dial Alignment	1	1.16%
			OA - Out Of Accuracy	22	25.58%
	I-60	129	BU - Burned	1	0.78%
			OA - Out Of Accuracy	36	27.91%
	I-70	530	CO - Corrosion	1	0.19%
			DA - Dial Alignment	6	1.13%
			FT - Failed Test	11	2.08%
			MD - Manufacturer Defect	1	0.19%
			OA - Out Of Accuracy	89	16.79%
	KV	380	BU - Burned	1	0.26%
			DB - Display bad - Electronic	1	0.26%
			FM - Foreign Matter	4	1.05%
			FT - Failed Test	18	4.74%
			MD - Manufacturer Defect	1	0.26%
			OA - Out Of Accuracy	78	20.53%
			OP - Open Pot Coil	1	0.26%
			ER - Error Code Problem	2	0.53%
	KV2C	273	DB - Display bad - Electronic	1	0.37%
			FT - Failed Test	1	0.37%
			OA - Out Of Accuracy	4	1.47%
			ER - Error Code Problem	2	0.73%
	VM-N	93	FT - Failed Test	1	1.08%
			OA - Out Of Accuracy	9	9.68%
	V-N	82	OA - Out Of Accuracy	17	20.73%
			OP - Open Pot Coil	1	1.22%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	2004	DB - Display bad - Electronic	10	0.50%
			FM - Foreign Matter	1	0.05%
			FT - Failed Test	1	0.05%
			KY - KYZ Bad	8	0.40%
			OA - Out Of Accuracy	6	0.30%
	J3S	132	OA - Out Of Accuracy	28	21.21%
			OP - Open Pot Coil	1	0.76%
	J4S	209	FT - Failed Test	3	1.44%
			OA - Out Of Accuracy	40	19.14%
	J5S	209	DA - Dial Alignment	1	0.48%
			FT - Failed Test	2	0.96%
			MD - Manufacturer Defect	1	0.48%
			OA - Out Of Accuracy	46	22.01%
	SS	75	DB - Display bad - Electronic	1	1.33%
			OA - Out Of Accuracy	4	5.33%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Landis + Gyr	MS	333	CO - Corrosion	1	0.30%
			DA - Dial Alignment	7	2.10%
			FM - Foreign Matter	2	0.60%
			FT - Failed Test	3	0.90%
			MD - Manufacturer Defect	7	2.10%
			OA - Out Of Accuracy	28	8.41%
			NM - Noisy Meter	2	0.60%
	MT	23	OA - Out Of Accuracy	8	34.78%
	MX	328	DA - Dial Alignment	7	2.13%
			FT - Failed Test	1	0.30%
			MD - Manufacturer Defect	10	3.05%
			OA - Out Of Accuracy	34	10.37%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

California

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	31	DA - Dial Alignment	1	3.23%
			DB - Display bad - Electronic	11	35.48%
			OA - Out Of Accuracy	1	3.23%
	ALPHA+	12	DB - Display bad - Electronic	1	8.33%
	ALPHA-1	5	DB - Display bad - Electronic	1	20.00%
	D5	22	FT - Failed Test	2	9.09%
			OA - Out Of Accuracy	7	31.82%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

California

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	I-50	1	OA - Out Of Accuracy	1	100.00%
	I-70	34	DA - Dial Alignment	4	11.76%
			FT - Failed Test	2	5.88%
			MD - Manufacturer Defect	1	2.94%
			OA - Out Of Accuracy	5	14.71%
	KV	19	FM - Foreign Matter	1	5.26%
			FT - Failed Test	1	5.26%
			MD - Manufacturer Defect	1	5.26%
			OA - Out Of Accuracy	1	5.26%
			ER - Error Code Problem	1	5.26%
	VM-N	1	OA - Out Of Accuracy	1	100.00%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

California

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	J4S	13	FT - Failed Test	3	23.08%
	J5S	24	DA - Dial Alignment	1	4.17%
			FT - Failed Test	2	8.33%
			MD - Manufacturer Defect	1	4.17%
			OA - Out Of Accuracy	2	8.33%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

California

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Landis + Gyr	MS	32	DA - Dial Alignment	6	18.75%
			FM - Foreign Matter	1	3.13%
			FT - Failed Test	1	3.13%
			MD - Manufacturer Defect	4	12.50%
			OA - Out Of Accuracy	3	9.38%
			NM - Noisy Meter	1	3.13%
	MT	2	OA - Out Of Accuracy	1	50.00%
	MX	33	DA - Dial Alignment	3	9.09%
			FT - Failed Test	1	3.03%
			MD - Manufacturer Defect	7	21.21%
			OA - Out Of Accuracy	6	18.18%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	24	OA - Out Of Accuracy	2	8.33%
	ALPHA+	12	FM - Foreign Matter	1	8.33%
	ALPHA-1	170	DB - Display bad - Electronic	1	0.59%
			FM - Foreign Matter	12	7.06%
			OA - Out Of Accuracy	1	0.59%
			ER - Error Code Problem	2	1.18%
	D4	22	OA - Out Of Accuracy	4	18.18%
	D5	2	OA - Out Of Accuracy	1	50.00%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	I-50	12	OA - Out Of Accuracy	2	16.67%
	I-60	28	OA - Out Of Accuracy	9	32.14%
	I-70	34	FT - Failed Test	2	5.88%
			OA - Out Of Accuracy	7	20.59%
	KV	57	FM - Foreign Matter	3	5.26%
			OA - Out Of Accuracy	6	10.53%
			OP - Open Pot Coil	1	1.75%
	KV2C	41	ER - Error Code Problem	1	2.44%
	VM-N	6	OA - Out Of Accuracy	1	16.67%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	39	FM - Foreign Matter	1	2.56%
			OA - Out Of Accuracy	1	2.56%
	J4S	7	OA - Out Of Accuracy	2	28.57%
	SS	4	DB - Display bad - Electronic	1	25.00%
			OA - Out Of Accuracy	1	25.00%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Landis + Gyr	MS	14	CO - Corrosion	1	7.14%
			OA - Out Of Accuracy	2	14.29%
	MT	2	OA - Out Of Accuracy	1	50.00%
	MX	22	OA - Out Of Accuracy	4	18.18%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	341	DB - Display bad - Electronic	5	1.47%
			OA - Out Of Accuracy	2	0.59%
			ER - Error Code Problem	1	0.29%
	ALPHA+	70	DB - Display bad - Electronic	1	1.43%
	ALPHA-1	47	OA - Out Of Accuracy	1	2.13%
	D4	187	FT - Failed Test	1	0.53%
			OA - Out Of Accuracy	19	10.16%
	D5	185	FT - Failed Test	7	3.78%
			OA - Out Of Accuracy	50	27.03%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	I-210	58	OA - Out Of Accuracy	1	1.72%
	I-50	73	DA - Dial Alignment	1	1.37%
			OA - Out Of Accuracy	19	26.03%
	I-60	100	OA - Out Of Accuracy	27	27.00%
	I-70	461	CO - Corrosion	1	0.22%
			DA - Dial Alignment	2	0.43%
			FT - Failed Test	7	1.52%
			OA - Out Of Accuracy	76	16.49%
	KV	181	DB - Display bad - Electronic	1	0.55%
			FT - Failed Test	10	5.52%
			OA - Out Of Accuracy	6	3.31%
			ER - Error Code Problem	1	0.55%
	KV2C	166	OA - Out Of Accuracy	4	2.41%
	VM-N	72	OA - Out Of Accuracy	6	8.33%
	V-N	76	OA - Out Of Accuracy	17	22.37%
			OP - Open Pot Coil	1	1.32%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	180	DB - Display bad - Electronic	1	0.56%
	J3S	132	OA - Out Of Accuracy	28	21.21%
			OP - Open Pot Coil	1	0.76%
	J4S	189	OA - Out Of Accuracy	38	20.11%
	J5S	181	OA - Out Of Accuracy	42	23.20%
	SS	64	OA - Out Of Accuracy	3	4.69%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Landis + Gyr	MS	286	DA - Dial Alignment	1	0.35%
			FM - Foreign Matter	1	0.35%
			FT - Failed Test	2	0.70%
			MD - Manufacturer Defect	3	1.05%
			OA - Out Of Accuracy	23	8.04%
			NM - Noisy Meter	1	0.35%
	MT	19	OA - Out Of Accuracy	6	31.58%
	MX	271	DA - Dial Alignment	4	1.48%
			MD - Manufacturer Defect	3	1.11%
			OA - Out Of Accuracy	24	8.86%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Utah

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	27	DB - Display bad - Electronic	2	7.41%
			FT - Failed Test	2	7.41%
			OA - Out Of Accuracy	1	3.70%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Utah

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	I-60	1	BU - Burned	1	100.00%
	I-70	1	OA - Out Of Accuracy	1	100.00%
	KV2C	35	FT - Failed Test	1	2.86%
			ER - Error Code Problem	1	2.86%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Utah

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	1315	DB - Display bad - Electronic	8	0.61%
			FT - Failed Test	1	0.08%
			KY - KYZ Bad	8	0.61%
			OA - Out Of Accuracy	5	0.38%
	J5S	2	OA - Out Of Accuracy	2	100.00%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Washington

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	39	OA - Out Of Accuracy	2	5.13%
General Electric	KV2C	8	DB - Display bad - Electronic	1	12.50%
	VM-N	11	FT - Failed Test	1	9.09%
			OA - Out Of Accuracy	1	9.09%
Itron	CENTRON	229	DB - Display bad - Electronic	1	0.44%

Appendix D_1

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Sample Meter Tests

Wyoming

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	21	OA - Out Of Accuracy	2	9.52%
General Electric	KV	18	OA - Out Of Accuracy	4	22.22%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	1012	KY - KYZ Bad	1	0.10%
			ST - Stopped Meter	1	0.10%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	EV	27	OA - Out Of Accuracy	1	3.70%
	KV	846	DB - Display bad - Electronic	1	0.12%
			OA - Out Of Accuracy	8	0.95%
	KV2C	1859	KY - KYZ Bad	2	0.11%
			OA - Out Of Accuracy	4	0.22%
			ST - Stopped Meter	1	0.05%
			ER - Error Code Problem	1	0.05%
	VM-N	20	OA - Out Of Accuracy	5	25.00%
	V-N	7	OA - Out Of Accuracy	1	14.29%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Total Company

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	79	DB - Display bad - Electronic	2	2.53%
			OA - Out Of Accuracy	1	1.27%
	SS	13	OA - Out Of Accuracy	3	23.08%
			OP - Open Pot Coil	1	7.69%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

California

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	16	ST - Stopped Meter	1	6.25%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	KV	76	OA - Out Of Accuracy	1	1.32%
	KV2C	103	KY - KYZ Bad	1	0.97%
			ER - Error Code Problem	1	0.97%
	V-N	2	OA - Out Of Accuracy	1	50.00%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Idaho

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	SS	3	OA - Out Of Accuracy	3	100.00%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	KV	150	DB - Display bad - Electronic	1	0.67%
			OA - Out Of Accuracy	2	1.33%
	KV2C	681	OA - Out Of Accuracy	2	0.29%
	VM-N	12	OA - Out Of Accuracy	4	33.33%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Oregon

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Itron	CENTRON	8	DB - Display bad - Electronic	1	12.50%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Utah

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
Elster	ALPHA	535	KY - KYZ Bad	1	0.19%
General Electric	EV	22	OA - Out Of Accuracy	1	4.55%
	KV	397	OA - Out Of Accuracy	2	0.50%
	KV2C	636	KY - KYZ Bad	1	0.16%
			OA - Out Of Accuracy	1	0.16%
			ST - Stopped Meter	1	0.16%
Itron	CENTRON	51	DB - Display bad - Electronic	1	1.96%
			OA - Out Of Accuracy	1	1.96%
	SS	8	OP - Open Pot Coil	1	12.50%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Washington

Manufacturer	Model	Tests	As-Found Condition Codes	Qty	%
General Electric	KV	139	OA - Out Of Accuracy	3	2.16%
	KV2C	192	OA - Out Of Accuracy	1	0.52%
	VM-N	1	OA - Out Of Accuracy	1	100.00%

Appendix D_2

PacifiCorp
Calendar Year 2013
Uniquely Defective/As-Found Condition Codes
Periodic Meter Tests

Wyoming					
Manufacturer	Model	Tests	As-Found Condition Codes	**Qty**	**%**

Appendix E
PacifiCorp 2012
Scheduled Meter Test Counts

TOTAL COMPANY

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	903	903	100.0%
8yr	2091	2091	100.0%
16yr	1685	1685	100.0%
Sample	6498	6498	100.0%
Totals	11177	11177	100.0%

CALIFORNIA

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	8	8	100.0%
8yr	48	48	100.0%
16yr	33	33	100.0%
Sample	281	281	100.0%
Totals	370	370	100.0%

IDAHO

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	38	38	100.0%
8yr	141	141	100.0%
16yr	141	141	100.0%
Sample	585	585	100.0%
Totals	905	905	100.0%

OREGON

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	214	214	100.0%
8yr	695	695	100.0%
16yr	392	392	100.0%
Sample	3400	3400	100.0%
Totals	4701	4701	100.0%

UTAH

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	403	403	100.0%
8yr	793	793	100.0%
16yr	830	830	100.0%
Sample	1543	1543	100.0%
Totals	3569	3569	100.0%

Appendix E
PacifiCorp 2012
Scheduled Meter Test Counts

WASHINGTON

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	45	45	100.0%
8yr	236	236	100.0%
16yr	174	174	100.0%
Sample	352	352	100.0%
Totals	807	807	100.0%

WYOMING

Maintenance Class Code	Scheduled	Completed	% Completed
2yr	195	195	100.0%
8yr	178	178	100.0%
16yr	115	115	100.0%
Sample	337	337	100.0%
Totals	825	825	100.0%

Appendix F

2013 PacifiCorp

Meter Retirement Report

Category & Reason	Meter Model	Serial # Range		Inservice 12/31/2012		Retired		Inservice 12/31/2013
Failed Sample Test Program - failed 2 consecutive years								
Failed Sample	Westinghouse CS, 1-ph	All		1	-	1	=	0
Failed Sample	Westinghouse D5	All		18,427	-	643	=	17,784
Failed Sample	General Electric EV	All		488	-	86	=	402
			Total	18,916		730		18,186
Special Problem - Open potential coil, guide pin, gears, or other manufacture defect								
Manuf Defect	Westinghouse D4, 1-ph	68,800,000-71,999,999		167	-	6	=	161
Potential Coil	Sangamo J3	All		6,618	-	305	=	6,313
			Total	6,785		311		6,474
Obsolete - Significant age (wear); maintenance; low ampere class								
Jewel Bearing	G.E. I-30	All		0	-	0	=	0
Jewel Bearing	GE I-14, I-16, I-20	All		0	-	0	=	0
			Total	0		0		0
			Grand Total	**25,701**	-	**1,041**	=	**24,660**

Appendix G

PacifiCorp 2013

Metering Operation Practices and Procedures
Select Company Metering Standards

Table of Contents (partial)

Watthour Reference Standards

1 Scope

This document establishes PacifiCorp's policy on the certification of revenue metering watthour reference standards.

