METERING MANAGEMENT PLAN

September 2006

DOCUMENT RELEASE INFORMATION

Client	Economic Regulation Authorit Energy Safety
Project Name	Metering Code 2005
Document Number	3274025
Document Title	METERING MANAGEMENT PLAN
Revision Status	Approved by the ERA/ES

Document prepared by:

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WESTERN POWER CORPORATION

METERING MANAGEMENT PLAN

This document represents Western Power's Metering Management Plan, submitted in accordance with Regulation 9 (1) of the Electricity (Supply Standards and System Safety) Regulations 2001.

Signed: _____

MARK DE LAETER
GENERAL MANAGER
ASSET INTEGRATION DIVISION
NETWORKS

Date:

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1 Introduction

This Metering Management Plan (Plan) details Western Power's system to ensure that meters register within the margin of error referred to in Section 41 (4) of the Electricity Act 1945. The Plan complies with the requirements of AS/NZS 1284.13:2002 and has been written in mandatory and specific language to ensure that all staff clearly understand all requirements without any ambiguity. A sequential numbering system has been used for all headings.

Western Power will ensure compliance with the regulatory requirements that electricity tariff metering will register within the margin of error of the correct registration by sampling, testing and assessment of the meter population

2 Responsibility/ Reporting

The General Manager will be directly responsible to Western Power's Managing Director for the functional responsibility of the Metering Management Plan. Western Power's Metering Services Section is located within Asset Management Division.

The Metering Services Manager will have overall operational responsibility for the operation and implementation of the Plan. The Metering Services Manager reports to the Manager Customer Solutions Branch who in turn answers directly to the General Manager Asset Management Division.

A Strategist has been appointed who reports to the Metering Services Manager. The Strategist's role is to manage Western Power's Technical Services Group

The Strategist will be responsible for the day-to-day liaison with the Economic Regulatory Authority on matters relating to the Plan.

A chart outlining the organisational structure has been included in *Appendix A*.

3 Definitions

For the purposes of this Metering Management Plan the following definitions apply.

Basic current (Ib)	Value of current with which the relevant performance of a direct-connected meter is fixed.
Compliance testing period	Is the period that meters, categorised by accuracy class, can be left in-service before testing in accordance with this Metering Management Plan has to be carried out.
Meter accuracy class	Number, which gives the limits of permissible error, for all values of current between 0.1Ib and Imax for unity power factor (in the case of Polyphase meters with balanced loads) when the meter is tested under reference conditions.
Meter constant	Value expressing the relationship between the active energy registered by the meter and the corresponding (i) number of revolutions of the meter disk, in the case of electromechanical meters or (ii) value of the test output, in the case of electronic meters.
Pattern or type approval	The process whereby an impartial body examines the pattern or type (design) of a meter prototype against a set of national or international metrological specifications. This determines whether a meter is capable of retaining its calibration over a range of environmental and

	operating conditions and ensures that the meter is not capable of facilitating fraud.
Population	A quantity of meters produced under conditions that are considered uniform and where the meters have been assigned the same type number as indicated on the nameplate of the meter. Each population is assumed to consist of meters of a single pattern and to have been manufactured under the same conditions.
Power factor (p.f.)	Power Factor is the ratio of True Power to Apparent Power.
Rated current (In)	Value of current with which the relevant performance of a Current Transformer (CT) operated meter is fixed.
Reference conditions	Appropriate set of influence quantities and performance characteristics, with reference values, their tolerances and reference ranges, with respect to which the intrinsic error of a meter is specified.
Reference voltage	The value of voltage in accordance with which the relevant performance of the meter is fixed.

4 Synopsis

The Plan details the following methodologies:

- Implementation;
- Determination of populations;
- Determination of samples;
- Sampling plan;
- Metrology;
- Reporting; and
- Result analysis.

The Plan is based on the application of statistical sampling of the meter population to identify the performance of the various meter types in current service. Systematic sampling and testing will be conducted on in-service meters and meters taken out of service. It applies to the following categories of meter installations:

- direct-connected and transformer-connected meters;
- induction and static meter types; and
- both single-phase and poly-phase meters.

4.1 Sampling

The metrological performance of the electricity tariff meter population will be assessed by the use of statistical sampling. Statistical sampling provides an objective, acceptable methodology to determine the sampling risk, sample size, and an evaluation of the meter population.

