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**Appointed Examiner's audit of Exceptional Event Claim -  
United Kingdom Power Networks  
Fire under 132kV overhead tower lines at West Ham Grid -  
05 April 2012**



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## Authorisation

Name	Position	Signed	Date
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## Glossary

Abbreviation	Meaning
ACSR	Aluminium Conductor Steel reinforced (a type of overhead conductor)
AE	Appointed Examiner
BEA	British Electricity Authority (Operative from 1948 to 1954)
CB	Circuit-breaker
CEGB	Central Electricity Generating Board (Operative from 1957 to 1990)
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
HV	High Voltage – all voltages above 1kV up to and including 20kV
LPN	London Power Networks plc
QoS	Quality of Service
RIGs	Regulatory Instructions & Guidance
SCADA	Supervisory Control and Data Acquisition
SI	Short Interruption (i.e. less than three minutes duration)
SLD	Single Line Diagram
SoF	Statement of Facts
ToR	Terms of Reference
UKPN	United Kingdom 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 a fire under the 132kV double circuit tower line between West Ham and Brunswick Wharf on 05 April 2012 adversely affected the reported performance for its London Power Networks plc (LPN) licensed area for the reporting year 2012/13.
2. The AE has visited LPN 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 LPN's performance in mitigating the impact of the event upon its customers.
5. The AE concludes that LPN had taken every precaution to ensure that its 132kV overhead lines near West Ham Grid Substation were safeguarded from third party interference.
6. The AE also concludes that LPN had been pro-active in its stewardship of these assets in carrying out a thorough inspection which resulted in remedial repairs to fixtures and jumpers during 2011.
7. The AE commends LPN's control engineers for analysing the alarms generated by the incident and for quickly restoring all supplies.
8. The AE also concludes that LPN replaced the damaged conductors and re-commissioned the double circuit tower line as expeditiously as possible, thus minimising the risk to the security of supplies to its customers.
9. The AE concludes that LPN 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.
10. The AE therefore recommends that an adjustment to LPN's 2011/12 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	3.04	1.94	1.94
CML	1.05	0.15	0.15



