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Final Report

**Appointed examiner's audit of Exceptional Event Claim -
Scottish and Southern Energy Power Distribution
Damaged 132kV underground cable – 14 February 2012**



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Glossary

Abbreviation	Meaning
AE	Appointed Examiner
CB	Circuit-breaker
CEGB	Central Electricity Generating Board
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
QoS	Quality of Service
RIGs	Regulatory Instructions & Guidance
SCADA	System Control and Data Acquisition
SEPD	Southern Electric Power Distribution
SLD	Single Line Diagram
SoF	Statement of Facts
SSE	Scottish and Southern Energy
ToR	Terms of Reference

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 Scottish and Southern Energy (SSE) under the “one-off” exceptional event mechanism that damage caused to a 132kV underground cable emanating from its Cowley Grid Substation at 11:56 on Tuesday 14 February 2012 adversely affected the reported performance for its Southern Electric Power Distribution (SEPD) licensed area for the reporting year 2011/12.
2. The AE has visited SEPD 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 SEPD’s performance in mitigating the impact of the event upon its customers.
5. The AE concludes that SEPD had no reason to believe that the cable was likely to suffer third party interference, especially as its presence and location are covered by a legal document.
6. The AE commends SEPD’s control engineers for analysing the alarms generated by the incident and for quickly despatching operational personnel to the area.
7. The AE also commends SEPD for restoring supplies as expeditiously as possible.
8. The AE further commends SEPD for re-arranging its 132kV system so as to maximise the security of supplies available to its customers.
9. The AE concludes that SEPD 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 SEPD’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	2.44	1.54	1.54
CML	0.42	0	0

