## 4.3 CP Form

| Change Proposal – BSCP40/02 | CP No: CP1588<br>*Version No: V0.4*<br>*(mandatory by BSCCo)* |
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| **Title (mandatory by originator)**<br><br>Periodic Calibrations | |

**Description of Problem/Issue** (mandatory by originator)

What is the issue?

Code of Practice (CoP) 4[1] details the requirements for calibration, testing and commissioning of Metering Equipment used for Settlement purposes. The calibration requirements for Meters are split into a Type A initial calibration and a Type B or C periodic calibration. The frequency and timing of Meter calibrations is specified in CoP4 as well as the required test points.

There is a lack of Industry reporting to confirm whether Meter calibration checks are being carried out on the relevant Metering Equipment which poses a risk to Settlement where a lack of data being reported does not allow any analysis to highlight concerns about Meter accuracy to be carried out.

Appendix A of CoP4 specifies that for CoP3[2] and CoP5[3], after the initial calibration of the Meter pre-installation, there isn't a requirement for a periodic calibration until year 15 for a Type B and year 20 for a Type C. With the low level of capital expenditure, compared to calibration testing, for CoP3 and CoP5 compliant Meters Registrants and Meter Operator Agents (MOAs) are choosing to replace the Meter prior to year 15, or year 10 if subject to a certification period[4] rather than perform a periodic calibration. As a consequence of this Elexon (BSCCo) has no data on the performance of the Meter, in terms of the errors and the drift from the initial calibration, to determine if there is a risk to Settlement posed by the use of a particular Meter Type.

There is also no process for Elexon to follow in BSCP601[5] to take action should it be identified that there is an issue with the long term accuracy of a particular Meter Type or, as required, notify the Office of Product Safety and Standards in the Department for Business and Trade where the Meter Type is on Schedule 4[4].

Background

The metering CoPs detail the technical requirements for Metering Systems. This includes the requirements for calibration, testing and commissioning of Metering Equipment used for

[1] CoP4 'Code of Practice for the Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes
[2] Code of Practice 3 'The Metering of Circuits with a Rated Capacity not exceeding 10MVA for Settlement Purposes'
[3] Code of Practice 5 'The Metering of Energy Transfers with Max Demand of up to (and including) 1MW for Settlement Purposes'
[4] Electricity Act 1989: Statutory register of all pattern approved electricity meters suitable for billing purposes in the UK - Schedule 4: UK nationally approved electricity meters
[5] BSCP601: Metering Protocol Approval and Compliance Testing


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Settlement purposes, which is specified in CoP4. Calibration requirements, including the timing and frequency) for Meters are detailed in CoP4 and are split as follow:

- Initial Calibration (Type A) - carried out under Reference Conditions[6] prior to installation, typically carried out by the Meter manufacturer;
- Sample Calibration - a Type B Calibration on a sample of the population of a Meter Type (BSCCo shall identify annually the Meter Types to be sample calibrated from year 2 or year 8 depending on the CoP);
- Periodic Calibration (Type B) - Type B Calibrations permit the extension of the period between Type A and Type C Calibrations by the instigation of an in-service testing regime;
- Periodic Calibration (Type C) - Calibration required after the Meter has been in service for a period of time.

Each MOA is required to submit an annual calibration report to BSCCo that details the Type B and Type C calibration tests that have been carried out. This is expected to show, and provide assurance, that actual Meter errors over a group of Meters will exhibit a pattern approaching a "normal distribution" and where it shows an error pattern over a group of Meters with a consistent bias towards the extremes allow BSCCo to investigate and recommend actions.

The frequency of Type B and Type C calibrations is specified in Appendix A of CoP4 and is split between CoP1[7] and CoP2[8]; and CoP3 and CoP5:

| By Year | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|
| CoP1 & CoP2 | A | - | C | - | C | - | C | - | C |
| | | Bm[13] | Bc | Cm + Bc | Bm | Bc | Cc + Bm | Bm | Bc |
| CoP3, 5, 6 & 7 | A | - | - | B | C | B | B | B | C |

Arranging and carrying out a periodic calibration test has a cost implication to Registrants of Metering Systems. The cost benefit analysis of this activity to periodically recalibrate has split what Registrants are doing across CoP1 and CoP2 compared with what is being done under CoP3 and CoP5. For CoP1 and CoP2 Metering Systems the Meters are required to be more accurate and in some circumstances have additional functional requirements (e.g. operational metering data provided by the Meter to the National Grid Electricity System Operator) which requires the use of a rack mounted Meter as opposed to a wall mounted Meter. Each of these requirements result in a higher cost per unit for this type of Meter that encourages a Registrant to periodically recalibrate the Meter for CoP1 and CoP2 to keep the Meter in service.

[6] Reference Conditions mean the 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.
[7] Code of Practice 1 'The Metering of Circuits with a Rated Capacity exceeding 100MVA for Settlement Purposes'
[8] Code of Practice 2 'The Metering of Circuits with a Rated Capacity not exceeding 100MVA for Settlement Purposes'


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CoP3 and CoP5 Meters are required to be less accurate (accuracy class 1.0 as opposed to class 0.2S or 0.5S) and as such have a lower cost per unit. Combined with the CoP4 requirement to conduct the first periodic calibration in year 15 Registrants have chosen to replace the asset in the run up to year 15 rather than calibrate the installed Meter.

