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**Appointed examiner's audit of Exceptional Event Claim -  
UK Power Networks (London)  
132kV incident – Deptford to Bengeworth Road  
07 July 2014**



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Name	Position	Signed	Date
Geoff Stott	Ofgem's Appointed Examiner		16 December 2015

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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
ENA	The Electrical Network Association
ep	energypeople (Ofgem's Appointed Examiner)
ESQCR	Electricity, Safety, Quality and Continuity Regulations
QoS	Quality of Service
LPN	UKPN's London Power Network licensed area
NEDeRS	The E's National Equipment Defect Reporting Scheme
RIGs	Regulatory Instructions & Guidance
SCADA	Supervisory Control and Data Acquisition
SI	Short Interruption
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 underground cable between its Deptford and Bengeworth Road Substations at 14:12 on Monday 07 July 2014 adversely affected the reported performance for its London Power Networks (LPN) licensed area for the reporting year 2014/15.
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 CI but not 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's inspection and maintenance programme is consistent with good practice and was up to date at the time of the incident.
6. UKPN had received no prior notification from the third party that caused the damage to the underground cable and was therefore unaware of the site works.
7. The AE concludes that, prior to this incident, LPN had done all it could to safeguard its 132kV underground cable from third-party interference.
8. The AE also concludes that LPN's protection testing was up to date at the time of the incident and the faulty relay had operated correctly in March 2014.
9. The AE considers that LPN could not have predicted the failure of the protection relay and that LPN could not have avoided its failure.
10. The AE commends LPN's control engineers for analysing the alarms generated by the incident and for restoring all supplies as quickly as possible.
11. 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.
12. The AE therefore recommends that an adjustment to LPN's 2014/15 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	1.38	0.28	0.28
CML	0.44	0	0