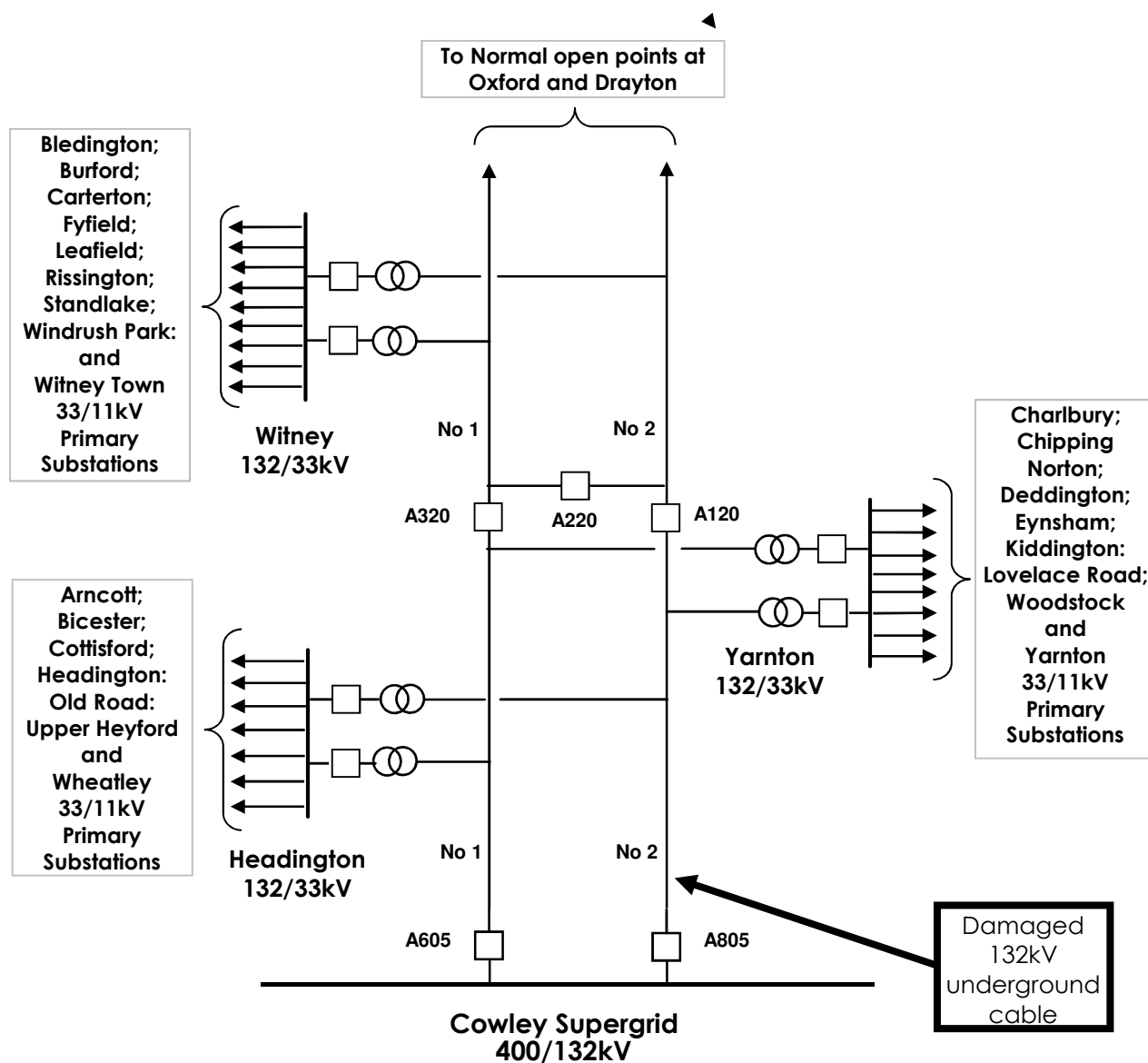


1. Audit part 1

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. SEPD has provided photographic evidence to support its claim that its Cowley Grid Substation to Headington feed Yarnton and Witney 132kV number 2 underground cable suffered third-party damage on 14 February 2012.
13. SEPD's protection operated correctly to clear the incident from SEPD's distribution network.
14. Supplies from 24 of SEPD's 33/11kV Primary Substations were lost, affecting supplies to 110,597 of SEPD's customers.
15. Auto-reclose systems restored supplies to 38,634 of the affected customers in less than 3 minutes.
16. The remaining supplies were restored via tele-controlled switching within 30 minutes.
17. A simplified view of the sections of SEPD's 132 and 33kV networks affected by this event is shown in Figure 1.

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



Notes:

1. Only the salient items of switchgear are shown.
2. SEPD's network was running normally at the time of the incident.
3. CB A320 and auto-isolators at Yarnton operated correctly to isolate Yarnton and Witney to 'split' the network.
4. Following the successful auto-reclosure of the number 1 feeder, supplies to Headington 132/33kV Grid Substation and six of its 'satellite' Primary Substations were restored within one minute (<3 minutes and therefore a short interruption).
5. The seventh, Wheatley Primary Substation, is equipped with an auto-changeover which would normally have restored supplies within a short interruption. In this case, the multiple auto-reclosures on the 132kV system inhibited the operation of the auto changeover and supplies were restored by tele-controlled switching.
6. Supplies to Yarnton and to Witney were restored by tele-controlled switching.

2. Exceptionality requirements

2.1 Does the event qualify for exclusion

18. 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.
19. 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

20. 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

21. 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	0.9	2.44	2.44	Pass	1.54
CML exceptionality	0.7	0.42	0.42	Fail	0

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 threshold 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 Audit of One-off Exceptional Event



3. SEPD's views of its performance

3.1 Dealing with the incident

22. SEPD's Headington, Yarnton and Witney 132/33kV Grid Substations are normally supplied via a dual 132kV circuit from Cowley Super-Grid Substation.
23. This dual circuit consists of underground cable between Cowley Super-Grid Substation and an overhead dual-circuit tower line that begins to the north of Headington; from where the dual circuit goes on to supply Yarnton and Witney Grid Substations.
24. In turn, Headington, Yarnton and Witney Grid Substations provide supplies to 24 33/11kV Primary Substations.
25. The system was running normally at the time of the incident when, at 11:56 on 14 February 2012, the circuit-breakers controlling the number 2 circuit tripped, auto-reclosed and locked-out.
26. The auto-reclose of the number 2 circuit resulted in the circuit-breakers controlling the number 1 circuit tripping due to it feeding into what was subsequently revealed to be a damaged cable.
27. SEPD's protection operated correctly to clear the damaged section of 132kV underground cable fault from its system, which enabled the number 2 circuit to auto-reclose and thus restore supplies to Headington Grid Substation.
28. The auto-reclosing of the number 1 circuit restored the supplies to the 38,634 of SEPD's customers fed from Headington Grid Substation.
29. The supplies to the remaining 71,963 were sequentially restored by tele-controlled switching; the last restoration being at 12:25 on 14 February 2012.
30. SEPD considers that its duty control engineers reacted well in assessing the alarms generated by the event and restoring all supplies via tele-controlled switching in 29 minutes.
31. SEPD also considers that its engineering team did well in isolating the damaged section of its 132kV network and restoring the remained section of its 132kV network so as to maximise the security of supplies to its customers.

