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**Appointed examiner's audit of Exceptional Event Claim -
UK Power Networks (Eastern)
132kV Incident – Norwich Trowse
to Gorleston and Great Yarmouth Grid Substations
01 January 2014**



Document Properties


Title: UK Power Networks (Eastern) – Audit of Exceptional Event Claim – UKPN (EPN) – 132kV Norwich Trowse to Gorleston and G⁺ Yarmouth Grid Substations – 01 January 2014

Reference: ep/Ofgem/EPN/01 Jan '14

Issue: Final report v1.0

Date: 26 May 2015

Authorisation

Name	Position	Signed	Date
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History

Issue	Date	Originator	Checker	Description
1.0	26 May 2015	Bill Slegg and Geoff Stott	Mel Brown	Final report incorporating UKPN and Ofgem comments
0.1	23 November 2014	Bill Slegg and Geoff Stott	Mel Brown	Draft version circulated to UKPN and Ofgem for factual checking and comment
0.0	18 September 2014	Geoff Stott	-	Document created from energypeople template

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Glossary

Abbreviation	Meaning
AE	Appointed Examiner
CB	Circuit-breaker
CI	Customer Interruptions per 100 connected customers
CML	Customer Minutes Lost per connected customer
DNO	Distribution Network Operator
EHV	Extra High Voltage – all voltages above 20kV up to but excluding 132kV
ep	energypeople
EPN	UKPN's Eastern Power Network licensed area
HV	High Voltage – all voltages above 1kV up to and including 20kV
QoS	Quality of Service
RIGs	Regulatory Instructions & Guidance
SCADA	Supervisory Control and Data Acquisition
SLD	Single Line Diagram
SoF	Statement of Facts
ToR	Terms of Reference
UKPN	UK Power Networks

Notes:

Within this document:

1. The term “higher voltage” is used to indicate all voltages greater than 1kV.
2. The calculations of CI and CML within this document are adapted from the annual calculations contained in the RIGs to reflect the CI and CML generated by the actual incidents being audited.

They are as follows:

CI: the number of interruptions to supply – the number of customers interrupted per 100 connected customers generated by the incidents being audited.

It is calculated as:

$$CI = \frac{\text{the sum of the number of customers interrupted for incidents being audited} * 100}{\text{the total number of connected customers}}$$

CML: the duration of interruptions to supply – the number of customers interrupted per connected customer generated by the incidents being audited.

It is calculated as:

$$CML = \frac{\text{the sum of the customer minutes lost for all restoration stages for incidents being audited}}{\text{the total number of connected customers}}$$

In both the formulae above, the total number of connected customers is as declared as at 30 September during the relevant reporting year. Any claims that occur and are audited prior to 30 September in the reporting year during which they occur will be audited using the total number of customers declared at 30 September in the previous reporting year.



Summary

1. Ofgem has commissioned energypeople as its Appointed Examiner (AE) to audit the submission made by UK Power Networks (UKPN) under the "one off" exceptional event mechanism that an incident which affected its 132kV dual circuit overhead line from Norwich Trowse Substation to Gorleston and Great Yarmouth at 20:26 on Wednesday 01 January 2014 adversely affected the reported performance for its Eastern Power Networks (EPN) licensed area for the reporting year 2013/14.
2. The AE has visited UKPN to audit the claim against part 1 of the "one-off" exceptional event process and finds that it passes the exceptionality threshold in terms of both CI and CML.
3. The AE concludes that the event falls within the category of an "other event" as defined in paragraph 8.57 of Special Licence Condition CRC 8, including meeting the exceptionality requirements set out in Appendix 3 thereof.
4. The AE therefore proceeded to part 2 of the "one-off" exceptional event process, assessing UKPN's performance in mitigating the impact of the event upon its customers.
5. The AE concludes that UKPN's tree-clearance programme for its 132kV overhead lines is consistent with good practice, including as it does an annual cycle.
6. The AE also concludes that, prior to this incident, UKPN had done all it could to safeguard its 132kV double-circuit tower line at Waveney Forest and was restricted to further tree-clearance by the stipulation of the landowner.
7. The AE commends UKPN for re-negotiating the above limitation on tree-clearance following this incident.
8. The AE also commends UKPN for pursuing a thorough post-fault investigation by the manufacturers of the failed surge arrestor and for undertaking to alert the wider industry of the findings once these are known.
9. The AE commends UKPN's control engineers for analysing the alarms generated by the incident and for restoring all supplies as quickly as possible.
10. The AE concludes that UKPN had met the criteria of Appendix 4 to paragraph 8.58 of Special Licence Condition CRC 8 and that therefore the incident is deemed to be eligible for adjustment in the DNO's reported performance.
11. The AE therefore recommends that an adjustment to EPN's 2013/14 reported distribution system performance is made, in line with the part 1 audited CI and CML figures as shown in the following table:

	Audited number	Number above the threshold	Recommended adjustment
CI	1.43	0.73	0.73
CML	1.69	1.09	1.09



1. Audit part 1

1.1 Summary of the main facts

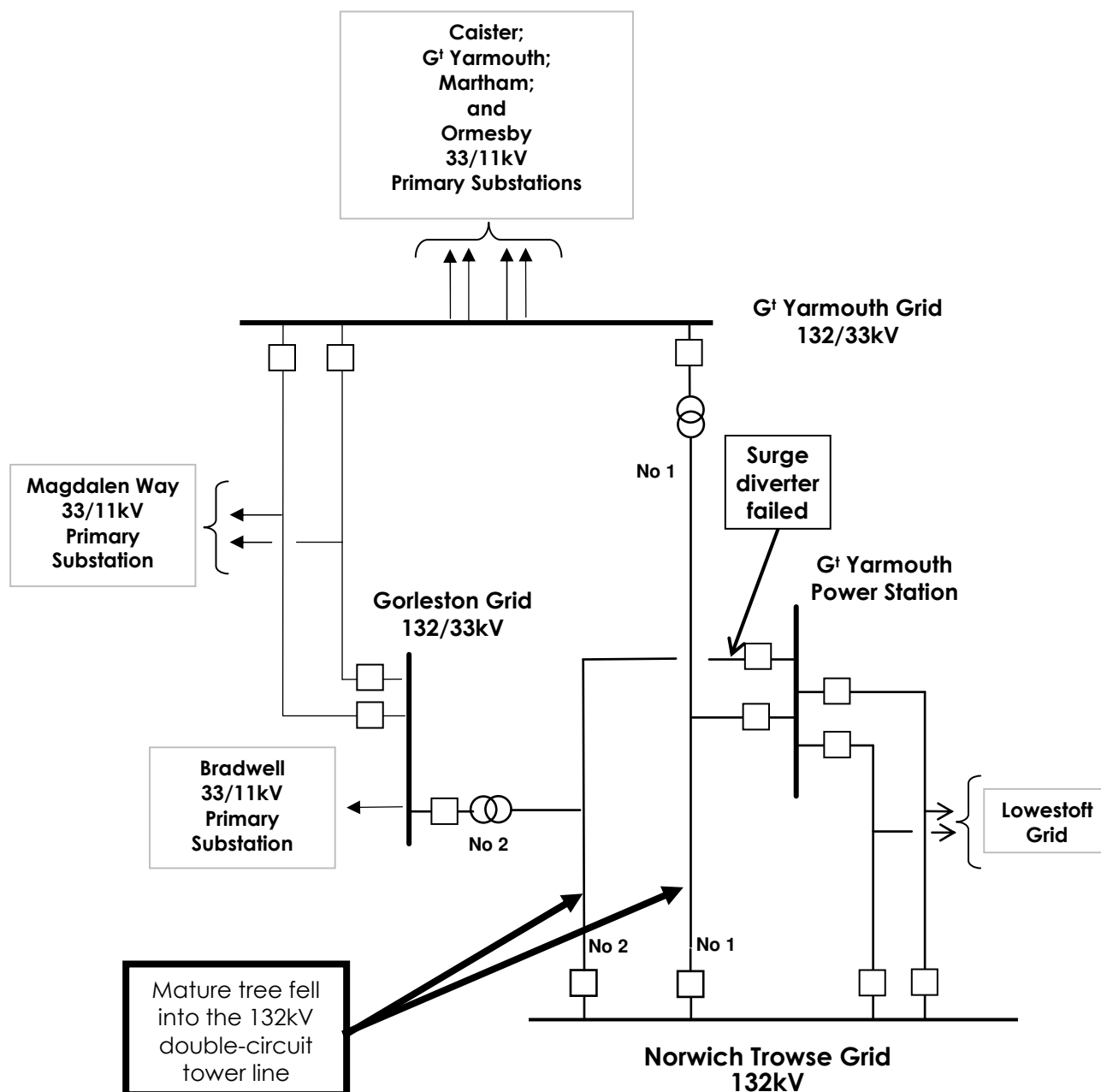
12. The AE's headline information log for this event is set out in Table A-1 at Appendix A. In addition, the following paragraphs summarise the main facts of the event.
13. UKPN has provided photographic evidence to support its claim that, in the Parish of Fritton and St Olaves, a mature tree fell onto its 132kV double-circuit tower line that connects Gorleston and Great Yarmouth with Norwich Trowse Grid,
14. The tree, which UKPN measured to be 60 metres tall, fell from outside the cut swathe it had agreed with the landowner.
15. UKPN's agreed cut swathe at the site of the incident is 40 metres wide – 20 metres each side of the centre-line of the 132kV double-circuit.
16. The incident affected both 132kV circuits and resulted in the loss of 132kV infeeds to both Gorleston Grid Substation and Great Yarmouth Grid Substation. Great Yarmouth Power Station has teed connections with each of these 132kV circuits.
17. In addition, Great Yarmouth Power Station has two other 132kV connections to Norwich Trowse 132kV Grid, both of which are teed to Lowestoft Grid Substation.
18. As a result of the loss of 132kV infeeds to Gorleston and Great Yarmouth 132/33kV Grid Substations, the 33kV infeeds to six of UKPN's 33/11kV Primary Substations were interrupted.
19. This resulted in the loss of supply to 51,030 of UKPN's customers for longer than three minutes.
20. UKPN's protection operated correctly to clear the incident from its distribution network, tripping the 132kV circuit-breakers controlling the 132kV double-circuit tower line.
21. UKPN's 132kV distribution system was running normally at the time of the incident.
22. UKPN's control engineer used tele-controlled switching to restore supplies from alternative 33kV and 11kV sources.
23. During the restoration activity it was found that a surge diverter fitted to the Gorleston Grid Substation teed Norwich Trowse 132kV Substation 132kV circuit-breaker at Great Yarmouth Power Station had failed.
24. UKPN's personnel worked to clear the fallen tree from its tower line, enabling the number 1 circuit to be restored at 01:26 on 02 January 2014.
25. The number 2 circuit was restored at 14:10 on 03 January 2014 after the faulted surge arrestor had been identified and the associated circuit-breaker removed from service.
26. The failed surge diverter forms an integral part of the gas-insulated circuit-breaker and thus rendered the circuit-breaker inoperative pending an investigation into the cause of the failure by the equipment manufacturers.
27. At the time of the audit visit the manufacturers were still in the process of carrying-out a detailed forensic examination of the failed device.
28. Pending the outcome of the manufacturer's investigation, the affected circuit has been temporarily sectionalised to enable the 132kV infeed to Gorleston 132/33kV Grid Substation to be restored.