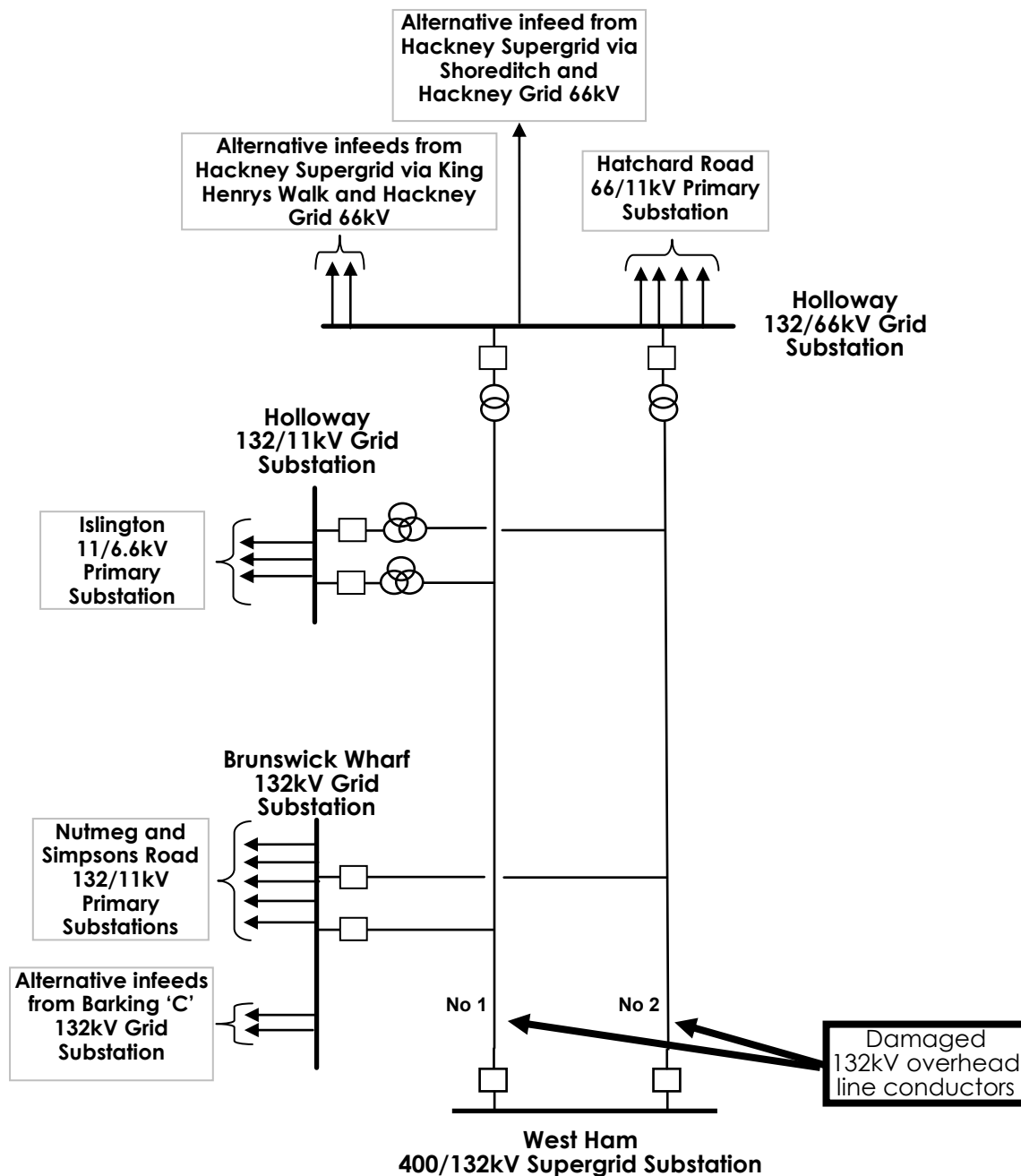
## 1. Audit part 1

### 1.1 Summary of the main facts

11. 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.
12. LPN has provided photographic evidence to support its claim that a fire irreparably damaged both circuits of its West Ham Supergrid Substation to Brunswick Wharf teed Holloway 132kV overhead tower line on 05 April 2012.
13. The intensity of the fire was such that the circuit conductors failed and infeeds were lost to one section of bus-bars at Brunswick Wharf 132kV Grid Substation; to one section of bus-bars at Holloway 132/66kV Grid Substation and to the whole of Holloway 132/11kV Primary Substation.
14. LPN's protection operated correctly to clear the incident from LPN's distribution network.
15. Supplies to 88,032 of LPN's customers were interrupted; 19,204 of which were restored in less than 3 minutes by LPN's auto-close equipment.
16. LPN's 132kV distribution system between West Ham, Brunswick Wharf and Holloway was running normally at the time of the incident.
17. As reported in LPN's SoF, the 66kV circuit between Hackney Grid and Shoreditch was switched out for investigative bus-bar repairs as part of the company's pre-Olympic preparations. *[AE's note: This circuit outage had no direct impact on the incident and its early return to service provided additional security of supply to LPN's customers whilst the damaged 132kV circuits were being repaired].*
18. A simplified view of the sections of LPN's 132kV and extra-high voltage (EHV) networks affected by this event are shown in Figure 1.



**Figure 1 – Simplified Network Diagram of LPN's 132kV and EHV distribution networks affected by the incident**



**Notes:**

1. Only the salient items of switchgear are shown.
2. LPN's 132kV network was running normally at the time of the incident.
3. The 66kV circuit between Hackney and Shoreditch was undergoing investigative repairs at the time of the incident.
4. The various substations are shown schematically – in reality there are two bus-bars at Brunswick Wharf and at the two Holloway Grids.
5. Supplies to Nutmeg and Simpsons Road were restored via an auto-close scheme.
6. All other supplies were restored by tele-controlled switching.



## 2. Exceptionality requirements

### 2.1 Does the event qualify for exclusion

19. 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.
20. 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

21. 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

22. 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	1.1	3.04	3.04	Pass	1.94
CML exceptionality	0.9	1.05	1.05	Pass	0.15

**Notes:**

1. Ofgem's CI and CML exceptionality criteria are set out in the AE's ToR<sup>1</sup>.
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.

