Victorian Electrolysis Committee

Electrolysis Area Testing – Industry Guideline

1.0 Introduction

Energy Safe Victoria (**Energy Safe**) has an objective in the State of Victoria to protect underground and underwater structures from the corrosive effects of stray electrical currents.

Part 2 section 6(d) of the *Electricity Safety Act 1998* (**ESA**) requires Energy Safe "to protect underground and underwater structures from corrosion caused by stray electrical currents". This overarching responsibility extends to any buried or submerged metallic structure (such as pipelines, pipes, tanks, cables, posts, pylons, and steel-reinforced structures) that is at risk of corrosion from stray currents from an electrical source (such as railways, tramways, substations, cathodic protection systems (**CPS**) and other DC electrical installations).

The purpose of this guide is to provide guidance to authorities and contractors in achieving these objectives in a timely manner from the Electrolysis Area Testing program.

2.0 Objectives

Programmed testing of traction substation "areas" is considered the most effective method of mitigating the effects of stray currents from traction systems and ensuring traction operators comply with their duties under s94 ESA. The "area" is determined by the extent of stray traction current that has been demonstrated to affect other assets.

Area testing involves all structure owners and the traction system operator in a coordinated test within one or more adjacent traction substation areas. Energy Safe uses this program to identify imbalances between systems that produce stray current to test compliance with the s94 duties of rail operators, and to identify preventative adjustments to protect third party assets.

At present (2025) there are 184 traction substations, operated by Metro Trains Melbourne (**MTM**) (119) and Yarra Trams (**YT**) (65). Following a risk workshop conducted in 2022 the Victorian Electrolysis Committee (**VEC**) advised Energy Safe that substations should be tested at a frequency of every 5 to 6 years, which requires approximately 30 substation area tests to be completed each year. An Area Test usually takes on average 3 weeks (can be 1 to 5 weeks) to complete depending on the complexity of the area, then 1 week to demobilise and mobilise the next area. Area Tests run continuously throughout the year, with a break taken over the Christmas/New Year period.

The objectives of an Area Test are to:

- Measure the effect of stray current on all underground metallic structures to assist the traction operator in meeting their s94 duty to design, install, operate and maintain the railway to minimise the risks of damage to property arising from leakage of stray electrical currents
- Adjust and balance the electrolysis mitigation system (**EMS**) which includes drainage bonds (**DBs**) and Thyristor Drainage Units (**TDUs**), such that the stray current affects are minimised on each test point on each structure with the minimum drainage current required and within an acceptable testing timeframe.
- Measure the effect from high-risk CPS (above 2A) to assist the owner is meeting their s93(2)(b) duty to ensure that the system is operated in accordance with its registration conditions and not interfering with any third-party assets.
- Determine recommendations to replace, modify or install new electrolysis mitigation systems to assist the traction operator in meeting their s94 duties

Energy Safe is advised by the Technical Sub-Committee (**TSC**) of the area test program that meets the performance targets. Energy Safe then coordinates testing in the areas nominated by the TSC within an agreed time frame. The schedule is flexible and subject to change due to: the time taken to complete an area; railway or tramway construction schedules; traction system abnormalities; or other factors.

2.1 Legislation

93 Operation of cathodic protection systems

(1) The owner of a cathodic protection system must not operate or allow another person to operate that system unless it is registered by Energy Safe Victoria in accordance with the regulations.

(2) The owner of a cathodic protection system must ensure that the system is operated in accordance with—

(a) this Act and the regulations; and

(b) any conditions to which the registration is subject.

94 Railway operator—duty in relation to stray electrical current leakage

A person who is the operator of a railway must ensure that that railway is designed, installed, operated and maintained in such a manner as to minimise the risks to safety of any person and the risks of damage to property arising from the leakage of stray electrical currents from that railway.

