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Code of Practice 510

Issue 5 October 2021

Commissioning of Measurement Transformers Connected to Settlement Metering Equipment

Amendment Summary

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1 Introduction

This Code of Practice provides information regarding the Balancing and Settlement Code (BSC) requirements for the commissioning of Half Hourly Metering Equipment in accordance with Code of Practice 4 (CP4) 'The calibration, testing and commissioning requirements of Metering Equipment for Settlement Purposes' and in particular those measurement transformers which are provided and owned by Electricity North West Limited (hereafter Electricity North West).

Electricity North West is a Party to the BSC, in compliance with Distribution Licence Condition 20, and failure to comply with our BSC obligations is a breach of the BSC and the Distribution Licence.

CP4 sets out the requirement for commissioning, testing and the calibration of all Metering Equipment for Settlement purposes. The tests are required to confirm that the Metering Systems are accurately recording the flow of electricity at each Defined Metering Point. Without commissioning there can be no certainty and where there are underlying errors these may go undetected for years. To reduce the occurrence of such errors the approved modification P283 'Reinforcing the Commissioning of Metering Equipment Processes' made changes to the BSC and its Code Subsidiary Documents on 6 November 2014 with respect to the responsibilities for the commissioning and testing of Half Hourly Metering Equipment.

Specific procedures and instructions for commissioning measurement transformers connected to settlement metering equipment can be found in the supporting document ES510 'Procedures for Commissioning of Measurement Transformers Connected to Settlement Equipment'.

2 Scope

This Code of Practice sets out the testing, commissioning and recording process to be carried out by Electricity North West on all new measurement transformers which it owns and operates and which are connected to Metering Equipment for Settlement purposes. Commissioning of meters is outside the scope of this CP.

This testing shall also be carried out on any piece of equipment within a metering system which is replaced during the life of the installation.

Where measurement transformers are not and will not be owned by Electricity North West then, the Meter Operator Agent (MOA) shall carry out all the commissioning procedures associated with the measurement transformers.

It will remain the responsibility of the Meter Registrant to ensure that the requirements of CP4 are met irrespective of the owner of certain Metering Equipment.

3 Definitions

BSC	Balancing and Settlement Code
BSC Party	A signatory to the Balancing and Settlement Code
Code Subsidiary Documents	Supporting documents of the BSC; for example, BSC Procedures, Code of Practice, Service Descriptions, Party Service Line, Data Catalogues etc
CP4	Balancing and Settlement Code, Code of Practice Four: Code of Practice for the Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes
CP10	Balancing and Settlement Code, Code of Practice 10: Code of Practice for Metering of Energy via Low Voltage Circuits for Settlement Purposes
CT	Current Transformer
DMP	Defined Meter Point, as defined in various BSC Metering Codes of Practice
DNO	Distribution Network Operator
ELEXON	The organisation which acts as the administrator of the Balancing and Settlement Code
HV	High Voltage, meaning a voltage of 1 000 volts and above
ICP	Independent Connections Provider
LV	Low Voltage, meaning a voltage of less than 1 000 volts
Meter	means a device for measuring Active Energy or Reactive Energy
MOA	Meter Operator Agent
P283	Modification 283 to the Balancing and Settlement Code
Registrant	means the Party to the BSC who registers the Metering System in either Supplier or Central Meter Registration Systems and is responsible for it
Settlement	means the determination and settlement of amounts payable in respect of Trading Charges in accordance with the [Balancing & Settlement] Code
TNO	Transmission Network Operator
VT	Voltage Transformer

4 General Requirements

Under the roles and responsibilities for all commissioning and calibration requirements, as set out in the BSC and CP4, the overall responsibility rests with the Registrant. Commissioning under CP4 is required when new equipment is installed.

The modification P283 has introduced a distinction where measurement transformers (Current Transformers and Voltage Transformers (CTs and VTs)) which are under the ownership of a Party to the BSC (typically the distribution or transmission system operator), such that the Party is responsible for the commissioning and calibration requirements of its own equipment, leaving the remainder of the Metering Equipment to be completed by the Meter Operator Agent (MOA). The MOA, having been provided relevant commissioning records from the equipment owner will review these records and its own commissioning for compliance with the requirements of CP4. The MOA is then required to notify the Registrant that commissioning of the Metering System is completed and provide notification of any defects or omissions in that process. It should be noted that this process applies to all CT operated Half Hourly Metering Equipment including, for the avoidance of doubt, CP10 Metering Systems, and Metering at the boundary between a Transmission Network and a Distribution Network (ie TNO to DNO) and at a boundary between adjacent Distribution Networks (ie DNO to DNO).

Where CTs and/ or VTs are not under the ownership of a BSC Party (for example a customer may own this equipment) then all of the requirements for commissioning, testing and calibrations are the responsibility of the MOA to carry out on behalf of the Registrant, i.e. there is no responsibility placed on the DNO to undertake this testing.

NOTE:

This obligation may fall on the MOA in the situation where a new connections customer has chosen an Independent Connections Provider (ICP) to provide their connection to Electricity North West's distribution system and the ICP does not have the knowledge and experience, or chooses not, to undertake the commissioning work.

However, in some cases, especially High Voltage Metering Systems, it may be necessary for the MOA to seek the assistance of the relevant Network Operator in carrying out these functions. As with the above process the MOA is required to inform the Registrant of the outcome of this process.

In all cases, irrespective of equipment ownership, the Registrant remains responsible for the Metering System as a whole including overall accuracy and the assessment thereof.

This Code of Practice sets out the process to be followed in order to ensure compliance with CP4 following the implementation of P283. In the event of any inconsistency between Electricity North West policy and CP4 then CP4 shall prevail.

When it is required to replace any piece of equipment within a metering system which is during the life of the installation, it is only necessary to undertake commissioning tests on that piece of equipment and not on the metering system as a whole.

5 Electricity North West Commissioning Process

To achieve compliance with BSC Code of Practice 4 the process, as set out in Appendix C, shall be followed. This process covers the following requirements.

Where new measurement transformers are being installed and are owned by or are to be adopted by Electricity North West, then those measurement transformers and the test facilities utilised by Electricity North West, its agent or the Independent Connections Provider (ICP) installing equipment to be adopted or the MOA on behalf of the ICP shall ensure the following.

(a) Commissioning of 100% of new installations is undertaken to verify through testing, as appropriate:

- the ratios and polarities of all measurement transformers used for Settlement purposes in accordance with CP4;
- the location of measurement transformers in relation to the Defined Metering Point;
- the relationship between voltages and currents are correct; and
- the burden on measurement transformers up to and including the Test Facility.

(b) Calibration of new measurement transformers is carried out and certificates/records of such tests are maintained in accordance with CP4; and

(c) Calibration and commissioning records are maintained in a standard format for HV and LV assets, as set out in Appendix A, for provision to the relevant MOA and Supplier as required from time to time. (The forms in Appendix A are available as separate Word documents rather than copying the Appendix). All completed forms shall be returned to P283commissioning@enwl.co.uk.

(d) Commissioning of measurement transformers and provision of calibration certificates/commissioning records meet the required timescales as set-out in accordance with BSCP515 namely:

- measurement transformers are commissioned at the earliest opportunity but not greater than 16 working days after energisation;
- calibration certificates/commissioning records are provided at the earliest opportunity but not greater than 5 working days after commissioning.

For the avoidance of doubt all agents, acting on our behalf, and ICPs where we intend to adopt distribution assets constructed by them must comply with this Code of Practice and the BSC and its Code Subsidiary Documents so that Electricity North West receives the necessary calibration and commissioning records should the MOA and/ or Registrant request this information. All agents, acting on our behalf, and ICPs where we intend to adopt distribution assets constructed by them must comply with the Electricity North West commissioning process and procedures including, but not limited to this Code of Practice 510, ES220, ES320 and ES510. All necessary testing, checking, documentation and records shall be provided in accordance with these documents.