2 Definitions

The following definitions and acronyms pertain to this document:

Basic Reference Standard: PacifiCorp's master reference standard. PacifiCorp currently uses Radian Research, Inc.'s RD-22
DUT: Device under test
Field Standard: A watthour standard mounted within an automatic test board or used with portable load boxes
Field Transfer Standard: A watthour standard that is certified quarterly with the basic reference standard
NIST: National Institute of Standards and Technology
NIST Traceable Independent Laboratory: An independent standards laboratory that is able to provide documental traceability to NIST e.g. Radian Research, Inc.
Transport Standard: A standard sent off annually to a NIST traceable independent laboratory to provide traceability from PacifiCorp's reference standards to NIST. PacifiCorp currently uses Radian Research, Inc.'s RD-23

3 References

ANSI C12.1 *Code for Electricity Metering*

4 General

The regulatory bodies of all states served by PacifiCorp have mandated that all meter tests be traceable to the National Institute of Standards and Technology (NIST). Documentation must be maintained by the utility containing the following items:

1) Description of test standards and meter testing equipment
2) Description of methods employed to ascertain and maintain the accuracy of the test standards and meter testing equipment, including the frequency of such tests

Records shall be maintained showing the date when each watthour standard was certified. Any watthour standard that fails to meet the accuracy requirements as outlined in this document shall be returned to the manufacturer.

The certification process compares the readings from a watthour standard and the device under test (DUT) subjected to the same voltages and currents. A watthour standard used to certify equipment must be of higher accuracy than the DUT.

5 Basic Reference Standard

5.1 General

The basic reference standard is defined in the latest edition of ANSI C12.1, which is PacifiCorp's primary certification reference standard and directly traceable to NIST. The basic reference standard consists of a primary reference standard or standards that are intercompared quarterly to trend their stability. The long-term history will indicate any degradation of the basic reference standard. This is the practice recommended by NIST.

5.2 Frequency of Certification

PacifiCorp will certify its basic reference standard annually with its transport standard upon return from NIST or a NIST traceable independent laboratory.

5.3 Accuracy

The accuracy of the basic reference standard shall have an error less than +/- 0.01%.

5.4 Certification Points

Certification points shown in Table 1 shall be used to certify the basic reference standard. All phase angles in Table 1 are lagging phase angles.

Table 1 – Basic reference standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

6 Transport Standard

6.1 General

The transport standard is defined in the latest edition of ANSI C12.1, which is used as an engineering transport standard. This standard does not leave the facility except to be transported back to NIST or a NIST traceable independent laboratory for annual certification and calibration (if necessary). The transport standard provides the traceability from PacifiCorp's reference standards to NIST. The transport standard is certified with the basic reference standard quarterly.

6.2 Frequency of Certification

The transport standard shall be sent to either NIST or a NIST traceable independent laboratory annually to be tested against the basic reference standard(s) of either NIST or a NIST traceable independent laboratory.

6.3 Accuracy

The portable watthour standard shall have an error less than +/- 0.01%.

6.4 Certification Points

Certification points shown in Table 2 shall be used to certify the transport watthour standard. All phase angles in Table 2 are lagging phase angles.

Table 2 – Transport reference standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

7 Field Transfer Standard

7.1 General

A field transfer standard is a traveling watthour standard, which is used to certify all other field standards.

7.2 Frequency of Certification

Field transfer standards shall be certified quarterly against the basic reference standard.

7.3 Accuracy

The field transfer standard shall have an error less than +/- 0.02%.

7.4 Certification Points

Certification points shown in Table 3 shall be used to certify the portable watthour standard. All phase angles in Table 3 are lagging phase angles.

Table 3 – Portable reference standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

8 Field Standard

8.1 General

A field standard is used to test revenue, substation, intertie and generation meters. These watthour standards are either mounted within field automatic test boards or with portable load boxes.

8.2 Frequency of Certification

Field standards shall be certified at least annually against the field transfer standard.

8.3 Accuracy

The field watthour standard shall have an error less than ± 0.04% or 0.05% depending on the reference standard located in the automatic test boards e.g. WECO test boards.

8.4 Calibration

Calibration points shown in Table 4 shall be used to certify the field watthour standards.

Table 4 – Field standard certification points

	Voltage & Phase Angle							
	120		240		277		480	
Amps	0°	60°	0°	60°	0°	60°	0°	60°
0.25								
0.5								
1.5								
2.5								
3								
5								
15								
30								
50								

9 Records Retention

PacifiCorp shall maintain a record of all the watthour standards including certification dates, results, and the person performing the certification. These records shall be maintained for a minimum of seven (7) years as required by PacifiCorp's Record Management department. However, it is at the discretion of the Metering Assets and Technology department to decide whether to retain the aforementioned records after seven (7) years. Any electronic records/results shall be kept indefinitely i.e. as long as there is memory to store these records.

Annual Watthour Transport Standard Verification

1 Scope

This document covers the annual verification of PacifiCorp's basic reference standard with PacifiCorp's transport standard sent to NIST or a NIST traceable independent laboratory using the RS-703A Automated Calibration System.

2 Definition

The following definitions and acronyms pertain to this document:

Basic Reference Standard: PacifiCorp's master reference standard. PacifiCorp currently uses Radian Research, Inc.'s RD-22
NIST: National Institute of Standards and Technology
NIST Traceable Independent Laboratory: An independent standards laboratory that is able to provide documental traceability to NIST
RS-703A System: Radian RS-703A Automated Calibration System
Transport Standard: A standard sent off annually to a NIST traceable independent laboratory to provide traceability from PacifiCorp's reference standards to NIST. PacifiCorp currently uses Radian Research, Inc.'s RD-23

3 Introduction

Every year, PacifiCorp shall first run its own tests on the transport standard using the same test points used by a NIST traceable independent laboratory as shown below in Table 1. All phase angles in Table 1 are lagging phase angles.

Next, PacifiCorp shall send a transport standard to a NIST traceable independent laboratory annually, to conduct accuracy certification tests. These tests will certify within an acceptable level of uncertainty that the registration of the transport standard is as expected within the limits stated by the manufacturer of the standard. This process also provides traceability of the company's watthour reference standard to the national watthour reference standard.

After the transport standard tests are completed by a NIST traceable independent laboratory, the transport standard is returned to PacifiCorp. PacifiCorp then runs its own test on the transport standard using the same test points used by the certifying laboratory, against PacifiCorp's basic reference standard shown in Table 1. All phase angles in Table 1 are lagging phase angles.

Table 1 – Test points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

4 Tools, Materials, and Equipment

The following tools, materials, and equipment are used to perform the intercomparison tests:

- Basic reference standard (RD-22)
- Transport reference standard (RD-23)
- RS-703A system
- BNC cables
- Radian Research, Inc. potential and current cables
- Auxiliary power cables for Radian Research, Inc. reference standards

5 Procedure

Sections 5.1 to 5.3 are the procedures that pertain to the annual watthour transport verification. Figure 1 shows the basic equipment setup of the basic reference and transport standards.

5.1 Equipment Setup

Follow the steps in Table 2 to set up the equipment.

Table 2 – Equipment setup

Step	Action
1	Ensure that auxiliary power is being provided to both the basic reference standard and transport standard.
	Note: The basic reference standard should not be disconnected or turned off unless deemed necessary.
2	A. Connect the BNC cable from channel 1 of the RS-703A data collection module to the output of the basic reference standard. B. Connect the BNC cable from channel 2 of the RS-703A data collection module to the output of the transport standard.
3	Connect the current leads in series from the current amplifier of the RS-703A to the basic reference and transport standards.
4	Connect the potential leads from the voltage amplifier of the RS-703A to the potential input of the basic reference standard. Jumper from the potential input of the basic reference standard to the transport standard.
	Note: Ensure polarity is correct. It is important to stay consistent with the polarity or the test results will be incorrect.
5	Select 'Watthour' display on both the basic reference standard and the transport standard.

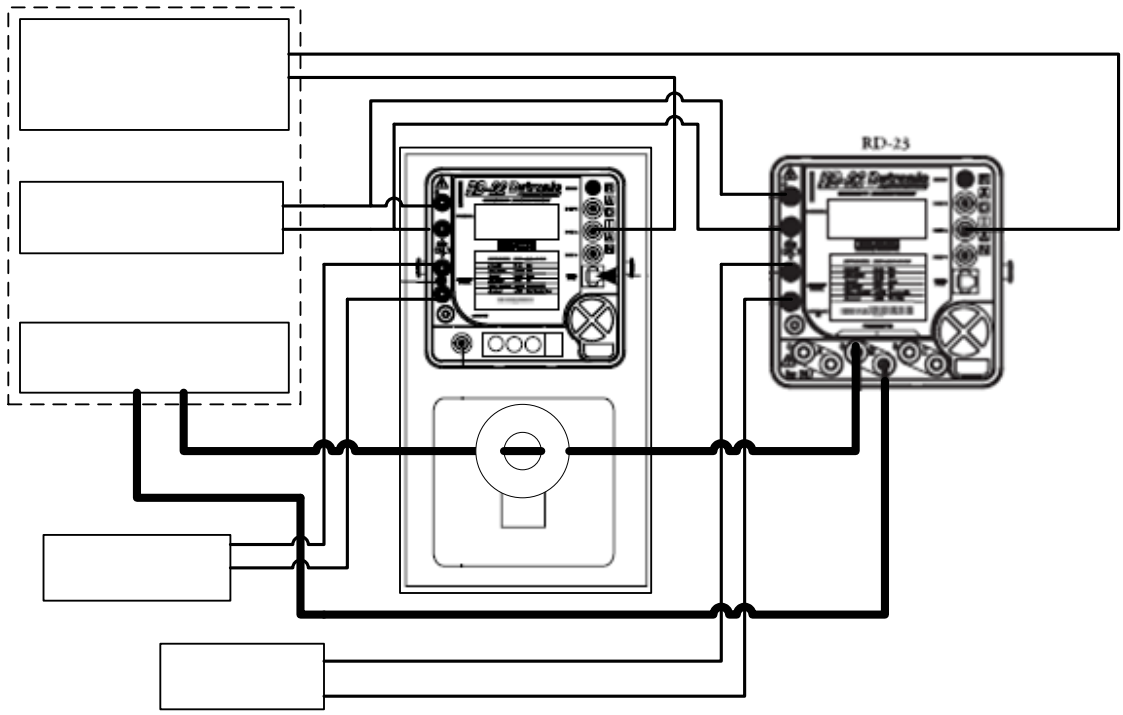


Figure 1 – Equipment setup to test transport standard

CAUTION

High voltage (up to 480V) is present at the terminals of the watthour standards.

5.2 Test Setup

Follow the steps in Table 3 to set up the verification test.

Table 3 – Test setup

Step	Action
1	Turn on the RS-703A system power supply with the appropriate key.
	Note: Energize the RS-703A for at least 30 minutes as suggested by Radian Research, Inc.
2	A. Turn the computer on. B. Double click on the 'RS-703A Control Program' icon located on the desktop.
3	A. On the 'Channel Table' screen, appropriately select the channel such that the devices under test are matched with their respective channels. B. Enter serial number of the devices under test accordingly.
	Note: For example, channel 1 and channel 2 should always be used for the basic reference standard and transport standard, respectively.
4	Make sure that the basic reference standard is used as the master reference standard. Do so, by making sure 'R1' on the 'Channel Table' screen is set to 'Reference' and check the boxes based on the channels of the devices under test. Leave 'R2' and 'R3' as 'None'.

5.3 Performing the Test

Follow the steps in Table 4 to perform the test on the reference standards.

Table 4 – Performing the test

Step	Action
1	Click on 'Open a Test' icon and select 'Whr - MOPP Cert. Points'.
	Note: A screen will pop up with the test sheet. Leave everything as is. There should not be any changes made to the test sheet.
2	On the test sheet, click on 'Run'. This will begin the test.
3	Upon completion of the test, verify that the percent error values for the basic reference and transport standards are within its worst case accuracy.
	Note: Basic reference standard worst case accuracy: ± 0.01% Transport standard worst case accuracy: ± 0.01%
4	Print two copies of the test results. File one of the copies in the file cabinet in the laboratory and place the other copy in the black tray for the meter engineer.

6 Records Retention

PacifiCorp shall maintain a record of all the watthour standards including certification dates, results, and the person performing the certification. These records shall be maintained for a minimum of seven (7) years as required by PacifiCorp's Record Management department. However, it is at the discretion of the Metering Assets and Technology department to decide whether to retain the aforementioned records after seven (7) years. Any electronic records/results shall be kept indefinitely i.e. as long as there is memory to store these records.

Quarterly Intercomparison of the Basic Reference and Transport Standards

1 Scope

This document covers the procedure for quarterly intercomparison of the basic reference and transport standards using the Radian RS-703A Automated Calibration System to determine the stability of the two reference standards.

2 Definition

The following definitions and acronyms pertain to this document:

NIST: National Institute of Standards and Technology
NIST Traceable Independent Laboratory: An independent standards laboratory that is able to provide documental traceability to NIST
RS-703A System: Radian RS-703A Automated Calibration System
Basic Reference Standard: PacifiCorp's master reference standard. PacifiCorp currently uses Radian Research, Inc.'s RD-22
Transport Standard: A standard sent off annually to a NIST traceable independent laboratory to provide traceability from PacifiCorp's reference standards to NIST. PacifiCorp currently uses Radian Research, Inc.'s RD-23

3 Introduction

Meter Engineering shall conduct an intercomparison of the basic reference standard against the transport standard quarterly. Conducting a quarterly intercomparison between the basic reference and transport standards will aid in determining the stability of the aforementioned reference standards. If one or both of the reference standards are found to be drifting out of calibration, appropriate action shall be taken. Typically this requires returning the drifting standard(s) to the manufacturer for inspection.

4 Tools, Materials, and Equipment

The following tools, materials, and equipment are used to perform the intercomparison tests:

- Basic reference standard (RD-22)
- Transport reference standard (RD-23)
- RS-703A system
- BNC cables
- Radian Research, Inc. potential and current cables
- Auxiliary power cables for Radian Research, Inc. reference standards

5 Procedures

Sections 5.1 to 5.3 are the procedures that pertain to intercomparison testing.

5.1 Test Setup

Follow the steps in Table 1 to set up the equipment.

Table 1 – Equipment setup

Step	Action
1	Ensure that auxiliary power is being provided to both the basic reference standard and transport standard.
	Note: The basic reference standard should not be disconnected or turned off unless deemed necessary.
2	A. Connect the BNC cable from channel 1 of the RS-703A data collection module to the output of the basic reference standard. B. Connect the BNC cable from channel 2 of the RS-703A data collection module to the output of the transport standard.
3	Connect the current leads in series from the current amplifier of the RS-703A to the basic reference and transport standards.
4	Connect the potential leads from the voltage amplifier of the RS-703A to the potential input of the basic reference standard. Jumper from the potential input of the basic reference standard to the transport standard.
	Note: Ensure polarity is correct. It is important to stay consistent with the polarity or the test results will be incorrect.
5	Select 'Watthour' display on both the basic reference standard and the transport standard.