3.2 SEPD's answers to questions on its performance

32. Within the last year, the AE has reviewed SEPD's design standards, construction methods and maintenance procedures during previous visits to audit exceptional event claims and found them fit for purpose.
33. The AE confirms that SEPD's emergency procedures provide for the type of event being examined here.
34. To aid understanding of the background to SEPD's SoF, the AE prepared a list of initial questions regarding this incident. These questions were used as the basis for the examination of SEPD's claim.
35. The AE visited the site of the incident on Wednesday, 08 August 2012.



36. The initial questions were discussed during the AE's visit to SEPD's Portsmouth Control Centre on 09 August 2012, when the records of SEPD's SCADA system, the incident report and other information were made available.
37. SEPD 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 SEPD's answers being printed in normal font.

Q1. What changes, if any, has SEPD made to its emergency plans and procedures since Ofgem's appointed examiner last visited to audit the exceptional event claim concerning the incident that occurred at SEPD's Norrington Grid Substation on 18 July 2011?

- A1. SEPD has reviewed its emergency plans and procedures following the incident at Norrington in July 2011. SEPD concluded that its processes and procedures catered for the incident at Norrington and consequently no changes have been made to SEPD's emergency plans as a result.

Q2. Examination of the Ordnance Survey maps and "Google Earth" for the Oxford area suggests the 132kV circuits between Cowley Grid substation and Headington are underground. Beyond Headington they are still underground until rising onto a double circuit tower line via a terminal tower / sealing-end structure to the northeast of Marston and to the north of the A40 Trunk Road. If this is correct, what route markers are deployed along the underground sections of the route?

- A2. The route description is correct. There are some above ground cable marker posts on route which were installed when the cable was laid.

Q3. When were the 132kV underground cables commissioned at the point of damage?

- A3. The cable was energised and commissioned on 16th January 1970 by the then British Insulated Callender's Cables (BICC) on behalf of the then Central Electricity Generating Board (CEGB).

Q4. What prior notification did SEPD receive regarding the soil-sampling work?

- A4. No enquiry had been received prior to the damage. However, subsequent to the incident, the company in question, Endeavour Drilling, requested plans of the area on Thursday, 16 February 2012.

Q5. What is the precise location of the damaged 132kV cable in the field adjacent to the Horspath Road Sports Ground?

- A5. Prior to the audit visit to its Walton Park control centre, SEPD provided a location plan showing the point of damage to the AE. *[AE's note: the location plan enabled the AE to visit the site of the cable damage on Wednesday, 08 August 2012 and to take photographs].*

Q6. For what purpose was the result of the soil-sampling that caused the damage to the underground cable to be used?

- A6. SSE understands that Oxford City Council appointed a contractor to carry out soil analysis with a view to using the land as a cemetery/burial ground.



Q7. At the time of the incident on 14 February 2012 what protection schemes were installed at SEPD's:

(a). Cowley Grid Substation on the 132kV Headington feed feeders;

A7(a). A605 and A805 are both fitted with distance protection, provided by a GEC Alstom Optimho relay, plus backup overcurrent and earth fault from a GEC Alstom -type KCGG relay.
There is tele-protection type intertripping to Headington and Yarnton.
Auto reclose is an Alstom KAVR100 relay.

(b) Yarnton Grid Substation on the three 132kV circuit breakers;

A7(b). There is distance protection on all four circuits provided by a GEC Quadramho relay, with two sets of current transformers (CTs') connected in parallel for each relay on each circuit providing coverage of each mesh corner. Backup overcurrent and earth fault is provided by GEC-type MCGG relays.

There is a separate high impedance earth fault relay providing local connections protection that only becomes operational on that corner if a line isolator is open and the line voltage transformer (VT) is out of service. In this case, this did not apply. Auto reclose is provided on the 3 circuit breakers by an Alstom-type KAVR159 relay, which is an electronic version of the older electromechanical "J" unit to CEGB Standard TPS 12/12 (Delayed automatic reclosure at busbar type substations).