Where the MOA commissions the measurement transformers, on behalf of the ICP, the MOA shall provide the necessary calibration and commissioning records to Electricity North West at the time of adoption and not before.

6 Duties and Responsibilities

6.1 Meter Operator Agent

The MOA shall:

- Receive commissioning and calibration records of measurement transformers and Test Facilities;
- Ensure that these records meet the requirements of CP4;
- Confirm that Meters are set to actual ratios of the installed measurement transformers;
- Confirm that all voltages and currents are of the correct relationship and that standard phase rotation exists at the Meter terminals;
- Confirm that the overall burden on measurement transformers are within limits;
- Where compensations are to be applied that they are correct;
- Any phase failure alarms operate correctly;
- The output of the Metering System correctly records the energy in the primary circuit at the Defined Metering Point;
- Establish a commissioning process which verifies through testing the correct operation of the Meters in accordance with CP4;
- Assess the overall accuracy of the Metering System for compliance with the relevant CP;
- Provide notification to the Supplier that the commissioning process is successfully completed in accordance with CP4 or that commissioning is not successful or complete together with notification of any defects or omissions in that process.

6.2 Registrant

The Registrant shall:

- Receive the commissioning information from the MOA;
- Assess the notification from the MOA and determine whether they believe that there is a risk to Settlement;
- Where there is deemed to be a risk to Settlement, consult with the relevant Network Operator and agree the appropriate steps to be taken to minimise such risk.

6.3 Network Operator (Electricity North West)

For provision of measurement transformers for Settlement purposes that Electricity North West owns or will own.

NOTE: Subject to the different obligations that apply, as stated in section 5, where the MOA commissions the measurement transformers on behalf of the ICP.

Energy Solutions shall:

- Advise a new MPAN to the Registrant and/ or MOA for new connections;
- Ensure those measurement transformers are correctly specified and that the specific part of the Metering System, which is owned or to be owned by Electricity North West, is suitably designed to meet the requirements of the applicable BSC CPs;
- Ensure that any timescales required by the BSC CPs for completion of commissioning and for submission of commissioning records are met.
- Evaluate any calibration certificates and commissioning records referred by Data Management, where there is doubt regarding correct completion and accuracy and ensure corrective action is taken.

Data Management shall:

- Ensure all relevant data associated with testing and commissioning of those measurement transformers is suitably collected, stored and managed on behalf of Electricity North West;
- Ensure calibration certificates and commissioning records associated with those measurement transformers are:
    - validated for completeness and accuracy;
    - checked for conformance against the templates provided by Regulation;
    - provided to the Registrant and/ or MOA;
- Ensure any defects/omissions related to those calibration certificates/commissioning records, where notified by the Registrant/MOA, are referred back and addressed by the relevant party;
- Analyse relevant data to identify any inadequacies, inaccuracies, irregularities or delays associated with P283 commissioning records and provide a weekly progress/exception report for internal stakeholders (see Appendix E).

NOTE: Any issues found with the certificates and records received will be highlighted to Energy Solutions for further evaluation and confirmation that they are suitable to be provided to the Registrant and/or MOA.

NOTE: The templates provided by Regulation are intended to ensure conformance with BSC CP4.

Finance shall:

- Ensure new MPANs are generated when requested;

- Maintain and update, as required, any details required to be kept for those MPANs;
- Communicate data concerning new or updated MPANs to Data Management.

Operations, where applicable, shall:

- Ensure that suitably competent and authorised persons carry out testing and commissioning of measurement transformers in accordance with this Code of Practice and all other Electricity North West documents related to the P283 commissioning process;
- Ensure accurate and complete commissioning records are provided to Data Management for the testing/commissioning carried out;
- Ensure measurement transformers that are replaced due to faults or asset replacement work are re-commissioned and all relevant calibration certificates/commissioning records are completed and returned to Data Management.

Policy & Standards shall:

- Ensure that equipment specifications for purchasing measurement transformers and associated equipment require manufacturers/suppliers to:
    - carry out appropriate tests and checks to conform with the requirements of BSC CP4;
    - provide calibration certificates for metering class CTs and VTs (see ES501);
    - provide commissioning records, where appropriate, for the tests and checks carried out by them.

Electricity North West's Meter Delivery Partner, where applicable, shall:

- Ensure that the meter terminal cabinet, including secondary wiring and test terminal blocks, and the multicore cable between the measurement transformers and the meter terminal cabinet are correctly installed and tested at the metering equipment location;
- Ensure that suitably competent and authorised persons carry out testing and commissioning of measurement transformers in accordance with this Code of Practice and all other Electricity North West documents related to the P283 commissioning process;
- Ensure accurate and complete commissioning records are provided to Data Management for the testing/commissioning carried out;
- Ensure that any manufacturer test/calibration certificates for CTs sourced by them are provided to Data Management.

Electricity North West's Logistics Partner, where applicable, shall:

- Ensure that any calibration/test certificates received by them from the supplier of metering VTs and/or CTs are emailed to Data Management via the P283 commissioning mailbox (P283commissioning@enwl.co.uk).

7 Auditing by Elexon

The rules for the operation of the wholesale electricity market are set out in the Balancing and Settlement Code. ELEXON administers the Code and provides and/or procures the services needed to implement it. This entails carrying out the work to compare how much electricity Generators and Suppliers said they would produce or consume with actual volumes as determined by Metering Systems. This includes determining the level of any financial adjustments which are required.

The impartiality of the system is underpinned by ELEXON's annual audit which includes within its scope the provision of Meter Technical details, to establish that the accuracy of all the constituent components of a metering system (Meters, CTs, VTs and lead burdens) are with prescribed limits.

ELEXON undertakes an annual audit of Electricity North West to confirm compliance with our BSC obligations and as such we must accommodate any such audit request covering activities within this Code of Practice, including any activity performed by an agent acting on our behalf.

8 Recording Keeping & Record Provision

It is a requirement of CP4 that all calibration and commissioning records shall be retained and available for use by the other parties for the life of the metering installation.

The complete and accurate calibration and commissioning records of measurement transformers owned by Electricity North West shall be stored, maintained and made available to the appointed MOA and/ or Registrant in accordance with the commissioning process and/ or on request.

9 Documents Referenced

DOCUMENTS REFERENCED	
CP4	Balancing and Settlement Code, Code of Practice Four: Code of Practice for the Calibration, Testing and Commissioning Requirements Of Metering Equipment For Settlement Purposes
CP10	Balancing and Settlement, Code of Practice 10 Code of Practice for Metering of Energy via Low Voltage Circuits for Settlement Purposes
P515	Balancing and Settlement Code, Procedure 515 Procedure Relating to Licensed Distribution
P283	Modification 283 to the Balancing and Settlement Code
ES220	Pre-Commissioning Requirements for Independent Connections Providers Requiring New Assets to be Connected to the 11/6.6kV Network
ES320	Preparation and Assembly of Sub-Station Plant (11/6.6kV and LV)

ES510	Procedure for Commissioning Measurement Transformers Connected to Settlement Metering Equipment

10 Keywords

BSC; Commissioning; CT; Measurement Transformer; Metering; P283; VT

Appendix A

A1 HV Metering Equipment Commissioning Record

Part 1 (Measurement Transformers) to fulfil the requirements of BSC CoP4 and P283

CUSTOMER INFORMATION	
Customer Name	
Property Address	
MPAN	
Substation Name / Number	
Switch Panel Circuit Name	
Switchgear Serial Number(s)	
Structure Plant Number (SPN)	