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





### 3. LPN's views of its performance

#### 3.1 Dealing with the incident

23. Infeeds to one section of the 132kV bus-bars at LPN's Brunswick Wharf Grid Substation are normally derived from LPN's West Ham Supergrid to Brunswick Wharf teed Holloway 132kV double circuit.
24. In turn, the infeeds to LPN's Nutmeg 132/11kV Primary Substation and to LPN's Simpson's Road 132/11kV Primary Substation are derived from the above section of 132kV bus-bars at LPN's Brunswick Wharf Grid Substation.
25. The other section of 132kV bus-bars at LPN's Brunswick Wharf Grid Substation is fed from LPN's Barking 'C' Grid Substation. There is an auto-close feature between the two sets of bus-bars at LPN's Brunswick Wharf Grid Substation.
26. This auto-close equipment operated to restore supplies to LPN's Nutmeg 132/11kV Primary Substation and to LPN's Simpson's Road 132/11kV Primary Substation in less than three minutes.
27. Infeeds to one section of the 66kV bus-bars at LPN's Holloway 132/66kV Grid Substation are also normally derived from LPN's West Ham Supergrid to Brunswick Wharf teed Holloway 132kV double circuit.
28. In turn, the infeeds to LPN's Hatchard Road 66/11kV Primary Substation are derived from the above section of 66kV bus-bars at LPN's Holloway 132/66kV Grid Substation.
29. The other section of 66kV bus-bars at LPN's 132/66kV Holloway Grid Substation are derived from the 66kV circuits from LPN's Hackney Supergrid Substation via LPN's Hackney Grid 66kV Substation.
30. Using tele-controlled switching, LPN's duty control engineer restored supplies to LPN's Hatchard Road 66/11kV Primary Substation via the alternative 66kV infeeds to LPN's 132/66kV Holloway Grid Substation.
31. Infeeds to LPN's 132/11kV Holloway 132/11kV Grid Substation are also derived from LPN's West Ham Supergrid to Brunswick Wharf teed Holloway 132kV double circuit.
32. In turn, the infeeds to LPN's Islington 11/6.6kV Primary Substation are derived from LPN's 132/11kV Holloway 132/11kV Grid Substation.
33. LPN's duty control engineer restored supplies to LPN's Islington 11/6.6kV Primary Substation using tele-controlled switching.
34. The 132kV system was running normally at the time of the incident and LPN's protection operated correctly to clear the incident from the system.
35. Once it was safe to access the site of the fire, LPN's personnel reported that the lower conductor, the 'blue' or 'L3' phase of both 132kV circuits was severed and that the centre conductor, the 'yellow' or 'L2' phase of the number 2 circuit was also severed.
36. LPN's West Ham Supergrid to Brunswick Wharf teed Holloway 132kV double circuit tripped at 15:11 on 05 April 2012 and all supplies were restored by 16:21 that day.



37. LPN considers that its duty control engineer reacted well in assessing the alarms generated by the event, analysing the reports from LPN's nearby Bidder Street offices, considering a report from the London Fire Brigade and restoring all supplies in just over one hour.
38. LPN also considers that its engineering team did well in replacing the three damaged 132kV conductors and re-energising the circuits within three days of the fire, thereby restoring the security of supplies to its customers.

### 3.2 LPN's answers to questions on its performance

39. Within the last two years, the AE has reviewed LPN's design standards, construction methods and maintenance procedures during previous visits to audit exceptional event claims and found them fit for purpose.
40. The AE confirms that LPN's emergency procedures provide for the type of event being examined here.
41. To aid understanding of the background to LPN'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 LPN's claim.
42. The initial questions were discussed during the AE's visit to LPN's Ipswich Control Centre on 22 April 2013, when the records of LPN's SCADA system, the incident report and other information were made available.
43. LPN 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 LPN's answers being printed in normal font.

**Q1. What changes, if any, has UKPN made to its emergency plans and procedures since the AE last visited on 25 July 2011 to audit the Exceptional Event claims concerning Great Yarmouth and Twickenham?**

- A1. UKPN has reviewed its emergency plans and procedures following the incidents at Great Yarmouth and Twickenham. UKPN concluded that its processes and procedures catered for those types of incident and consequently no changes have been made to LPN's emergency plans as a result.

**Q2. When was the fire-damaged section of 132kV overhead tower line installed?**

- A2. The line was originally erected in the early 1950's by the then Central Electricity Authority (CEA) as detailed in the Deed of Grant which is available for the AE's inspection.

*[AE's note: The AE can confirm the Deed of Grant shows that the fire-damaged 132kV overhead line at West Ham Grid was made between the then CEA and the then County Borough of West Ham on 16 June 1952 (for a period of 99 years starting on 24 June 1952). A subsequent variation to the Deed of Grant was made between the then Central Electricity Generating Board (CEGB) and the London Borough of Newham on 16 August 1966 (for a small line diversion). The Deed of Grant gives the owner of the overhead line full rights of oversail and full rights of access].*



**Q3. In relation to the material / composites from which 132kV overhead line conductors are made:**

- (a) What is UKPN's standard for the rating of the lines that were affected by this fire;**
- (b) What were the damaged overhead line conductors made from; and**
- (c) What conductors did UKPN use to repair the damaged spans?**

A3(a) Summer 658 amps; Spring 760 amps and Winter 817 amps. These are set out in UKPN's Engineering Standard - Reference Number EDS 0-0045.

A3(b) 400 mm<sup>2</sup> ("Zebra") Aluminium Conductor Steel Reinforced (ACSR).

A3(c) 400 mm<sup>2</sup> ("Zebra") Aluminium Conductor Steel Reinforced (ACSR).

**Q4. What is UKPN's process for the routine inspection of its 132kV overhead lines, including the frequency thereof?**

A4. UKPN's routine safety inspections are carried out every 2 years, with a full inspection in each intervening year.