29. As a result of this incident and to prevent a re-occurrence, UKPN has approached the landowner and has gained agreement to the felling of all other trees to the north of the double-circuit tower line that could foreseeably fall into it.
30. This work was underway at the time of the audit visit.
31. Also, UKPN has sent the failed surge arrestor to the manufacturers for examination.
32. A simplified view of the sections of UKPN's 132/33kV networks affected by this event is shown in Figure 1.



Figure 1 – Simplified Network Diagram of UKPN's 132/33kV distribution system affected by the incident



Notes:

1. Only the salient items of switchgear are shown.
2. UKPN's network was running normally at the time of the incident.
3. UKPN's control engineer used tele-controlled switching to restore supplies via alternative 33kV and 11kV sources.
4. The outgoing 33kV feeders from Gorleston and Great Yarmouth Grid Substations are shown schematically.

2. Exceptionality requirements

2.1 Does the event qualify for exclusion

33. The AE considers that the event falls within the category of an “other event” as defined in paragraph 8.57 of Special Licence Condition CRC 8, and meets the exceptionality requirements set out in Appendix 3 thereof.
34. The AE therefore considers that, subject to satisfying the requirements of Appendix 4 to CRC 8, the event qualifies for possible exclusion under the “one-off” exceptional events process.

2.2 Exceptionality test results

35. The number of incidents attributed to the event is shown in Table 1.

Table 1 – The number of incidents attributed to the event

Number of incidents attributed to the event	Claimed number	Audited number
132kV	1	1
EHV	0	0
HV	0	0
LV	0	0
Total	1	1

36. The results calculated by the AE to test this claim against Ofgem's exceptionality criteria are shown in Appendix A. A summary of the results is shown in Table 2.