3.0 Procedure

3.1 Area Test Procedure

The Area Test procedure is:

1. Energy Safe notifies the traction system operators and structure owners on the commencement date for the area test (usually a Friday).
2. Structure owners nominate test points to be logged during the test.
3. Energy Safe prepares the area test map.
4. Energy Safe appoints the test coordinator and assistant and commences the area test.
5. The structure owners' test operators monitor their respective structures and submit data daily to the test coordinator.
6. The traction system operator monitors the substations under test, including the stray current mitigation systems installed at these substations. Adjacent substations may be monitored during a test, with data submitted daily to the test coordinator.
7. During the first weekend the EMS associated with the substations under test are isolated to achieve an initial Weekend Soil Line (**WESL**) used as a datum to assess the condition of the structures
8. On the first Tuesday all drainage bonds and test points are critically assessed to determine whether drainage is required, and whether there is sufficient negative rail volts to allow for straight drainage.
9. Only reconnect DB's where required, taking into consideration possible future requirements.
10. If outlying TPs required drainage rather than over-draining at DB's determine if alternatives are available, ie bonding or CP
11. Only increase TDU output if necessary, use alternatives if available, ie adjust DB's, bonding or CP
12. The traction operators representative in conjunction with the Area Test coordinator assess the data from the substations to determine whether any changes to the substation load is required.
13. Energy Safe in conjunction with the structure owners adjust the EMS and carry out other testing to provide options to the technical representatives for their approval.
14. The test coordinator and traction system operator's technical representative assess the traction system loadings and their effect on the drainage system.
15. The test coordinator nominates adjustments to the TDU to minimise the traction effects. The traction system operator's technical representative arranges for the adjustments to the TDU to be implemented.

16. Testing continues until the test coordinator and technical representatives are satisfied that no further adjustments are required and stray current issues have been mitigated as far as reasonably practicable
17. The test coordinator conducts a final meeting attended by the technical representatives of the traction system operator and all structure owners to discuss testing and develop any recommendations for alterations or additions to the electrolysis mitigation system.
18. The technical representatives agree to the recommended changes.
19. The test coordinator obtains agreement of the traction system operator and all structure owners to conclude the test.
20. Energy Safe produces an area test report and submits it to the TSC for review and ratification.

3.2 Assessment Criteria

The electrolysis mitigation system should be designed to operate in accordance with AS 2832.1.

The main criteria used to assess structure charts is the percentage (%) anodic to the soil line:

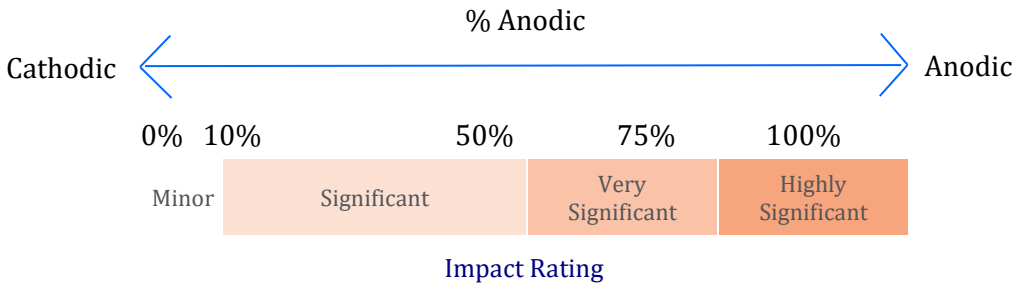

Figure 1 - Criteria for assessing potential impact of stray electrical currents

The soil line is defined as the potential of the structure to earth when the rail-to-earth voltage at the traction substation is zero and the electrolysis mitigation system is isolated. The soil line is determined by the test coordinator as soon as possible after the area test starts.

Average anodic excursions of 20 mV from the soil line or less are considered insignificant.

When assessing the submitted charts, factors to be considered include:

- Percentage anodic to the cathodic protection criteria in AS 2832.1.
- Scaling of the charts being assessed with 1 volt as the minimum full scale.
- Magnitude of the current required to achieve the criteria nominated above.
- Magnitude of the anodic excursions shown on the charts.
- Magnitude of the cathodic excursions shown on the charts.
- Continuity of the structure and whether bonding is an option.
- The type of structure (see structure classifications in VEC Priority Assessment Matrix guideline) and their future use.
- Integrity of the structure (coating, earths, fault history).
- Limitations of the drainage and traction system.

4.0 Responsibilities

It is the responsibility of all participants in an Area test to provide accurate and timely data to the coordinator to ensure that the test is conducted in the most efficient manner possible.

To do this, traction operators and asset owners should ensure that information is provided in a timely manner, equipment is calibrated and fit for purpose.