**Q5. When was this particular section of double-circuit 132kV tower line last inspected?**

A5. In advance of its preparations for the 2012 Olympic Games, UKPN conducted a thorough inspection of all its circuits in the area of East London, including the 132kV overhead tower section affected by this incident. UKPN will make the specialist contractor's report available during the AE's visit.

It should also be noted that the 66kV circuit between Hackney Grid and Shoreditch was under an outage at the time of this incident to effect 'hot-spot' investigation and repairs as part of UKPN's preparations for the Olympic Games.

*[AE's note: The specialist contractor's report for the West Ham to Brunswick Wharf 132kV double circuit tower line clearly shows the various remedial repairs to fittings, fixtures and jumpers carried out during 2011].*

**Q6. What were the observations in that report regarding items stored underneath the 132kV overhead line or buildings having been built beneath it?**

A6. The report identified the area under the affected line as being "Industrial estate and access roads". UKPN does not have any control over activities carried out under its overhead lines unless it affects statutory clearances.

**Q7. What rights regarding wayleaves, over-sail, etc does UKPN have on this particular section of 132kV double-circuit tower line?**

A7. UKPN's 132kV dual-circuit overhead tower line at the point of damage is covered under a Deed of Grant which will be made available to the AE.

*[AE's note: please see the entries at A.2 above].*



**Q8. At the points of conductor failure, what was the ground clearance to the lowest (blue phase) conductors? When was this measurement last taken?**

A8. During 2011, as part of UKPN's preparatory work for the 2012 Olympic Games, a specialist overhead line contractor carried-out various remedial repairs to this 132kV double-circuit tower line.

The ground clearances measured in May 2011 are as follows:

	Location of spans	Between tower numbers	Ground clearance	Date of measurement
Circuit 1	A13 road crossing	1 and 2	20m	05 May '11
Circuit 2			20m	
Circuit 1	Industrial estate and access roads	2 and 3	16m	11 May '11
Circuit 2			16m	

*[AE's note: the above clearances are consistent with UK practice and would give UKPN no cause for concern].*

**Q9. What protection is fitted to the West Ham to Brunswick Wharf 132kV circuits?**

A9. The West Ham to Brunswick Wharf and feed circuits are equipped with "Translay" unit protection with back-up overcurrent and earth fault protection. LPN will make the details of its protection schemes and their associated settings available to the AE.

*[AE's note: LPN has provided details of its protection schemes and their settings for these 132kV circuits].*

**Q10. What protection operated to clear the incident from UKPN's network?**

A10. The West Ham to Brunswick Wharf section of the circuits, which includes the fire-damaged overhead lines, tripped on unit protection, thus de-energising the entire circuits. *[AE's note: the operation of LPN's unit protection would be the correct mode of detecting the severed overhead line conductors].*

**Q11. What was the precise location of the fire in relation to UKPN's double-circuit 132kV overhead line? (an illustration using, say, "Google Maps" would be useful in aiding the AE's understanding of this incident)?**

A11. During the AE's visit, LPN will demonstrate the location of its 132kV tower line in relation to the fire using "Google Maps". Additionally, LPN will provide the AE with an internet link to a "Sky News" video taken from the air at the time of the fire.

*[AE's note: It is clear from the information provided by LPN that the fire was in a yard underneath LPN's 132kV overhead tower line. The intensity of the fire can be clearly seen from the 'Sky News' video].*

**Q12. In addition to those in the SoF, what photographs does UKPN have of this incident? Electronic copies would be useful to insert into the AE's report?**

A12. LPN will provide electronic copies of the photographs it has of the fire, most of which are included in the SoF.

*[AE's note: In addition to those in the SoF, LPN provided a photograph of the damaged overhead tower line from which it can be seen that the conductors were severed as reported in the SoF].*



**Q13. What learning points has UKPN incorporated into its procedures as a result of this incident?**

A13. While site conditions under overhead lines are regularly inspected and assessed for safety these conditions can change on a daily basis and therefore incidents of this type are outside the control of UKPN and, apart from ensuring adequate ground clearances, cannot reasonably be guarded against.

**Q14. What further learning points should be considered as a result of the application of the current one-off Exceptional Event Claims process?**

A14. While UKPN believes this was a relatively simple incident to audit, we would support the audit taking place closer to the time of the actual incident to ensure all require information is readily available.

44. During the discussion of this claim it was concluded that a visit to the scene of the fire would be unnecessary; the AE was satisfied with LPN's date-stamped audit trail and LPN's photographic evidence. Also, "Google Maps" provided sufficient site information to enable the AE to make a judgement on the location and layout of LPN's 132kV overhead line in relation to its surroundings.