Table 2 – Summary of exceptionality test results

Test	Threshold	Claimed number	Audited number	Pass / Fail	Amount above threshold
CI exceptionality	0.7	1.43	1.43	Pass	0.73
CML exceptionality	0.6	1.69	1.69	Pass	1.09

Notes:

1. Ofgem's CI and CML exceptionality criteria are set out in the AE's ToR¹.
2. The audited CI and CML used in the exceptionality test have been determined from the number of incidents attributed to the event.
3. Where the event passes either or both the exceptionality thresholds, the amount(s) above the threshold(s) is/are carried forward into the Audit part 2 assessment of DNO performance.
4. In accordance with guidance from Ofgem, the AE's calculations use the threshold values contained in the current Distribution Price Control and the number of customers connected to the DNO's network relevant to the date on which the incident occurred.

¹ Audits of Electricity Distribution Network Operators' one-off Exceptional Events Claims for 2012/13 to 2014/15



3. UKPN's views of its performance

3.1 Dealing with the incident

37. UKPN's Gorleston and Great Yarmouth 132/33kV Grid Substations are normally supplied via a double-circuit 132kV tower line from its Norwich Trowse Grid Substation.
38. Each of these 132kV circuits has a feed connection to Great Yarmouth Power Station.
39. At the time of the incident, the system was running normally with both 132kV circuits on load.
40. At 20:26 on 01 January 2014, a mature tree fell into the 132kV double-circuit tower line resulting in the tripping of the circuit-breakers controlling the circuits.
41. UKPN considers that its protection operated correctly to clear the incident from the system.
42. UKPN considers that its duty control engineer reacted well in assessing the alarms generated by the event and restoring all supplies via tele-controlled switching on the 33kV and 11kV networks.
43. UKPN also considers that, having received a report of a flashover from the vicinity of the incident, its personnel did well in clearing the fallen tree from the 132kV overhead lines and in re-energising the circuits as rapidly as possible.

3.2 UKPN's answers to questions on its performance

44. Within the last three years, the AE has reviewed UKPN's design standards, construction methods and maintenance procedures during previous visits to audit exceptional event claims and found them fit for purpose.
45. The AE confirms that UKPN's emergency procedures provide for the type of event being examined here.
46. To aid understanding of the background to UKPN's Statement of Facts (SoF), the AE prepared a list of initial questions regarding this incident. These questions were used as the basis for the examination of UKPN's claim.
47. The initial questions were discussed during the AE's visit to UKPN's Ipswich Control Centre on 16 September 2014, when the records of UKPN's SCADA system, the incident report and other information were made available.
48. UKPN has provided answers to the AE's initial list of questions. For ease of reference, the AE's questions are printed in bold font with UKPN's answers being printed in normal font.

Q1. What, if any, changes has EPN made to its emergency plans and procedures since the Appointed Examiner (AE) last visited to audit the exceptional event claim concerning the incident that occurred 07 June 2010 which affected EPN's customers supplied from its Great Yarmouth Grid Substation?

- A1. Following a review of this incident and the normal review cycle no changes have been made to UK Power networks' emergency plans or procedures for single 'one-off' events.



Q2. EPN's Statement of Facts (SoF) for the incident affecting its Gorleston and Yarmouth Grid Substations on 01 January 2014 indicates that the cause was attributed to a tree falling into the 132kV overhead lines. What photographic evidence is available to support EPN's claim that this was the cause of this incident?

A2. Photographs of the incident site at the time of the incident and just prior to the audit visit have been handed to the AE. *[AE's note: UKPN's photographs show the clear-cut swathe either side of the 132kV tower line and the height of the tree in relation to it].*

Q3. EPN's Statement of Facts (SoF) also states that its tree-trimming for the affected circuits was up to date in line with its internal procedure EOP 01 009, which it considers enables it to conform with ENA TS 43-08.

a. What considerations has UKPN made towards invoking the standards embodied in ETR-132

A3(a). UK Power Network has considered ETR – 132, however, the clearance was restricted to a 20m swathe by the landowner as confirmed on the associated "Tree and Vegetation Clearance Consent Form". *[AE's note: UKPN has provided a copy of this form, reference number 732901, which clearly states that tree clearance is given for a 20m swathe].*

b. What is the frequency at which EPN clears vegetation from the routes of its 132kV circuits?

A3(b). UK Power Network carries out an annual inspection and clearance on 132kV overhead line routes

c. What is the distance either side of the overhead circuit(s) to which EPN clears trees from its 132kV circuits?

A3(c). UK Power Networks' policy requires all 132kV overhead line to have a minimum swathe cleared of 14m either side of the centre line for a single circuit and 16m for a double circuit. Where landowners allow, UK Power Networks will strive to gain greater clearance to falling trees.

and

d. What is the actual clearance distance at the site of this incident?