4.2 Sample

The Plan identifies a meter sample as one or more meters taken from the population and used to determine the metrological performance of the population. The sample is randomly selected from the population so that each meter making up the population group has the same chance of selection and the probability of selection is known. The result can then be statistically evaluated, objectively interpreted and precision and reliability calculated.

4.3 Sampling plan

The metrological performance of a meter population for both accuracy and performance characteristics shall be assessed by sampling by attributes.

4.4 Attributes sampling

Sampling by attributes is an inspection method whereby for each of the test points the meter either 'passes' or 'fails' to meet the limits of the meter accuracy class. The number of fails are counted and compared to the requirements detailed in the Plan. A flowchart for attribute sampling is given in *Appendix B*.

5 Implementation

5.1 Initial Compliance period

At the commencement of the Plan all meters that are in-service are deemed to have a compliance-testing period shown in Table 1. These periods have been based on the expected serviceable life of meters.

TABLE 1. INITIAL IN-SERVICE COMPLIANCE PERIOD

Meter Accuracy Class	Error Limit	Compliance Testing Period
General Purpose	±2.0%	15 years
Class 1	±1.5%	10 years
Class 0.5	±0.75%	8 years
Class 0.2	±0.3%	4 years

Meters categorised by accuracy class that have been in-service for periods greater than the compliance periods shown in Table 1 shall be tested within 5 years from the commencement of the Plan.

In addition, the population of any new pattern or type of meter placed in service shall undergo testing within three years of being placed in-service.

An example of when meters are to be tested follows:

Example 1

The Plan commenced 2003.

A population of General-Purpose meters was placed in-service in 1984. From Table 1 the compliance period for these meters is 15 years. Because this particular meter population exceeds the compliance period of 15 years it will be tested within 5 years ie. by the end of 2008.

Example 2

The Plan commenced 2003.

A population of General-Purpose meters was placed in-service in 1988. From Table 1 the compliance period for these meters is 15 years. Therefore, this particular meter population is within the compliance period of 15 years and deemed to comply until the end of 2003. This meter population will be tested no later than the end of 2005.

6 Sampling

6.1 Determination of populations

The populations for the purposes of sampling are determined on the basis of:

- meter manufacturer; and
- meter type.

Western Power assigns each meter a code that identifies both the manufacturer and type. Details of when and where a meter is placed in service together with billing details are held in Western Power's Customer Information System (CIS).

The numbers of meters that make-up a population is obtained from CIS. CIS is interrogated to produce the following details for each meter:

- meter type;
- meter number;
- customer account number;
- location/address; and
- date installed.

The details, by meter type, are stored in electronic spreadsheet format. From these spreadsheets the quantity of meters that make up the populations are determined. The sample size is then based on the number of meters that make up the populations.

6.2 Determination of sample size

The number of meters that make-up the sample when sampling by attributes is given in Table 2.

TABLE 2

Number of meters in Population	Sample Size
2 – 8	2
9 - 15	3
16 – 25	5
26 – 50	8
51 – 90	13
91 – 150	20
151 – 280	32
281 – 500	50
501 – 1 200	80
1 201 – 3 200	125
3 201 – 10 000	200
10 001 – 35 000	315
35 001 – 150 000	500
150 001 – 500 000	800

Population numbers in excess of 500,000 meters shall be sub-divided into smaller groups and the sample sizes determined accordingly.

6.3 Random selection of sample

The meters that are to make up the sample are chosen at random from the population that is being tested at the time. A population is comprised of meters that have been assigned the same meter type number by the supply authority, for example an Email meter type 15M. New meter type numbers are assigned when the manufacturer has made changes to the pattern of the meter.

Only one population group is considered at any time. The electronic spreadsheets that contain the group populations have the capability to select an evenly distributed random sample that is based on the meter number. Details of the random sampling process are described in each of the spreadsheet files. The actual number of meters for each sample shall be increased by 10% above the required sample number to allow for the replacement of faulty or damaged meters.

6.4 Field testing

The lists of meters that make up the sample are processed through CIS and Service Orders are created. The Service Orders instruct field-metering officers to test the installed meter on-site in accordance with the requirements of Section 7 of the Plan. Should the meter be found not to comply with the accuracy or performance characteristics given in Table 1. and section 7. the meter shall be removed and replaced with a new meter. Notwithstanding this mandatory requirement the field-metering officer may be instructed to remove the installed meter after site testing and replace it with a new meter. The meter that has been removed shall be placed carefully, in a vertical position, into a suitable box and transported to Western Power's Electrical Standards Laboratory for further testing and result comparisons between field and laboratory assessment. Approximately 1% of the sample size shall be removed for additional tested in the laboratory.