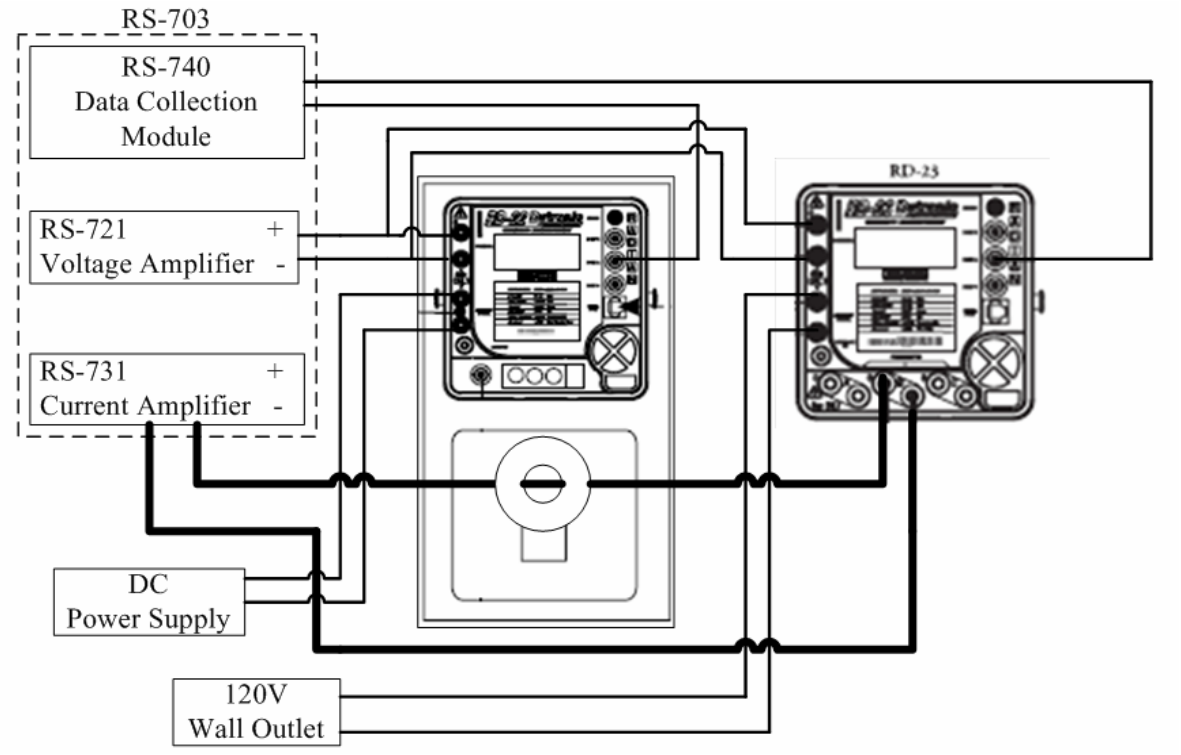


Figure 1 –Equipment setup for quarterly intercomparison

CAUTION

High voltage (up to 480V) is present at the terminals of the watthour standards.

5.2 Test Setup

Follow the steps in Table 2 to setup the software for an intercomparison test.

Table 2 – Selecting devices

Step	Action
1	Turn on the RS-703A system power supply with the appropriate key.
	Note: Energize the RS-703A for at least 30 minutes as suggested by Radian Research, Inc.
2	A. Turn the computer on. B. Double click on the 'RS-703A Control Program' icon located on the desktop.
3	A. On the 'Channel Table' screen, appropriately select the channel such that the devices under test are matched with their respective channels. B. Enter serial number of the devices under test accordingly.
	Note: For example, channel 1 and channel 2 should always be used for the basic reference standard and transport standard, respectively.
4	Make sure that the basic reference standard is used as the master reference standard. Do so, by making sure 'R1' on the 'Channel Table' screen is set to 'Reference' and check the boxes based on the channels of the devices under test. Leave 'R2' and 'R3' as 'None'.

5.3 Performing the Test

Follow the steps in Table 3 to perform an intercomparison test.

Table 3 – Performing the test

Step	Action
1	Click on 'Open a Test' icon and select 'Whr - MOPP Cert. Points'.
	Note: A screen will pop up with the test sheet. Leave everything as is. There should not be any changes made to the test sheet.
2	On the test sheet, click on 'Run'. This will begin the test.
3	Upon completion of the test, verify that the percent error values for the basic reference and transport standards are within its worst case accuracy.
	Note: Basic reference standard worst case accuracy: ± 0.01% Transport standard worst case accuracy: ± 0.01%
4	Print two copies of the test results. File one of the copies in the file cabinet in the laboratory and place the other copy in the black tray for the meter engineer.

6 Records Retention

PacifiCorp shall maintain a record of all the watthour standards including certification dates, results, and the person performing the certification. These records shall be maintained for a minimum of seven (7) years as required by PacifiCorp's Record Management department. However, it is at the discretion of the Metering Assets and

Technology department to decide whether to retain the aforementioned records after seven (7) years. Any electronic records/results shall be kept indefinitely i.e. as long as there is memory to store these records.

Quarterly Certification of the Field Transfer Standard

1 Scope

This document covers the procedure for quarterly certification of the field transfer standard against the basic reference standard using the Radian RS-703A Automated Calibration System.

2 Definition

The following abbreviation pertains to this document:

Basic Reference Standard: PacifiCorp's master reference standard. PacifiCorp currently uses Radian Research, Inc.'s RD-22
Meter Administrator Standard: A portable watthour standard that is certified quarterly with the basic reference standard
NIST: National Institute of Standards and Technology
NIST Traceable Independent Laboratory: An independent standards laboratory that is able to provide documental traceability to NIST
RS-703A System: Radian RS-703A Automated Calibration System

3 Introduction

PacifiCorp shall conduct quarterly certification of its field transfer standards. The standard shall be tested against the basic reference standard. By conducting a quarterly certification will help to determine the stability of the aforementioned reference standards. If one or both of the reference standards are found to be drifting out of calibration, appropriate action shall be taken. Typically this requires returning the drifting standard(s) to the manufacturer for inspection. Conducting a quarterly test is part of PacifiCorp's NIST traceability path.

4 Tools, Materials, and Equipment

The following tools, materials, and equipment are used to perform the quarterly certification tests:

- Basic reference standard (RD-22)
- Field transfer standard (RD-21)
- BNC cables
- Radian Research, Inc. potential and current cables
- Auxiliary power cables for Radian Research, Inc. reference standards

5 Procedures

Sections 5.1 to 5.3 are the procedures that pertain to intercomparison testing.

5.1 Test Setup

Follow the steps in Table 1 to set up the equipment.

Table 1 – Equipment setup

Step	Action
1	Ensure that auxiliary power is being provided to both the basic reference standard and field transfer standard.
	Note: The basic reference standard should not be disconnected or turned off unless deemed necessary.
2	A. Connect the BNC cable from channel 1 of the RS-703A data collection module to the output of the basic reference standard. B. Connect the BNC cable from channel 3 of the RS-703A data collection module to the output of the meter administrator standard.
3	Connect the current leads in series form the current amplifier of the RS-703A to the basic reference and transport standards.
4	Connect the potential leads from the voltage amplifier of the RS-703A to the potential input of the basic reference standard. Jumper from the potential input of the basic reference standard to the transport standard.
	Note: Ensure polarity is correct. It is important to stay consistent with the polarity or the test results will be incorrect.
5	Select 'Watthour' display on both the basic reference standard and the meter administrator standard.

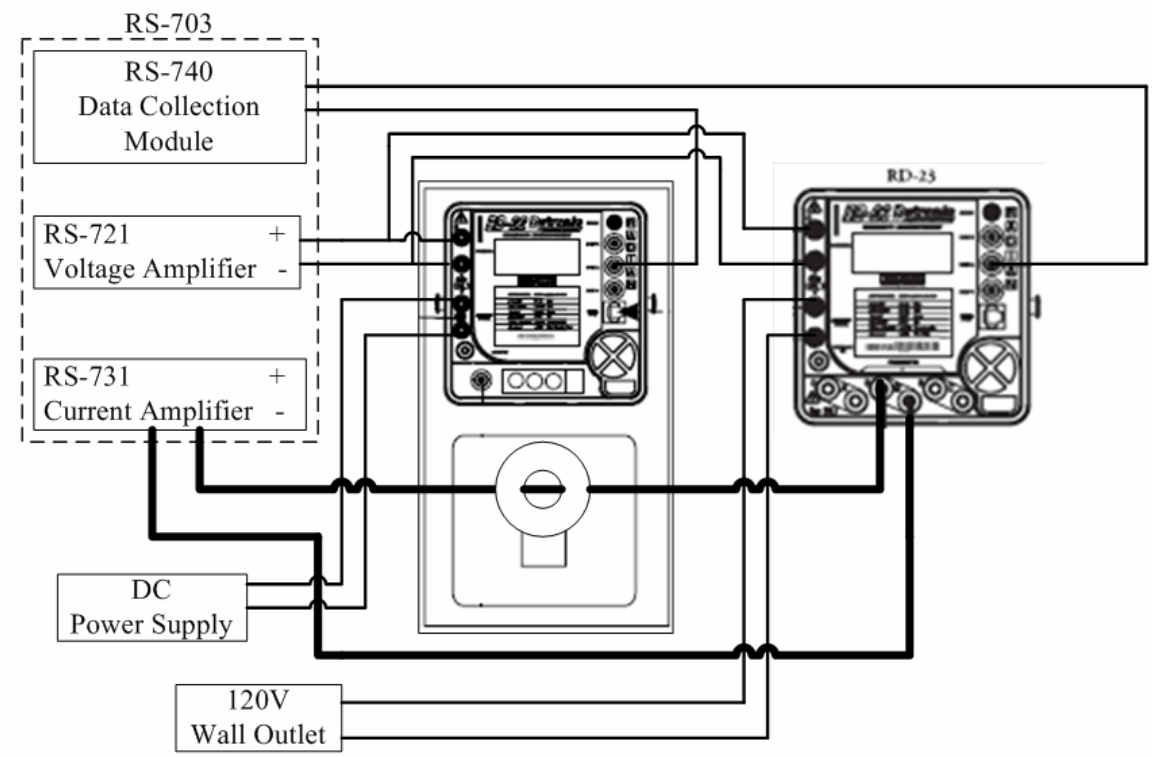


Figure 1 –Equipment setup for quarterly certification

CAUTION

High voltage (up to 480V) is present at the terminals of the watthour standards.

5.2 Test Setup

Follow the steps in Table 2 to setup the software for an intercomparison test.

Table 2 – Selecting devices

Step	Action
1	Turn on the RS-703A system power supply with the appropriate key.
	Note: Energize the RS-703A for at least 30 minutes as suggested by Radian Research, Inc.
2	A. Turn the computer on. B. Double click on the 'RS-703A Control Program' icon located on the desktop.
3	A. On the 'Channel Table' screen, appropriately select the channel such that the devices under test are matched with their respective channels. B. Enter serial number of the devices under test accordingly.
	Note: For example, channel 1 and channel 2 should always be used for the basic reference standard and transport standard, respectively.
4	Make sure that the basic reference standard is used as the master reference standard. Do so, by making sure 'R1' on the 'Channel Table' screen is set to 'Reference' and check the boxes based on the channels of the devices under test. Leave 'R2' and 'R3' as 'None'.

5.3 Performing the Test

Follow the steps in Table 3 to perform an intercomparison test.

Table 3 – Performing the test

Step	Action
1	Click on 'Open a Test' icon and select 'Whr - MOPP Cert. Points'.
	Note: A screen will pop up with the test sheet. Leave everything as is. There should not be any changes made to the test sheet.
2	On the test sheet, click on 'Run'. This will begin the test.
3	Upon completion of the test, verify that the percent error values for the basic reference and transport standards are within its worst case accuracy.
	Note: Basic reference standard worst case accuracy: ± 0.01% Meter administrator standard worst case accuracy: ± 0.02%
4	Print two copies of the test results. File one of the copies in the file cabinet in the laboratory and place the other copy in the black tray for the meter engineer.

6 Records Retention

PacifiCorp shall maintain a record of all the watthour standards including certification dates, results, and the person performing the certification. These records shall be maintained for a minimum of seven (7) years as required by PacifiCorp's Record Management department. However, it is at the discretion of the Metering Assets and Technology department to decide whether to retain the aforementioned records after seven (7) years. Any electronic records/results shall be kept indefinitely i.e. as long as there is memory to store these records.

PacifiCorp's Watthour Standard Procedure

1 Scope

This document covers the process of providing traceability of PacifiCorp's primary watthour standard to the national watthour standard. PacifiCorp's primary watthour standard is its basic reference standard; the Radian Research, Inc. RD-22 reference standard.

2 Definitions and Abbreviations

The following definitions and abbreviations pertain to this document:

Accuracy: Typical closeness of a particular measurement result to the true value. This can be expressed as the largest allowable error such as a percentage or an absolute value
NIST: National Institute of Standards and Technology
NIST Traceable Independent Laboratory: An independent standards laboratory that is able to provide documental traceability to NIST
PPM: Parts-per-million is equal to one millionth or 0.0001%
Random errors: Random errors are the drifts in the system during a test that are unaccountable, or are accountable but left uncorrected, for whatever reason (i.e., random fluctuations)
Resolution: The degree that small changes in a measure can be identified
Systematic errors: Systematic errors are a result of unique system problems where the tests are performed. If the errors are known, they can usually be corrected
Uncertainty: A range of values that reflect the degree of confidence to which a measured quantity is to the absolute value. This, in general, reflects an instrument's absolute accuracy. The wider the range of values, the lower the confidence you have in the particular measurement

3 References

J. D. Ramboz, et.al., *A Calibration Service for Wattmeters and Watthour Meters*, NBS. Technical Note 1179, U.S. Government Printing Office, Washington, D.C., July 1983.

N.Michael Oldham, *A Measurement Assurance Program for Electric Energy*, NBS. Technical Note 930, U.S. Government Printing Office, Washington, D.C., 1976.

ANSI C12.1 *Code for Electricity Metering*

MOPP 3.1 *Watthour Reference Standard*

4 General

The master watthour standard is used to certify all other standards including:

- Transport standard (RD-23)
- Field transfer standards (RD-21s)
- Shop meter test boards standards
- Field standards in automatic test sets
- Field standards used with load boxes

5 Introduction

PacifiCorp's watthour reference standards are all traceable to the national watthour standard maintained by NIST.

Every year, PacifiCorp certifies its primary reference standard with a NIST traceable standard.

Figure 1 shows the traceability path from NIST to PacifiCorp's reference standards. PacifiCorp's sequential chain of traceability begins at a NIST traceable independent laboratory; in particular, Radian Research, Inc.

6 PacifiCorp's Reference Standards

6.1 Basic Reference Standard

The Radian Research RD-22 is a precision solid-state reference standard used by PacifiCorp as its basic reference standard. This standard is certified to the national standard annually. The basic reference standard test results are documented on the RS-703A system quarterly. Quarterly intercompare between the basic reference standard and the transport standard provides additional data associated with stability. The basic reference standard is certified to the national standard maintained by NIST using the test points shown in Table 1. All phase angles in Table 1 are lagging phase angles.

Table 1 – Basic reference standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

6.2 Transport Standard

The Radian Research Inc., RD-23 is a precision solid state reference standard used as an engineering transport standard. This standard does not leave the facility except to be transported back to Radian Research, Inc. for annual certification and calibration (if necessary). Test points used to certify the transport standard, are shown in Table 2. The transport standard provides the traceability from PacifiCorp's reference standards to NIST. The transport standard is intercompared with the basic reference standard quarterly using the test points shown in Table 2. All phase angles in Table 2 are lagging phase angles.

Table 2 – Transport reference standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

6.3 Field Transfer Standard

The Radian Research, Inc. RD-21 is a solid state reference standard used to certify field watthour standards annually. Field transfer standards are certified quarterly against the basic reference standard using the test points shown in Table 3. All phase angles in Table 3 are lagging phase angles.

Table 3 – Field transfer standard certification points

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

6.4 Field Standard

The Radian Research, Inc. RD-20 and RM-10 are solid state reference standards found either mounted within field automatic test boards or with portable load boxes. Portable standards are certified annually against the field transfer standard using the test points shown in Table 4. All phase angles in Table 4 are lagging phase angles.