As a result for CoP3 and CoP5 no evidence is available to confirm whether or not actual Meter errors for Meter Types are exhibiting a pattern approaching a "normal distribution". Without this evidence to conduct an analysis BSSCo are unaware whether a Meter Type is showing a consistent bias towards the extremes of error, which would pose a risk to Settlement accuracy.

The Issue 93[9] group discussed an aspect with the intent of defining a process to deal with determining if Meter sample and periodic calibration checks are required to confirm the performance of particular Meter Types. The Workgroup highlighted the need for this requirement to trigger a recognition of a higher risk of failure at end of life and potentially inaccuracy.

The Workgroup arrived at the following areas to consider/progress:

- Parties must adhere to the requirement for completing a calibration (sample and periodic) check, if it is clearly set out in CoP4; and
- It was important to ensure Meter accuracy was known, if Meters were being replaced prior to their periodic calibration check, End of Life testing should be required.

The conclusion from the Issue 93 workgroup provided the below recommendations that were noted and agreed by the workgroup:

- Continue and reinforce the current calibration check process (periodic and sample calibrations);
- Introduce CoP specific End of Life testing; and
- Introduce End of Life testing (CoP specific sample testing of existing Meter Types e.g. CoP3 and CoP5.

The recommendations were presented to, and noted by, the BSC Panel on 8 September 2022[10],

**Proposed Solution (**mandatory by originator)

This CP will look to create a new section 5.2A in CoP4 to detail the requirements and timescales for end of life sample calibrations. These will focus on Meter Types used in CoP3 and CoP5 Metering Systems.

The Office for Product Safety & Standards (OPSS) In Service Testing (IST) Handbook[11] (May 2022 v3.61) section 7.0 ‘Sampling plan and criteria for meter populations requiring replacement’ specifies the number of samples required for a known population size, as shown in the table

[9] Issue 93 ‘Review of the BSC metering Codes of Practice’
[10] BSC Panel 330/08
[11] Office for Product Safety & Standards In Service Testing Handbook


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below. Columns have been added to detail the percentage of the population range for the upper and lower limit.

| Population | Sample Size | Lower % of Population | Upper % of Population |
|---|---|---|---|
| 1,201 to 3,200 | 50 | 4.2% | 1.6% |
| 3,201 to 10,000 | 75 | 2.3% | 0.75% |
| 10,001 to 35,000 | 100 | 1.0% | 0.29% |
| 35,001 to 150,000 | 150 | 0.43% | 0.1% |
| >150,000 | 200 | 0.13% | N/A |

The CoP4 end of life sample testing population ranges and sample sizes will be based on the population of a Meter Type an individual Meter Operator Agent is responsible for. As the Meter Types that do not fall under IST Handbook (i.e. over 100 kW and current transformer operated Meters) have significantly lower volumes the population ranges have been amended for the end of life testing sample calibration. The following limits and sample sizes have been developed:

| Population | Sample Size | Lower % of Population | Upper % of Population |
|---|---|---|---|
| 100 to 500 | 5 | 5.0% | 1.0% |
| 501 to 2,000 | 10 | 2.0% | 0.5% |
| 2,001 to 10,000 | 20 | 1.0% | 0.20% |
| >10,001 | 40 | 0.40% | N/A |

An additional process has been added into BSCP601 section 2 ‘Interface and Timetable Information’ for where BSCCo has identified an issue with errors following the analysis of end of life sample calibration test results. This will involve notifying and liaising with the Office of Product Safety and Standards and then making a recommendation to the Panel. This recommendation can be to instruct Parties to remove a particular Meter Type over a transitional period or prevent its continued installation.

Should this CP be approved Elexon will develop a process to identify the volumes of Meter Types a MOA is responsible for in CoP3 and CoP5 and develop a technique to analyse calibration test results to make an assessment, and if required a recommendation, on the accuracy performance of a Meter Type.


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| **Justification for Change** (mandatory by originator)<br>This CP will provide an assurance process to confirm whether a Meter Type is still operating within the allowed accuracy limits or is drifting towards, or beyond, the extreme end of the limits. It will also define the steps to be taken where an issue is identified mitigating the risk to Settlement. |
| **To which section of the Code does the CP relate, and does the CP facilitate the current provisions of the Code?** (mandatory by originator)<br>Section L 'Metering' |
| **Estimated Implementation Costs** (mandatory by BSCCo)<br><£2,000 |
| **BSC Configurable Items Affected by Proposed Solution(s)** (mandatory by originator)<br>• CoP4 'Code of Practice for the Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes';<br>• BSCP601 'Metering Protocol Approval and Compliance Testing' |
| **Impact on Core Industry Documents or System Operator-Transmission Owner Code** (mandatory by originator)<br>No impact identified |
| **Related Changes and/or BSC Releases** (mandatory by BSCCo)<br>Issue 93 'Review of the BSC metering Codes of Practice' |
| **Requested Implementation Date (mandatory by originator)**<br>TBC |
| **Reason:** To allow enough time to consult the industry, update the relevant documents and implement this change as early as possible. |
| **Version History (mandatory by BSCCo)** |
| ***Originator's Details:*** |
| ***BCA Name:*** Iain Nicoll |
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| ***Telephone Number:*** 0207 380 4162 |
| ***Date:*** 07 November 2023 |
| Attachments: Yes.<br><br>BSCP601 and CoP4 |


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