## 1. Audit part 1

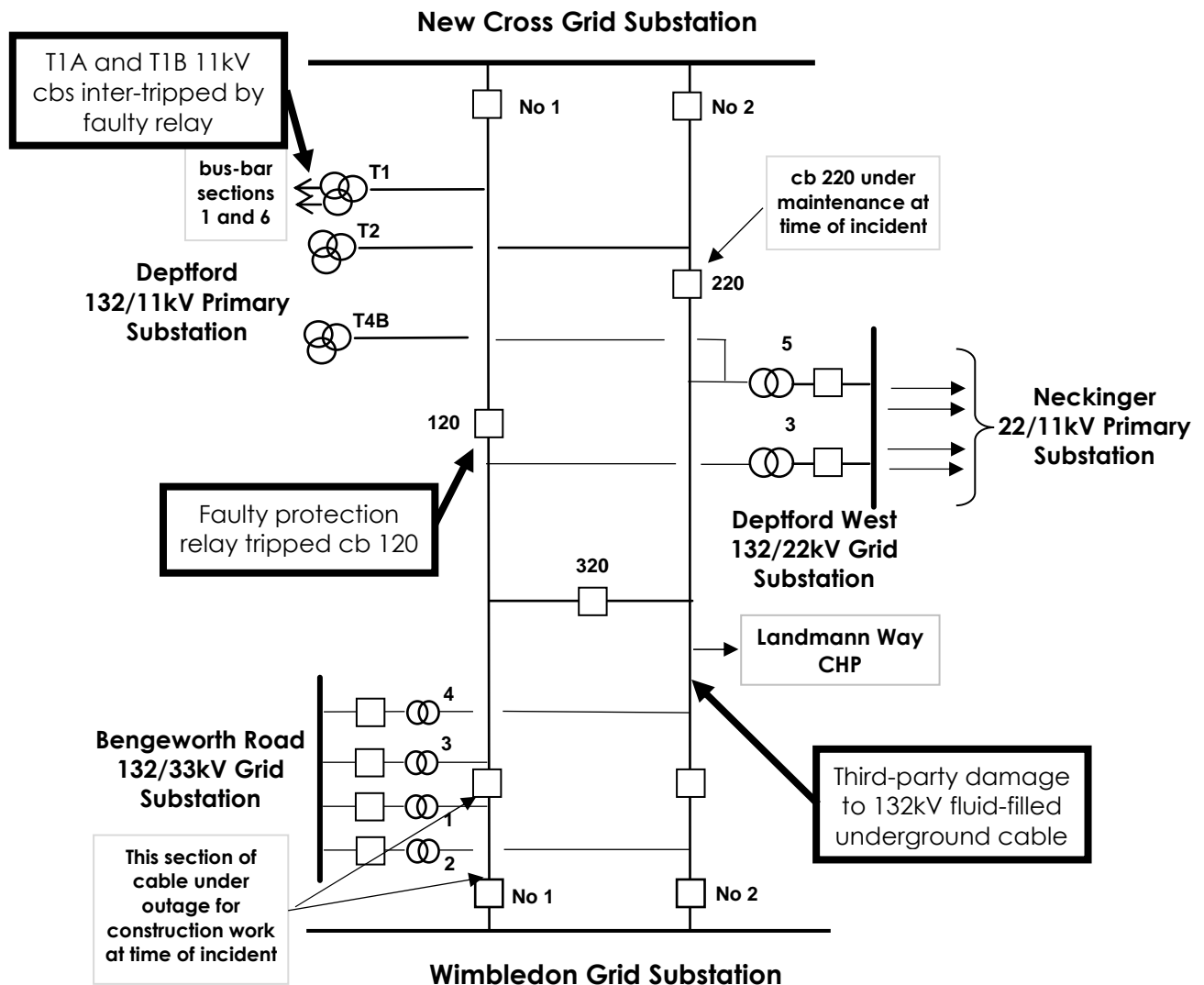
### 1.1 Summary of the main facts

13. 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.
14. The affected section of LPN's 132kV distribution network runs between New Cross and Wimbledon Grid Substations.
15. The connection comprises two fluid-assisted underground cables which both have feed connections to LPN's Bengeworth Road 132/33kV Grid Substation, Deptford 132/11kV Primary Substation and Deptford West 132/22kV Substation.
16. The number 2 circuit also provides the connection to the Landmann Way combined heat and power generating site.
17. LPN's 132kV system was running abnormally at the time of the incident due to maintenance of the 132kV circuit-breaker on the number 2 circuit at Deptford Substation and an outage for construction work on the section of the number 1 132kV circuit between Wimbledon 132kV Grid Substation and Bengeworth Road 132/33kV Grid Substation.
18. LPN's protection tripped operated correctly to disconnect the damaged section of the number 2 circuit from its system.
19. LPN's sequence switching restored supplies to 10,450 of its customers within three minutes, these customers experiencing a 'Short Interruption' (SI).
20. Due to a faulty protection relay on the number 1 132kV circuit and the resultant inter-tripping of the 11kV circuit-breakers associated with Grid Transformer number 1 at LPN's Deptford 132/11kV Primary Substation, 9,743 of LPN's customers supplied from its LPN's Deptford 132/11kV Primary Substation lost supply for longer than three minutes.
21. Also, the section of LPN's 132kV system between its Bengeworth Road 132/33kV Grid Substation and its Deptford West 132/22kV Grid Substation became inverted (back-fed) via the series combination of the number 2 and the number 3 132/33kV Grid Transformers at Bengeworth Road 132/33kV Grid Substation.
22. Consequently, the voltage of the infeed to Grid Transformer number 3 at LPN's Deptford West 132/22kV Grid Substation went outside statutory limits causing LPN to de-energise this section of its 132kV system.
23. In turn, LPN's Deptford West 132/22kV Grid Substation feeds its Neckinger 22/11kV Primary Substation and the above de-energisation thus disconnected supplies to LPN's 21,912 customers fed from its Neckinger 22/11kV Primary Substation.
24. The combination of these occurrences therefore resulted in the loss of supply to 31,655 of LPN's customers for longer than three minutes.
25. LPN's control engineer used tele-controlled switching to restore the supplies to LPN's customers fed from its 132/11kV Deptford Primary substation, completing this by 15:35 on the day of the incident.
26. Meanwhile, following on-site confirmation of the faulty relay and its removal from service, the number 1 132kV infeed was restored to LPN's Deptford West 132/22kV Grid Substation and hence to LPN's 22/11kV Neckinger Primary Substation.



27. The supplies to LPN's 21,912 customers supplied from its Neckinger 22/11kV Primary Substation were all restored at 15:15 on the day of the incident.
28. The loss of fluid pressure in the damaged underground cable was such that a falling pressure alarm was not received until 15:10 and a low pressure alarm at 15:35.
29. UKPN's contact centre did not receive any call from the third party that a cable had been damaged.
30. In order to provide as much security of supply to its customers, LPN called for the speeding-up of the construction work affecting the number 1 circuit and the maintenance of the circuit-breaker on the number 2 circuit.
31. A simplified view of the sections of LPN's 132/33kV networks affected by this event is shown in Figure 1.