Table 4 – Field standard certification points

	Voltage & Phase Angle							
	120		240		277		480	
Amps	0°	60°	0°	60°	0°	60°	0°	60°
0.25								
0.5								
1.5								
2.5								
3								
5								
15								
30								
50								

6.5 Automated Calibration System

The Radian 703A system is a computer-operated calibration system that has the ability to test several solid state standards simultaneously, but only seven channels are available of its sixteen channels. This system provides an automated method to document the master standard certification, transport standard calibration, and transport standard certification. The 703A system is certified monthly to the Company's basic reference standard.

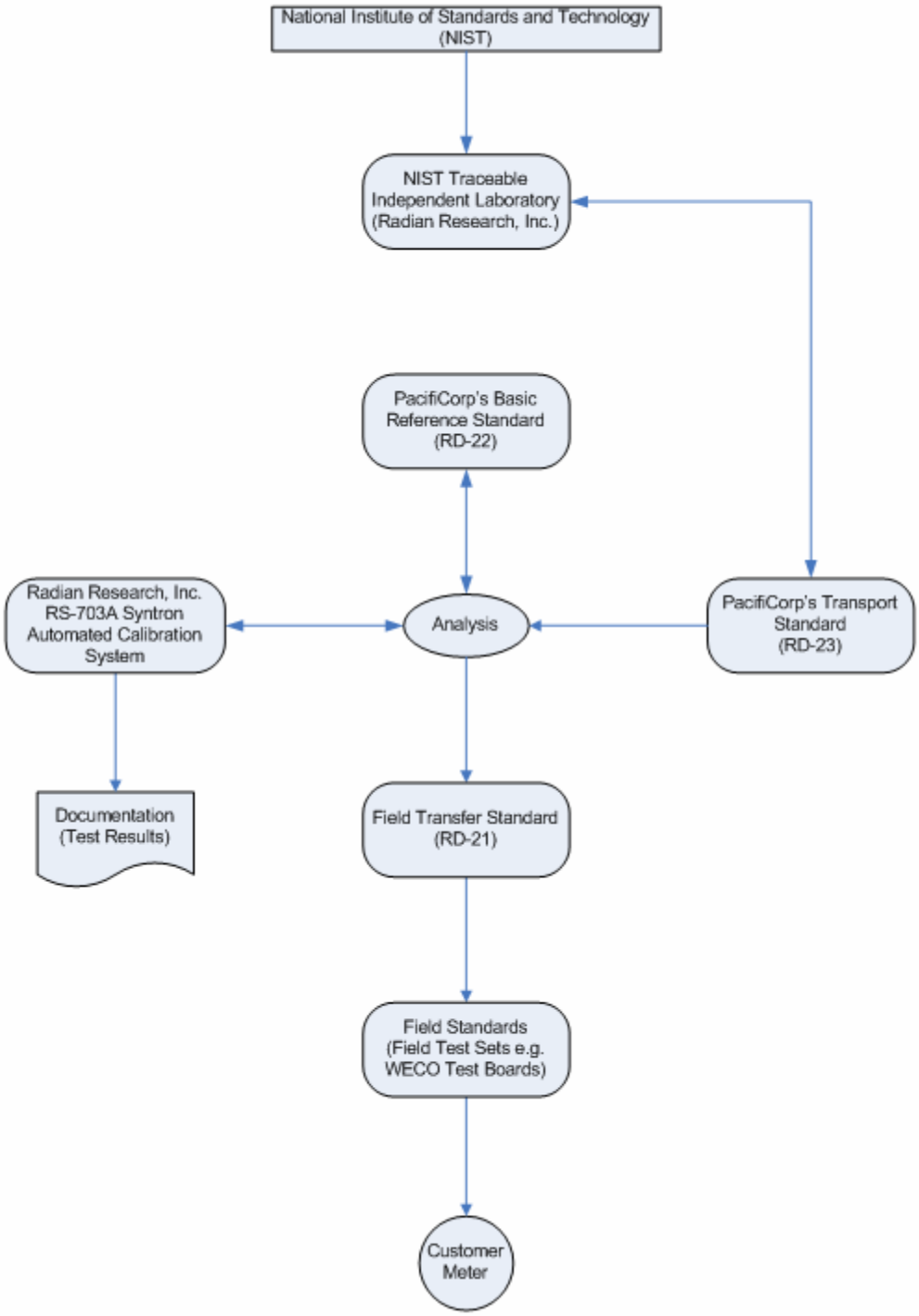


Figure 1 – PacifiCorp's traceability diagram

7 NIST Certification Process

7.1 Meter Engineer's Responsibility

The meter engineer shall monitor trends of the quarterly and annual certifications and recommend corrective action as needed. The meter engineer shall also ensure NIST traceability of PacifiCorp's reference standards.

Table 5 describes the process of annual NIST certification.

Table 5 – NIST certification process

Step	Description
1	The NIST traceable independent laboratory certifies its basic reference standards to the national watthour standard maintained by NIST to an uncertainty of 0.003% (30 PPM).
2	The NIST traceable independent laboratory certifies PacifiCorp's transport standard against its basic reference standards to an uncertainty of 0.003% (30 PPM) annually.
3	The NIST traceable independent laboratory returns PacifiCorp's transport standard to PacifiCorp.
4	Upon return of the transport standard, the transport standard is verified against PacifiCorp's basic reference standard to an accuracy of 0.01% (100 PPM) using the test points shown in Table 6 and utilizing the RS-703A system.
5	At the completion of the test, PacifiCorp compares its results with the results from the NIST traceable independent laboratory. In doing so an accuracy crosscheck is completed and establishes traceability to the national watthour standard maintained by NIST.
6	The field transfer standards are certified quarterly to an accuracy of 0.02% (200 PPM) using the test points shown in Table 6 and utilizing the RS-703A system.
7	The field transfer standards are used to certify field standards found in automated test boards e.g. WECO test boards, to an accuracy of 0.04% (400 PPM) or 0.05% (500 PPM) depending on the reference standard found in these test boards.
8	Metermen test the accuracy of the customer's meter using their automated test boards and can be assured that the customer's meter is accurate to 0.1% (1000 PPM) or better.

Table 6 – Certification test points (All phase angles are lagging phase angles)

	Voltage & Phase Angle											
	120						240		277		480	
Amps	0°	60°	120°	180°	240°	300°	0°	60°	0°	60°	0°	60°
0.25												
2.5												
5												
5												
5												
15												
30												
30												
30												
50												

8 Records Retention

PacifiCorp shall maintain a record of all the watthour standards including certification dates, results, and the person performing the certification. These records shall be maintained for a minimum of seven (7) years as required by PacifiCorp's Record Management department. However, it is at the discretion of the Metering Assets and Technology department to decide whether to retain the aforementioned records after seven (7) years. Any electronic records/results shall be kept indefinitely i.e. as long as there is memory to store these records.

8.1 Basic Reference Standard

Two copies of the test results from the basic reference standard certification shall be retained. One copy of the test results shall be filed in the designated filing cabinet located near the RS-703 system. The second copy shall be for the meter engineer of whom shall track the stability of the reference standard and advise appropriate action should the basic reference standard drift out of calibration.

8.2 Transport Standard

Two copies of the test results from the annual transport standard verification shall be retained. One copy of the test results shall be filed in the designated filing cabinet located near the RS-703 system. The second copy shall be for the meter engineer of whom shall track the stability of the reference standard and advise appropriate action should the transport standard drift out of calibration. Annual certification of the transport standard shall be done by Radian Research, Inc. where upon return of the transport standard a report of the test results will be provided. This report shall be maintained by the meter engineer.

8.3 Field Transfer Standards

Two copies of the test results from the quarterly certification of the field transfer standard shall be retained. One copy of the test results shall be filed in the designated

filing cabinet located near the RS-703 system. The second copy shall be for the meter engineer of whom shall track the stability of the reference standard and advise appropriate action should the basic reference standard drift out of calibration.

8.4 Field Standards

Test records of the certification of field standards shall be sent to the meter administrator based on service territory location. Those states serviced by Pacific Power will send an electronic copy of their test records to Pacific Power's designated meter administrator. Those states serviced by Rocky Mountain Power will send an electronic copy of their test records to Rocky Mountain Power's designated meter administrator. A specific format shall be used when saving the test results upon completion of a field standard certification shown in Figure 2.

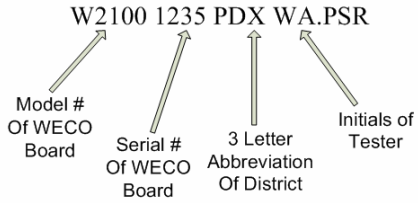


Figure 2 – WECO certification test result file name format

It is the responsibility of the meter administrator to save all electronic test records sent via e-mail to the J: drive located in this directory:

J:\Groups\Metering\Administrators - Field Support\Administrators\Reports-Weco+ Weco Certifications

In this directory, the meter administrator shall place the test results in the appropriate folder based on the year tested, the service territory i.e. Pacific Power or Rocky Mountain Power and district e.g. Portland.

New Residential Meter Verification Policy

1 Scope

This policy documents PacifiCorp's quality assurance verification program for all new residential meters received by the company.

2 Policy

Once each month, a company meter shop receiving new meters from the manufacturer will select, inspect, and test one pallet of new, form 2S, 240 volt, kilowatt-hour only meters.

3 Validation Results

The results of the tests from the quality assurance program will be compared by Meter Engineering with the manufacturer's certified test data and analyzed for conformance with stated accuracy and specifications.

Any problems discovered with the new meter quality or accuracy will be reported to the meter manufacturer. Meter Engineering will work with the manufacturer to correct any deficiencies.

4 Discussion

PacifiCorp purchases new residential meters from meter manufacturers that are ISO 9000 qualified. PacifiCorp requires the meter manufacturers to provide the company with certified test data for all new meters received by the company. This validation policy provides PacifiCorp with a process to monitor the quality of new residential meters that are received.

This validation procedure shall be used to:

1) Ensure that shipping and handling does not cause any accuracy problems in the meters.
2) Validate the laboratory accuracy standardization between the company and manufacturer.
3) Provide feedback to the manufacturer on the quality of products that are received.

5 Validation Scheduling

During the last quarter of each year, Meter Engineering will work with the meter shops to compile a list of each meter shop's test month. This test month shall be the month during which the meter shop will test a pallet of meters. If a shop does not receive a pallet of meters during its test month and it does not have another recently received pallet in stock, it shall test the first pallet of meters that it receives afterwards.

6 Validation Procedure

The purpose of the new meter tests is to track the quality of the meters that are received from the manufacturer. To help make the test results as useful as possible, the meterman who will be performing the tests should carefully follow the instructions given below. In particular, note that any meters with problems should **not** be adjusted in any way. They should be set aside in the same condition in which they were received and they will most likely be returned to the manufacturer. This helps them identify and correct problems in their manufacturing process.

After a report of the test data has been compiled by Meter Engineering the shop will be informed of what to do with the meters that were defective in any way. If there seems to be a significant problem, the meters will be returned to the manufacturer in their original condition to help discover what went wrong in their production.

For each month's test, the pallet of meters which was most recently received in that shop should be tested. In fact, if a new pallet will be received before the end of the month, it should be tested upon arrival instead of testing a pallet which may already be in stock. This way the test results will reflect the effects of the most recent changes that the manufacturer has made in the production process.

When the entire pallet has been tested, the test results should all be uploaded to CSS and the completed test verification form, discussed below, should be returned to Meter Engineering by mail, fax, or email. The meterman performing the tests should ensure that the data is correctly uploaded to CSS as quickly as possible so that the report can be generated using this data. This will help allow a timely decision to be made as to whether or not any defective meters that were found should be returned to the manufacturer.

Note that none of the meter covers should be removed during the validation procedure.

6.1 Physical Inspection

Inspect all meters in the pallet for the following:

T-seal:	Each meter should have a T-seal. It should be properly installed.
Potential link:	Link should be closed (if present).
Cotter pins:	One pin per blade; should be well seated (if present).
Name plate:	Check for accuracy.
Cover:	Check for any defects.

Record the findings of the inspection using the New Meter Test Verification Form which can be found in Appendix C of the MOPP. Include a description of any problems that are found with the meter serial number. Again, set these meters aside without making any changes. An example of the form has been provided in Figure 1.

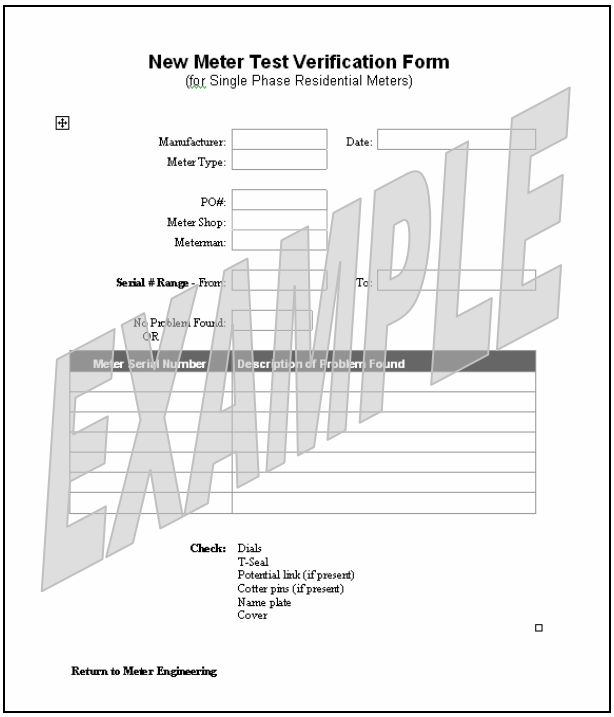


Figure 1 – Example New Meter Test Verification Form

6.2 Accuracy Testing

Before beginning the tests, verify that the WECO board is absolutely level to make sure that the results will be accurate. If it is tilted at all, the results for this meter type can be off by 0.5 to 1.0%, especially in the light load values.

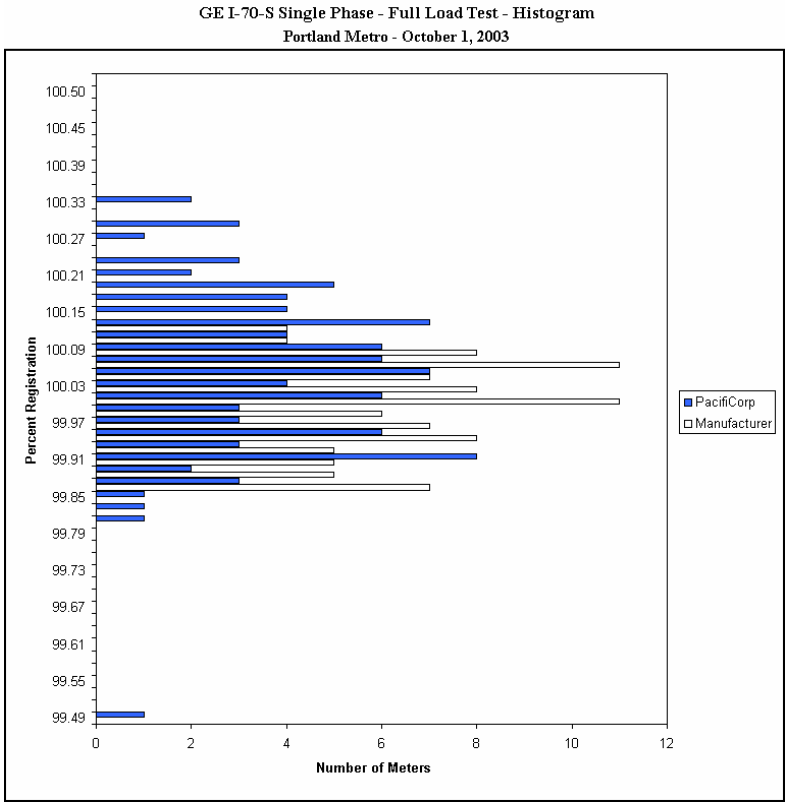
If any of the new meters is more than 0.5% out of accuracy in the full load test or 0.7% out of accuracy in the light load test, it should be set aside and should **not** be adjusted. Note the serial number and test results for any such meters on the verification form.