Personnel must have the requisite experience, qualifications and are competent for the task. This will ensure the electrolysis Area Test can be completed successfully.

All personnel involved in the Area Test must comply with the health and safety requirements of the traction system operator and structure owners, as appropriate.

4.1 Traction Operators responsibilities

The traction operators are to provide adequate resources to participate in an Area Test, which includes to monitor substations, make any requested changes to substation loads or TDU settings, and to respond to any faults.

Traction operators will be advised by Energy Safe of the scheduled commencement of an Area Test and the substations to be monitored during the Area Test. The traction operator will also be advised who the designated Energy Safe Area Test coordinator will be. The following responsibilities are to be observed:

- Loading of substations shall be determined by the traction operator **prior** to an Area Test commencing, especially in the case of any new substation installations to ensure reliable train operations and optimised electrolysis drainage conditions.
- Nominated substations shall be monitored as early as practicable prior to any Area Test commencing. Monitoring devices (data loggers or chart recorders) should record:
    - substation load
    - rail to earth voltage

  And, where applicable:
    - drainage current
    - thyristor drainage unit output voltage
- All devices used shall be calibrated and checked for operation prior to use.
- Any TDUs shall be calibrated and tested for correct operation prior to the Area Test commencing, and during an Area Test as requested by the Area Test coordinator. X-Y recordings should be provided to the Energy Safe Area Test coordinator for each TDU on the commencement of the test, subsequent to any changes made during the test and on completion of the test.
- Where there is a TDU in a railway substation in the area under test, arrangements will be made through the traction operator's representative to have this switched off from 15:00 hours on the Friday proceeding the first weekend and until 12:00 hours on the first Tuesday. TDUs in Tramway substations are not switched off by the Control Centre over the first weekend of the Area Test.
- At the beginning of the Area Test, the traction operator's representative is to arrange for the overnight switching period of the TDU's in the area under test, to be increased from 1 hour (default setting is 02:00 hours to 03:00 hours) to 2 hours (02:00 hours to 04:00 hours) to allow for the switching of cathodic protection units to occur during the TDU off period and to distinguish between the effect from TDUs in adjoining areas.
- Railway and Tramway substation data must be provided to the Area Test coordinator on a daily basis, no later than **11:00** hours and include the overnight 'switched' period, as mentioned above in a format acceptable to Energy Safe.
- The traction operator concerned should ensure that continuity of the EMS is maintained in the area under test and the adjacent areas, and that the substation operation remains normal. They should also provide personnel to remedy any breakdown of equipment and to service the recording meters.

- Any issues affecting the normal operation of the TDU and associated electrolysis infrastructure (i.e. electrolysis feeders) should be communicated as soon as possible to the traction operator's representative who will advise the Energy Safe Area Test coordinator.
- Any requests for changes to Substation loads and/or Railway TDU settings will be communicated by the Energy Safe to the traction operator's representative. These changes should be made within 24hrs for TDUs, and within 3 business days for substation loads, so as to reduce downtime on the Area Test.
- TDUs in tramway substations are adjusted by Energy Safe personnel.

4.2 Asset Owner responsibilities

4.2.1 Area Test preparation

The Area Test map will be provided to the structure owners/representatives no later than **10 business days** prior to the test commencement, along with a list of all drainage bonds in the area, and any previous Area Test data available. The authorities will need to determine which locations within the map boundary require monitoring. **All drainage bond locations must be monitored for potential and drainage current.** A complete list of the selected test locations is to be provided to the Area Test coordinator, in an excel format, no later than **5 business days** prior to the test commencement. The information in the address list provided should include:

- test point address of each structure to be charted
- size of each structure and pressure if a gas structure
- test point id (ES number, Tech ID etc.) of each structure
- the GPS coordinates of each test point
- the status of flanges and any bonding configurations
- for water industry test points a drawing of each test point should be provided

The Area Test coordinator will review all maps and determine the Area Test numbers for each location. These numbers are allocated per Area Test.

As soon as the Area Test numbers are determined, the Area Test coordinator will provide the relevant authorities the Area Test address sheet containing the allocated numbers which must be applied accurately to the data logger chart identification.