The transformers are fitted with a traditional CEGB-type grid transformer scheme but for the purposes of this incident would have been cleared via local trip from the distance protection at Yarnton combined with an intertrip receive from Cowley.

and

(c) The 33kV transformer circuit breakers at Headington, Yarnton and Witney Grid Substations?

A7(c). Voltage controlled overcurrent, Standby earth fault, Restricted earth fault, Bucholz, Winding Temperature, Duobias, overcurrent, earth fault and under voltage protection.

Q8. What settings are applied to the above protection schemes?

A8. A list of full protection settings was provided to the AE during the audit visit.

Q9. What was the complete sequence of protection operations when supply was lost?

A9. The complete sequence of protection operations was provided to the AE during the audit visit.

Q10. In addition to SEPD's response to the above questions, the following will be useful to inform the discussions during the audit of the present claim:

(a). sight of SEPD's policy for installing above-ground indication (route-markers) that show the presence of its 132kV underground cables;

SSE does not have a consistent policy regarding the installation of above ground cable marker posts and this is under review in regard to the original CEGB signs.

(b). evidence to show SEPD's policy is in place at the sight of the damaged 132kV underground cable;

SSE does not have a consistent policy regarding the installation of above ground cable marker posts. An original CEGB sign is located close to the point of damage.

(c). SEPD's photographs of the location of the damaged 132kV underground cable, showing any route markers to indicate the presence of the cable;

SSE's photographs showing the drilling rig in situ at the point of damage and a photograph of the jointing / cable repair work were provided to the AE.

(d). SEPD's control room log;

A copy of SSE's control room log for the incident was provided to the AE during the audit visit.

(e). SEPD's switching log showing the sequence of supply restoration;

A copy of SSE's switching log for the incident was provided to the AE during the audit visit.

(f). SEPD's incident report;

A copy of SSE's incident report was provided to the AE during the audit visit.

(g). the details of SEPD's SCADA alarms received during this incident;

A list of all SCADA alarms was provided to the AE during the audit visit.

(h). if available, a representation of SEPD's SCADA record of this incident;

A representation of the incident on SSE's control system was demonstrated to the AE during the audit visit.

and

(i). additional to the 132kV SLD in the SoF, a simplified SLD of the affected sections of SEPD's 33kV network would assist energypeople to 'picture' the connectivity of the affected primary substations. An electronic copy of this SLD will be needed for the appointed examiner's report.

Three diagrams of the affected 33kV network were provided to the AE during the audit visit.

A visit to the site of the damaged cable 132kV may assist the audit of this incident. *[AE's note: re Q5 above – assisted by SEPD's location plans and guidance notes, the AE visited the site of the cable damage on Wednesday 08 August 2012 without the need for SEPD's personnel to attend site. The AE took photographs during the site visit].*

Q11. What learning points has SEPD incorporated into its procedures as a result of this incident?

A11. Review / alter the protection at Yarnton – such that if supply is lost from Cowley the Auto-Reclose timer is inhibited.

Q12. What further learning points should be considered as a result of the application of the current one-off Exceptional Event Claims process?

A12. SSE would wish to see an examiner appointed within a fixed time scale following an event subject to the exceptional event process.



38. SEPD also provided further information both during and subsequent to the audit visit. This includes:
- sight of the legal agreement between the then occupier and the then CEGB providing for the installation, subsequent maintenance and freedom from interference for the underground cables at the point of damage and its immediate vicinity;
 - SEPD's mains records which clearly show the presence of the underground cables at the point of damage;
 - sight of SEPD's recording systems which clearly shows the request for cable route records received from Endeavour Drilling on 16 February 2012 [**AE's note:** *this is two days after the incident*];
 - photographs of the soil-sampling drilling rig in situ at the point of damage;
 - a photograph of the repair work being undertaken on the 132kV underground cable;
 - confirmation that SEPD is reviewing its policy for marking the routes of its 132kV underground cables and is in discussion with the ENA regarding the national policy; and
 - confirmation that the inspection of its cable route markers will be specifically included in its update of checks to be carried out during the above ground patrol of its underground 132kV cable routes.