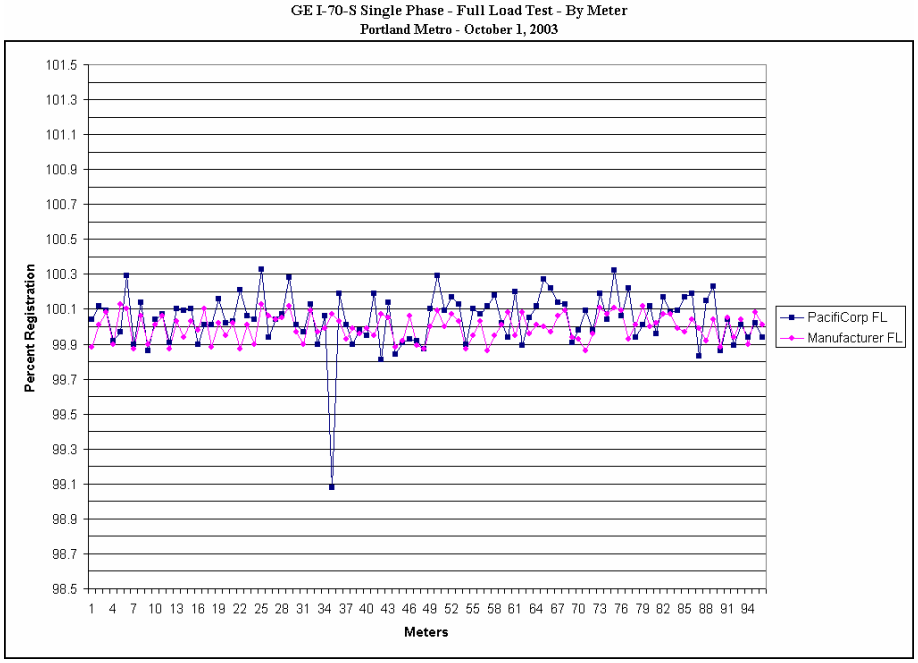
Only one set of test results (one FL value and one LL value) should be saved and uploaded for each meter. During the test, if a false start or otherwise suspicious reading occurs, that test should be cleared (by pressing F10 – New meter) and run again. If two different tests are saved for the same meter, the first will be placed in the "As Found" column and the second in the "As Left" column. This gives the impression that the meter was adjusted, which should not happen for these new meter verification tests.

7 Validation Report Example

Given on the following page is an example of the type of analysis which is done using the data obtained from the new residential meter verification policy. The summary statistics, full load histogram, and test results by meter charts are shown comparing the manufacturer's certified test data to the results of PacifiCorp's testing.

							Percent Registrations					
Manufacturer	Meter Type	Phase	Serial Number Range	Test Type	Test Source	Number of Meters Tested	Mean	Standard Deviation	High	Low	Range	Number of Meters Outside Limits
GE	I-70-S	Single	25243836 - 25243931	Full Load	Manufacturer	96	99.998	0.0751	100.13	99.86	0.27	0
					PacifiCorp	96	100.043	0.1566	100.33	99.08	1.25	1
				Light Load	Manufacturer	96	100.004	0.0812	100.14	99.86	0.28	0
					PacifiCorp	96	99.825	0.2598	100.4	98.76	1.64	4





Meter Accuracy Adjustment Limits and Retirement Criteria

1 Scope

This document and its subsections specify the PacifiCorp policy for accuracy adjustment limits allowable for in-service meters tested in the field and additional meter retirement criteria. It specifies procedures for meters that are not within allowable accuracy limits, including limited meter retirement criteria. The policy explains when to adjust meters, when to retire meters, and when meters meet company standards (detailed retirement procedures are given in MOPP 9 *Metering Equipment Failures, Warrenties, and Retirement*). The limits specified herein meet or exceed the requirements of the Public Utility Commission, Public Service Commission, and Washington Utilities and Transportation Commission.

The policy presented in this document applies generally to all meter types and further instructions regarding specific meter types are given in the subsections which follow this document. Specifically, subsections addressing single-phase electro-mechanical, single- and three-phase solid-state, and three-phase electro-mechanical and hybrid meters are provided.

2 Meter Accuracy Testing – General Information

2.1 Types of Meter Tests

There are four standard meter tests used to measure meter accuracy. These tests are described below. The tests which apply to a specific meter type and which should be performed when measuring its accuracy along with the number of disc revolutions or test pulses that should be used for each test are given in the appropriate subsections of this document.

2.1.1 Series Full Load (Watthour)

The series full load meter test measures the accuracy of the percent registration of the meter when its metered voltage and test amps, as specified on the meter nameplate, are applied to all of its elements simultaneously. This meter test is designated by %FL.

2.1.2 Series Light Load (Watthour)

The series light load meter test measures the accuracy of the percent registration of the meter when its metered voltage and ten percent of its test amps, as specified on the meter nameplate, are applied to all of its elements simultaneously. This meter test is designated by %LL.

2.1.3 Series Power Factor (Watthour)

The series power factor meter test measures the accuracy of the percent registration of the meter when its metered voltage and test amps, as specified on the meter nameplate, are applied to all of its elements simultaneously, with the current lagging the voltage by 60 degrees. This meter test is designated by %PF.

2.1.4 Single-Element Full Load (Watthour)

The single-element full load meter test measures the accuracy of the percent registration of the meter's individual elements when its metered voltage and test amps, as specified on the meter nameplate, are applied to only one of its elements. This meter test is designated by A-FL, B-FL, or C-FL corresponding to the element which was tested.

2.2 Meter Cover Removal

All in-service meter tests should be performed without removing the meter cover unless the test cannot be performed without removing the cover – for example, if the photo pick-up is unable to read the disk of an electro-mechanical meter accurately because of a dirty cover, or if the cover must be removed to place a solid-state meter in test mode.

2.3 Number of Runs

Only one complete test run is required for each meter test. For adjustable meters, if the meter requires calibration, additional tests or runs will be performed after any adjustments are made to verify that the results were satisfactory.

2.4 Photo Pick-Up

Standard procedure for meter testing includes using the photo pick-up to count disk revolutions or test pulses of the meter. The photo pick-up automates the test, is more accurate than manual methods, and establishes higher customer confidence in the tests.

2.5 Leveling the Test Board

Before performing any accuracy tests on electro-mechanical or hybrid meters, ensure that the test board is as level as possible. This is especially important to remember when using a test board which is mounted in a company vehicle as any inclination can strongly influence the results of the tests. This is especially true of the results of light load tests.

3 Meter Removal Criteria and Accuracy Adjustment Limits

The purpose of this section is to prescribe meter removal criteria for meters being used or to be used for the revenue metering of electric energy and to outline procedures that will reasonably assure compliance with the requirements of this section.

3.1 General Requirements

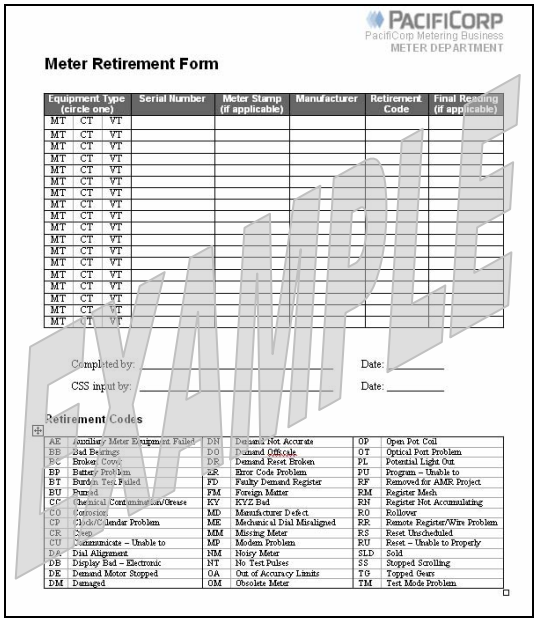
No meter shall be placed in service, or be allowed to remain in service, that:

1) Has an incorrect register constant, watthour constant, gear ratio, or dial train
2) Is mechanically, electrically, electronically, or otherwise defective
3) Is incorrectly connected, installed, or applied
4) Tests outside the accuracy limits in the applicable subsection of this document
5) Is on a meter retirement list
6) Is a potential safety hazard

Meters meeting the criteria for removal from service shall be identified during normal field visits. This document does not authorize field visits for the specific purpose of identifying meters that meet the removal criteria; metermen shall not make field visits specifically for this purpose.

If a meter is on the annual test schedule and meets any of the removal criteria above, an as-found test shall be performed, and then the meter shall be removed from service. All other meters that meet any of the non-accuracy-related criteria above shall be removed from service without performing an as-found test. If any meter which is still under warranty is removed from service, it shall be returned directly to the manufacturer or to the Meter Test Facility (MTF).

Whenever a meter is retired, it is important to reference a valid retirement code for entry into CSS. The Meter Retirement Form in Appendix C of the MOPP can be used in the process and already includes a list of retirement codes. An example of it is shown in Figure 1.



PACIFICORP
PacifiCorp Metering Business
METER DEPARTMENT

Meter Retirement Form

Equipment Type (circle one)			Serial Number	Meter Stamp (if applicable)	Manufacturer	Retirement Code	Final Reading (if applicable)
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					
MT	CT	VT					

Completed by: _____ Date: _____

CSS input by: _____ Date: _____

Retirement Codes

AE	Auxiliary Meter Equipment Failed	DN	Demand Not Accurate	OP	Open Pot Coil
BB	Bad Bearings	DO	Demand Officials	OT	Optical Port Problem
BC	Broken Cover	DR	Demand Reset Broken	PL	Potential Light Out
BP	Battery Problem	ER	Error Code Problem	PU	Program – Unable to
BT	Burden Test Failed	FD	Faulty Demand Register	RF	Removed for AMR Project
BU	Burned	FM	Foreign Matter	RM	Register Mesh
CC	Chemical Contamination/Grease	KY	KYZ Bad	RN	Register Not Accumulating
CO	Corrosion	MD	Manufacturer Defect	RO	Rollover
CP	Clock/Calendar Problem	MR	Mechanical Dial Misaligned	RR	Remote Register/Wire Problem
CR	Creep	MM	Missing Meter	RS	Reset Unscheduled
CU	Communicate – Unable to	MP	Modem Problem	RU	Reset – Unable to Properly
DA	Dial Alignment	NM	Noisy Meter	SLD	Solid
DB	Display Bad – Electronic	NT	No Test Pulses	SS	Stopped Scrolling
DE	Demand Motor Stopped	OA	Out of Accuracy Limits	TG	Topped Gears
DM	Damaged	OM	Obsolete Meter	TM	Test Mode Problem

Figure 1 – Example Meter Retirement Form

3.2 Accuracy Limits

The subsections of this document outline the test types that should be performed for each meter type and the actions that should be performed based on the accuracy of the meter's percent registration for each test. The specified errors in percent registration apply to the results of each test individually. In no case do they refer to the average error or any other combination of the results of two separate tests.

3.3 Meter Equipment Retirement Code (MERC)

Every meter will be assigned a Meter Equipment Retirement Code (MERC). Meters will no longer be retired based on their MERC codes.

4 High or Low Bill Complaint Meters

All tests generated and requested by customer service for high or low bill complaints shall be performed, even if the meter meets one or more of the removal criteria specified in section 3.1.

The accuracy of a high or low bill complaint meter shall not be adjusted. If the error is within +/- 2% for both the full load and light load test, it shall remain in service even if the meter meets one or more of the removal criteria in this policy. Any high or low bill complaint meter whose error is greater than +/-2% for the full load or light load tests should be removed from service.

A high or low bill complaint meter may be removed immediately from service if it is a potential safety hazard.

In the event that a high bill complaint meter is immediately removed from service, the meter must be kept and tagged in the local shop until the customer service representative has resolved the situation with the customer or for one year.

Table 1 – Accuracy Limits for High or Low Bill Complaint Meters

Meter Type	Meter Accuracy Limits	
	%FL	%LL
All meters	±2.0%	±2.0%

Single-Phase, Electro-Mechanical and Hybrid Meter Accuracy Limits

1 Scope

This section describes the allowable accuracy limits for direct connect, single-phase including network (apartment type), electro-mechanical and hybrid meters. The policies herein explain when to retire meters, and when meters meet company standards based on percent registration.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

All meters referenced in this document refer to only direct connect, kWh only, single-phase including network (apartment type), electro-mechanical and hybrid meters.

3 Tests to Be Performed

Only two tests are required to assess the accuracy of this meter type: series full load (%FL) and series light load (%LL). Both tests should be performed using one disc revolution whenever meters of this type are tested.

4 Meter Removal Criteria and Accuracy Adjustment Limits

The purpose of this section is to prescribe limits of accuracy and meter removal criteria for this meter type and to outline procedures that will reasonably assure compliance with the requirements of this section. The general requirements given in section 3.1 of MOPP 7.2 should be observed along with the instructions regarding meter accuracy in the section below.

4.1 Accuracy Limits

Table 1 below summarizes the possible percent registration values and corresponding actions that should be taken for this meter type. The specified errors in percent registration apply to both the %FL and %LL results individually. They do not refer to the average error of the two tests.

Table 1 – Single-phase, electro-mechanical and hybrid meter test accuracy limits

Meter Error		Action to be Taken
%FL	%LL	
within ±1%	within ±1%	Do not adjust. Leave in service.
greater than ±1%	greater than ±1%	Do not adjust. Remove from service.

5 AMR Designated Area Meters

Any non-AMR meter removed from its socket in an AMR designated area shall be replaced with an AMR meter. The requirements given section 4 of MOPP 7.2 shall be observed for high or low bill complaint meters.

5.1 Disconnect Services

Any non-AMR meter in an AMR designated area that is removed from its socket for disconnect purposes shall be reinstalled. The original meter is needed to keep track of the disconnected service. When the site is visited for reconnection, the meter shall be replaced with an AMR meter.

5.2 AMR Designated Areas

Listed below is a table of AMR designated areas.

Table 2 – Designated AMR areas.

Plant No.	Area
5300	Meter Test Facility
5160	Metro Hub – Salt Lake City
2220	Metro Salt Lake City
2210	Ogden
2215	Layton
2230	Jordan Valley
2235	Park City
2240	Tooele
2405	American Fork
2410	Santaquin

Single-Phase, Solid-State Meter Accuracy Limits

1 Scope

This section describes the allowable accuracy limits for single-phase, solid-state meters. The policies presented herein address both self-contained and instrument-rated meters and explain when to retire meters and when meters meet company standards based on percent registration.

2 Tests to Be Performed

For this meter type, a series full and light load test should be performed whenever the meter is tested. It is not necessary to perform a power factor test for this meter type.