7 Testing/Technical

7.1 Meter populations

Table 3 details the indicative meter populations grouped by meter type for single-phase meters and Table 4 details the indicative meter populations grouped by meter type for poly-phase meters. These tables also give the number of meter that makes up the sample.

TABLE 3. INDICATIVE SINGLE-PHASE METER POPULATION AND SAMPLE SIZE FOR ATTRIBUTE SAMPLING

Meter Type	Population	Attribute Sample Number	Meter Type	Population	Attribute Sample Number
5A	1,043	80	**15M**	299,078	800
5AF	19,782	315	**15PM**	24,252	315
5AM	30,954	315	**15W**	2,443	125
5M	29,280	315	**15D**	21,486	315
10AM	1,923	125	**15PD**	2,528	125
10AT	964	80	**101**	4,339	200
10M	10,732	315	**115**	3,088	125
10W	3,610	200	**118**	221	32
MCO	3,153	200			

TABLE 4. INDICATIVE POLY-PHASE METER POPULATION AND SAMPLE SIZE FOR ATTRIBUTE SAMPLING

Meter Type	Population	Attribute Sample Size
SDME	1,244	125
Ampy	3,244	125
E1	3,486	200
CT Meters (Mechanical)	3,556	200
A1	5,210	200
A1/Q3/Q4 CT Electronic	5,700	200
L&G	38,376	500
Direct Connected Meters (Mechanical)	303,783	800

7.2 Measurement points for accuracy testing

Table 5 details the load test points for each category of meter. For poly-phase meters, the accuracy figures relate to balanced currents.

TABLE 5

Category of Meter	Test Points			
	Light Load	Full Load	Full Load 2	Full Load 3
Direct-connected single-phase	0.1Ib	-	Lb	-
	p.f = 1	-	p.f = 1	-
Direct-connected poly-phase	0.1Ib	-	Lb	Lb
	p.f = 1	-	p.f = 0.5 lagging	p.f = 1
Transformer – connected	0.05In	In	In	2In or Imax whichever is the lesser
	p.f. = 1	p.f. = 1	p.f. = 0.5lagging	p.f. = 1

Ib = Basic current

Value of current with which the performance of a direct-connected meter is fixed

In = Rated current

Value of current with which the performance of a Current Transformer is fixed

7.3 Performance characteristics

In addition to the accuracy test points given in Table 5 meters shall be tested for compliance of:

- running at no-load (creep test); and
- operation of the register or display.

7.4 Running at no-load (induction meters)

Under the following conditions, the rotor of the meter shall start but not complete one revolution:

- Voltage: reference voltage on each phase.
- Current: 0.001Ib (p.f. = 1) in each phase, and connected for forward rotation.

7.5 Operation of register or display

It shall be verified that the relationship between the meter constant and the indication on the display complies with the marking on the nameplate. The test is carried out by applying a load and in the case of:

INDUCTION METERS

Counting the number of revolutions of the disk it takes for the fastest moving pointer or drum of the register to move between one number and the next.

- Electronic meters

Counting the number of pulses it takes for the least significant digit or fastest moving drum of the register to move by at least one digit.

Example

An induction meter has a constant of 800 revolutions per kWh with the fastest moving register dial marked in 1/10 kWh. Therefore, it should take 80 revolutions of the disk for the 1/10 dial pointer to move between one mark and the next for correct operation of the register.

7.6 Meter testing

Equipment used to determine accuracy and performance characteristics of the sample shall hold certificates of calibration that are traceable to National Standards through an unbroken chain via the Electrical Standards Laboratory's Primary Watt-Hour Artefact. The traceability chain is detailed in section 10.2.

Before meters are tested they shall be inspected for signs of damage or interference. Meters that show signs of damage shall be replaced with a suitable new meter. Regarding meters that show signs of tampering the field officer shall, immediately, contact the Revenue Protection Section of Western Power for possible further investigation.

Accuracy testing shall be carried out on each meter at the points given in Table 5. For each test point the calculated error of the meter shall be recorded onto the spreadsheet. The errors of each meter shall not exceed the error limits of Table 1. The spreadsheet shall indicate the result of the accuracy test as either a pass condition or a fail condition.

At the completion of accuracy testing the meters shall be subjected to:

- running at no-load; and
- a register check.