CT/VT INFORMATION			
Current Transformers	**L1**		**L3**
Location of CTs (with respect to the **Defined Metering Point)**			
CT Serial Number			
Burden (i.e.VA Rating)	VA		VA
Accuracy Class	%		%
Make			
Type			
Available Ratios (in Amps)	Amps		Amps
Ratio Selected (in Amps)	Amps		Amps
Voltage Transformers	**L1**	**L2**	**L3**
Location of VTs (with respect to the **Defined Metering Point)**			
VT Serial Number			
Burden (i.e.VA Rating)	VA	VA	VA
Accuracy Class	%	%	%
Make			
Type			
Available Ratios (in Volts)	Volts	Volts	Volts

Ratio Selected (in Volts)	Volts	Volts	Volts
Secondary Fuse Rating(s)	Amps	Amps	Amps

CT/VT REFERENCE VOLTAGE ASSOCIATIONS			
L1 CT associated with L1 voltage? If No write explanation in Field Notes box	Yes/No		
L2 CT associated with L2 voltage? If No write explanation in Field Notes box	Yes/No		
L3 CT associated with L3 voltage? If No write explanation in Field Notes box	Yes/No		
Standard Phase sequence at Testing Facility (L1, L2, L3)? If No write explanation in Field Notes box	Yes/No		
CT shorting links left closed? If No write explanation in Field Notes box	Yes/No		
VT fuses and earth links in place? If No write explanation in Field Notes box	Yes/No		
CTs and VTs calibration records attached? If No write explanation in Field Notes box	Yes/No		
CT secondary cable burden (i.e.VA Rating)	VA		VA
Total CT burden to Testing Facility (i.e.VA Rating)	VA		VA
VT reference voltage - secondary cable burden (i.e.VA Rating)	VA	VA	VA
Total VT burden to Testing Facilities (i.e.VA Rating)	VA	VA	VA
All connections tight?	Yes/No		
Meter potential fuse ratings			Amps

RATIO AND POLARITY VERIFICATION			
CT ratio verification tests			
Description of tests performed			
CT polarity verification tests			
Description of tests performed			
Test equipment information			
Description			
Make			
Type			
Serial no.			
Calibration expiry date	/ /	/ /	/ /

Current Transformers	L1	L3
Secondary Winding Insulation Resistance	Mega Ohms	Mega Ohms
DC Resistance of Secondary Earth Link	Micro Ohms	Micro Ohms
Primary Current injected/measured* *Delete as applicable	Amps	Amps
Secondary Current measured Hi Ratio	Amps	Amps
Secondary Current measured Low Ratio	Amps	Amps
Ratio Calculation High Ratio		
Ratio Calculation Low Ratio		
Voltage Transformers	**L1 – L2**	**L2 – L3**
Primary Winding Insulation Resistance	Mega Ohms	Mega Ohms
Secondary Winding Insulation Resistance	Mega Ohms	Mega Ohms
DC Resistance of Secondary Earth Link	Micro Ohms	Micro Ohms
Primary Volts injected/measured* *Delete as applicable	Volts	Volts
Secondary Volts measured	Volts	Volts
Ratio Calculation		

Field notes:

Burden Measurements

CT Equivalent Impedance =		Ω
L1		L3
V = V		V = V
I = A		I = A
Z = Ω		Z = Ω
CT Rated Amps² x Z = VA		CT Rated Amps² x Z = VA

All tests/checks performed with correct outcomes	Yes/No
Tests performed by:	
Date of Tests	/ /

A2 LV Metering Equipment Commissioning Record

Part 1 (Measurement Transformers) to fulfil the requirements of BSC CoP4 and P283

CUSTOMER INFORMATION	
Customer Name	
Property Address	
MPAN	
Metered Service Unit Serial Number	

CT INFORMATION			
Current Transformer	**L1**	**L2**	**L3**
Location of CTs (with respect to the **Defined Metering Point)**			
CT Serial Number			
Burden (i.e. VA Rating)	VA	VA	VA
Accuracy Class	%	%	%
Make			
Type			
Available Ratios (in Amps)	Amps	Amps	Amps
Ratio Selected (in Amps)	Amps	Amps	Amps
CT pole face P1 facing Distribution System?	Yes/No	Yes/No	Yes/No

CT REFERENCE VOLTAGE ASSOCIATIONS			
L1 CT associated with L1 voltage? If No write explanation in Field Notes box	Yes/No		
L2 CT associated with L2 voltage? If No write explanation in Field Notes box	Yes/No		
L3 CT associated with L3 voltage? If No write explanation in Field Notes box	Yes/No		
Standard Phase sequence at Testing Facility (L1, L2, L3)? If No write explanation in Field Notes box	Yes/No		
CT shorting links left closed? If No write explanation in Field Notes box	Yes/No		
Voltage fuses/earth links in place? (If applicable) If No write explanation in Field Notes box	Yes/No		
CTs calibration records attached? If No write explanation in Field Notes box	Yes/No		
CT secondary cable burden (i.e. VA Rating)	VA	VA	VA
Total CT burden to testing facility (i.e. VA Rating)	VA	VA	VA
All connections tight?	Yes/No		
Meter potential fuse ratings			Amps
Local fuse rating, as informed by the MOA			Amps

RATIO AND POLARITY VERIFICATION	
CT ratio verification tests	
Description of tests performed:	
CT polarity verification tests	
Description of tests performed:	

Test equipment information			
Description			
Make			
Type			
Serial no.			
Calibration expiry date	/ /	/ /	/ /

Current Transformers	**L1**	**L2**	**L3**
Secondary Winding Insulation Resistance	Mega Ohms	Mega Ohms	Mega Ohms
DC Resistance of Secondary Earth Link	Micro Ohms	Micro Ohms	Micro Ohms
Primary Current injected/measured* *Delete as applicable	Amps	Amps	Amps
Secondary Current measured Hi Ratio	Amps	Amps	Amps
Secondary Current measured Low Ratio	Amps	Amps	Amps
Ratio Calculation High Ratio			
Ratio Calculation Low Ratio			

Field notes:

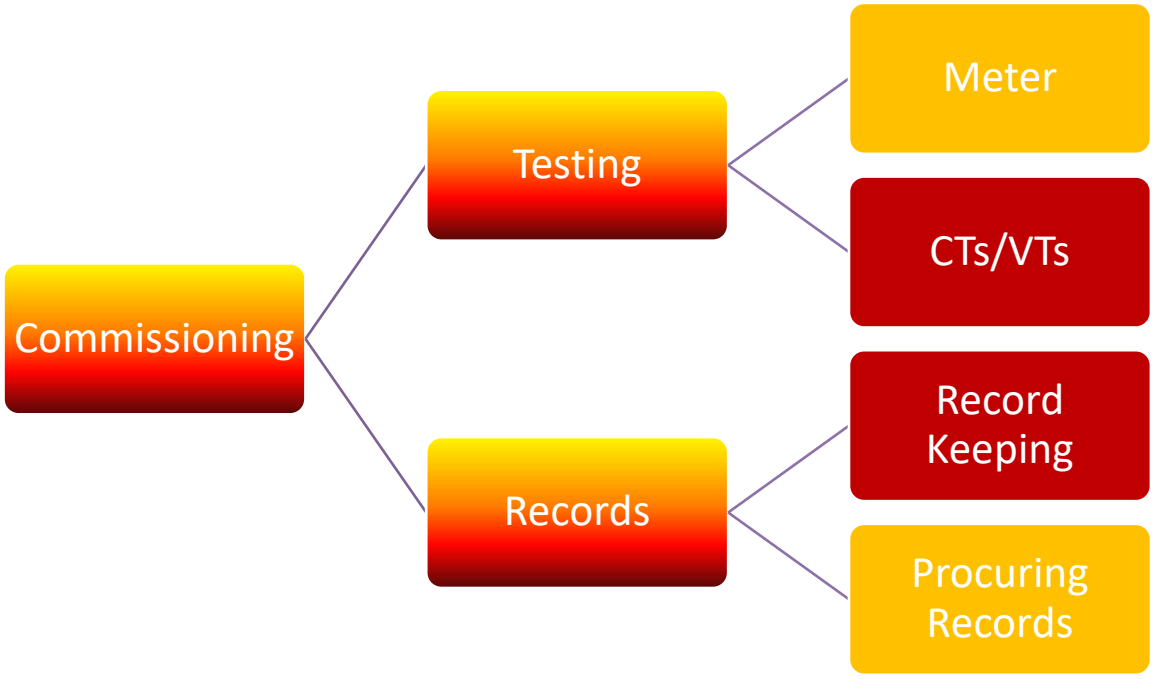
Burden Measurements

CT Equivalent Impedance =					Ω
L1		L2		L3	
V =	V	V =	V	V =	V
I =	A	I =	A	I =	A
Z =	Ω	Z =	Ω	Z =	Ω
CT Rated Amps² x Z =	VA	CT Rated Amps² x Z =	VA	CT Rated Amps² x Z =	VA

All tests/checks performed with correct outcomes	Yes/No
Tests performed by	
Date of Tests	/ /

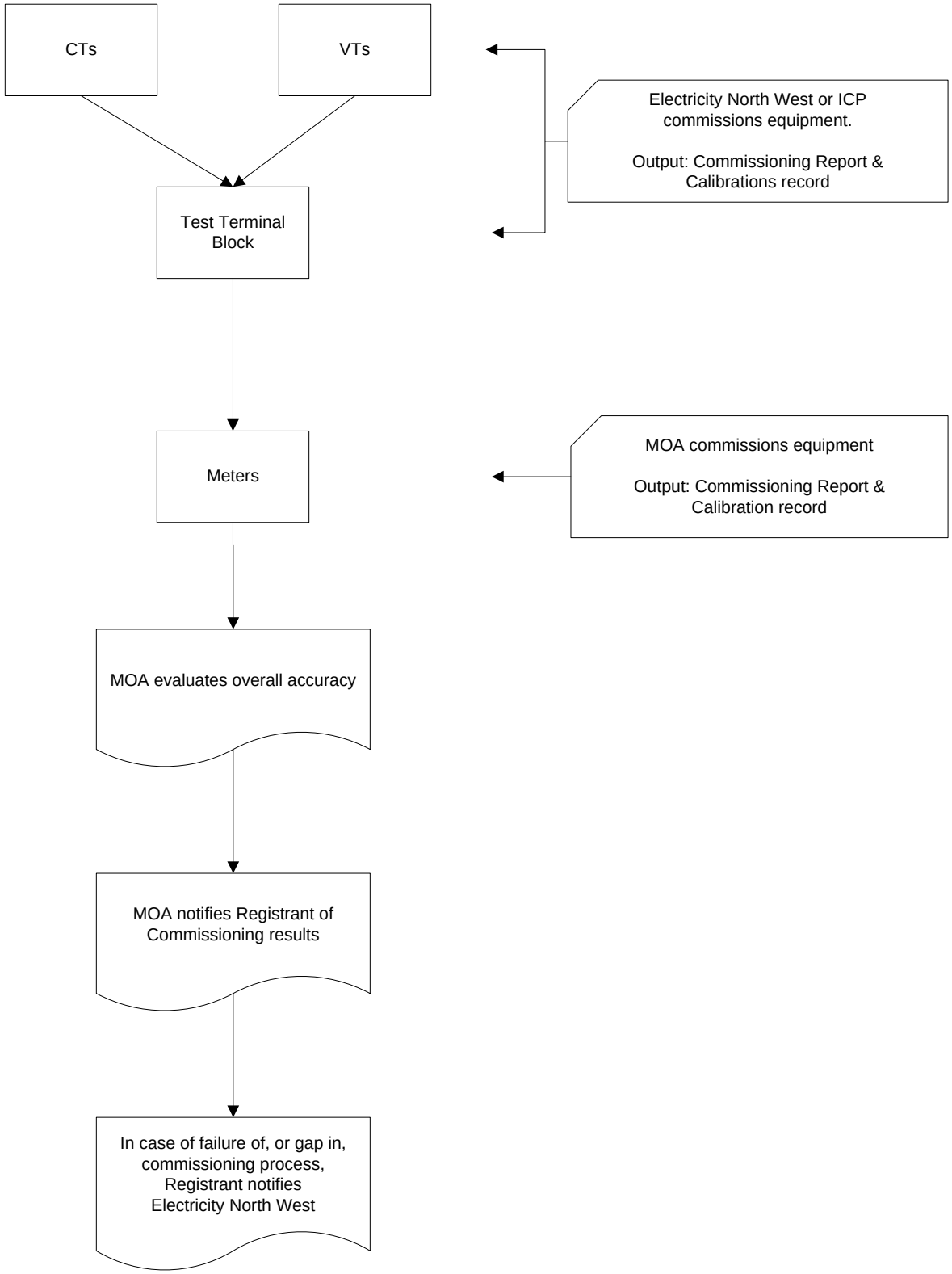
Appendix B

Figure 1 – Obligations Required by Metering Code of Practice CP4



NOTE: The activities to which Electricity North West is obligated are indicated by a partially red background for those which are shared and a full red background for those which are wholly attributed.

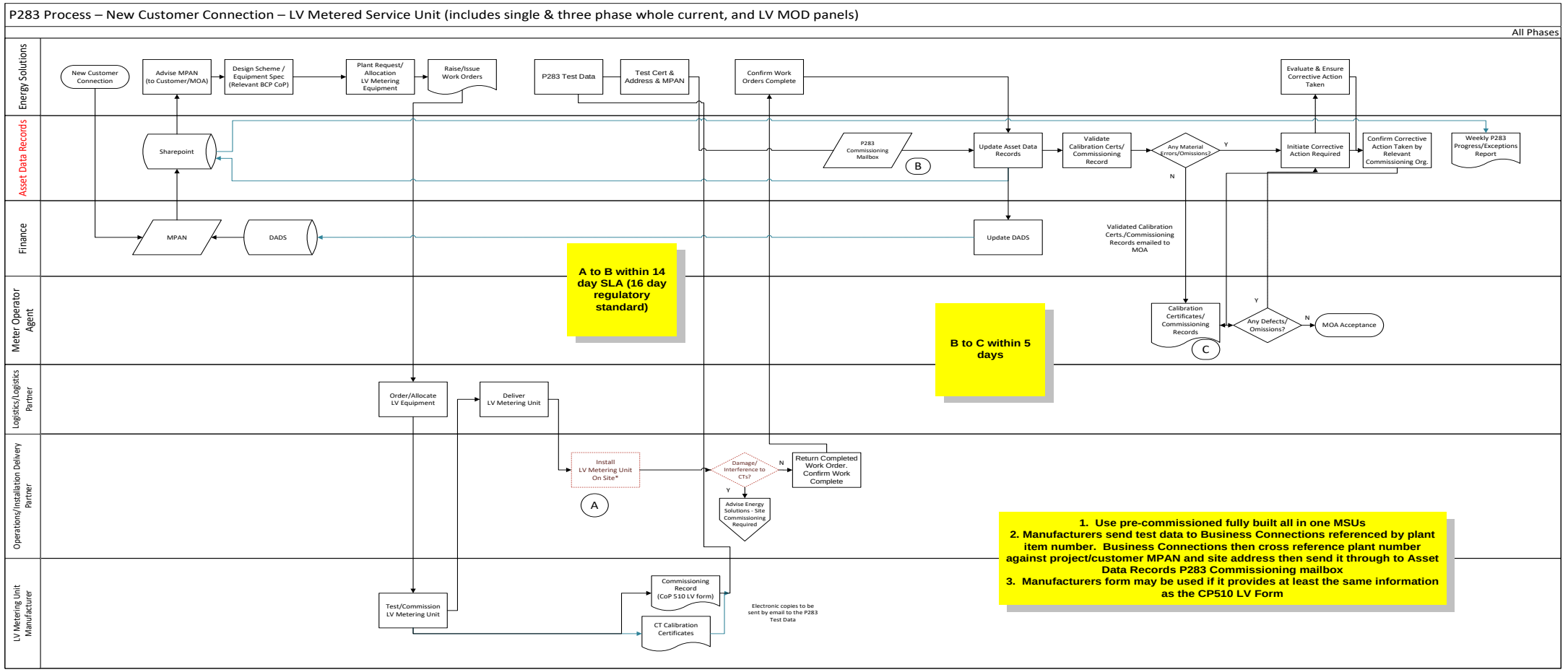
Figure 2 – Post P283 – Testing Process Timeline and Responsibilities