3 Accuracy Limits and Meter Removal Criteria

The purpose of this section is to prescribe limits of accuracy and meter removal criteria for this meter type and to outline procedures that will reasonably assure compliance with the requirements of this section. The general requirements given in section 3.1 of MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* should be observed along with the instructions regarding meter accuracy in the section below.

3.1 Accuracy Limits

Table 1 below summarizes the allowable error in percent registration for each test by meter type. Since meters of this type are not adjustable, any one which tests outside of these limits should be removed from service. For full and light load tests, specified percent errors do not refer to the average error of the two tests. In all cases, the specified errors in percent registration apply to the result of each test individually.

Table 1 – Single-phase, solid-state meter test accuracy limits (except Washington)

	Allowable Percent Error by Test Type		
Meter Type	%FL	%LL	%PF
0.2 Accuracy Class — Example: KV(2), ALPHA(+)	±0.5	±1.0	NA
0.5 Accuracy Class — Example: Centron	±0.5	±1.0	NA

Table 2 – Single-phase, solid-state meter test accuracy limits (Washington only)

	Allowable Percent Error by Test Type		
Meter Type	%FL	%LL	%PF
0.2 Accuracy Class — Example: KV(2), ALPHA(+)	±0.5	±0.5	NA
0.5 Accuracy Class — Example: Centron	±0.5	±0.5	NA

Three-Phase, Solid-State Meter Accuracy Limits

1 Scope

This section describes the allowable accuracy limits for three-phase, solid-state meters. The policies presented herein address both self-contained and instrument-rated meters and explain when to retire meters, and when meters meet company standards based on percent registration. High end solid state meters are excluded from this standard.

2 Tests to Be Performed

2.1 Self-Contained, Three-Phase, Solid-State Meters

For this meter type, a series full load, light load, and power factor test should be performed whenever the meter is tested. It is not necessary to perform single-element tests for this meter type unless a problem with an element is suspected.

2.2 Instrument-Rated, Three-Phase, Solid-State Meters

For this meter type, a series full load, light load, and power factor test should be performed along with a single-element full load test for each of the meter's elements whenever the meter is tested.

3 Accuracy Limits and Meter Removal Criteria

The purpose of this section is to prescribe limits of accuracy and meter removal criteria for this meter type and to outline procedures that will reasonably assure compliance with the requirements of this section. The general requirements given in section 3.1 of MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* should be observed along with the instructions regarding meter accuracy in the section below.

3.1 Accuracy Limits

Table 1 below summarizes the allowable error in percent registration for each test by meter type. Since meters of this type are not adjustable, any one which tests outside of these limits should be removed from service. For full and light load tests, specified percent errors do not refer to the average error of the two tests. In all cases, the specified errors in percent registration apply to the result of each test individually. Allowable error in percent registration for Washington is ±0.5% for all solid state meter tests.

Table 1 – Three-phase, solid-state meter test accuracy limits (except Washington)

	Allowable Percent Error by Test Type					
Meter Type	%FL	%LL	%PF	A-FL	B-FL	C-FL
Self-Contained	±0.5	±1.0	±1.0	NA	NA	NA
Instrument-Rated	±0.5	±1.0	±1.0	±1.0	±1.0	±1.0

Three-Phase, Electro-Mechanical and Hybrid Meter Accuracy Limits

1 Scope

This section describes the allowable accuracy limits for three-phase, electro-mechanical and hybrid meters. The policies presented herein address both self-contained and instrument-rated meters and explain when to retire meters, and when meters meet company standards based on percent registration and age of the meter.

2 Tests to Be Performed

For both self-contained and instrument-rated meters of this type, a series full load, light load, and power factor test should be performed along with a single-element full load test for each of the meter's elements whenever the meter is tested.

3 Accuracy Limits and Meter Removal Criteria

The purpose of this section is to prescribe limits of accuracy and meter removal criteria for these meter types and to outline procedures that will reasonably assure compliance with the requirements of this section. The general requirements given in section 3.1 of MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* should be observed along with the instructions regarding meter accuracy in the section below.

3.1 Accuracy Limits

Table 1 below summarizes the allowable error in percent registration for each test by meter type. Table 2 then describes the actions that should be taken based on the test results. For full and light load tests, specified percent errors do not refer to the average error of the two tests. In all cases, the specified errors in percent registration apply to the result of each test individually.

Table 1 – Action chart by meter age and test results

Meter Type	Meter Error	Action to be Taken
Self Contained	Any test less than +/-1.0%	Do not adjust. Leave in service.
	Any test greater than +/-1.0%	Do not adjust. Remove from service.
Instrument Rated	Remove from service.	

Meter Testing

1 Scope

This document establishes PacifiCorp company standards for testing of new and used meters.

2 General

The list below summarizes PacifiCorp's standard meter testing requirements for new and used meters. These requirements are the minimum and do not cover any other procedural testing deemed necessary by local management.

2.1 New Meters

The testing requirements for new meters shall include the following:

Certified test data:	Manufacturers shall provide certified test data for all new meters purchased by PacifiCorp.
Instrument-rated meters:	All new instrument-rated meters shall be tested by PacifiCorp before or within the 90 day installation check-back period.
Self-contained meters:	Samples of new self-contained meters shipped to PacifiCorp shall be scheduled for testing.

2.2 Used Meters

The testing requirements for used meters shall include the following:

In-service meters:	All in-service meters that were scheduled to be tested as part of the annual metering test program shall be tested.
Obsolete meters:	Obsolete meters that are on the annual meter test program shall be tested before removal from service for retirement. All other obsolete meters shall not be tested before retirement.
Return-to-service meters:	A meter that has been removed from one service address shall be tested before it is installed at another service address. Meters that are re-assigned from one account to another account at the same service address need not be tested.

In-Service Meter Test Program

1 Scope

The purpose of this document is to establish an annual in-service test program for all PacifiCorp owned revenue watt-hour meters in order to meet company requirements and to conform to the state regulatory agencies' approved use of the American National Standards Institute (ANSI) standard C12.1 guidelines.

2 Program Purpose

The annual in-service meter performance test program provides meter plant performance data for a year-end statistical analysis to insure that metering accuracy standards are being maintained throughout the service life of meters.

3 Test Program

The annual in-service test program is divided into two categories: statistical sampling tests, and periodic interval tests. Meters are assigned to one of the two testing categories based on the billing multiplier as provided by the company's Customer Service System (CSS).

- All in-service meters with a meter multiplier of 40 or less fall into the statistical sampling test category.
- All in-service meters with meter multiplier greater than 40 fall into the periodic interval test category.

3.1 Scheduling

The meters to be tested for the annual tests shall be selected and scheduled for testing in January each year. All metering test data for the previous year shall be entered before January 1st.

4 Statistical Sampling Tests

The PacifiCorp statistical sampling in-service test program is based on ANSI/ASQC standard Z1.9 *Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming*.

The sample size and meters to be tested shall be determined by the following procedure:

1) Each category of meters shall be divided into homogeneous groups by manufacturers' models, with sub-groupings determined by significant manufacturing design changes.
2) The population of each homogeneous group shall be determined.

3) The sample size to be tested for each homogeneous group shall be selected from the ANSI/ASQC Z1.9 table. The sample size is based on the population of the homogeneous group.
4) Each meter in the sample shall be drawn at random; that is, each meter in a homogeneous group must have an equal chance to be selected.

5 Periodic Interval Tests

Periodic testing provides a fixed interval of two, eight and sixteen years between tests. To select meters for periodic testing, the following interval schedule shall be used:

Table 1 – Interval schedule for testing

Meter Multiplier	Test Interval
Greater than 600	2 years
80-600	8 years
>40 and less than 80	16 years

1) Count the total number of meters in the periodic testing category that have meter multipliers as shown in the above table.
2) Divide each total by the periodic time interval indicated. The result is the number of meters which will be scheduled for testing that year. Scheduling this number of meters results in a fairly constant test count each year.
3) To determine which meters in each group should be tested, schedule meters without test dates first and then those meters with the oldest test dates next until the number of meters found for each group in the previous step is reached.

6 Analysis

After the end of each calendar year, the meter test data and as-found condition codes (AFCC) shall be analyzed and recommendations shall be made regarding ANSI/ASQC Z1.9 failed meter models and to models with excessive AFCC counts in critical categories. Models that may need to be placed on the retirement list shall be determined.

Meter Retirement List

1 Scope

This document summarizes PacifiCorp's company policy concerning meters which should be retired according to meter type. It does not include retirement criteria based on meter accuracy test results. Refer to MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* for information pertaining to retirement criteria based on meter accuracy.

2 General Policy

Meters with the following characteristics are considered obsolete and should be retired.

- Meters with jewel bearings.
- Mechanical demand meters.
- Thermal demand meters.
- A-base meters which have been removed from service.
- Meters with any manufacturing or design defect which causes inaccuracy in a significant percentage of the meter type.
- Any meter type which no longer has software support.
- Any meter with an "OBS" MERC (Meter Equipment Retirement Code)

3 Meter Retirement List

Table 1 below summarizes the meter types that should be retired according to the characteristics described above.

Table 1 – Meters to be retired by model and register type

Model	Register	Action	Notes
J3S	MECH KWH	Retire	
J5S	IMS-I200	Retire	Hexagram
P30	MECH KWH	Retire	
PW	MECH KWH	Retire	
All	DE-5	Retire	Mechanical Demand
All	ST-D101	Retire if reprogramming is required	
All	ST-MT100	Retire if reprogramming is required	
All	CTR-101	Retire if reprogramming is required	
All	CTR-102	Retire if reprogramming is required	
MQS	MECH KWH	Retire	Jewel Bearing
CS	MECH KWH	Retire	Jewel Bearing
D2S	MECH KWH	Retire	Jewel Bearing
D5S	All	Retire	Failed Sample Test
Poly-Phase D2	MECH KWH	Retire	Jewel Bearing
All	EMF-2110	Retire if reprogramming is required	
All	EMF-2430	Retire if reprogramming is required	
All	MARK III	Retire	Mechanical Demand

Model	Register	Action	Notes
MS	PDR	Retire if reprogramming is required	
MS	DDMS	Retire if reprogramming is required	
MS	DTMS	Retire if reprogramming is required	
MT	PDR	Retire if reprogramming is required	
All	T-90	Retire if reprogramming is required	
All	TM-81	Retire if reprogramming is required	
All	TM-91	Retire if reprogramming is required	
All	TMR-900	Retire if reprogramming is required	
All	TMR-92	Retire if reprogramming is required	
I	MECH KWH	Retire	Jewel Bearing
I-16-S	MECH KWH	Retire	Jewel Bearing
I-30-S	MECH KWH	Retire	Jewel Bearing
All	M-90	Retire if reprogramming is required	
V-2	MECH KWH	Retire	Jewel Bearing
V-3	MECH KWH	Retire	Jewel Bearing
V-4	MECH KWH	Retire	Jewel Bearing
V-5	MECH KWH	Retire	Jewel Bearing
V-6	MECH KWH	Retire	Jewel Bearing
V-9	MECH KWH	Retire	Jewel Bearing
All	M-30	Retire	Mechanical Demand
All	M-50	Retire	Mechanical Demand
All	M-60	Retire	Mechanical Demand

Retirement Policy: Failed Statistical Sampling Test Program Meters

1 Scope

This document provides PacifiCorp's policy and the method used to determine if a meter group or sub group should be retired based on the analysis of the annual in-service statistical sampling test data for revenue meters. This policy also establishes the procedure to be followed if a homogeneous meter group fails to meet the acceptable accuracy performance criteria.

2 References

ANSI C12.1, Method 1, *Code for Electricity Metering*

ANSI Z1.9, *Sampling Procedures and Tables for Inspection by Variables for Percent Non-Conforming* (ASQC)

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 7.4 *In-Service Meter Test Program*

3 Definitions

Weighted average: Four times the percent accuracy at full load plus one times the percent accuracy at light load divided by 5. (Wt avg = (4FL+LL)/5).

4 Purpose

The purpose of a retirement policy is to provide a proactive program to maintain the meter plant within an acceptable level of accuracy and maintainability as mandated by state laws, rules and policies.

5 General

The company conducts an annual in-service statistical sampling test program for revenue meters as detailed in MOPP 7.4 *In-Service Meter Test Program.* Individual state rules or utility commission policies may have more stringent meter evaluation and retirement requirements than what are outlined herein. The company will base any retirement program on the analysis of the sampling test data in order to insure the meters are operating with an acceptable degree of accuracy throughout their service life.

6 Retirement Constraints

All failed meter group retirements are subject to the following constraints:

1) The retirements of meters are to be under a company-approved plan. The plan will include a budgeting requirement estimate and implementation program. The meters are to be retired as scheduled in the company-approved implementation program.
2) All meters that meet the retirement criteria and are under warranty shall be returned to the manufacturer.

7 Scheduled Test

If a meter is to be tested as part of the scheduled statistical sampling test program and the meter is on the company meter retirement list, it shall be tested first then retired.

8 Customer Requested Meter Test

If a meter is to be tested as a result of a customer request for meter test, and the meter is on the company meter retirement list, it shall be tested first, then the retirement procedure contained in MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* should be followed.

9 Meter Site Visit

If a meter site is being visited for any reason other than for a scheduled test or customer requested test, and the meter is on the company meter retirement list, it shall be removed from service and retired without testing.

Remove from service any meter that may be a potential hazard to personnel or equipment.

10 Standards Used to Determine Sampling Quantities and Acceptable Performance

ANSI Z1.9 Part II, *Double Specification Limit, Paragraph B 12.1.1;* Acceptable Quality Level (AQL) of 2.5%, inspection level of GII shall be used to determine sampling quantities and acceptability criteria for the meter statistical sample testing program.

The weighted average values (Method 1 of *ANSI C12.1*) shall be used in the sampling analysis to determine whether the meter group exceeds the threshold criteria. Only meters with a weighted average percent registration between 95% and 105% are included in the analysis. A meter with registration accuracy performance beyond 5% normally results from either physical damage or an abnormal electrical experience.

11 Failed Sample Test Retirement Program Procedures

If a meter group exceeds the Threshold Criteria, 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 meter 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 re-evaluated. An evaluation of design and/or manufacture deficiencies will be performed on the failed meter group and identifiable subgroups.
- If, for the second consecutive year, the meter group exceeds the threshold criterion, the meter group or identified subgroup will be declared obsolete. The sample-testing program for the obsolete meter group already scheduled will be completed.
- The company will implement a retirement program for the identified obsolete meter group. The obsolete meter group retirement program will be based upon relevant state rules or utility commission approved policies. If no applicable state rules or policies exist, the obsolete meter group retirement program will be based upon accuracy trends, meter group size, risk to customers, and economic impact on the company and work force considerations. However, no obsolete meter group will be allowed to remain in service longer than twelve (12) years from the date it was declared obsolete.
- Annual random sample testing of the obsolete meter group will normally continue until all meters have been removed from service. The company will analyze the data annually to determine if the obsolete meter retirement program requires modification.

Retirement Policy: High Maintenance Meters

1 Scope

This document provides PacifiCorp's policy and the method used to determine if an identified group of meters should be retired based upon either an unacceptable failure rate due to normal use or excessively difficult or expensive maintenance costs. This policy also establishes the procedure to be followed to institute a high maintenance meter retirement program exclusive of any replacement program mandated by utility commission agreement.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

3 Purpose

The purpose of a retirement policy is to provide a proactive program to maintain the meter plant within an acceptable level of accuracy and maintainability as mandated by state laws, rules and policies.