4.2.2 Structure Owners responsibilities:

- Measure the effect of stray current on all underground metallic structures to test whether the EMS is working effectively within the substation area.
- Adjust pipeline configurations where possible, ie at insulated flanges to optimise electrolysis drainage conditions.
- The area test coordinator must be advised prior to the test commencing of any structures that have been decommissioned, isolated or replaced that may influence the operation of the electrolysis mitigation system since the previous area test.
- Test high risk CPS (above 2A) to ensure compliance with their registration conditions, and not interfering with any third-party assets
- All CPS should be continuously "on" (i.e. not switching off, or being interrupted), all time switches and CPS circuitry are to be checked for correct operation at the commencement of the test.
- All CPS should be operating at their normal operating output (within registered permitted output). The Area Test coordinator **must** be informed at the commencement of the Area Test if a unit is not operating or is operating at a reduced output.
- The Area Test coordinator **must** be informed of the state of any flanges and/or bonds in the test points being monitored at the commencement of the Area Test.

- CPS should only be interrupted upon request from the Area Test coordinator. The Area Test coordinator will advise which “off” times are required.
- When a CPS is requested to be switched (ie interrupted) during an area test, a potential and current datalogger must be installed at the CPS to validate the unit had switched overnight.
- No other works that may impact the chart data (potential surveys etc) are to be conducted in the vicinity of the Area Test.

4.2.3 Data logger setup and use

- All data loggers should be calibrated and checked that they are operating correctly prior to the electrolysis Area Test commencing. The data logger battery condition must be sufficient for the duration of the test, otherwise replaced. Any previous data should be cleared from the data logger memory.
- Personnel assigned to the electrolysis Area Test should be familiar with the test locations and assets being tested. Preferably, they should have relevant plans and/or data associated with the testing locations and structures.
- Data loggers should be installed in the nominated locations as detailed in the Energy Safe Area Test address sheet. Any alteration to nominated locations **must** be communicated to the Area Test coordinator as soon as possible. The area test coordinator **must** be advised of any nominated test point locations that are not charted and the reason why.
- Structures with drainage bonds associated with the substations being tested must have both a potential and current logger installed. All data logger current shunt connections should be made in the structure owners test point.
- The test locations should be surveyed prior to the Area Test to determine if the test equipment can be accommodated, or if modification are required, e.g. replacement of test point box.
- If access to the test point is not possible, and the location is at an electrolysis drainage bond cabinet, asset owners/representatives can request access from the relevant traction operators representative prior to the commencement of the test. (Note charges will apply at the relevant hourly rate).
- Asset Owners / Representatives shall not access the electrolysis DB cabinets without an MTM or Yarra Trams representative in attendance (except DB cabinets with only connections between asset owners).
- Data loggers should be installed and operating prior to the Area Test commencing (under normal circumstances logging commences at 08:00 hours on the Friday).
- All connections should be clean and tight, particularly the shunt connections. Shunts should be of as low a resistance as possible and leads in series with shunts should be adequately lugged. Correct scaling should be confirmed **prior** to the Area Test commencing.
- The structure should be connected to the positive terminal of the datalogger, producing negative readings with respect to the reference.
- Data loggers should be set up with the correct title/heading, i.e. allocated Energy Safe number, followed by the address, then structure size and test point number.
    - **Example 1**, Melbourne Water 1150mm MSWM pipeline at test point number ES36789 at the location of St Georges Rd and Hutton St, and assigned the test number of M10 by the Area Test coordinator, should be setup as,

      M10 St Georges Rd & Hutton St 1150 ES36789

      If this was at a North/South insulating flange (unbonded), and this was installed on the northern side of the insulating flange, it would be setup as,

      M10N St Georges Rd & Hutton St 1150 ES36789 N (North),

- **Example 2**, MGN 450mm TP MSGM at test point number 04/L40 at the location of Heatherton Rd and Stud Rd, and assigned the test number of T8 by the Area Test coordinator, should be setup as,

  T08TP Heatherton Rd & Stud Rd 04L40

  If this was at a regulator pit, and the outlet pipework was a 150mm HP MSGM at test point number 06/05H140 at the location of Heatherton Rd and Stud Rd, and assigned the test number of T8 by the Area Test coordinator, should be setup as,

  T08HP Heatherton Rd & Stud Rd 05H140

- **Example 3** (Current Charts), Western Water 450mm MSWM at Shields St east of railway, and assigned the test number of W27 by the Area Test coordinator, should be setup as,