**Figure 1 – Simplified Network Diagram of LPN's 132/33/22/11kV distribution system affected by the incident**



**Notes:**

1. Only the salient items of switchgear are shown.
2. The outgoing 33kV circuits from Bengeworth Road 132/33kV Grid Substation are not shown.
3. LPN's network was running abnormally at the time of the incident:
  - a. Circuit-breaker 220 at Deptford Substation was undergoing maintenance; and
  - b. The section of the number 1 circuit between Wimbleton and Bengeworth Road Grid Substations was on an outage for construction work.
4. LPN's control engineer used tele-controlled switching to restore supplies lost from Dartford 132/11kV Primary Substation via alternative 11kV sources.
5. The four outgoing feeders from Deptford West 132/22kV Grid Substation to Neckinger 22/11kV Primary substation are shown schematically.
6. Following the mal-operation of circuit-breaker 120 at Dartford Substation transformer number 3 at Dartford West 132/22kV Grid Substation and the bus-bars at Neckinger 22/11kV Primary Substation received abnormal volts via inversion of the 132kV system through transformer numbers 2 and 3 at Bengeworth Road 132/33kV Grid Substation.

## 2. Exceptionality requirements

### 2.1 Does the event qualify for exclusion

32. 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.
33. 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

34. 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
<b>Total</b>	<b>1</b>	<b>1</b>

35. 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	1.38	1.38	Pass	0.28
CML exceptionality	0.9	0.44	0.44	Fail	0

**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.

<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

36. LPN's Bengeworth Road 132/33kV Grid Substation, Deptford 132/11kV Primary Substation and Deptford West 132/22kV Substation are normally supplied via two 132kV underground cables running between New Cross and Wimbledon Grid Substations.
37. At the time of the incident, the system was running abnormally as follows:
  - a. the section of the number 1 circuit between Wimbledon and Bengeworth Road was under an outage for construction work; and
  - b. on the number 2 circuit, 132kV circuit-breaker number 220 at LPN's Deptford Substation was under an outage for maintenance.
38. At 14:12 on 07 July 2014, the 132kV circuit-breakers controlling the section of the number 2 circuit between Bengeworth Road and Deptford Substations tripped due to third-party damage caused to this section of 132kV fluid-filled underground cable.
39. At the same time, 132kV circuit-breaker number 120 at LPN's Deptford Substation tripped due to a faulty protection relay, inter-tripping the 11kV circuit-breakers associated with T1 Grid Transformer at LPN's 132/11kV Deptford Primary Substation, thereby losing the infeeds to sections 1 and 6 of the 11kV bus-bars.
40. A series combination of T2 and T3 132/33kV transformers at Bengeworth Road Grid Substation resulted in the infeed to T3 132/22kV transformer at LPN's Deptford West Grid Substation receiving non-statutory volts, causing LPN's control engineer to de-energise the circuit and interrupting the supplies to LPN's customers fed from its Neckinger 22/11kV Primary Substation.
41. Supplies to LPN's customers fed from sections 1 and 6 of the 11kV bus-bars at its 132/11kV Deptford Primary Substation were restored by LPN's control engineer using tele-controlled switching
42. The faulty relay was removed from service and the 132kV infeed was restored to LPN's 132/22kV Deptford Grid substation and its customers fed from its Neckinger 22/11kV Primary Substation.
43. LPN considers its protection operated correctly to clear the damaged section of 132kV underground cable from its system.
44. LPN considers that its duty control engineer reacted well in assessing the alarms generated by the event and restoring supplies to its Deptford 132/11kV Primary Substation via tele-controlled switching on the 11kV networks.
45. LPN considers that its personnel acted correctly in removing the faulty protection relay from service and thereby enabling the restoration of its customers' supplies fed from its Neckinger 22/11kV Primary Substation.
46. The cause of the incident was confirmed to be third-party damage to the section of 132kV underground cable between LPN's Bengeworth Road Primary Substation and its Deptford West Grid Substation.