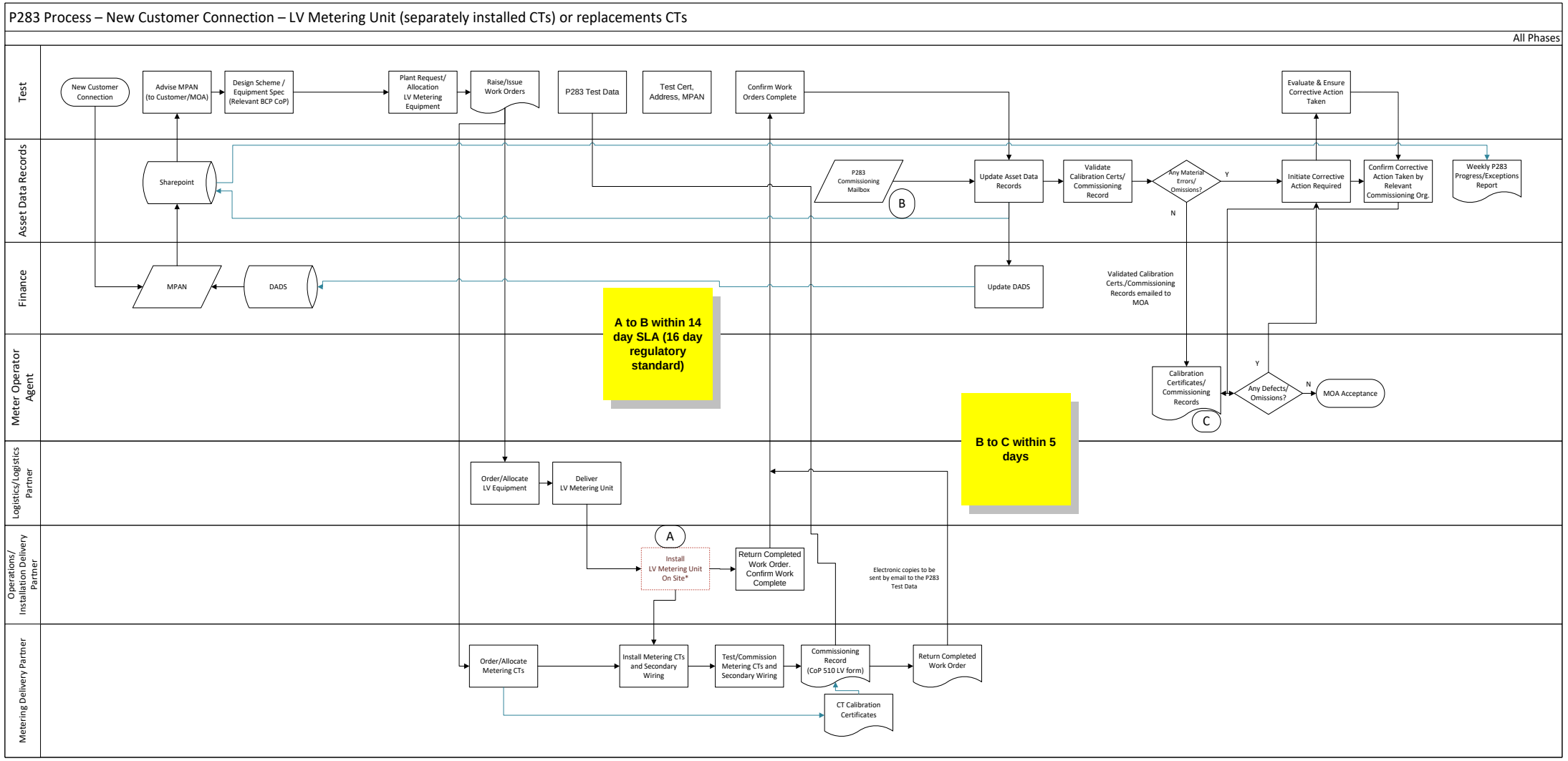
Appendix C – Commissioning Process Flowcharts