4. Audit part 2

4.1 SEPD's performance in preventing the event

39. In viewing SEPD's performance in preventing this event, the AE has considered what more SEPD could have reasonably done to ensure that its 132kV underground cables in the vicinity of the point of damage was safeguarded from damage.
40. The AE has discussed SEPD's policy on its deployment of cable route-markers and recommends that SEPD reviews its policy to ensure it is consistently applied throughout its distribution system, including replacing the older style CEGB metal plates with more modern concrete-type posts.
41. SEPD confirms that no prior notification was received regarding the soil-sampling drilling work or possible change of land use under which the cables are situation.
42. SEPD's photographs taken at the time of the incident clearly show the soil-sampling drilling rig in situ at the point of damage.
43. SEPD's photograph of the repair work clearly shows the concrete cable tiles protecting the underground cables at the point of damage.
44. The AE's photographs taken during the site visit clearly show the CEGB route marker post which indicates the presence of 132kV underground cables, albeit that the depth is illegible.
45. SEPD's measurement systems clearly show the tripping of the circuit-breakers associated with the Cowley Super-Grid Substation to Headington, Yarnton and Witney number 2 circuit at 11:56 on 14 February 2012.
46. SEPD's measurement systems confirm the restoration of supplies to six of the twenty-four affected Primary Substations due to the operation of the auto-reclose feature on the Cowley Super-Grid Substation to Headington Grid Substation number 1 circuit at 11:57.
47. SEPD's measurement systems also confirm the sequential restoration of the remaining customers by tele-controlled switching. The restoration of the final customers' supplies from Wheatley Primary substation was achieved at 12:25; 29 minutes after the occurrence of the incident.
48. An examination of SEPD's measurement systems and a SCADA representation of its distribution network confirm that SEPD did all it could to restore supplies as expeditiously as possible.
49. An examination of SEPD's measurement systems confirms that SEPD's control engineers acted quickly to assess the alarms generated by the incident and to restore supplies as speedily as possible.
50. The AE concludes that SEPD had no reason to believe that its 132kV underground cables in the vicinity of the incident were liable to third-party interference and damage.

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

51. The damage to the 132kV underground cable is consistent with it being struck by a soil-sampling drill, no prior notification of which had been received.
52. The resultant damage would have resulted in a permanent fault on the cable.



53. The AE has studied the running arrangements of SEPD's 132kV distribution network affected by this incident and concludes that SEPD's protection systems worked correctly to clear the incident from SEPD's distribution system.
54. The AE commends SEPD's control engineers for analysing the situation and restoring supplies as rapidly as possible, thereby minimising the duration of the interruption.
55. The AE commends SEPD for re-arranging its 132kV system so as to maximise the security of supplies to its customers during the time it took to permanently repair the damaged cable.
56. The AE commends SEPD for undertaking an in-house review of the incident and concluding that its 132kV protection schemes operated as designed and for concluding that it is prudent to consider updating the installation at Yarnton Grid Substation to prevent a second-circuit closure onto a permanent fault.
57. The AE also commends SEPD for its learning from this incident regarding the route-marking of its 132kV underground cables with a view to installing the more modern concrete-styles 'post' in place of the partially illegible CEGB-style metal ones as originally installed in this case.
58. The AE also commends SEPD for reviewing its inspection regime for underground cables and for undertaking to contact the Energy Networks Association regarding a review of the national guidelines regarding the inspection regime for underground cable routes, possibly as an adjunct to the review of security standards for various installations.

4.3 Recommended performance adjustments

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

Table 3 – Recommended performance adjustments

	Amount above threshold	Audit part 2 recommendation
CI	1.54	1.54
CML	0	0

4.4 Detailed justification

60. In reaching a judgement on a recommendation, the AE has firstly considered whether or not SEPD could have reasonably taken any different course of action that would have prevented the damage to its 132kV underground cable.
61. In viewing SEPD'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.
62. The AE considers that SEPD had no reason to believe that its 132kV underground cables in the vicinity of the point of damage were vulnerable to third-party interference or damage.