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

- 47. Within the last three 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.
- 48. The AE confirms that LPN's emergency procedures provide for the type of event being examined here.
- 49. 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 UKPN's claim.
- 50. The initial questions were discussed during the AE's visit to UKPN's Control Centre on 19 June 2015, when the records of LPN's SCADA system, the incident report and other information were made available.
- 51. 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 LPN made to its emergency plans and procedures since the Appointed Examiner (AE) last visited to audit the exceptional event claim concerning the incident which affected LPN's customers due to the fire at West Ham that occurred on 05 April 2012**

- A1. UK Power Networks reviews its policies and procedures on a regular basis, however, no changes have been made following this incident.

**Q2. LPN's Statement of Facts (SoF) for this incident on 07 July 2014 indicates that the primary cause was third-party damage to a fluid-assisted cable, what information had LPN supplied to the organisation that damaged the underground cable prior to the third-party starting work?**

- A2. UK Power Networks was not aware of the third-party works at the time of the incident.

**Q3. What on-site supervision had LPN provided to the organisation that caused the damage to the underground cable?**

- A3. Please see above: as UK Power Networks was unaware of the third-party's site works – no supervision could be provided.

**Q4. When did LPN receive the call that the cable had been damaged?**

- A4. No damage calls were received at UK Power Networks' Contact Centre.

**Q5. What photographic evidence can UKPN provide showing the damaged cable?**

- A5. No photographs are available on this occasion.

**Q6. How was the New Cross to Deptford 132kV configured for the maintenance of CB 220 at Deptford? i.e. was T2 at Deptford 11kV energised from New Cross?**

- A6. Each side of CB 220 was isolated from the network, hence T2 at Deptford 11kV was energised at the time of the incident.

**Q7. When did the maintenance on this circuit-breaker commence?**

- A7. CB 220 at Deptford Grid was switched out for maintenance on 29 June 2014.



- Q8. What risk assessments / contingency plans / network running alterations had been made for the outages of circuit-breaker 220 at Deptford and the construction work between Wimbledon and circuit-breaker 120 at Bengeworth Road?**
- A8. UK Power Networks' pre switching checks were undertaken prior to the outage and the outage was reviewed through UK Power Networks' Outage Planning team and contingency plans identified. This was reviewed with the AE during visit to UK Power Networks Control Centre.
- Q9. What protection schemes are installed on the number 2 132kV circuit between Wimbledon and New Cross feed Bengeworth Road feed Landmann Way feed Deptford West 22kV feed Deptford 11kV?**
- A9. The section of network in question is fitted with feeder fast acting unit protection, along with back-up protection OC and EF.
- Q10. What settings are applied to these protection schemes?**
- A10. Please see the response to Q9 above regarding fast-acting unit protection.
- Q11. What protection operated correctly to clear the damaged 132kV underground cable from LPN's network?**
- A11. The initial 132kV fault between Bengeworth Road and Deptford 132kV was correctly cleared by feeder unit protection and all circuit ends tripped.
- Q12. What type of relay is the faulty one?**
- A12. Siemens Argus 1 relays.
- Q13. What is UKPN's policy for testing this type of relay?**
- A13. Inspection carried out yearly as per UK Power Networks' Substation inspection. Maintenance is carried out every 12 years when operational tests are performed.
- Q14. When was the last test done on the faulty protection relay? How did the timing of this test compare to UKPN's policy? The AE will need sight of this test report.**
- A14. The faulty relay was commissioned in 2004 and its next scheduled maintenance was due in 2016. Last time it operated successfully was in March 2014.
- Q15. What references are made to this type of relay in the ENA's National Equipment Defect Reporting Scheme (NEDeRS®)?**
- A15. There are no references to this type of relay in NEDeRS.
- Q16. What learning points has LPN incorporated into its procedures as a result of this incident?**
- A16. UK Power Networks reviews its policies and procedures on a regular basis, however, no changes have been made following this incident. But 3 actions came out of internal review of the incident:
- Urgent replacement of faulty Siemens Argus 1 relays at Deptford 132kV;
  - Issue bulletin to staff to make them aware of Argus 1 relay failures; and
  - Identify locations of Argus 1 relays and review for further action following consultation with manufacturer.