C1 Commissioning Process for LV Metering Equipment

C1.1 LV Metered Service Unit



C1.2 LV Metering (separately installed CTs or replacement CTs

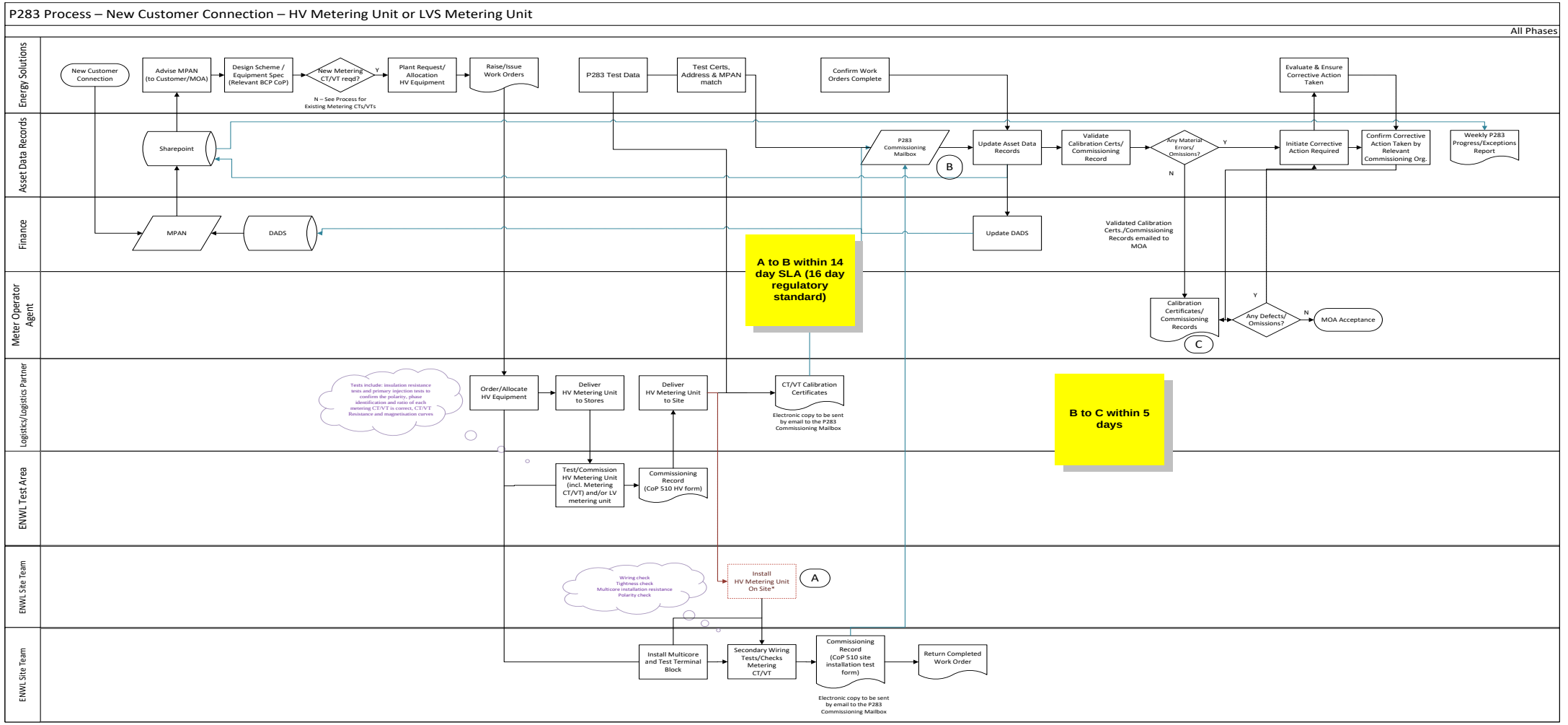


C1.3 LV Substation Cable Distribution Board

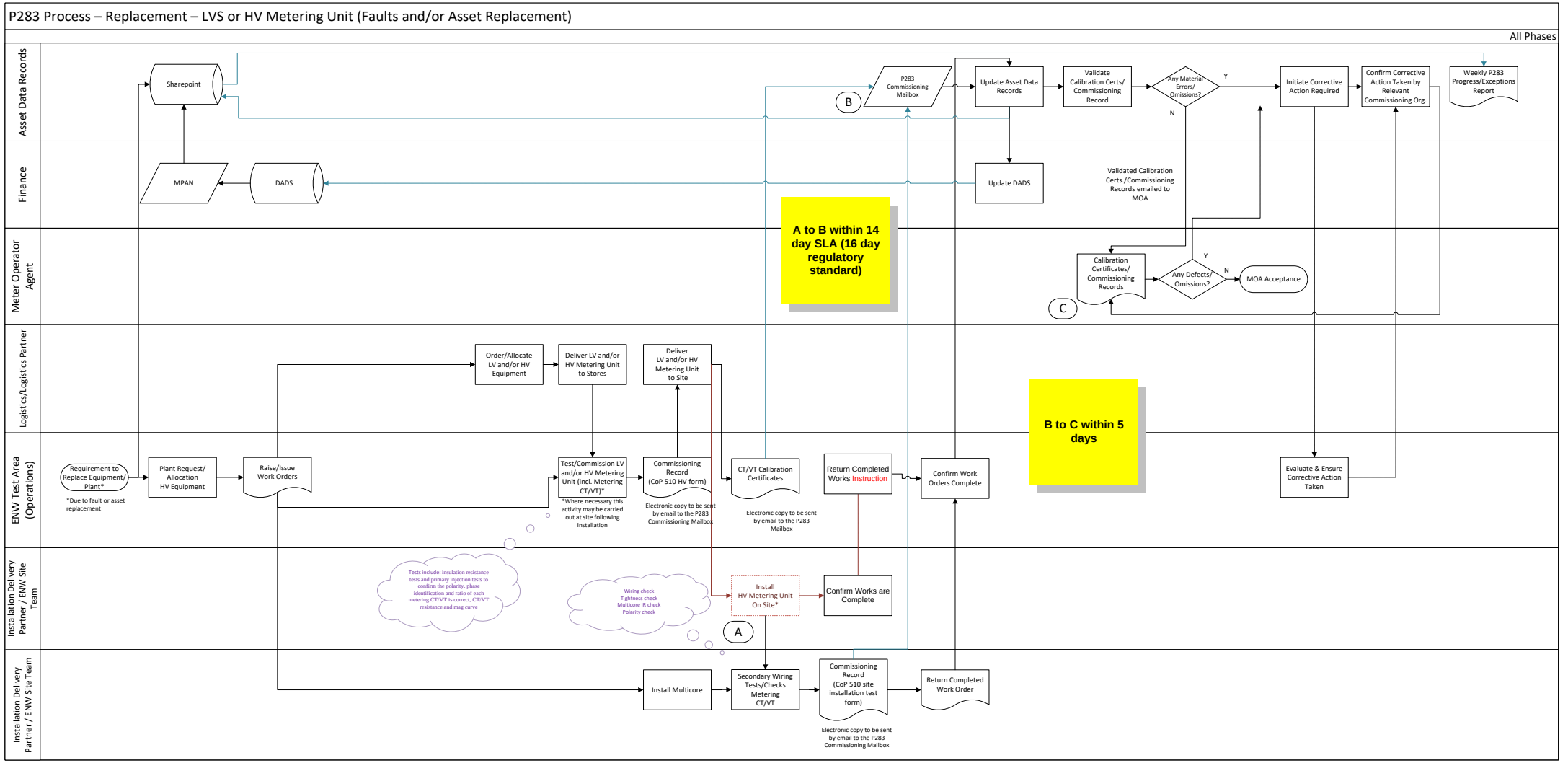
Follow C1.4 where LV CTs are pre-installed in the ENWL Test Area. Any bespoke installation should follow C1.2 separately installed CTs or replacement CTs

C2 Commissioning Process for HV Metering Equipment

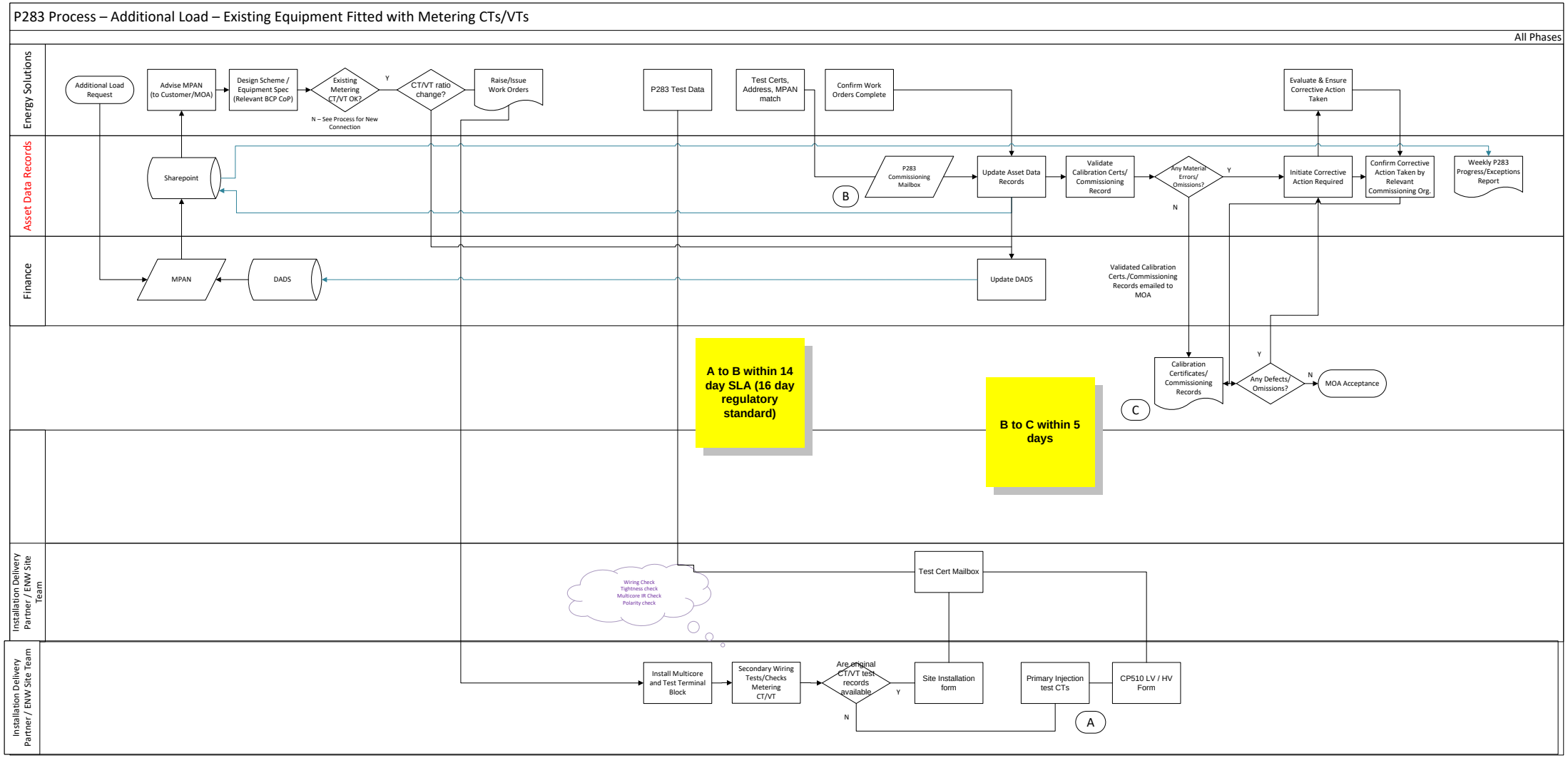
C2.1 HV Metering Unit – New Customer Connection