  W27# Shields St E of rail (followed by test point number)

- Data logger file numbers should be saved as 2 or 3 digits, i.e. M7 should be saved as M07. This assists with the processing and reviewing of the data in numerical order.
- Weekend charts should be for a minimum of 72hrs, i.e. they must capture the Friday afternoon peak to Monday morning. This is to allow the Area Test coordinator to establish the weekend overnight soil lines for each structure.
- When installing a data logger, a 'spot' potential reading with a calibrated multimeter **must** be recorded at the time of installation, to confirm the data logger is capturing the data accurately and correct scaling for current.
- The Area Test coordinator **must** be advised of locations where a temporary earth stake is being used.
- The earth stake potential **must be verified at least weekly** where a temporary earth stake is being used.
- All data charts shall be submitted daily and must be presented to the Area Test coordinator no later than **11:00** hours. This allows time for the Area Test coordinator to assess the charts and make any necessary adjustments. Any delays should be communicated to the Area Test coordinator as soon as possible.
- It is the responsibility of the structure owner/representatives to ensure reliable data loggers, and a communications platform is being used to meet the requirement of submitting daily accurate information.
- Failed charts (flat lines, short length, no data sent) must be investigated on the day of failure. The area test coordinator must be advised of the reason for any charts that are not submitted. Loggers and leads must be changed when persistent failures (3 days) at the same location occur.
- Data logger charts **must** be submitted with the correct polarity (i.e. Positive (upwards) to Negative (downwards) voltage on the Y axis. Drainage bond current **must** be in a positive direction.
- The protection level line (ie -850mV) should be displayed on every potential chart.
- At the completion of the Area Test, when removing shunts from bonded structures, ensure that cables are reconnected correctly and tightened appropriately.

4.2.3 Personnel and other related items

- Any changes to personnel involved in the Area Test should be, suitable qualified as specified in "Key points", and communicated to the Area Test coordinator as soon as possible. Ideally, the same individual / individuals should commence, and complete an Area Test.

- Spare equipment / data loggers should be available to the assigned Area Test personnel to minimise any downtime or lost time due to logger failures.
- No additional test locations, which were not included in the original address sheet, should be added during the Area Test without prior notification to the Area Test coordinator, whereby a new Area Test number will be assigned.
- The test coordinator **must** be informed of any other issues which may impact the test.
- No other works such as: coating defect surveys; coiling surveys; CP interference test; current injection tests; and bonding/un-bonding should be carried out in the area under test without the **prior** consent of the Area Test coordinator.
- Persons representing their company at the final meeting should have the required level of authorisation to agree to the draft recommendations and the test being concluded.

4.3 Energy Safe responsibilities

Energy Safe's role is to provide the following functions during an Area Test:

- Coordinate the test with the traction system operator and structure owners.
- Prepare the area test map and test point numbering
- Provide the test coordinator and assistant
- Collate and analyse data to assess the condition of structures
- Balance and adjust the electrolysis mitigation system
- Make recommendations to replace, modify or install new electrolysis mitigation systems
- Prepare and issue the Area test report.

On conclusion of the test, the technical representatives of all parties agree on the technical recommendations, including the operating settings—that is, the "agreed" settings for operating the electrolysis mitigation system.

Energy Safe then prepares a test report with recommendations and submits it to the TSC for review and ratification at the next TSC meeting. The report is sent to the testing participants within 10 business days of the completion of the Area Test.

Recommendations have their priority assessed for timeframes to complete as per the *VEC – Guideline for Priority Assessment Matrix* document.

5 Datalogger specifications

5.1 Scope

These specifications detail the current requirements for dataloggers, and associated software developed for use in area testing. The aim of this specification is to ensure that developments in equipment and software comply with a common set of guidelines and to encourage the ongoing development of appropriate technology and tools to improve the test procedures. In developing these guidelines, it is intended that testing does not become dependent on any particular equipment or software.

Equipment used in an area test must comply with the requirements of this specification and the technical requirements detailed in AS 2832.1, and in particular section 2.2.2.6.2 where "If a data logger is used for the monitoring of potential, its frequency of sampling shall be not less than four samples per minute". These specifications should be considered mandatory unless otherwise indicated.