**Q17. What further learning points should be considered as a result of the application of the current one-off Exceptional Event Claims process?**

- A17. UKPN considers 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 Ofgem's AE.
52. 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 LPN's date-stamped audit trail.
53. LPN also provided further information both during and subsequent to the audit visit. This includes:
- Information to show that the affected section of LPN's network is P2/6 compliant;
  - Information to show that, prior to the current incident, the affected 132kV fluid-filled underground cable has been free from incidents due to this cause;
  - 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 representation of the incident on LPN's SCADA system; and
  - Copies of LPN's protection schemes and associated relay settings for its 132kV, 33kV, 22kV and 11kV networks affected by this event.



## 4. Audit part 2

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

54. In viewing LPN's performance in preventing this incident, the AE has considered what more LPN could have reasonably been expected to have done to ensure that its 132kV fluid-assisted cable was safeguarded from incidents of this nature.
55. Whilst LPN has no routine inspection of buried / underground cables, the fluid pressure is continuously monitored in UKPN's control centre via its SCADA system and, as mentioned in LPN's SoF – the circuit tripped before any alarm was received from the pressure-monitoring equipment.
56. LPN's protection testing was up to date at the time of the incident and LPN had no reason to think that the protection relay was faulty.
57. LPN's measurement systems clearly show the tripping of the 132kV circuit-breakers controlling the damaged section of fluid-filled underground cable 14:12 on 07 July 2014.
58. LPN's measurement systems also show the simultaneous tripping of 132kV circuit-breaker number 120 at Deptford Substation (a mal-operation due to the faulty protection relay).
59. LPN's measurement systems also confirm the loss of supplies to its Neckinger 22/11kV primary substation when the incoming supply was deliberately disconnected due to the abnormal voltage being experienced as a result of the inverted section of 132kV underground cable.
60. LPN's measurement systems confirm the restoration of supplies lost from bus-bar sections 1 and 6 at Deptford 132/11kV Primary Substation via tele-controlled switching from alternative 11kV sources.
61. LPN's measurement systems also confirm the restoration of the normal 132kV infeed to its 132/22kV Deptford Grid Substation after the faulty protection relay had been removed from service. This restored supplies to LPN's customers fed from its Neckinger 22/11kV Primary Substation.
62. An examination of UKPN'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.
63. The AE concludes that, prior to this incident occurring, LPN had done all it could reasonably have been expected to do in considering that its 132kV fluid-filled underground cable was protected from third-party damage.
64. Equally, the AE concludes that, prior to the incident occurring, LPN had done all it could reasonably be expected to do to ensure that its protection schemes and associated relays are free from defects.

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

65. The report from site confirmed that the incident affecting the fluid-filled underground cable was due to third-party damage.
66. The AE has studied the running arrangements of LPN's 132/33/22/11kV distribution networks affected by this incident and concludes that LPN's protection systems worked correctly to clear the damaged cable from LPN's distribution system.



67. The AE also concludes that the tripping of circuit-breaker 220 at LPN's Dartford Substation was a mal-operation due to the faulty protection relay.
68. The AE commends LPN'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

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

**Table 3 – Recommended performance adjustments**

	Amount above threshold	Audit part 2 recommendation
CI	0.28	0.28
CML	0	0

#### 4.4 Detailed justification

70. 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 the damage to its 132kV fluid-filled underground cable and also prevented the protection relay from going faulty.
71. 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.
72. The AE notes that LPN has no previous records of incidents of this type either affecting this section of its 132kV fluid-filled cable or this type of protection relay.
73. The AE also notes that LPN's protection testing was up to date at the time of the incident and the company had no reason to think that the protection relay was faulty.
74. The AE is mindful of the statutory requirements placed on utilities and their contractors regarding safe excavation and concludes that LPN had done all it could reasonably be expected to do to ensure that its 132kV fluid-filled cable would not be damaged by the excavations in its vicinity.
75. The AE therefore concludes that LPN had no cause to consider any additional measures other than those consistent with good UK practice.
76. In considering LPN'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.



77. The AE is satisfied that LPN's distribution network affected by this incident complies with the requirements of Security of Supply Standard P2/6 (596 MVA at 132kV firm).
78. The Appointed Examiner therefore concludes that UKPN's claim is justified and recommends to Ofgem that the amount of CI above the threshold value should be excluded from LPN's performance for reporting year 2014/15.