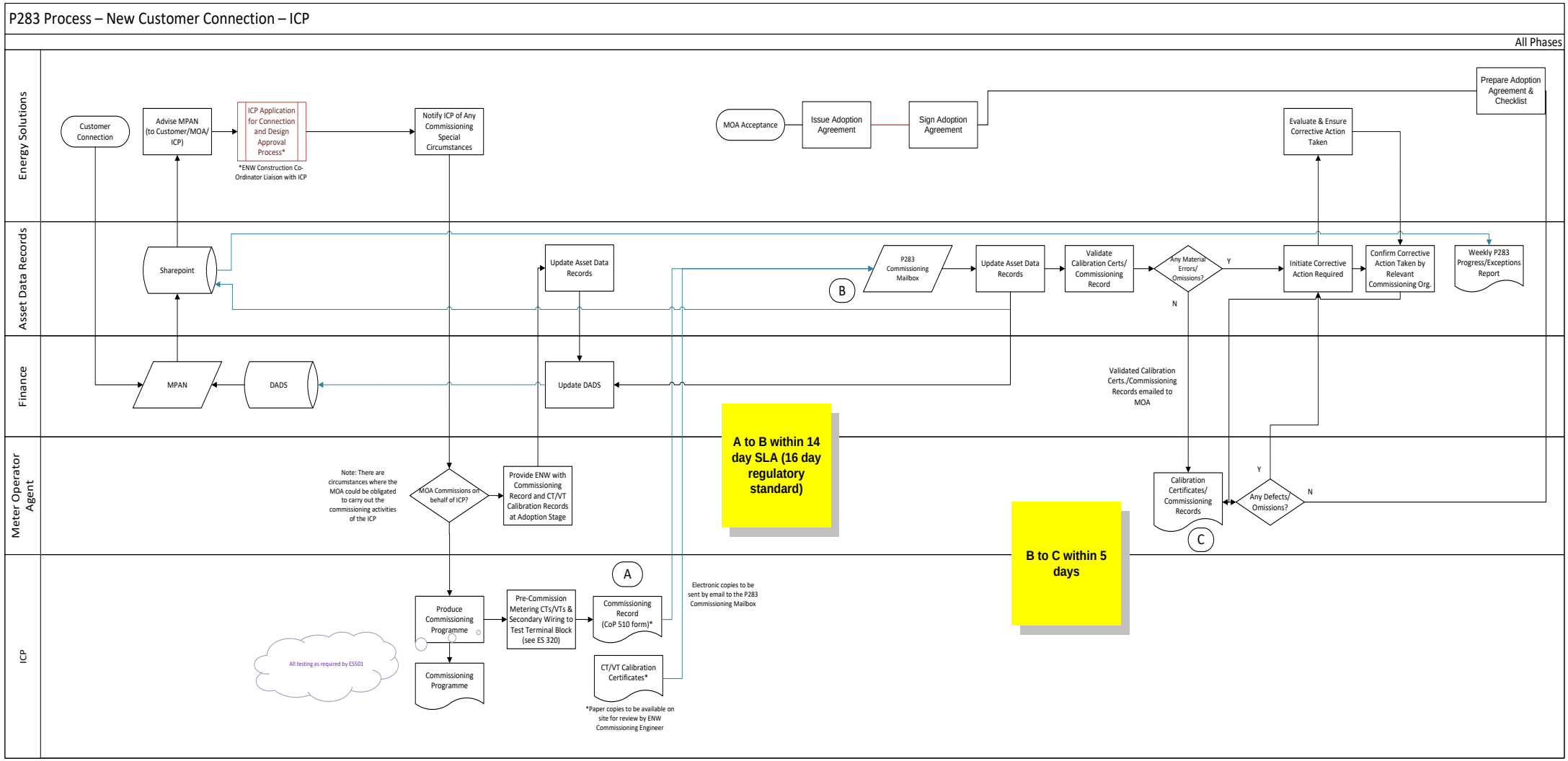
C2.2 HV Metering Unit – Replacement



C3 Commissioning Process for Additional Load



C4 Commissioning Process for ICP New Customer Connection



Appendix D – Responsibilities for Commissioning Activities

D1 General

The responsibilities for carrying out specific commissioning activities associated with measurement transformers in equipment supplied and carried out by Electricity North West or its agents is shown in Table D.1.

Table D1

ES 510 Commission Activity	HV Metering Unit	LV Ritherdon Unit	LV Metered Service Unit	LV Service Way S/S Cable Distribution Board
Current Transformers				
Location of Defined Metering Point (see 6.2.1)	Metering Delivery Partner	Metering Delivery Partner	Energy Solutions	Metering Delivery Partner
CT/VT Reference Voltage Associations (see 6.4)	Metering Delivery Partner	Metering Delivery Partner	Manufacturer/ Supplier	Metering Delivery Partner
Insulation Resistance (see 8.1)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations
Polarity & Phase Identification (see 8.2)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations
Ratio (see 8.3)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations
On Load Test (see 8.4) if possible	Metering Delivery Partner	Metering Delivery Partner	N/A	Metering Delivery Partner
Burden Measurements (see 9)	Metering Delivery Partner	Metering Delivery Partner	N/A	Metering Delivery Partner
As-Left Checks (see 10)	Metering Delivery Partner	Metering Delivery Partner	N/A	Metering Delivery Partner
Voltage Transformers (additional to those for Current Transformers)				
Insulation Resistance (see 7.1)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations
Phase Identification (see 8.2)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations
Ratio (see 7.3)	Operations	Metering Delivery Partner	Manufacturer/ Supplier	Operations

D2 Commissioning Specific Equipment

The following responsibilities relate to testing/commissioning by Electricity North West and/or its agents/delivery partners. ICPs are responsible for conducting all commissioning test/checks of measurement transformers and associated wiring for equipment they install.