For each of the above performance characteristics the result is recorded as either a pass condition or fail condition on the spreadsheet.

8 Administrative Practices/Reporting

8.1 Reporting of results

The results of all the testing for a particular sample shall be recorded onto an electronic spreadsheet. The spreadsheet shall show, as a minimum, the details listed below for each meter tested from the sample:

- report number;
- meter Manufacturer;
- meter type;
- meter number;
- date of test;
- ambient temperature at time of test;
- relative humidity at time of test;
- average applied voltage;
- meter errors for each accuracy point; a negative sign indicates that a meter is slow;
- whether the meter (i) meets the accuracy requirement given in Table 1, in which case the spreadsheet will indicate 'pass' or (ii) the meter error is greater than the accuracy requirements given in Table 1, in which case the spreadsheet will indicate 'fail'; and
- whether each meter does or does not comply with the performance characteristics described in sections 7.3. to 7.5. Once again the spreadsheet will indicate this as a pass or fail.

An example of a completed spreadsheet is shown in *Appendix C*. The spreadsheet shall be profiled (saved) in the Document Management System (DMS) for future retrieval and analysis. The DMS profile title shall describe the population tested and any variance that the sample was based upon ie. meter type, then sub-population. The DMS file name and number shall appear on each page of the spreadsheet.

8.2 Result analysis

For each accuracy test and performance characteristic the number of passes are added and the number of fails are added. The sample, therefore the population, shall be considered as meeting the requirements of this Plan for each of the accuracy and performance characteristics if the number of meters that fail is equal to, or less than, the pass number given in Table 6 for each category of the test. See *Appendix C* for an example.

TABLE 6. SAMPLE SIZE AND PASS/FAIL LEVELS WHEN TESTING BY ATTRIBUTES

Population size	Sample Size	Full Load		Light Load		Run no Load Register		Register	
		PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL
2 – 8	2	0	1	0	1	1	2	0	1
9 - 15	3	0	1	0	1	1	2	0	1
16 – 25	5	0	1	0	1	1	2	0	1
26 – 50	8	1	2	1	2	1	2	1	2
51 – 90	13	1	2	2	3	3	4	1	2
91 – 150	20	2	3	3	4	5	6	2	3
151 – 280	32	3	4	5	6	7	8	3	4
281 – 500	50	5	6	7	8	10	11	5	6
501 – 1 200	80	7	8	10	11	14	15	7	8
- 3 200	125	10	11	14	15	21	22	10	11
3 201 – 10 000	200	14	15	21	22	21	22	14	15
10 001 – 35 000	315	21	22	21	22	21	22	21	22
35 001 – 150 000	500	21	22	21	22	21	22	21	22
150 001 – 500 000	800	21	22	21	22	21	22	21	22

If the population meets the requirements of this Plan then the meters that comprise the population shall be left in-service for the periods given in Table 7. Table 7 outlines the on-going compliance period for populations that meet the requirements. Meter population shall be re-tested after the periods shown in the table for the respective accuracy class.

TABLE 7. ON-GOING IN-SERVICE COMPLIANCE PERIOD

Meter Accuracy Class	Error Limit	Compliance Testing Period
General Purpose	±2.0%	7 years
Class 1	±1.5%	5 years
Class 0.5	±0.75%	4 years
Class 0.2	±0.3%	2 years

8.3 Non-Compliant Sample meters

If a meter from the sample is found to be non-compliant. i.e. it exceeds the Error Limits given in Table 1. for its meter classis, the meter shall be removed and replaced with a new meter.

9 Remedial Action

9.1 Non-compliant meters

- If a population fails either the accuracy tests or performance characteristics the following action shall be taken:

    - redefine the population by install dates;
    - the population shall be replaced with new meters

9.2 Redefining a population

If a sample fails compliance testing the population from which the sample was taken may be redefined into a new population defined by type and the year of installation. This may, however, require the site testing of a large number of additional meters and, therefore, an increase in costs associated with testing multiple samples. The costs of redefining the population, together with the risk of not obtaining a positive outcome, have to be weighed against the costs of a meter change program to replace, in some cases, many thousands of meters.

9.3 Meter change program

Should a failed meter population be identified all meters that make up the population shall be removed and replaced with new meters. The timeframe for the completion of the replacement of a failed meter population shall not exceed 3 years from the time of identification of the failed population, except where the Director has on request by Western Power approved a longer period due to a very large number of meters (>50,000) being required to be replaced

Application for funding to replace a failed meter population shall be made:

- in the current fiscal year that the failed population is identified if the said population is identified before 31st December of that year; or
- in the next fiscal year that the failed population is identified if the said population is identified after 31st December of that year.