5.2 Functions

Dataloggers must be capable of:

- Recording continuous voltage and current for at least 72-hours.
- Producing compatible data files, which can be read, processed, viewed and retained by the software products used by VEC members (Winchart).

5.3 Data compression

Data compression, if used, must be of an approved method.

5.4. File names

A standardised system of file naming must be used for all electronic charts submitted to Energy Safe by structure owners.

Folder name

The folder name is the date of the test in the format yyyymmdd, e.g. 20140728

File names

File names identify the test point in the format AxxSSSSt, where:

- A identifies the structure owner (see below).
- xx is the VEC point number identified by 2 or 3 digits, e.g. 07
- SSSS identifies the structure, diameter, pressure or direction, e.g. 1350
- t identifies the type of chart: C for current or V for voltage

Authority	Auth	Code
Air Liquide	ALA	D
AGN (Vic Gas Distribution)	AGN	K
ANS	ANS	U
AquaSure	AS	W
Beach Energy	BE	B
BOC	BOC	L
BP	BP	B
Caltex	CAL	X
CitiPower	CP	E
Coliban Water Authority (Bendigo)	CWA	C
Crib Point	CRPT	P
Electricity Suppliers (not CitiPower)	EI	E
Elgas	ELG	L
Epping Homemaker	EH	H
ESSO	ESSO	O

Greater Western Water	GWW	C
Melbourne Polytechnic	MP	T
Melbourne Water	MW	M
Mobil	MOB	R
Mobil Refineries Australia	MRA	P
Multinet Gas Networks	MGN	T
Old Colonists' Association of Victoria	OCAV	Z
QENOS	QEN	Q
South East Water	SEW	S
Viva Black Oil	VBO	S
Viva White Oil	VWO	S
VTS (APA Group)	VTS	G
WAG	WAG	W
Yarra Trams	YT	A
Yarra Valley Water	YVW	Y

Examples

M121350V is a voltage chart on a 1350 mm diameter water main at test point M12.

G05MSTPC is a current chart on a transmission pressure gas main at test point G5.

5.5 Data file format

The data file is an ASCII text file with a 12-line header. Readings commence on line 13. Each line is terminated with CR-LF characters. Values are space delimited. Times use a colon separator in the format hh:mm:ss. Dates use a forward slash separator in the format dd/mm/yy.

Data file		**Notes**
Line 1	Datalogger ID *ID*	Energy Safe-approved ID
Line 2	Test location and description *Location*[space]*TestDescription*	First space is separator
Line 3	Type of recording and offset or multiplier *Type*[space]*Factor*	*Type* Voltage or Current *Factor* integer For Voltage, *Factor* is an offset in mV. Offset is subtracted from all recorded voltage readings. For Current, *Factor* is a scaling factor in amps per 10 mV. All readings are multiplied by 10 times the scaling factor.

Data file		Notes
Line 4	Number of readings, log interval, and start time *Number*[space]*LogInterval*[space]*Time*[space]*Date*	*Number* integer *LogInterval* integer seconds *Time* hh:mm:ss *Date* dd/mm/yy
Line 5	Stop time *Time*[space]*Date*	*Time* hh:mm:ss *Date* dd/mm/yy
Line 6	Datum limits [text]*DatumLimit*[text]*Time*[text]	Extracts numerical datum limit and time from text. Separating text must be alphabetic. *DatumLimit* integer mV *Time* hh:mm:ss
Line 7	Exclusion times [text]from[space]*Window*[space]to[space]*Wall*[space] [text]	Start and end times of exclusion period (from window to wall). Period is not counted in statistical averaging, maximum and minimum. *Window* hh:mm:ss dd/mm/yy following the first “from” *Wall* hh:mm:ss dd/mm/yy following the first “to” Single digit times and dates can be used i.e. 0:8:10 1/5/95
Line 8	Average reading Average =[space]*Avg*[space]mV	Average or mean of all readings outside the exclusion period. The value follows the space after the first equals sign. *Avg* integer mV
Line 9	Maximum reading and percentile Maximum =[space]*Max*[space]*Percentile%* =[space]*PercentilemV*[space]mV	Maximum of all readings outside the exclusion period. The value follows the space after the first equals sign. *Max* integer mV Percentile value is optional *Percentile%* integer percent *PercentilemV* integer mV