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

- LPN's photographs of the fire and the severed 132kV conductors;
- LPN's control room log for this incident;
- LPN's incident report from which it calculated the CI and CML attributed to this incident;
- The details of LPN's SCADA alarms received during this incident;
- A detailed discussion on the restoration strategy, including an inversion of part of the 132kV system from the 66kV system and the temporary protection settings applied;
- A representation of the incident on LPN's SCADA system;
- A larger-scale SLD of the affected area of LPN's higher voltage network;
- Details of LPN's protection schemes and associated relay settings for its 132kV circuit affected by this event;
- The report from LPN's specialist contractor, detailing the specific remedial repairs carried out on the affected 132kV overhead tower lines during 2011; and
- Details of the wayleave and over-sail agreements for the affected 132kV tower line.



## 4. Audit part 2

### 4.1 LPN's performance in preventing the event

46. In viewing LPN's performance in preventing this event, the AE has considered what more LPN could have reasonably done to safeguard its 132kV overhead lines in the vicinity of the fire.
47. An examination of LPN's records shows that the lines were installed in the 1950's under the auspices of the then British Electricity Authority (BEA). There is no record of a similar event having previously occurred.
48. In common with general UK practice, LPN's overhead route is covered by a Deed of Grant agreement.
49. The AE has discussed LPN's policy on its overhead line clearances and has been shown records of the locality from which it is possible to determine that they are properly applied.
50. Augmenting the information from LPN's photographs via the on-line facilities of "Google Maps" and the "Sky News" video clip shows the yard in which the fire was situated to be open storage with adjacent single-storey sheds which would give LPN no cause for concern.
51. LPN's photograph 1, taken from LPN's nearby Bidder Street offices at the time of the incident, shows the fire in relation to the over-sailing 132kV tower line.

*[AE's note: examination of this photograph shows that all phase conductors and the over-running tower earth wire are still intact].*

52. LPN's photograph 2 shows the fire having been brought under control and the severed phase conductors hanging loose from the suspension insulators of the terminal tower.
53. It is practically impossible to fully safeguard any overhead line from this type of event, the principal safeguard being the clearance to the conductors from known terrain below them.
54. The AE has discussed LPN's approach to ground clearances of its 132kV overhead line and is satisfied that the clearances in this situation are more than the statutory minimum requirements of 6.7 metres to ground including roads and 3.6 metres to buildings.
55. Added to the above observation is the fact that, following a detailed inspection of this section of 132kV overhead tower line, LPN had commissioned a contracting specialist to undertake the remedial repairs during 2011. In neither case was anything untoward noticed within the storage yard situated below the overhead line.
56. LPN's measurement systems clearly show the tripping of the circuit-breakers associated with the two damaged 132kV overhead line circuits at 15:11 on 05 April 2012.
57. LPN's measurement systems also confirm the restoration of all supplies to the affected Primary Substations via auto-close operation and by tele-controlled switching by 16:21 on 05 April 2012.
58. An examination of LPN's measurement systems and a SCADA representation of its distribution network confirm that LPN did all it could to restore supplies as expeditiously as possible.





59. The AE concludes that LPN had done all it could reasonably have been expected to do in considering that its West Ham to Brunswick Wharf teed Holloway 132kV overhead tower line was safeguarded from all credible events that could occur beneath it in accordance with accepted good practice within the UK electricity supply industry.

#### 4.2 LPN's performance in mitigating the effects of the event

60. The irreparable damage to the 132kV overhead conductors is consistent with the heat from an intense conflagration of the type shown in LPN's photographs and the "Sky News" video clip.
61. The resultant severing of the phase conductors would have had the effect of creating virtually simultaneous faults on both 132kV circuits.
62. The AE has studied the running arrangements of LPN's 132kV and higher-voltage distribution network affected by this incident and concludes that LPN's protection systems worked correctly to clear the incident from LPN's distribution system.
63. The AE commends LPN's control engineers for analysing the situation, assessing the information from LPN's personnel at its Bidder Street offices and from the London Fire Brigade and for restoring supplies as rapidly as possible, thereby minimising the duration of the interruption.
64. The AE commends LPN for having undertaken the pre-Olympic Games inspection of all its 132kV and higher voltage networks in the East London area and for having completed the timely repairs to its West Ham to Brunswick Wharf teed Holloway 132kV over tower circuits in a timely way.

#### 4.3 Recommended performance adjustments

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

**Table 3 – Recommended performance adjustments**

	<b>Amount above threshold</b>	<b>Audit part 2 recommendation</b>
<b>CI</b>	1.94	1.94
<b>CML</b>	0.15	0.15

#### 4.4 Detailed justification

66. In reaching a judgement on a recommendation, the AE has firstly considered whether or not LPN could have reasonably taken any different course of action that would have prevented its 132kV overhead lines from being damaged by a fire beneath them.
67. In viewing LPN'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.
68. The AE considers that LPN's routine inspections of its 132kV overhead lines, combined with the ground clearance beneath them gave LPN no cause for concern regarding the storage yard in which the fire occurred.