A3(d). The clearance at the site of the incident is restricted by the landowner to 20m, with dead or diseased trees outside the restricted cut cleared if at risk of falling onto the double-circuit.

Q4. What photographic evidence can EPN furnish to demonstrate its cut swathe at the site of the incident?

A4. Photograph of the incident site at the time of the incident and just prior to the audit visit have been supplied and these photographs show the extent of the cut swathe. *[AE's note: UKPN's photographs show the clear-cut swathe either side of the 132kV tower line and the height of the tree in relation to it].*

**Q5. EPN's SoF indicates that the tree fell from outside the cut swathe****a. Was the tree on the same landowner's property as EPN's 132kV circuits?**

A5(a). Yes

b. If 'yes', what measures did EPN take to persuade the landowner that the tree needed cutting / felling?

A5(b). UK Power Networks is in regular contact with the landowner and continues to negotiate with the landowner to gain increased clearances. On 15 September 2014 work started to clear the trees between the PPA tower line and the PAC tower line following further negotiations with the landowner. *[AE's note: this is the belt of trees between the two cut swathes which are clearly visible from "Google Earth" as shown in photograph number 4].*

c. If 'no' what did UKPN do to approach the relevant landowner?

A5(c). Not applicable.

and

d. What notes show this tree as an exception on UKPN's tree-clearance records?

A5(d). The tree in question fell from outside the agreed 20m cut swathe as confirmed on the Clearance Consent Form. It should be noted that the tree did not break but was up-rooted as a result of strong winds and saturated ground conditions.

Q6. What judgement did UKPN make regarding the possibility of this tree falling into its 132kV overhead lines?

A6. The landowner had given permission for only a restricted cut along the full length of this heavily wooded area. In addition to the 20m cut swathe, UK Power Networks' negotiated that dead or diseased trees outside this 20m limit with the potential to hit the overhead line could also be cleared. As the tree in question was healthy and outside the agreed 20m cut swathe permission to cut it was not granted.

Q7. What was determined when UKPN's tree-clearance manager visited this site?

A7. UK Power Networks' tree manager is in regular contact with the landowner and continues to work with the landowner to improve tree clearance in this area. Since this incident additional tree clearance has been agreed with the landowner and work started on 15 September 2014 to clear the trees in the area to the north of the double-circuit tower line from which the tree fell that caused this incident.

Q8. What is the history of trees affecting these particular 132kV overhead lines?

A8. The permanent fault history shows that there has been no previous tree related incidents in the last two years.

Q9. What damage was caused to the affected 132kV conductors and what repairs (if any) were needed?

A9. There was no permanent damage to the overhead line. However, the tree had to be removed before the circuits could be restored.

Q.10. What is the height of the affected 132kV conductors at the point where the tree impacted them?

A10. The ground clearance at the point of contact was measured at 8.5m using a "Suparule" Height Meter.

Q11. What is the recent history of auto-reclose operations on this double-circuit overhead line?

A11. A list of alarms from Norwich Trowse Substation for the 12 months prior to the event has been forwarded to the AE. It shows that the 132kV circuit-breakers controlling this double-circuit tower line operated during the storms of December 2013. The circuits were patrolled and no cause was found. *[AE's note: UKPN's alarm log shows that both these circuit-breakers auto-reclosed on 24 December 2013].*

Q12. Given that the 132kV circuits tripped at 20:26 on 01 Jan '14, how did UKPN locate the fault so quickly in the dark on New Year's night - the fault report records the first engineer arriving on site just seconds over an hour from the incident start time?

A12. At the time of the incident on the 01 January 2014 a number of field staff were dispatched to site. One of the team was directed by the control engineer to go and look at the route of the line where it passed through Waveney Forest. This was marked on the control diagram as a wooded area. The field staff were local to the area and this meant that they were able to go direct to site with a minimum of delay.

Q13. What was the type of 132kV surge arrester that failed at Yarmouth Power Station

A13. The failed surge arrester was an integral part of the GIS switchgear with the following details: Fixed Circuit Breaker – Model ELK- Series GIS CB – Manufacturer ABB.

Q14. What caused it to fail?

A14. The cause of failure is currently unknown. However, the failed unit has been sent back to the manufacturer for examination. The industry lightning detection system has been checked and there is no evidence of lightning in the area at the time of the failure.

Q15. What is EPN's experience of the reliability of this type of surge arrester?

A15. UK Power Networks has no previous experience of failure of this type of surge arrester.