Data file		Notes
Line 10	Minimum reading and percentile Minimum =[space]*Min*[space]*Percentile%* =[space]*PercentilemV*[space]mV	Maximum of all readings outside the exclusion period. The value follows the space after the first equals sign. *Min* integer mV Percentile value is optional *Percentile%* integer percent *PercentilemV* integer mV
Line 11	Scale factors [text]	Reserved for scale factors, such as gain, calibration and weekend. Leave blank if not required. Free format text
Line 12	Other information [text]	Reserved to record other information. Leave blank if not required. Free format text
Line 13 to EOF	Readings *Value*	*Value* integer mV Raw (unfactored) recording

Example

01	CS-GF-C014
02	G23 Williams St at Station St, 750mm MSGM
03	Voltage 28
04	335 180 08:07:25 06/03/14
05	08:38:18 06/03/14
06	The voltage was under 850 mV for 00:13:32
07	Excluding readings from 00:10:00 to 00:05:00
08	Average = 1104 mV
09	Maximum = 1535 mV 99.5% = 1533 mV
10	Minimum = 1409 mV 0.5% = 1421 mV
11	Gain: 7 Calib: *20159 / 8192 mV Weekend = 723 mV
12	1 channel, 9851 bytes in block, polarity +ve to structure
13	814 mV

5.6 Software

All software used in area testing must be designed for use on Microsoft Windows compatible computers; support commonly available peripheral devices, such as screens, printers, mice, and storage devices; and meet the compatibility requirements detailed in this specification.

In particular, they shall be capable of:

- Producing a data file confirming the naming, header and data compression requirements detailed in this specification.
- Able to handle all approved formats.
- Meet the expectations for user interfacing and graphical presentation required during area testing (especially for setting up loggers and downloading of data files).
- Meet the technical capability for viewing recorded data without disturbing the 24-hour recordings.
- Provide the essential features for the presentation, processing and analysis of recordings for area testing.
- Be able to identify most commonly encountered errors, which can then be handled by the user. User to be easily able to escape from most situations.
- Communication errors to be checked for and corrected where possible.
- The data display should be capable of being switched between “dots” and “lines”.

Graphical display capabilities:

- Display near full-screen graph of recorded data on 24-hour time base (unanchored).
- Include location, type of recording and statistical data on the graph.
- Option for scaling graphs to include:
- Full auto-scaling
- Auto-ranging to selected scales (1, 2.5, 5 and 10 volt ranges)
- Fixed scale (display all charts on a defined scale)
- Save user preferred defaults
- Rapid display of data should rate high in performance criteria.
- Ease (minimum number of keystrokes) to display charts, find and retrieve files, adjust datum or zoom parameters.

Optional features include:

- Adjustable datum which displays the percentage under the value (high priority).
- Zoom box to display parts of a chart (high priority).
- Optional use of dots or connected lines between readings (high priority).
- Display multiple charts for comparison (high priority).
- Include a weekend soil line datum (medium priority).
- Exclude/remove selected parts of the chart (medium priority).
- Optional polarity, with facility to change/invert polarity (medium priority).
- Produce histograms of recorded data (low priority).
- Display moving averages of recorded data (low priority).

6 Costs

Costs associated to participate in Area Tests are covered by each company, which include but not limited to:

- datalogging,
- bonding,
- additional testing,
- changes to the network or protection equipment, and
- meeting representation.

If any party requests an Area Test to be conducted that it is outside of the regular 6-year routine, they could be required to fund this out of sequence test and reimburse all participants for their costs. This will be determined on a case-by-case basis by the TSC members.

References

- The Electricity Safety Act 1998.
- VEC – Guideline for Priority Assessment Matrix

Document Information

Version	Date	Revision Information	Author	Edited by	Authorised by
1.0	26/02/2019	New Procedure	P Chiaravalloti		
1.1	09/07/2019	Draft - issued for comment	P Chiaravalloti	Lou Ioan	
2.0	21/07/2020	For industry comment	P Chiaravalloti	Peter Wade	
3.0	24/09/2020	Industry comments incorporated	P Chiaravalloti	Peter Wade	Peter Wade
4.0	19/02/2025	Incorporating Code of Practice information	Peter Wade	R White & P Chiaravalloti	
5.0	12/06/2025	Incorporating VEC & TSC member comments	Peter Wade	R White	Ian Burgwin