69. This view is reinforced when considering the sensitivities surrounding power supplies to the (then) forthcoming 2012 Olympic Games and the repairs to fixings, fixtures and jumpers carried out by LPN's specialist contractor in 2011. The contractor's personnel and LPN's engineer in charge of the 132kV outages would have been alerted to any untoward activity below LPN's overhead lines.
70. In considering LPN's restoration strategy, the AE is conscious that LPN's duty control engineer acted with commendable skill and speed in analysing the SCADA alarms and indications generated by this incident, absorbing the information from LPN's personnel in its Bidder Street offices and the call from the London Fire Brigade, beginning to restore supplies via tele-switching within twenty-one minutes; completing it in just over one hour.
71. The AE commends LPN's control engineer for using a network 'inversion' technique as part of the restoration strategy, whereby, once the damaged 132kV overhead line had been isolated, the section of 132kV network between Holloway 132/66kV Grid Substation and Holloway 132/11kV Primary Substation was energised from the restored 66kV bus-bars at Holloway 132/66kV Grid Substation, thus providing 132kV infeeds to Holloway 132/11kV Primary Substation.
72. The AE also commends LPN for its early restoration to service of the 66kV feeder between Hackney Grid and Shoreditch to provide further network support to the above inversion situation.
73. The AE is pleased to report that, as part of the above planned 66kV outage, LPN had instigated contingencies to off-load some of its Hearn Street Primary Substation, which derives its 66kV infeeds from LPN's Shoreditch 66kV Grid Substation.
74. The AE is satisfied that LPN's distribution network affected by this incident complies with the requirements of Security of Supply Standard P2/6 (120 MVA firm).
75. The AE therefore concludes that UKPN's claim is justified and recommends to Ofgem that the amount of CI and CML above the threshold value should be excluded from LPN's performance for reporting year 2012/13.





## Appendix A - Record of Audit part 1

Table A-1: Appointed Examiner's Information Log

"One-Off" Exceptional Event	Reporting Year 2011/12
<b>Licensed Area</b>	LPN
<b>Date of event</b>	05 April 2012
<b>Cause</b>	Fire caused 132kV overhead conductors to fail
<b>Notification to Ofgem</b>	10 April 2012
<b>SoF received</b>	29 June 2012
<b>SoF information</b>	<ul style="list-style-type: none"> <li>• Protection operated to trip the circuit-breakers controlling the West Ham to Brunswick Wharf teed Holloway 132kV double circuit at 15:11 on Thursday, 05 April 2012;</li> <li>• Infeeds to two 132/66kV Grid Substations were interrupted which in turn affected supplies to four Primary Substations;</li> <li>• LPN personnel working in LPN's Bidder Street offices reported an intense fire in a pallet storage yard beneath the above 132kV circuits;</li> <li>• London Fire Brigade reported that the overhead lines had come down;</li> <li>• LPN's auto-close feature at Brunswick Wharf 132/66kV Grid Substation operated to restore Nutmeg and Simpson's Road Primary Substations in less than 3 minutes - a Short Interruption (SI);</li> <li>• Using tele-controlled switching, LPN's control engineer restored all supplies by 16:21 on 05 April 2012; and</li> <li>• The damaged conductors were replaced during 07 April 2012 (n° 1 circuit) and 08 April 201 (n° 2 circuit) 2 with both circuits being re-energised on 08 April 2012.</li> </ul>
<b>Additional pre-visit information provided</b>	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 LPN's response, is contained in paragraph 43 of the report.
<b>Location of audit visit</b>	LPN's Ipswich Control Centre.
<b>Date of audit visit</b>	22 April 2013
<b>Visiting Auditor</b>	Geoff Stott (ep)
<b>LPN's Representatives</b>	Bill D'Albertanson and Steve Johnson



**Information provided during  
and subsequent to the audit  
visit**

Comprehensive documentation / information including:

- A discussion of the restoration strategy including the 66kV to 132kV inversion at Holloway;
- The protection applied to the affected circuits;
- Sight of LPN's switching programme for the incident which shows the circuit-breakers tripping at 15:11 on 05 April 2012, the auto-close operations at Brunswick Wharf 132/66kV Grid Substation and the subsequent sequential restoration of supplies by tele-controlled switching as shown in the SoF;
- A larger print of the affected 132kV and higher voltage networks;
- Sight of the printout from LPN's SCADA system that shows the alarms generated by the event;
- LPN's incident log for the event;
- A copy of the summary notes compiled for the event by LPN's control engineer who was on duty at the time of the incident;
- Sight of LPN's incident report that shows:
  - the number of customers affected by the incident to be 68,828; and
  - the customer minutes lost due to the incident to be 2,384, 245.
- The AE confirms that these figures agree with those quoted in LPN's SoF;
  - Using LPN's total connected customers at 30 September 2011 of 2,267,440 the number of customers affected equates to a CI of 3.04.  $[68,828 \times 100 / 2,267,440]$ ; and
  - Similarly, the customer minutes lost for this event equate to a CML of 1.04.  $[2,384, 245 / 2,267,440]$ .
- LPN's photographs of the fire and severed conductors;
- The "Sky News" video clip;
- LPN's demonstration using "Google Maps" of the yard in which the fire took place in relation to LPN's 132kV double circuit overhead tower line;
- A copy of the specialist contractor's report detailing the remedial works carried out on the affected 132kV circuits during 2011;
- A copy of LPN's outage summary associated with the above remedial repair work;
- No need to visit the area to clarify anything;
- Discussed post-fault learning points;
- Confirmed P2/6 compliant (120 MVA firm);
- LPN 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.