Q16. What is the UK's reported experience of the reliability of this type of surge arrester as reported via the ENA's National Equipment Defect Reporting Scheme (NEDeRS®)??

A16. There are no defect reports in NEDeRS for this type of surge arrester.

Q17. What protection schemes are installed on:

a. The 132kV circuits that tripped during the incident?

A17(a). Details of the protection schemes will be provided during the AE's visit.

b. The 33kV side of the Grid Transformer at Gorleston Grid Substation?

A17(b). Details of the protection schemes will be provided during the AE's visit.

c. The 33kV sides of the Grid Transformers at Yarmouth Grid Substation?

A17(c). Details of the protection schemes will be provided during the AE's visit.

d. The 33kV bus-section circuit-breaker at Yarmouth Grid Substation?

A17(d). Details of the protection schemes will be provided during the AE's visit.

Q18. What settings are applied to the above protection schemes?

A18. Details of the protection settings will be provided during the AE's visit.

**Q19. What protection operated when supply was lost?**

A19. It has been confirmed from site that at, Norwich Trowse, circuit-breakers 1205 and 1105 locked-out on distance protection and the remote ends of the two circuits locked-out on intertrip receive. This sequence of operation has been confirmed as being the correct protection operation for this type of fault.

Q20. What investigations have been carried out into why the surge diverter failed?

A20. Currently the surge arrester is with the manufacture for investigation. Once the results are finalised UK Power Networks will make the findings available to the AE. It should be noted that surge arresters of this type of GIS switchboard are an integral part of the switchgear itself.

Q21. What has UKPN done to ensure its other surge diverter of this type are not prone to similar failure?

A21. There is no current history of failure of this type of surge arrester. However, as a result of the ongoing investigation, actions may need to be taken once full details of the failure mode are known.

Q22. What has EPN done to replace the failed surge diverter at Great Yarmouth Power Station?

A22. This is currently ongoing. Please see UK Power Networks' responses to questions 18 and 19 above.

Q23. What learning points has EPN incorporated into its procedures as a result of this incident?

A23. Following the incident the landowner has granted additional permission to clear the belt of trees from which the tree fell that caused this incident. UK Power Networks believes this demonstrates that building a working relationship with landowners can deliver improved tree clearances without the need for enforced intervention.

Q24. What further learning points should be considered as a result of the application of the current one-off Exceptional Event Claims process?

A24. Just one observation, whilst we understand there has been a lot of activity regarding weather related events in 2013 it is always better to review claims as close to the event as possible as it makes it easier to retrieve any additional information requested by the AE.

49. During the discussion of this claim it was concluded that a visit to the site of the incident would be unnecessary; the AE was satisfied with UKPN's date-stamped audit trail and UKPN's photographic evidence.

50. UKPN also provided further information both during and subsequent to the audit visit. This includes:

- A copy of the agreement which was in place at the time of the incident between UKPN's tree-clearance contractor and the agent representing the landowner which clearly shows the restriction of 20 metres each side of the tower line;
- Information to show that the affected section of UKPN's network is P2/6 compliant;



- Information to show that, prior to the current incident, the affected 132kV double-circuit tower line has been free from incidents due to this cause;
- UKPN's photographs of the cut swathe and the fallen tree in relation to the 132kV double-circuit tower line;
- UKPN's control room log for this incident;
- UKPN's incident report from which it calculated the CI and CML attributed to this incident;
- The details of UKPN's SCADA alarms received during this incident;
- A representation of the incident on UKPN's SCADA system; and
- Copies of UKPN's protection schemes and associated relay settings for its 132kV and 33kV feeders affected by this event.