## Appendix A - Record of Audit part 1

Table A-1: Appointed Examiner's Information Log

"One-Off" Exceptional Event	Reporting Year 2014/15
Licensed Area	UKPN(LPN)
Date of event	07 July 2014
Cause	Third-party damage to a 132kV fluid-filled underground cable and a faulty protection relay
Notification to Ofgem	15 July 2014
SoF received	09 September 2014
SoF information	<ul style="list-style-type: none"> <li>• LPN's 132kV distribution system was running abnormally at the time of the incident;</li> <li>• At 14:12 on Monday 07 July 2014 the 132kV circuit-breakers controlling the section of 132kV fluid-filled underground cable between Bengeworth Road and Deptford tripped, thus losing all supplies from bus-bar sections 1 and 6 at Deptford 132/11kV Primary Substation;</li> <li>• A faulty protection relay tripped circuit-breaker 120 at Deptford;</li> <li>• Sequence automation restored 10,450 customers in under 3 mins;</li> <li>• Abnormal volts led to the deliberate disconnection of supplies fed from Neckinger 22/11kV Primary Substation;</li> <li>• Supplies lost from Deptford 132/11kV Primary Substation were restored via 11kV alternatives using tele-controlled switching (9,743 customers &gt; 3 mins); and</li> <li>• Supplies from Neckinger 22/11kV Primary Substation were restored after the faulty relay was removed and the 132kV circuit re-energised from New Cross Grid Substation (31,921 customers &gt; 3 mins).</li> </ul>
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 LPN's responses, is contained in paragraph 51 of the report.
Location of audit visit	UKPN's Control Centre
Date of audit visit	19 June 2015
Visiting Auditor	Geoff Stott (ep)
UKPN's Representatives	Bill D'Albertanson and Steve Johnson.
Information provided during and subsequent to the audit visit	<p>Comprehensive documentation / information including:</p> <ul style="list-style-type: none"> <li>• A discussion of LPN's pressure-monitoring system;</li> <li>• A discussion regarding LPN's protection testing, its history of the type of relay that went faulty and the testing being up to date at the time of the incident;</li> <li>• A discussion regarding the exchange of information between LPN and the third-party prior to the incident occurring as required under statutory legislation;</li> </ul>

- A discussion regarding the history of any similar previous incidents;
- A discussion regarding the post-incident learning and notifications under (NEDeRS®);
- A discussion of the protection arrangements on the 132/33/22/11kV networks affected by this incident;
- The settings applied to the above protection schemes;
- A copy of LPN's switching programme for the incident which shows the tripping of the 132kV circuit-breakers controlling the damaged fluid-filled underground cable at 14:12 on 07 July 2014;
- Sight of LPN's switching programmes showing:
  - the restoration of supplies to Deptford 132/11kV Primary substation via tele-controlled 11kV alternative sources;
  - the deliberate disconnection of the infeeds to Neckinger 22/11kV Primary Substation due to the abnormal voltage situation; and
  - the restoration of the infeeds to Neckinger 22/11kV Primary Substation following the removal of the faulty protection relay.
- A copy of the report concerning the damage to the fluid-filled underground cable;
- Sight of the previous report for the routine testing of the faulty protection relay;
- Copies of the relevant 132kV SLDs;
- Sight of the printout from LPN'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 for longer than 3 minutes to be 31,655; and
  - the customer minutes lost due to the incident to be 1,002,600;
- The AE confirms that these figures agree with those quoted in UKPN's SoF;
- Using LPN's total connected customers at 30 September 2014 of 2,298,560 the number of customers affected equates to a CI of 1.38  $[31,655 \times 100 / 2,298,560]$
- Similarly, the customer minutes lost for this event equate to a CML of 0.44  $[1,002,600 / 2,298,560]$ ;
- 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 protection inspection and maintenance policy;
- Confirmed P2/6 compliant (596 MVA at 132kV 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	
Voltage + DNO's incident references	Claimed	Audited	Claimed	Audited
FREP-84195-J: Deptford Grid 132kV, Bus-section 3 cct at 320 132kV +GT4; FREP-84197-J: Deptford Grid 11kV, GRID 1B 11kV + CB 120; and FREP-84205-J: Neckinger Deptford West GT3 disconnection	1.38	1.38	0.44	0.44
EHV	0	0	0	0
HV	0	0	0	0
LV	0	0	0	0
Total	1.38	1.38	0.44	0.44
UKPN (LPN) Threshold (total)	1.1		0.9	
Part 1 Exceptionality Test	Pass		Fail	
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 2014/15.