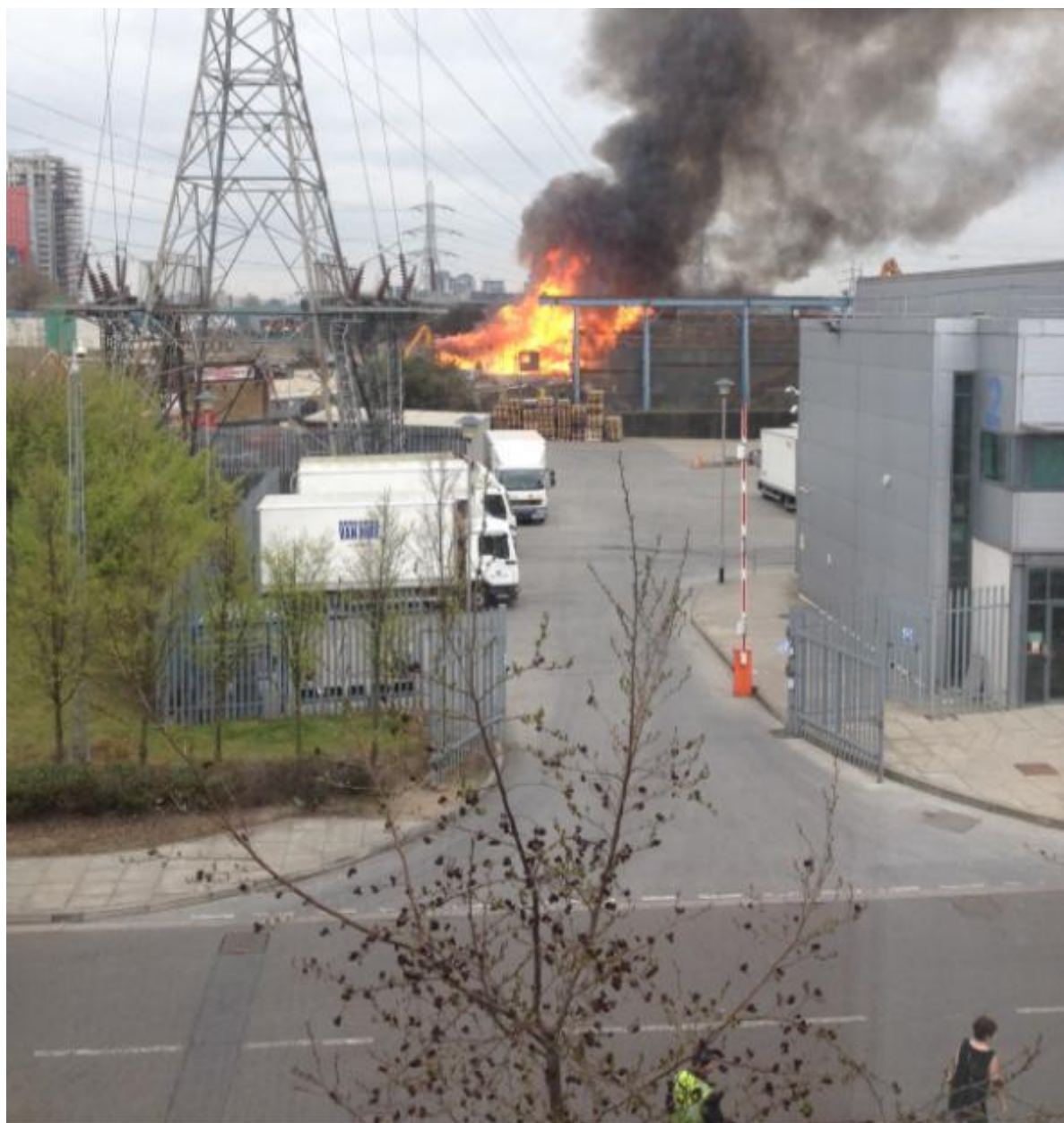
Table A-2: Impact on CI and CML

	CI		CML	
	Claimed	Audited	Claimed	Audited
132kV	3.04	3.04	1.05	1.05
EHV	0	0	0	0
HV	0	0	0	0
LV	0	0	0	0
Total	3.04	3.04	1.05	1.05
LPN Threshold (total)	1.1		0.9	
Part 1 Exceptionality Test	Pass		Pass	
Part 1 Precondition of eligibility (meets App 3 to paragraph 8.57 of CRC 8)	Pass			

**NOTE:** LPN'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 2012/13.



## Appendix B - LPN's photographs

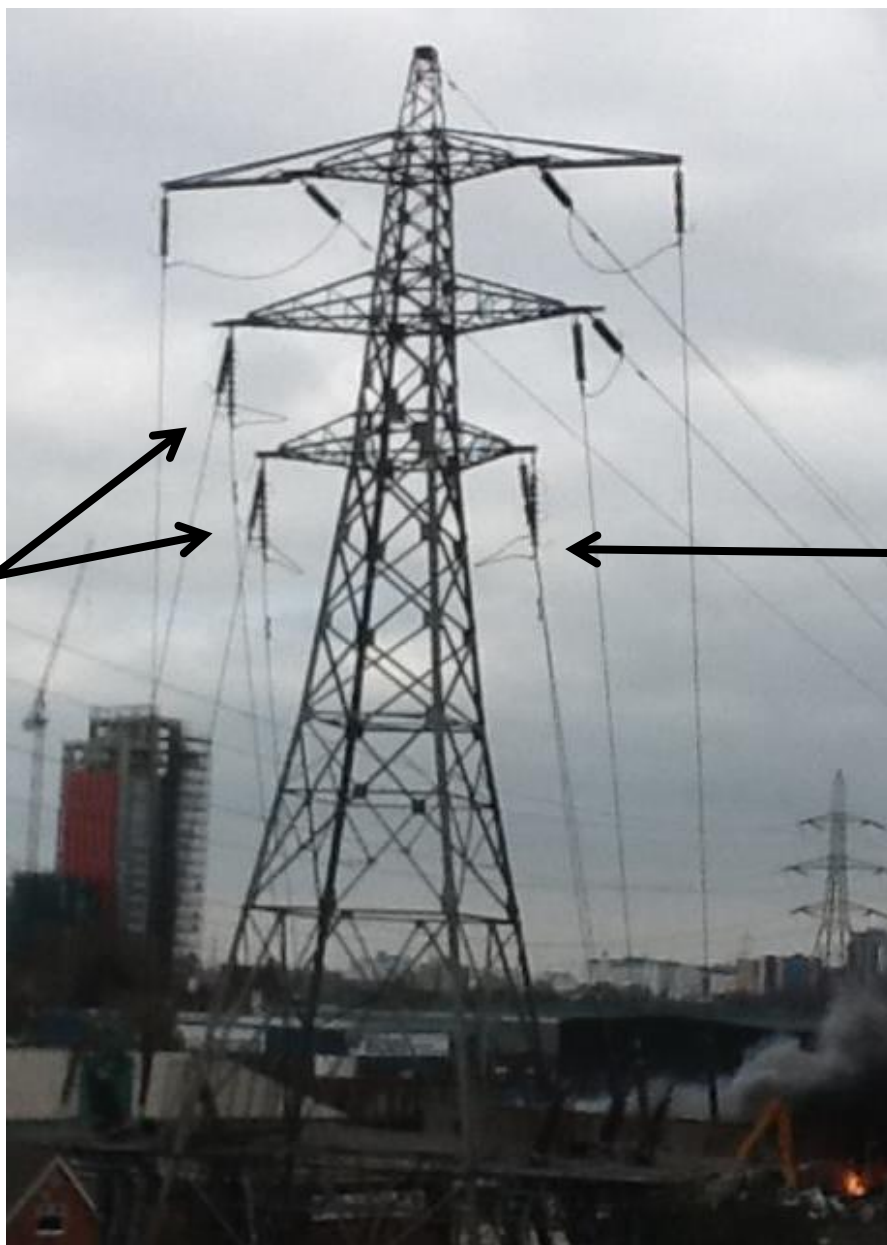


Photograph 1 – The fire as seen from LPN's Bidder Street offices



The lowest  
and centre  
conductors  
severed on  
the n° 2  
circuit

The lowest  
conductor  
severed on  
the n° 1  
circuit



Photograph 2 – The damaged 132kV overhead line conductors