Expenditure of funds may be spread over the 3 year period allowed (or a longer period as approved by the Director) for completion of the work if appropriate.

10 Accreditation and Traceability

10.1 Accreditation

Western Power's Electrical Standards Laboratory holds accreditation in the field of Electrical Testing from the National Association of Testing Authorities, Australia (NATA). The NATA accreditation will be maintained for all classes of test necessary to fulfil the requirements of the Plan.

The laboratory is appointed by the National Measurement Institute (NMI) to issue regulation 13 certificates, under the National Measurement Regulations 1999 in accordance with the National Measurement Act 1960, for the verification and re-verification of reference standards.

The laboratory is also appointed by the NMI as a Verifying Authority for electricity meters in accordance with section 18ZC of the National Measurement Act 1960.

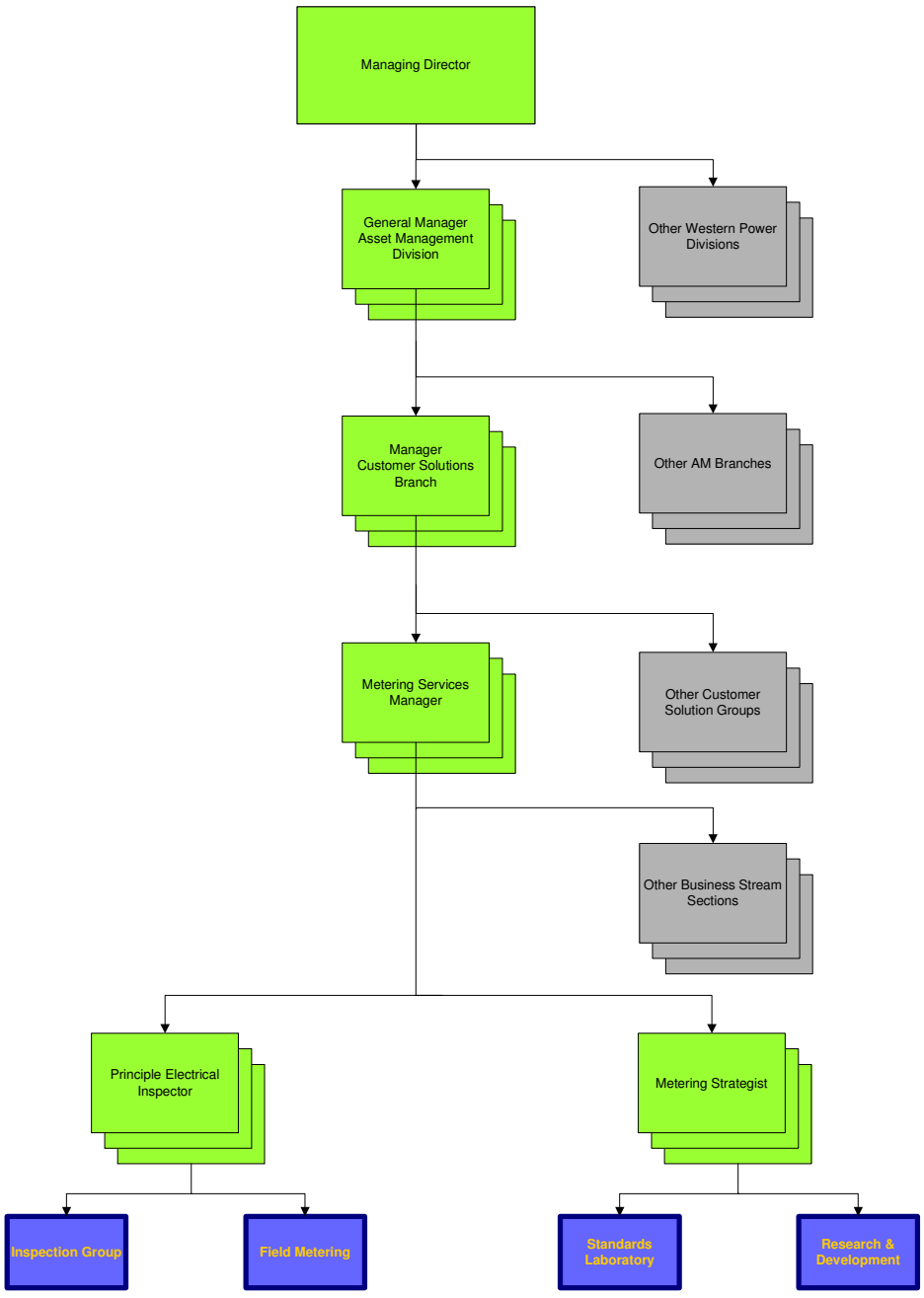
Appointment as a verifying authority for reference standards and electricity meters shall be maintained as a condition for the acceptance of the Plan.