4. Audit part 2

4.1 UKPN's performance in preventing the event

51. In viewing UKPN's performance in preventing this incident, the AE has considered what more UKPN could have reasonably been expected to have done to ensure that its 132kV double-circuit tower line was safeguarded from incidents due to interference from trees
52. The AE has discussed UKPN's tree-clearance policy for its 132kV overhead circuits and the AE notes that the cut swathe at the site of the incident exceed UKPN's in-house minimum of 32 metres clearance (16 metres each side of the centre of the tower line) by 8 metres (4 metres each side of the centre of the tower line).
53. UKPN's photographs show the cut swathe at the site of the incident and the fallen tree in relation to it.
54. The cut swathe through the belt of trees at Waveney Forest is clearly visible on "Google Earth".
55. UKPN's photograph 1, taken on the night of the incident, shows the fallen tree resting on the just-visible 132kV overhead line conductor.
56. UKPN's photograph number 2 shows the fallen tree shortly after the second 132kV circuit was re-energised. As can be seen, the tree appears to be healthy and therefore out-with UKPN's agreement with the landowner.
57. UKPN's photograph number 3 shows the cut swathe in September 2014 and was taken just prior to the AE's audit visit.
58. Photograph 4 is taken from "Google Earth". It shows the parallel cut swathes through which pass both the affected 132kV double-circuit and another in UKPN's ownership.
59. UKPN's measurement systems clearly show the loss of 132kV infeeds to its Gorleston and Great Yarmouth Grid Substations when the circuit-breakers controlling them tripped at 20:26 on 01 January 2014.
60. UKPN's measurement systems also confirm the restoration of supplies via tele-controlled switching from 33kV and 11kV alternative sources.
61. UKPN's measurement systems also confirm the restoration of the number 1 132kV circuit at 01:26 on 02 January 2014 and the number 2 circuit at 14:10 on 03 January 2014
62. An examination of UKPN's measurement systems and a SCADA representation of its distribution network confirm that UKPN did all it could to restore supplies as expeditiously as possible.
63. The AE concludes that, prior to this incident occurring, UKPN had done all it could reasonably have been expected to do in considering that its 132kV double-circuit tower line from Norwich Trowse Grid Substation to Gorleston and Great Yarmouth was free from interference from trees as the relevant landowners would permit.
64. UKPN's tree-clearance policy is in line with nationally recommended standards and was applied at the site of the incident.

4.2 UKPN's performance in mitigating the effects of the event

65. The incident affecting the 132kV double-circuit tower line is consistent with a mature tree falling into it from outside the cut swathe that UKPN had agreed with the landowner.



66. The AE has studied the running arrangements of UKPN's 132/33kV distribution network supplying its Gorleston and Great Yarmouth Grid Substations and concludes that UKPN's protection systems worked correctly to clear the incident from UKPN's distribution system.
67. The AE commends UKPN's control engineers for analysing the situation, and for restoring supplies as rapidly as possible, thereby minimising the duration of the interruption.

4.3 Recommended performance adjustments

68. The AE's recommendations to Ofgem are shown in Table 3.

Table 3 – Recommended performance adjustments

	Amount above threshold	Audit part 2 recommendation
CI	0.73	0.73
CML	1.09	1.09

4.4 Detailed justification

69. In reaching a judgement on a recommendation, the AE has firstly considered whether or not UKPN could have reasonably taken any different course of action that would have prevented the tree falling into its 132kV double-circuit tower line.
70. In viewing UKPN's performance in preventing this event, the AE has taken into account his personal knowledge of the United Kingdom's distribution system practice and that of his colleagues who have considerable operational experience of incidents due to many causes.
71. The AE notes that UKPN has no previous records of incidents of this type affecting this 132kV double-circuit tower line.
72. The AE also notes that UKPN's tree clearance policy was properly applied and that restrictions imposed by the landowner prevented an even wider cut swathe at the site of the incident.
73. The AE therefore concludes that UKPN had no cause to consider any additional measures other than those consistent with good UK practice.
74. That said, as a direct result of the incident UKPN has approached the landowner with a view to obtaining permission to widen the cut-swathe throughout the belt of trees in the vicinity of the incident and, following negotiations, agreement was reached.
75. Consequently, work was underway at the time of the audit visit to remove all trees in the belt to the north of the double-circuit 132kV tower line.
76. The AE considers that UKPN was mindful of maximising the security of supplies to its customers by working to clear the fallen tree during the hours of darkness and to restore the 132kV circuits with a minimum of delay.
77. In considering UKPN's restoration strategy, the AE is conscious that UKPN's duty control engineer acted with commendable skill and speed in analysing the SCADA alarms and indications generated by this incident; and, using tele-controlled switching, restored supplies as rapidly as possible.



78. The AE is satisfied that UKPN's distribution network supplying its Gorleston and Great Yarmouth Grid Substations complies with the requirements of Security of Supply Standard P2/6 (117.3 MVA firm).
79. The Appointed Examiner therefore concludes that UKPN's claim is justified and recommends to Ofgem that the amounts of CI and CML above the threshold values should be excluded from EPN's performance for reporting year 2013/14.