63. The AE considers that experienced soil-sampling operatives should consider the possibility of buried equipment wherever they are working. In addition to electricity equipment it is equally possible that high-pressure gas mains, or trunk oil pipelines, or fibre-optic communication cables may lie beneath the surface.
64. Consequently, the AE would expect such operations to be preceded by diligent enquiries of all potential utilities and, in any event, for the drilling operatives to carry-out thorough cable-tracing before putting the drilling rig to work. In this case the presence of SEPD's underground 132kV cables would have been clearly detected.
65. In considering SEPD's restoration strategy, the AE is conscious that SEPD's duty control engineers acted with commendable skill and speed in analysing the SCADA alarms and indications generated by this incident.
66. The AE is satisfied that SEPD's distribution network affected by this incident complies with the requirements of Security of Supply Standard P2/6.
67. The AE has discussed SEPD's learning from this incident, including the discussions regarding the possibility of enhancing its standard for the route-marking of its 132kV underground cables and the inclusion of associated checks on condition as a specific activity during the inspections of its underground cable routes.
68. The AE commends SEPD for re-configuring its 132kV system whilst the permanent repairs were being carried-out.
69. The AE is satisfied that SEPD has inherited an easement, which is a legal right covering the presence of the cables from the former CEEGB. This includes the occupier's agreement to refrain from any excavation below 2 feet and any digging or tree-planting activities with 9 feet 9 inches of each side of the centre line of the cable route.
70. The AE is satisfied that SEPD has met the criteria for preventative and mitigating actions set out in Appendix 4 to paragraph 8.58 of Special Licence Condition CRC 8.
71. The AE therefore concludes that SEPD's claim is justified and recommends to Ofgem that the amount of CI above the threshold value should be excluded from its performance for reporting year 2011/12.



Appendix A - Record of Audit part 1

Table A-1: Appointed Examiner's Information Log

"One-Off" Exceptional Event	Reporting Year 2011/12
Licensed Area	SEPD
Date of event	14 February 2012
Cause	Damage to 132kV underground cable
Notification to Ofgem	16 February 2012
SoF received	24 February 2012
SoF information	<ul style="list-style-type: none"> • protection operated on the n° 2 Cowley Super-Grid s/s to Headington, Yarnton and Witney Grid s/s's 132kV circuit at 11:56 on Tuesday 14 February 2012; • the circuit auto-reclosed resulting in the n°1 circuit 'seeing' the fault and both circuits being de-energised; • supplies to 24 of SEPD's 33/11kV Primary Substations were interrupted; • part of the n°2 circuit auto-reclosed restoring Headington Grid and 6 of the Primary Substations supplied from it; • 18 Primary Substations were still off supply; • these were restored by tele-controlled switching, the last customers were restored at 12:25 (29 minutes duration); • a report was received at 12:57 to report that a cable had been damaged "in a field next to the Sports Ground in Horspath Road, Oxford"; • having positively identified the damaged section of cable, the remaining 132kV system was re-configured to maximise security of supply; and • "repairs are expected to take up to 14 days".
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 SEPD's response, is contained in paragraph 37 of the report.
Location of audit visits	<ol style="list-style-type: none"> 1. The AE visited the site of the cable damage at Horspath Road, Oxford; and 2. SEPD's Portsmouth Control Centre.
Date of audit visits	<ol style="list-style-type: none"> 1. 08 August 2012; and 2. 09 August 2012.
Visiting Auditor	Geoff Stott (ep)
SEPD's Representatives	Adam O'Hara and Dave Sharman



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

Comprehensive documentation / information including:

- sight of the legal agreement dating from 1968 between the then occupier of land under which the cables are installed and the then CEGB;
- a discussion of the protection arrangements on the parts at SEPD's distribution system affected by this incident;
- the settings applied to the above protection schemes;
- discussion regarding the configuration of CB's and auto-isolators at Yarnton;
- SEPD's review and comprehensive report of the protection scheme operations and the conclusion to alter the schemes at Yarnton in association with upgrading its 132kV CB's to preclude a similar occurrence in the future;
- copies of the relevant 33kV SLDs;
- sight of the printout from SEPD's SCADA system that shows the alarms generated by the event;
- the control room switching schedules covering the event;
- the switching log showing the loss of supplies from Headington, Yarnton and Witney Grid Substations when the CBs associated with the n°1 132kV circuit tripped to clear the incident at 11:56 on 14 February 2012 (the n°2 circuit having tripped immediately after it auto-reclosed);
- the normal network running arrangements were demonstrated, including the auto-isolators installed at Yarnton Grid Substation;
- the switching operations to restore supplies were demonstrated;
- sight of SEPD's incident report that shows:
 - the number of customers affected by the short interruption affecting 6 Primary Substations supplied from Headington Grid Substation to be 38,634;
 - the number of customers affected by the incident affecting the remaining 17 Primary Substations to be 71,963; and
 - the customer minutes lost due to the incident to be 1,243,459.
- the AE confirms that these figures agree with those quoted in SEPD's SoF;
- using SEPD's total connected customers at 30 September 2011 of 2,953,242 the number of customers affected equates to a CI of 2.44. $[71,963 \times 100 / 2,953,242]$; and
- similarly, the customer minutes lost for this event equate to a CML of 0.42. $[1,243,459 / 2,953,242]$.
- The AE has visited the site of the damage and taken photographs.