4 Definitions

High maintenance meter group: 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.

5 General

The company will base any retirement program for high maintenance meters on the analysis of field data and experience in addition to manufacturer advisories in order to insure the meters are operating with an acceptable degree of accuracy and maintainability throughout their service life.

6 Retirement Constraints

All high maintenance meter group retirements are subject to the following constraints:

1) The retirements of meters are to be under a company-approved plan. The plan will include a budgeting requirement estimate and implementation program. The meters are to be retired as scheduled in the company approved implementation program.
2) All meters that meet the retirement criteria and are under warranty shall be returned to the manufacturer.

7 Scheduled Test

If a meter is to be tested as part of the scheduled statistical sampling test program and the meter is on the company meter retirement list, it shall be tested first then retired.

8 Customer Requested Meter Test

If a meter is to be tested as a result of a customer request for meter test, and the meter is on the company meter retirement list, it shall be tested first, then the retirement procedure contained in MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria* is to be followed.

9 Meter Site Visit

If a meter site is visited for any reason other than for a scheduled test or customer requested test, and the meter is on the company meter retirement list, it shall be removed from service and retired without testing.

Remove from service any meter that may be a potential hazard to personnel or equipment.

10 High Maintenance Meter Analysis

Meter Engineering shall evaluate annually the results from the annual statistical sample and periodic test programs, meters classified as uniquely defective, manufacturers' advisory announcements, and company field reports to determine if any meter group, model or subgroups qualify as a high maintenance meter group.

The evaluation will recognize meters with design or manufacturing deficiencies that demonstrate an excessive number of premature failures, or defects that lead eventually to accuracy problems or meters that are developing a history of poor performance. High maintenance meter groups may not necessarily fail the acceptability criteria of the statistical sample-testing program but their frequency of problems or maintenance requirements are excessively high.

11 High Maintenance Meter Retirement Procedure

An identified high maintenance meter group will be removed from service under an approved

company mandated retirement program. The retirement program will be based upon state regulatory requirements, failure types, failure rates, group quantity, risk to customers, corporate economic impact and work force considerations.

Annual random statistical sample testing of the high maintenance meter group will normally continue until all of the meters have been removed from service. The company will analyze the scheduled test data as well as conduct ongoing failure and maintenance evaluations annually to determine if the retirement program requires modification.

Retirement Policy: Special Problem Meters

1 Scope

This document provides PacifiCorp's policy and the method used to determine if an identified group of meters should be retired based upon either an unacceptable failure rate due to manufacturer defects or excessively expensive to track, test, analyze and maintain. This policy also establishes the procedure to be followed to institute a special problem meter retirement program exclusive of any replacement program mandated by utility commission agreement.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

3 Purpose

The purpose of a retirement policy is to provide a proactive program to maintain the meter plant within an acceptable level of accuracy and maintainability as mandated by state laws, rules and policies.

5 Definitions

Special problem meter group: An identified group or subgroup of meters, from a single manufacturer, which suffers premature failures due to manufacturer defects. Also included are meter groups of less than 100, manufactured more than 40 years ago, which, in the determination of the company, are excessively expensive to track, test, analyze and maintain.

6 General

The company will base any retirement program for special problem meters on the analysis of field data and experience, in addition to manufacturer advisories, in order to insure the meters are operating with an acceptable degree of accuracy and maintainability throughout their service life.

7 Retirement Constraints

All special problem meter group retirements are subject to the following constraints:

1) The retirements of meters are to be under a company-approved plan. The plan will include a budgeting requirement estimate and implementation program. The meters are to be retired as scheduled in the company approved implementation program.
2) All meters that meet the retirement criteria and are under warranty shall be returned to the manufacturer.

8 Scheduled Test

If a meter is to be tested as part of the scheduled statistical sampling test program and the meter is on the company meter retirement list, it shall be tested first then retired.

9 Customer Requested Meter Test

If a meter is to be tested as a result of a customer request for meter test, and the meter is on the company meter retirement list, it shall be tested first, then the retirement procedure contained in MOPP 7.2 is to be followed.

10 Meter Site Visit

If a meter site is visited for any reason other than for a scheduled test or customer requested test, and the meter is on the company meter retirement list, it shall be removed from service and retired without testing.

Remove from service any meter that may be a potential hazard to personnel or equipment.

11 Special Problem Meter Analysis

Meter Engineering shall evaluate annually the results from the annual statistical sample and periodic test programs, meters classified as uniquely defective, manufacturers' advisory announcements, and company field reports to determine if any meter group, model or subgroup qualifies as a special problem meter group.

The evaluation will recognize meters with design or manufacturing deficiencies that demonstrate premature failures, or defects that lead eventually to accuracy problems or meters that are developing a history of poor performance. The special problem meter group may not necessarily fail the acceptability criteria of the statistical sample-testing program, but their frequency of problems or maintenance requirements are excessively high.

12 Special Problem Meter Retirement Procedure

An identified special problem meter group will be removed from service under an approved

company mandated retirement program. The retirement program will be based upon state regulatory requirements, failure types, failure rates, group quantity, risk to customers, corporate economic impact and work force considerations.

Annual random statistical sample testing of the special problem meter group will normally continue until all of the meters have been removed from service. The company will analyze the scheduled test data as well as conduct ongoing failure and maintenance evaluations annually to determine if the retirement program requires modification.

Retirement Plan: Jewel Bearing Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring jewel bearing meters.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 7.3 *Meter Testing*

MOPP 9.3.1 *Meter Retirement List*

MOPP 9.3.3 *Retirement Policy: Failed Statistical Sampling Test Program Meters*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.6.1 *Retirement Plan: GE I14, I16, I20*

MOPP 9.3.6.4 *Retirement Plan: Westinghouse Model D Meters*

3 General

Meters manufactured with jewel bearings are the oldest types of meters on PacifiCorp's system. Jewel bearing meters are typically 120-volt and 120/240-volt electro-mechanical, single-phase meters. Jewel bearing meters were no longer manufactured after the 1950's.

4 Historical Information

The list below is a brief history of the jewel bearing meters at PacifiCorp.

- The jewel bearing meter types have been in MOPP 9.3.1 for numerous years.
- Utilities and manufacturers have long considered jewel bearing type meters to be obsolete technology.
- Many of the earlier models of jewel bearing meters were equipped with "non-surge-proof" magnets.
- Based on a developing history of inaccuracy, the Oregon Public Utilities Commission staff directed Pacific Power to remove all jewel-bearing meters. Subsequently, jewel bearing meters installed in the Pacific Power tariff areas were retired from service before 1997 under a multi-year plan. Metermen in the Rocky Mountain Power tariff areas have been retiring jewel bearing meters whenever the meter required testing or maintenance due to the meter's age and poor accuracy performance trend reputation.

5 Retirement Reasons

The reasons why PacifiCorp is retiring all jewel bearing meters are given in sections 5.1 through 5.5.

5.1 High Maintenance Meter Classification

All meter models using jewel bearings in their construction meet the qualifications of MOPP 9.3.4 for retirement.

5.2 Maintenance

It is not economical for PacifiCorp to perform any maintenance or repair on jewel bearing meters.

Many jewel bearing meters were equipped with “non–surge–proof” magnets.

5.3 Accuracy

Some homogeneous groups of jewel bearing type meters have failed the Scheduled Statistical Sample Testing Analysis Program per MOPP 9.3.3.

Trending analysis indicates that meters equipped with jewel bearings are failing standard accuracy performance requirements (+ 2%) for the following reasons:

- The jewel bearings are wearing out; causing an increase in friction that slows the meter resulting in loss of accuracy normally.
- The earlier models are equipped with magnets that lose their magnetism over time - causing the meter’s accuracy to decrease.
- High loads can cause the disk to “float” and drag against the magnet. This causes the meter to run slow.

5.4 Obsolete Technology

The meters were manufactured using a now obsolete technology.

5.5 Age

Jewel bearing meters, were, for the most part, installed over 45 years ago.

6 Financial Risk Evaluation

The jewel bearing type meters are typically set on small, older residential customer accounts consuming below average quantities of energy. The jewel bearing type meters performance has been evaluated to be of minor financial risk to customers and the company.

7 Retirement Program

The company's retirement program for all jewel bearing meters is outlined in MOPP 9.3.6.1 through MOPP 9.3.6.4.

7.1 Meters in Stock

Retire all meters with jewel bearings found in stock.

7.2 Meter Site Visit

If a jewel bearing meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.3 Scheduled Test

If a jewel bearing meter is to be tested as part of the scheduled statistical sampling test program it shall be tested first then retired.

Unless a small quantity remains in the model group, jewel–bearing meters will be scheduled for test as part of the annual in–service statistical sampling test program.

If the meter model group fails the Scheduled Statistical Sample Testing Analysis Program, a specific retirement program for the model will be established.

7.4 Customer Requested Meter Test

If a jewel bearing meter is to be tested as a result of a customer request for meter test, it shall be tested first, then the retirement procedure contained in MOPP 7.2 is to be followed.

7.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: General Electric I-14, I-16, and I-20 Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring General Electric I-14, I-16, and I-20 meters.

2 References

The references and resource documents listed below apply to the extent specified in the body of this standard.

ANSI Z1.4 *Sampling Procedures and Tables for Inspection by Attributes* (ASQC)

ANSI Z1.9 *Sampling Procedures and Tables for Inspection by Variables for Percent Non-Conforming* (ASQC)

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.1 *Meter Retirement List*

MOPP 9.3.3 *Retirement Policy: Failed Statistical Sampling Test Program Meters*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.6 *Retirement Plan: Jewel Bearing Meters*

3 General

The I-14, I-16, and I-20 meters are jewel-bearing type 120-volt and 120/240-volt electro-mechanical, single-phase meters manufactured by General Electric. Models I-14, I-16, and I-20 were produced from 1914 to 1936; therefore, the newest I-14, I-16, and I-20 meter still in service is at least 64 years old.

4 Historical Information

Models I-14, I-16, and I-20 have been in MOPP 9.3.1 for numerous years since they utilize jewel bearings. They also were equipped with "non-surge proof" magnets. For more information refer to MOPP 9.3.6.

Testing of these models was halted during 1998 and 1999. As of January 1, 2000, General Electric I-14, I-16 and I-20 meters were again made part of the annual in-service statistical sampling test program in order to confirm their rate of performance deterioration.

Based on a developing history of inaccuracy, the Oregon Public Utilities Commission staff directed Pacific Power to remove all jewel-bearing meters. Subsequently, the General Electric I-14, I-16, and I-20 meters installed in the Pacific Power tariff areas were retired from service before 1996 under a multi-year plan. Metermen in the Rocky Mountain Power tariff areas have been retiring General Electric I-14, I-16 and I-20 meters whenever the meter required testing or maintenance due to the meter's age and poor accuracy performance.

5 Retirement Reasons

The six reasons why I-14, I-16 and I-20 meters should be retired are given in sections 5.1 through 5.6.

5.1 Accuracy

The I-14, I-16 and I-20 meters have failed the Scheduled Statistical Sample Testing Analysis Program. Meter testing data from 1994, 1995, 1996 and 1997 confirms erratic accuracy of the remaining General Electric I-14, I-16 and I-20 meters' meter population. The meter sample test accuracy falls outside of the limits of ANSI Z1.9 and Z1.4 standards. State Commission regulations require all meters accuracy to have an error of less than +/- 2%. An average of 13.3% of the General Electric I-14, I-16 and I-20 meters tested in 1997 were found to exceed the +/- 2% limit, which is unacceptable. For more details, refer to MOPP 9.3.3.

5.2 High Maintenance Meter Classification

Models I-14, I-16 and I-20 meet the qualifications of MOPP 9.3.4.

5.3 Maintenance

Models I-14, I-16 and I-20 are equipped with "non-surge proof" magnets.

5.4 Jewel Bearing Meter Classification

These meters meet the qualifications of 7R.100 for retirement.

5.5 Obsolete Technology

These meters were manufactured using a now obsolete technology.

5.6 Age

These meters were, for the most part, installed over 64 years ago.

6 Financial Risk Evaluation

General Electric I-14, I-16 and I-20 meters are typically set on very small, very old residential customer accounts consuming far below average quantities of energy. Their homogeneous groups' poor performance has been evaluated to be of minor financial risk to customers and the company.

The replacement of these meters with modern socket models will normally require the installation of an A-base adapter at the company's expense, or an upgrade of the meter service equipment at customers' expense.

7 Specific Retirement Program for General Electric I-14, I-16, and I-20 Meters

7.1 Stock

Retire all General Electric I-14, I-16 and I-20 meters found in stock.

7.2 Meter Site Visit

If a General Electric I-14, I-16 or I-20 meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.3 Scheduled Test

If a General Electric I-14, I-16 or I-20 meter is to be tested as part of the scheduled statistical sampling test program it shall be tested first then retired.

Unless a small quantity remains in the model group, these meters will be scheduled for test as part of the annual in-service test program.

7.4 Customer Requested Meter Test

If a General Electric I-14, I-16 or I-20 meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

7.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: General Electric I-30 Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring General Electric I-30 meters.

2 References

The references and resource documents listed below apply to the extent specified in the body of this standard.

ANSI Z1.4 *Sampling Procedures and Tables for Inspection by Attributes* (ASQC)

ANSI Z1.9 *Sampling Procedures and Tables for Inspection by Variables for Percent Non-Conforming* (ASQC)

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.1 *Meter Retirement List*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.6 *Retirement Plan: Jewel Bearing Meters*

3 General

The I-30 meters are jewel bearing type 120-volt and 120/240-volt electro-mechanical, single-phase meters manufactured by General Electric. The I-30 meters were produced from 1937 to 1953; therefore, the newest I-30 meter still in service is at least 47 years old.

4 Historical Information

The I-30 meter-type has been in MOPP 9.3.1 for numerous years since it utilizes jewel bearings. For more details refer to MOPP 9.3.6.

Testing of the I-30 model has been part of the annual in-service statistical sampling test program since recorded history.

Based on a developing history of inaccuracy, the Oregon Public Utilities Commission staff directed Pacific Power to remove all jewel-bearing meters. Subsequently, the GE I-30 meters installed in the Pacific Power tariff areas were retired from service before 1996 under a multi-

year plan. Metermen in the Rocky Mountain Power tariff areas have been retiring I-30 meters whenever the meter required testing or maintenance due to the meter's age and poor accuracy performance.

5 Retirement Reasons

The five reasons why the General Electric I-30 meters should be retired are listed in sections 5.1 through 5.5.

5.1 Accuracy

The I-30 model has failed the Scheduled Statistical Sample Testing Analysis Program. Meter testing data from 1995, 1996, 1997, 1998 and 1999 confirms erratic accuracy of the remaining General Electric I-30 meter population. The meter sample test accuracy falls outside of the limits of ANSI Z1.9 and Z1.4 standards. State commission regulations require all meters accuracy to have an error of less than +/- 2%. An average of 4.8% of the General Electric I-30 meters tested in 1999 were found to exceed the +/- 2% limit, which is unacceptable.

5.2 High Maintenance Meter Classification

The I-30 meter-type meets the qualifications of MOPP 9.3.4 for retirement.

5.3 Jewel Bearing Meter Classification

The I-30 meter-type meets the qualifications of MOPP 9.3.6 for retirement.

5.4 Obsolete Technology

The I-30 meters were manufactured using a now obsolete technology.

5.5 Age

These meters were, for the most part, installed over 47 years ago.