Copies of the NATA and NMI certificates are given in *Appendix D*.

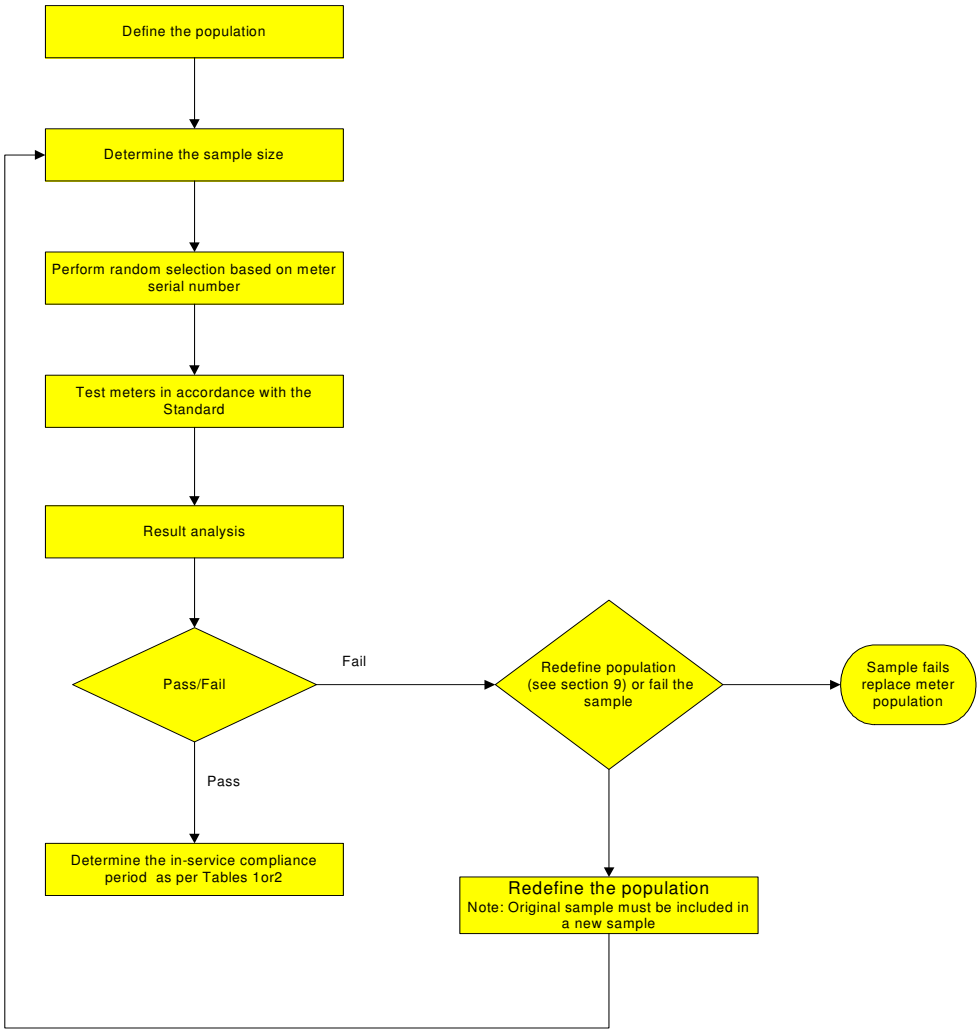
10.2 Traceability

All test equipment that is used in the in-service compliance test program holds calibration certificates that are traceable to National Standards held by the National Measurement Institute (NMI). The laboratory under its NATA accreditation carries out calibration of the test equipment.