	<ul style="list-style-type: none"> • Discussed SEPD's policy for route-marking 132kV underground cables – suggested replacing the very old CEGB-style plates. • Discussed the application of SEPD's route-marking policy for the damaged cable. • Discussed post-fault learning points, including anything to affect SEPD's policies and those of the ENA. • Confirmed P2/6 compliant (<300 MVA firm). • SEPD provided answers to the initial questions plus additional information both during and subsequent to the audit visit. • Okay regarding compliance with Appendix 4 of Paragraph 8.58 of CRC 8.
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Table A-2: Impact on CI and CML

	CI		CML	
	Claimed	Audited	Claimed	Audited
132kV	2.44	2.44	0.42	0.42
EHV	0	0	0	0
HV	0	0	0	0
LV	0	0	0	0
Total	2.44	2.44	0.42	0.42
SEPD Threshold (total)	0.9		0.7	
Part 1 Exceptionality Test	Pass		Fail	
Part 1 Precondition of eligibility (meets App 3 to paragraph 8.57 of CRC 8)	Pass			

NOTE: SEPD'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 2011/12.



Appendix B - SEPD's photographs



Photograph 1 – View looking eastwards of the soil-sampling drilling rig at the point of damage



Photograph 2 – View looking northwards of the soil-sampling drilling rig at the point of damage



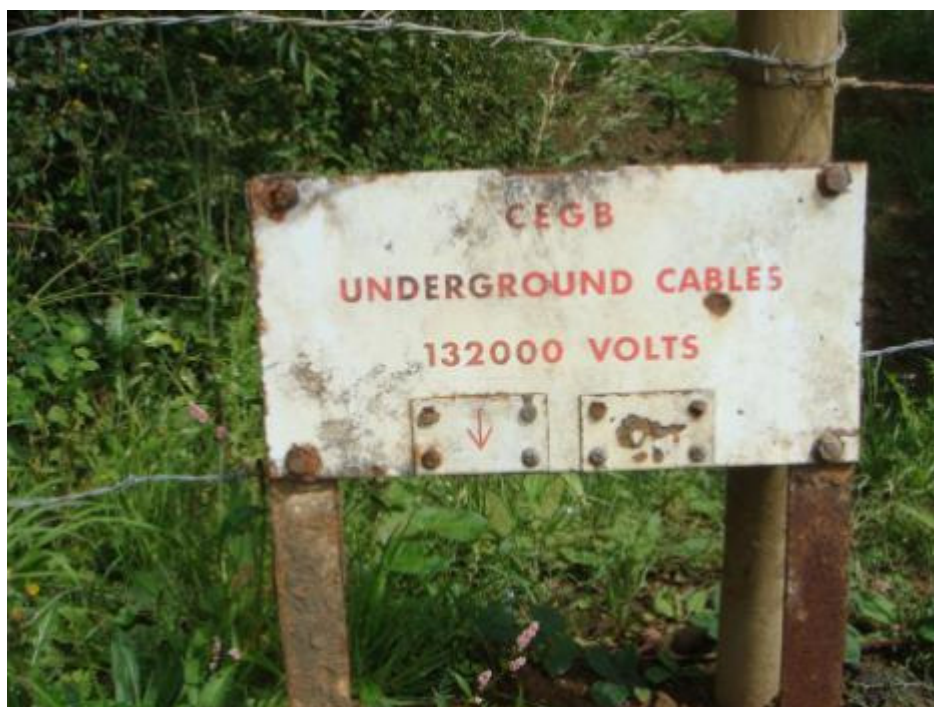
Photograph 3 – The repair work in progress – the concrete cable files protecting the cables are clearly visible



Appendix C - AE's photographs taken on 08 August 2012



Photograph 4 – View looking east – the CEGB route-marking sign is clearly visible



Photograph 5 – Close-up of the CEGB route-marking sign