6 Financial Risk Evaluation

The General Electric I-30 meters are typically set on small older residential customer accounts using below average quantities of energy.

The General Electric I-30 meters homogeneous groups' poor performance has been evaluated to be of minor financial risk to customers and the company.

7 Specific Retirement Program for General Electric I-30 Meters

7.1 Stock

Retire all General Electric I-30 meters found in stock.

7.2 Meter Site Visit

If a General Electric I-30 meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.3 Scheduled Test

If a General Electric I-30 meter is to be tested as part of the scheduled statistical sampling test program, it shall be tested first then retired.

Unless a small quantity remains in the model group, these meters will be scheduled for test as part of the annual in-service test program.

7.4 Customer Requested Meter Test

If a General Electric I-30 meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

7.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: Westinghouse Model C Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring Westinghouse model C meters.

2 References

ANSI Z1.4 *Sampling Procedures and Tables for Inspection by Attributes* (ASQC)

ANSI Z1.9 *Sampling Procedures and Tables for Inspection by Variables for Percent Non-Conforming* (ASQC)

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.1 *Meter Retirement List*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.6 *Retirement Plan: Jewel Bearing Meters*

3 General

The model C meters are jewel bearing type 120-volt and 120/240-volt electro-mechanical, direct connect, single-phase meters manufactured by Westinghouse. The C meters were produced from 1933 to 1953; therefore, the newest model C meter still in service is at least 47 years old.

4 Historical Information

The model C meter type has been on the MOPP 9.3.1 for numerous years since it utilizes jewel bearings. For more details refer to MOPP 9.3.6.

Testing of model C meters was part of the annual in-service statistical sampling test program until 1998. During 1998 and 1999 the C meter group was placed on an eight-year periodic schedule to increase the number of site visits and resulting retirements. At the direction of the Meter Standards Team, as of January 1, 2000, the C meters were made part of the annual in-service statistical sampling test program in order to annually evaluate their rate of performance deterioration.

Based on a developing history of inaccuracy, the Oregon Public Utilities Commission staff directed Pacific Power to remove all C meters. Subsequently, the C meters installed in the

Pacific Power tariff areas were retired from service before 1996 under a multi-year plan. Metermen in the Rocky Mountain Power tariff areas have been retiring C meters whenever the meter required testing or maintenance due to the C meter's age and poor accuracy performance.

5 Retirement Reason

The reasons why the Westinghouse model C meters should be retired are given in sections 5.1 through 5.5.

5.1 Accuracy

The model C meters failed the Scheduled Statistical Sample Testing Analysis Program for 1995, 1996 and 1997. The periodic testing program during 1998 and 1999 confirmed the erratic accuracy of the remaining C meter population. The meter sample test accuracy falls outside of the of ANSI Z1.9 and Z1.4 standards limits. State commission regulations require all meters to have an error of less than +/- 2%. For example, 8.2% of the C meters sample tested during 1997 were found to exceed the +/- 2% limit, which is unacceptable.

5.2 High Maintenance Meter Classification

The model C meter type meets the qualifications of MOPP 9.3.4 for retirement.

5.3 Jewel Bearing Meter Classification

The model C meter type meets the qualifications of MOPP 9.3.6 for retirement.

5.4 Obsolete Technology

The model C meters were manufactured using a now obsolete technology.

5.5 Age

These meters were, for the most part, installed over 47 years ago.

6 Financial Risk Evaluation

The model C meter is typically set on smaller residential customer accounts and a few small commercial accounts, such as traffic signals or timers.

This model C meter homogeneous group's poor performance has been evaluated to be of minor financial risk to customers and the company.

7 Specific Retirement Program for Westinghouse Model C Meters

7.1 Stock

Retire all model C meters found in stock.

7.2 Meter Site Visit

If a model C meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.3 Scheduled Test

If a model C meter is to be tested as part of the scheduled statistical sampling test program it shall be tested first then retired.

Unless a small quantity remains in the model group, these meters will be scheduled for test as part of the annual in-service test program.

7.4 Customer Requested Meter Test

If a model C meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

7.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: Westinghouse Model D Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring Westinghouse model D meters.

2 References

The references and resource documents listed below apply to the extent specified in the body of this standard.

ANSI Z1.4—1993, *Sampling Procedures and Tables for Inspection by Attributes* (ASQC)

ANSI Z1.9—1993, *Sampling Procedures and Tables for Inspection by Variables for Percent Non-Conforming* (ASQC)

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.1 *Meter Retirement List*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.6 *Retirement Plan: Jewel Bearing Meters*

3 General

The model D meters are jewel bearing type 120-volt and 120/240-volt electro-mechanical, direct connect, single-phase meters manufactured by Westinghouse. The D meters were produced from 1954 to 1960 as a replacement for the model C meters. Therefore, the newest model D meter still in service is at least 40 years old. The model D damping magnet was improved over the type used in the model C meters and does not have a "non-surge proof" magnet problem.

4 Historical Information

The model D meter type has been in the MOPP 9.3.1 for numerous years since it utilizes jewel bearings; refer to MOPP 9.3.6.

Testing of model D meters has been part of the annual in-service statistical sampling test program since their installation.

Based on a developing history of inaccuracy, the Oregon Public Utilities Commission staff directed Pacific Power to remove all D meters. Subsequently, the D meters installed in the Pacific Power tariff areas were retired from service before 1996 under a multi-year plan. Metermen the Rocky Mountain Power tariff areas have been retiring D meters whenever the meter required testing or maintenance since the D meters are on the jewel bearing meter retirement list.

5 Retirement Reasons

The Westinghouse model D meter should be retired for the reasons listed in sections 5.1 through 5.5.

5.1 Accuracy

The model D meters failed the Scheduled Statistical Sample Testing Analysis Program for 1995 and 1996 but passed in 1997. The model D meters failed the ANSI Z1.9 criteria and passed the ANSI Z1.4 criteria in 1998. The model D performance analysis passed the ANSI Z1.9 and failed the ANSI Z1.4 criteria in 1999. The accuracy performance has been marginal and erratic. State commission regulations require all meters to have an error of less than +/– 2%. For example, 5.3% of the D meters sample tested during 1999 were found to exceed the +/– 2% limit, which is unacceptable.

5.2 High maintenance Meter Classification

The model D meter type meets the qualifications of MOPP 9.3.4 for retirement.

5.3 Jewel Bearing Meter Classification

The model D meter type meets the qualifications of MOPP 9.3.6 for retirement.

5.4 Obsolete Technology

The model D meters were manufactured using a now obsolete technology.

5.5 Age

These meters were, for the most part, installed over 40 years ago.

6 Financial Risk Evaluation

The model D meter is typically set on small residential customer accounts and a few small commercial accounts timers.

This model D meter homogeneous group’s poor performance has been evaluated to be of minor financial risk to customers and the company.

7 Specific Retirement Program for Westinghouse Model D Meters

7.1 Stock

Retire all model D meters found in stock.

7.2 Meter Site Visit

If a model D meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.3 Scheduled Test

If a model D meter is to be tested as part of the scheduled statistical sampling test program, it shall be tested first then retired.

Unless a small quantity remains in the model group, these meters will be scheduled for test as part of the annual in–service statistical sampling test program.

7.4 Customer Requested Meter Test

If a model D meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

7.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: 30-Minute Mechanical Demand Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring all 30-minute mechanical demand meters regardless of manufacturer or manufacturing date.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.5 *Retirement Policy: Special Problem Meters*

3 General

The 30-minute electro-mechanical demand meters were installed where energy and demand registration was needed to meet tariff requirements. They were manufactured by a variety of companies.

4 Historical Information

Listed below is a brief history of the 30-minute demand interval mechanical meters.

- Pacific Power tariffs were changed to a 15-minute demand interval in 1993-1994.
- The 30-minute mechanical demand meters were classified by Pacific Power as "special problem meters" to be removed during site visits.
- Pacific Power tariff area metermen have been removing and retiring 30-minute mechanical demand meters whenever the meter site was visited.
- There are no 30-minute mechanical demand meters in the Utah tariff areas.

5 Retirement Reasons

5.1 Special Problem Meters Classification

The 30-minute mechanical demand meters meet the MOPP 9.3.5 retirement criteria for establishing a special problem meter group.

6 Demand Specific Special Problem Meter Retirement Program for 30-Minute Mechanical Meters

6.1 Stock

Retire all 30-minute mechanical demand meters found in stock.

6.2 Meter Site Visit

If a 30-minute mechanical demand meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

6.3 Scheduled Test

These meters will be scheduled for test as part of the annual in-service test program.

If a 30-minute mechanical demand meter is to be tested as part of the scheduled test program, it shall be tested first then retired.

6.4 Customer Requested Meter Test

If a 30-minute mechanical demand meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

6.5 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: Thermal Demand Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring all thermal demand meters regardless of manufacturer or manufacturing date.

2 References

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

3 General

The thermal demand meters were installed where energy and demand registration was needed to meet tariff requirements. They were manufactured by a variety of companies. These meters were produced from 1930 to 1978.

3.1 Historical Information

Thermal demand meters were classified years ago by both Rocky Mountain Power and Pacific Power as "high maintenance meters" to be removed during site visits.

Pacific Power tariff area metermen have been removing and retiring 30-minute thermal demand meters whenever the meter site was visited. Rocky Mountain Power tariff area metermen have usually removed and retired thermal demand meters when the meter site was visited.

4 Retirement Reasons

The four reasons why the thermal demand meters should be retired are listed in sections 4.1 through 4.4.

4.1 Accuracy

The thermal demand meters are difficult to read and to test accurately.

4.2 Special Problem

The thermal demand meters meet the MOPP 9.3.4 retirement criteria for establishing a high maintenance meter group. Thermal demand meters are excessively difficult and expensive to test and maintain. National ANSI standards suggest thermal demand meters

be tested and maintained every 16 years; however, thermal demand meters are impractical to test in the field or in a shop.

4.3 Obsolete Technology

Thermal demand meters were manufactured using a now obsolete technology.

4.4 Age

These meters were, for the most part, installed over 25 years ago.

5 Specific High Maintenance Meter Retirement Program for Thermal Demand Meters

5.1 Scheduled Removal

Any thermal demand meter identified in the meter records system, used in demand registration applications, is to be scheduled for removal and removed within 12-months from when identified.

5.2 Stock

Retire all thermal demand meters found in stock.

5.3 Meter Site Visit

If a thermal demand meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

5.4 Scheduled Test

If a thermal demand meter is to be tested as part of the scheduled test program it shall be tested first then retired.

These meters will be scheduled for test as part of the annual in-service statistical sample or periodic test and verification program.

5.5 Customer Requested Meter Test

If a thermal demand meter is to be tested as a result of a customer request for meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

5.6 Potential Hazard

Remove from service any meter that may be a potential hazard to personnel or equipment.

Retirement Plan: Mechanical Demand Meters

1 Scope

This implementation plan documents PacifiCorp's program for retiring all 15-minute and other interval mechanical demand meters regardless of manufacturer or manufacturing date.

2 References

ANSCI C12.11—1995, Method I, *Code for Electricity Metering*

MOPP 7.2 *Meter Accuracy Adjustment Limits and Retirement Criteria*

MOPP 9.3.4 *Retirement Policy: High Maintenance Meters*

MOPP 9.3.7 *Retirement Plan: 30-Minute Mechanical Demand Meters*

3 General

The electro-mechanical demand meters were installed where energy and demand registration was needed to meet tariff requirements. They were manufactured by a variety of companies.

This document refers to all meters with mechanical demand intervals with the exception of the 30-minutes mechanical demand meters, which are addressed in MOPP 9.3.7.

4 Historical Information

A study was conducted by Meter Engineering in 1994. At several sites, a mechanical demand meter was installed side by side with an electronic demand meter. The percent registration of the two meter types over several months was compared. The study showed that typically a three percent increase in demand registration was noted with an electronic register. This was due to the sliding demand interval capability of the electronic meter demand register.

The 15-minute mechanical demand meters were classified by PacifiCorp as "high maintenance meters" (too expensive to maintain on the ANSI recommended 8-12 year cycle) to be removed during site visits.

PacifiCorp metermen have been removing and retiring 15-minute mechanical demand meters if the upscale demand test was not accurate.

5 Retirement Reasons

The reasons why the mechanical demand meters should be retired are given in sections 5.1 through 5.2.

5.1 High Maintenance

The mechanical demand meters meet the MOPP 9.3.4 retirement criteria for establishing a high maintenance meter group. It was determined to not be economical for PacifiCorp to maintain mechanical demand meters.

Mechanical demand meters have an increasing failure rate due to lack of maintenance on the demand register.

5.2 Loss in Revenue

Electronic 15-minute demands are set by the peak “sliding” 15-minute demand interval. Mechanical 15-minute demands are set by a fixed 15-minute demand interval. An average three percent increase in demand is normally obtained by replacing mechanical demand with electronic demand meters.

6 Meter Retirement Criteria for Mechanical Demand Meters

6.1 Meter Site Visit

If a mechanical demand meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

6.2 Scheduled Test

If a mechanical demand meter is to be tested as part of the scheduled test program it shall be tested first then retired.

6.3 Customer Requested Meter Test

If a mechanical demand meter is to be tested as a result of a customer request for a meter test, it shall be tested first, and then the retirement procedure contained in MOPP 7.2 is to be followed.

6.4 Potential Hazard

Any meter that may be a potential hazard to personnel or equipment shall be removed from service.

6.5 Stock

All mechanical demand meters in stock shall be removed.

Retirement Plan: D5

1 Scope

This implementation plan documents PacifiCorp's program for retiring all Westinghouse Model D5 meters.

2 General

The Model D5 is 120-volt and 120/240-volt electro-mechanical, single-phase, direct connect meters manufactured by Westinghouse.

As of January 2012, there were 19,000 Westinghouse Model D5 meters.

Unless a small quantity remains in the D5 model group, these meters will continue to be scheduled for testing as part of the annual in-service statistical sampling test program.

3 Historical Information

Testing of the D5 meters has been part of the annual in-service statistical sampling test program.

4 Retirement Reasons

The D5 homogeneous meter group has failed the sample test accuracy limits of ANSI Z1.9 for two consecutive years, 2010 and 2011.

The standard MOPP *9.3.3: Failed Statistical Sampling Test Program Meters* defines the policy and method used to determine if a meter group or sub group should be retired based on the analysis of the annual in-service statistical sampling test data for revenue meters.

6 Financial Risk Evaluation

The D5 meters are typically installed on average use residential customer accounts.

The revenue effect on the company is negative since the failing meters are running slow, especially at light load.

The D5 meter homogeneous group failure rate has been evaluated to be of low financial risk to the company and no financial risk to customers.

7 Retirement Program for Westinghouse Meter Model D5:

The company's retirement program for all D5 meters is outlined in 7.1 through 7.4.

7.1 Meters in Stock

Retire all D5 meters found in stock.

7.1 Meter Site Visit

If a Model D5 meter site is visited for any reason other than for a scheduled test or customer requested test, it is to be removed from service and retired without testing.

7.2 Scheduled Test

If a Model D5 meter is to be tested as part of the scheduled statistical sampling test program it shall be tested first and then retired.

7.3 Customer Requested Meter Test

If a Model D5 meter is to be tested as a result of a customer request for a meter test, it shall be tested first, and then the retirement procedure contained in company policy MOPP *7.2 Meter Accuracy Adjustment Limits Retirement Criteria* should be followed.

7.4 Potential Hazard

Any meter that may be a potential hazard to personnel or equipment shall be removed from service.

8 Authored by

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