D2.1 LV Metering Cut-Outs (Riterdon)

It is intended that Electricity North West's Metering Delivery Partner is responsible for carrying out all commissioning test/checks in ES510 following installation at site.

D2.2 LV Metered Service Units

LV Metered Service Units are supplied to Electricity North West as fully factory assembled and tested units. Consequently, the manufacturer/supplier is responsible for carrying out all applicable tests/checks on the metering CTs and secondary wiring of each unit prior to dispatch to Electricity North West. Providing the metering CTs and secondary wiring to the test terminal block are not subsequently disturbed then only a visual inspection needs to be carried out by Electricity North West's Installation Delivery Partner prior to energisation to confirm there has been no obvious damage to the during transport and installation.

NOTE: Other test/checks not specific to the measurement transformers also need to be carried out such as checking the correct polarity and earth loop impedance of the supply.

D2.3 LV Substation Cable Distribution Boards with Metered Service Ways

As this metering equipment is intended to be prepared and tested in the same manner as HV metered service units, the same process and commissioning responsibilities are intended to be applied (see D2.4).

D2.4 HV Metered Service Units

HV Metered Units are generally prepared and tested by Electricity North West Operations staff prior to being dispatched to site. In this case Operations staff are responsible for carrying out insulation resistance tests and primary injection tests to confirm the polarity, phase identification and ratio of each measurement transformer is correct. If these tests cannot be completed prior to being dispatched to site, then Operations are responsible for carry out same tests but on site following installation. Following installation on site, Electricity North West's Metering Delivery Partner is responsible for carrying out all other commissioning test/checks in ES510 including: ensuring the CT/VT reference voltage associations are correct between the equipment/plant to the test terminal block; burden measurements, on-load tests (where possible) and as-left checks.

D3 Independent Connection Providers

ICPs are responsible for carrying out all commissioning activities for measurement transformers that they procure and install except where the MOA commissions the measurement transformers on behalf of the ICP (see section 4).

Appendix E – Performance Monitoring & Reporting

E1 Management Information

Energy Solutions is responsible for the performance monitoring and reporting process to be followed and for ensuring corrective action is taken.

As directed by Energy Solutions, Data Management is responsible for holding the following data and information in Table E1, for each reporting period, that can be used to monitor the performance of the P283 commissioning processes.

Table E1

	Data/Information	**Source**
CT Metered MPANs & Connections	New MPANs issued	Finance
	MPANs where supplier has been appointed	Finance
	MPANs where the MOA has been appointed	Finance
	MPANs that have become active	Finance
Commissioning Records	Commissioning records received for validation (including dates received)	P283 commissioning mailbox
	CT/VT calibration certificates received for validation	P283 commissioning mailbox
	Missing commissioning records/calibration certificates	P283 commissioning mailbox
	Errors found in validated commissioning records/calibration certificates	Data Management
	Commissioning records completed and submitted to the MOA	Data Management
	Defects/omissions in commissioning records notified by the MOA	MOA
Timelines	Energisation dates for connections	Energy Solutions
	'Request for commissioning' dates from MOA	Data Management
	'Commissioning completed' dates for measurement transformers	Commissioning Record

	'Submission of commissioning records' dates to MOA	Data Management
	Time (number of working days) to rectify any defects/omissions notified by the MOA	Data Management

E2 Key Performance Indicators

Data Management is responsible for collating and reporting the following key performance indicators (KPIs) for each reporting period.

Table E2

	Key Performance Indicator
CT Metered MPANs & Connections	Number of new CT metered MPANs
Commissioning Records	Number of CT metered MPANs where commissioning is outstanding
	Number of CT metered MPANs where commissioning has been completed
	% of CT metered MPANs with missing/incomplete commissioning records
	% of commissioning records/calibration certificates found to have errors
	% CT metered MPANs where defects/omissions have been notified by the MOA
Timelines	% CT metered MPANs meeting 16 working day timeline (from energisation/MOA request for commissioning to commissioning completed)
	% CT metered MPANs where commissioning records submitted to MOA not later than 5 working days following commissioning
	Average number of working days to rectify defects/omissions in commissioning records

E3 Reporting

Data Management is responsible for submitting a performance report for each reporting period to internal Electricity North West stakeholders containing a summary of relevant management information (see E1) and KPIs (see E2).

Internal Electricity North West stakeholders include:

- Energy Solutions
- Regulation

- Finance
- Electricity North West Meter Delivery Partner

Data Management is responsible for maintaining a circulation list of individual stakeholders who will be sent the performance report.

The format of the report is determined by Data Management

The nominal monitoring period will be weekly.

Appendix F – Competencies

F1 General

Satisfactory performance of the P283 commissioning process requires persons who carry certain activities/roles in the process to have the following competencies.

F2 Design/Specification of Metering CT/VT Equipment

Design of metering CT/VT circuits and/or specification of equipment containing measurement transformers is to be carried out by a person with the following knowledge and/or experience:

- Knowledge and understanding of relevant BSC CP requirements, in particular BSC CP3, CP4 and CP5;
- Awareness of Electricity North West Electricity Specifications, in particular:
    - ES314 for HV metering units; and
    - ES503 for LV metered service units;
- Basic electrical knowledge and understanding of metering CT/VT secondary wiring schematics and wiring diagrams;
- At least three month's experience of design / specification of measurement transformers under supervision of competent designer / specifier.

It is expected that a planner will carry out this role.

F3 Installation/Work on Metering CT/VT Circuits

Installation of and work on metering CT/VT equipment, including secondary wiring, is to be carried out by a technically competent electrical fitter or commissioning engineer, who has the following authorisations, knowledge and/or experience.

Qualification/Knowledge	Electrical City & Guilds - Level 2 (or equivalent). Basic electrical understanding of CTs and VTs and associated secondary electrical circuits.
Authorisation	Holds Electricity North West Authorisation Codes 165 and 166. Authorised for Substation Access (for work in substation environments). Competent Person for work on or near LV systems. Competent Person to receive a Permit-to-Work document (for work on equipment that is or can be connected to HV systems).
Experience	Electrical craftsman/technician/engineer with a minimum of three months experience working on metering CT/VT equipment/circuits. Person undergoing on-job training under Personal Supervision of a suitably Authorised and experienced person.

F4 Commissioning Metering CT/VT Circuits

Electrical testing and commissioning of metering CT/VT circuits, including secondary wiring, is to be carried out by a technically competent commissioning engineer, who has the following authorisations, knowledge and/or experience.

Qualification/Knowledge	Electrical City & Guilds - Level 2 (or equivalent). Advanced electrical understanding of CTs and VTs and associated secondary electrical circuits.
Authorisation	Holds Electricity North West Authorisation codes 165 and 166 (see CP614), as a minimum. Authorised for Substation Access (for work in substation environments). Authorised for codes 132/134 for testing of live LV circuits (see CP614). Authorised for code 354 to receive a Sanction for Test (for testing equipment that is or can be connected to HV systems).
Experience	Electrical technician/engineer with a minimum of three month's experience testing CT/VT circuits. Person undergoing on-job training under Personal Supervision of a suitably Authorised and experienced person.

F5 Validation of Commissioning Records

Validation of commissioning records/calibration certificates is to be carried out by a person with the following knowledge and/or experience:

- Knowledge of BSC CP4 requirements;
- Awareness and training in Electricity North West acceptance criteria associated with validating CP510 Commissioning Record forms;
- Knowledge of Data Management role and responsibilities in CP510;
- One month's supervised experience of carrying out validation role.

It is expected that a non-technical person with appropriate familiarisation and on-job training can carry out this role.