11 APPENDIX A Organisational Chart



12 APPENDIX B Sampling by Attributes Flowchart



13 APPENDIX C - Extract of Results Spreadsheet

Test Report No. TR No 20020357					Full Load	Light Load	Full Load	Light Load					
Meter Manufacturer: Emmco					Accuracy Test				Accuracy Test		Run No Load		
5AF kWh meter Tests							Meter Error						
Date of Test	Temp	RH %	Applied Voltage	METER No	Disc Division	Disc Division	(%)	(%)	Full Load	Light Load	(FWD Current)	(REV Current)	Reg'tr
1/06/2002	23.2	38	240	13756	-9.0	-26.0	-1.13	-6.50	Pass	Fail	Pass	Pass	Fail
1/06/2002	23.2	38	240	11764	4.0	0.0	0.50	0.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	12163	5.0	1.5	0.63	0.38	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	7099	-1.0	-5.0	-0.13	-1.25	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	15100	6.0	3.5	0.75	0.88	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	17090	6.5	0.0	0.81	0.00	Pass	Pass	Pass	Pass	Fail
1/06/2002	23.2	38	240	26663	6.0	-2.0	0.75	-0.50	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	16184	7.0	4.0	0.88	1.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	14155	0.5	-3.0	0.06	-0.75	Pass	Pass	Pass	Pass	Pass
1/06/2002	23.2	38	240	20528	9.0	0.0	1.13	0.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	241	19470	4.0	0.0	0.50	0.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	241	8132	3.0	-3.0	0.38	-0.75	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	241	19508	3.5	1.0	0.44	0.25	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	241	17005	-4.0	-2.0	-0.50	-0.50	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	241	7076	8.0	3.0	1.00	0.75	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	240	15567	-2.0	-8.0	-0.25	-2.00	Pass	Fail	Pass	Pass	Pass
1/06/2002	21.1	44	240	28387	-3.0	-5.0	-0.38	-1.25	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	240	200	3.0	0.0	0.38	0.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	240	28381	5.0	0.0	0.63	0.00	Pass	Pass	Pass	Pass	Pass
1/06/2002	21.1	44	240	27529	-11.0	-5.0	-1.38	-1.25	Pass	Pass	Pass	Pass	Pass
9/07/2002	22.7	40	240	17950	-6.0	-2.0	-0.75	-0.50	Pass	Pass	Pass	Pass	Pass
9/07/2002	22.7	40	240	5051	-1.0	-2.0	-0.13	-0.50	Pass	Pass	Pass	Pass	Pass
9/07/2002	22.7	40	240	18774	-7.0	-2.0	-0.88	-0.50	Pass	Pass	Pass	Pass	Pass
9/07/2002	22.7	40	240	3018	0.0	-8.0	0.00	-2.00	Pass	Fail	Pass	Pass	Pass

Sample taken from Table 6

General Purpose Meter Population = 275
Sample Size = 32

Results of sample by Attributes

METER No	FL %Error	LL %Error	Run No Load	Register
11972	1.60	0.71	Pass	Pass
10671	0.93	1.21	Pass	Pass
8650	0.96	1.62	Pass	Pass
9985	1.52	0.96	Pass	Pass
8092	0.99	2.57	Pass	Pass
8241	1.91	1.67	Pass	Pass
19043	0.55	-0.05	Pass	Pass
16324	2.04	2.23	Pass	Pass
17501	0.90	0.34	Pass	Pass
17826	0.26	-0.27	Pass	Pass
16593	0.99	0.00	Pass	Pass
18054	1.20	0.71	Pass	Pass
12885	1.70	2.04	Pass	Pass
14523	-0.36	0.60	Pass	Pass
12612	1.06	0.58	Pass	Pass
15417	1.25	0.92	Pass	Pass
16572	1.10	-0.02	Pass	Pass
16337	1.14	0.17	Pass	Pass
10523	0.05	1.19	Pass	Pass
9508	0.99	2.57	Pass	Pass
6518	0.79	1.13	Pass	Pass
6411	0.82	0.78	Pass	Pass
7953	-0.38	-4.13	Pass	Pass
6524	1.19	0.87	Pass	Pass
2480	0.56	0.78	Pass	Pass
621	-5.59	-6.16	Pass	Pass
5415	0.04	0.79	Pass	Pass
4552	-0.05	0.31	Pass	Pass
4485	1.60	0.71	Pass	Pass
5821	0.93	1.21	Pass	Pass
4487	0.96	1.62	Pass	Pass
20003	0.82	0.78	Pass	Pass
Failures	2	6	0	0
Decision	Pass	Fail	Pass	pass

EXTRACT FROM TABLE 6: Pass Fail Criteria by Attributes

Population size	Sample Size	Full Load		Light Load		Run no Load		Register	
		pass	fail	pass	fail	pass	fail	Pass	fail
151 – 280	32	3	4	5	6	7	8	3	4

This population fails the compliance testing for light load. It complies with the requirements for performance characteristics.