Appendix A - Record of Audit part 1

Table A-1: Appointed Examiner's Information Log

"One-Off" Exceptional Event	Reporting Year 2013/14
Licensed Area	UKPN(EPN)
Date of event	01 January 2014
Cause	Tree falling into a 132kV double-circuit tower line
Notification to Ofgem	01 January 2014
SoF received	30 April 2014
SoF information	<ul style="list-style-type: none"> UKPN's 132kV distribution system was running normally at the time of the incident with both 132kV circuits being on load; At 20:26 on Sunday 01 January 2014 the 132kV circuit-breakers controlling the 132kV double-circuit tower line tripped, thus losing all supplies from Gorleston and Great Yarmouth Grids; and Supplies to 6 of UKPN's 33/11kV Primary Substations were interrupted (51,030 customers).
Additional pre-visit information provided	Based on the SoF the AE drew up a list of initial questions. These were discussed during the audit visit. This initial list of questions, together with UKPN's responses, is contained in paragraph 48 of the report.
Location of audit visit	UKPN's Ipswich Control Centre
Date of audit visit	16 September 2014
Visiting Auditor	Geoff Stott (ep)
UKPN's Representatives	Bill D'Albertanson and Stuart Plant.
Information provided during and subsequent to the audit visit	<p>Comprehensive documentation / information including:</p> <ul style="list-style-type: none"> A discussion of UKPN's tree-clearance policy regarding its 132kV overhead circuits; A discussion on the tree-clearance agreement with the landowner (via his agent) at the time of the incident, including sight of the signed document showing the 20 metre (each side of the tower line) cut swathe; A view of the area via "Google Maps" which clearly shows the cut swathe at the site of the incident; A discussion regarding the post-incident learning and the associated enhanced agreement to clear the belt of trees from which the tree fell; A discussion regarding the failure of the 132kV surge-diverter and the on-going manufacturer's investigations; A discussion of the protection arrangements on the 132/33kV networks affected by this incident; The settings applied to the above protection schemes; A copy of UKPN's switching programme for the incident which shows the tripping of the 132kV circuit-breakers controlling the double-circuit tower line at 20:26 on 01 January 2014;



- Sight of UKPN's switching programmes showing the restoration of the supplies to the affected Primary Substations via tele-controlled switching on the 33kV and 11kV networks;
- Copies of the relevant 132kV and 33kV SLDs;
- Sight of the printout from UKPN's SCADA system that shows the alarms generated by the event;
- A copy of UKPN's incident report that shows:
 - the number of customers affected by the incident to be 51,030; and
 - the customer minutes lost due to the incident to be 6,039,027;
- The AE confirms that these figures agree with those quoted in UKPN's SoF;
- Using EPN's total connected customers at 30 September 2013 of 3,565,115 the number of customers affected equates to a CI of 1.43 $[51,030 \times 100 / 3,565,115]$
- Similarly, the customer minutes lost for this event equate to a CML of 1.69 $[6,039,027 / 3,565,115]$;
- UKPN's photographs of the fallen tree in relation to the 132kV double-circuit tower line;
- No need to visit the site of the incident to clarify anything;
- Discussed post-fault learning points, including anything to affect the UKPN's future tree- clearance policy;
- Confirmed P2/6 compliant (117.3 MVA firm (winter));
- UKPN provided answers to the initial questions plus additional information both during and subsequent to the audit visit; and
- Okay regarding compliance with Appendix 4 of Paragraph 8.58 of CRC 8.



Table A-2: Impact on CI and CML

	CI		CML	
Voltage (DNO's incident reference)	Claimed	Audited	Claimed	Audited
132kV (FREP-680858-H)	1.43	1.43	1.69	1.69
EHV	0	0	0	0
HV	0	0	0	0
LV	0	0	0	0
Total	1.43	1.43	1.69	1.69
UKPN (EPN) Threshold (total)	0.7		0.6	
Part 1 Exceptionality Test	Pass		Pass	
Part 1 Precondition of eligibility (meets App 3 to paragraph 8.57 of CRC 8)	Pass			

NOTE: UKPN's measurement systems are subject to QoS audits for accuracy of reporting and it is not within the AE's ToR to repeat that work as part of the examination of exceptional event claims, although any consequential adjustments to reporting accuracy will be reflected in Ofgem's final adjudication of reported performance for the regulatory reporting year 2013/14.



Appendix B - UKPN's photographs

Photograph 1 – The fallen tree as found at the time of the incident





Photograph 2 – The cut swathe and the fallen tree





Photograph 3 – The cut swathe in September 2014 – taken just prior to the audit visit





Photograph 4 – The cut swathe taken from “Google Earth”



Note: The photograph shows two parallel cut swaths; both are for UKPN's 132kV tower lines.

The one relevant to this event is the northerly one.

The tree fell from the belt of trees that is situated between the two cut swaths.

It is this belt of trees that UKPN has since gained the landowner's permission to fell.