14 APPENDIX D Current Accreditation and NMI Authorities

14.1 NATA Certificate

ACCREDITED LABORATORY

National Association of Testing Authorities, Australia
(ABN 59 004 379 748)
has accredited

Western Power Corporation
Metering Services

following demonstration of its technical competence
to operate in accordance with

ISO/IEC 17025 (1999)

which includes the management requirements of ISO 9002:1994.
This facility is accredited in the field of Electrical Testing
for the tests, calibrations and measurements shown on
the *Scope of Accreditation* issued by NATA.

The COMMON SEAL of the NATIONAL ASSOCIATION
OF TESTING AUTHORITIES, AUSTRALIA
was affixed hereto by authority of the
Board of the Association in the presence of

A J RUSSELL
CHIEF EXECUTIVE

Date of accreditation: 12 November 1951
Accreditation number: 47

NATA is Australia's government-endorsed laboratory accreditor, and a leader in accreditation internationally.
NATA is a signatory to the international mutual recognition agreements of the International Laboratory
Accreditation Cooperation (ILAC) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC).

14.2NMI Appointment as Verifying Authority for Reference Standards

AUSTRALIA

APPOINTMENT AS A VERIFYING AUTHORITY FOR REFERENCE STANDARDS OF MEASUREMENT

In accordance with Regulation 73 of NATIONAL MEASUREMENT REGULATIONS 1999, in force under the NATIONAL MEASUREMENT ACT 1960, the National Standards Commission hereby appoints the person for the time being holding, or performing the duties of, the office of

OFFICER IN CHARGE OF STANDARDS LABORATORY WESTERN POWER CORPORATION WA

to be a Verifying Authority for the verification and reverification of reference standards of measurement under regulation 13 of the National Measurement Regulations 1999 for the following physical quantities:

plane angle
time
frequency
energy
power
potential difference(and electromotive force)
electric current
electrical capacitance
electrical resistance
electrical inductance

This appointment is for a period of three years and is limited to the range specified in the attached schedule, and using procedures approved by the National Standards Commission.

Dated this 30th day of July 2001

J M BENNETT
Executive Director

National Standards Commission

12 Lyonpark Road North Ryde NSW 2113,
PO Box 282 North Ryde NSW 1670 Australia
Telephone (61 2) 9856 0300 Facsimile (61 2) 9856 0399
www.nsc.gov.au
ABN 27 731 182 821

14.3NMI Verifying Authority for Electricity Meters

AUSTRALIA

APPOINTMENT AS A VERIFYING AUTHORITY FOR UTILITY METERS

In accordance with section 18ZC of the NATIONAL MEASUREMENT ACT 1960 the National Standards Commission hereby appoints the person for the time being holding, or performing the duties of, the office of

OFFICER IN CHARGE OF STANDARDS LABORATORY WESTERN POWER CORPORATION WA

to be a Verifying Authority for the verification of

ELECTRICITY METERS

This appointment is for a period of three years and is limited to the range specified in the attached schedule, and using procedures approved by the National Standards Commission.

Dated this 12th day of September 2001

J M BENNETT
Executive Director

National Standards Commission

12 Lyonpark Road North Ryde NSW 2113,
PO Box 282 North Ryde NSW 1670 Australia
Telephone (61 2) 9856 0300 Facsimile (61 2) 9856 0399
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15 APPENDIX E – Document Amendment Table

VERSION NUMBER	DATE OF MODIFICATION	MODIFICATION MADE TO: - SECTION	PAGE	BRIEF DESCRIPTION OF AMENDMENT
4	08/08/06	2 – Substitute OOE for ERA	4	Remove mention of OOE for ERA
		Appendix A	16	Update Org Chart
3	18/08/05	8 - Returning sample meters to the field	14	Removed – no longer applicable due to field testing
		7 - Meter Testing	12	Removed mention of bench testing and warm-up
		7 - Running at no-load (electronic meters)	11	Removed, - no longer a requirement
		6	9	Field Testing requirement noted
		2	4	Changed BU name
		Appendix A	16	Updated Org Chart
2	16/11/04	Appendix D	23	Removed NMI Approval Authority Cert. from document
Original	Dec '03	All	All	Last Edit