Quality of Service Incentive Scheme – Exceptional Events

Appointed Examiner's Report	
Reporting year	2010/11
DNO	SPN
Cause	Fault in 132kV cable feeding Twickenham Grid
Date of event	23 June 2010

Submitted to:
Ofgem

Submitted by:

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Name	Position	Signed	Date
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History

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Glossary

AE	Appointed Examiner
BPI	British Power International
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
HV	High Voltage – all voltages above 1kV up to and including 20kV
QoS	Quality of Service
UKPN	UK Power Networks
RIGs	Regulatory Instructions & Guidance
SCADA	System Control and Data Acquisition
SLD	Single Line Diagram
SoF	Statement of Facts
SPN	South Eastern Power Networks
ToR	Terms of Reference
TWA	Thames Water Authority

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

Ofgem has appointed British Power International Limited (the Appointed Examiner) to audit the submission made by UK Power Networks (UKPN) under the "one-off" exceptional event mechanism that the loss of supply to its Twickenham Grid Substation at 15:20 on Wednesday, 23 June 2010 adversely affected the reported performance for its South Eastern Power Networks plc (herein known as SPN) distribution licensed area for the reporting year 2010/11.

The Appointed Examiner (AE) has visited SPN 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.

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.

The AE therefore proceeded to part 2 of the "one-off" exceptional event process, assessing SPN's performance in mitigating the impact of the event upon its customers.

The AE concludes that SPN's procedures were properly invoked prior to the outage on the n°1 132kV feeder between Laleham and Twickenham Grid Substation.

The AE also concludes that, in reinforcing its 33kV system and in applying its procedures and reconfiguring its 33kV network, SPN had applied appropriate mitigating measures to guard against the consequences of an incident affecting the n°2 feeder ahead of the outage of the n°1 feeder.

SPN deployed three of its control engineers to deal with the incident and the AE concludes that SPN restored its customers' supplies as expeditiously as possible.

The AE commends SPN for researching various options for the replacement of the gas compression cables and adopting an innovative approach to the work.

The AE concludes that SPN 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.

The AE therefore recommends that an adjustment to SPN 2010/11 reported distribution system performance is made, in line with the part 1 audited CI figures as shown in the following table:

	Audited number	Number above the threshold	Recommended adjustment
CI	2.32	1.22	1.22
CML	0.92	0.02	0.02

1. Audit part 1

Summary of main facts

1.1 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.

1.2 SPNs 132/33kV Twickenham Grid Substation is fed via two 132kV feeders from Laleham 275/132kV Grid Substation, sections of the underground cables of which are of the gas-compression type.

1.3 At the time of the incident, the n°1 feeder was out of service to allow for the replacement of the gas compression cable with solidly insulated cable, utilising the steel ducts vacated by the removal of the gas compression cable.

1.4 SPN has furnished evidence to support its claim that a fault in the n°2 132kV feeder between Laleham and Twickenham Grid Substations resulted in the loss of supplies to Ham, Richmond and Twickenham Primary Substations.

1.5 Prior to the outage of the n°1 feeder, the 33kV infeeds to Ham Primary Substation had been transferred from Twickenham Grid Substation to Kingston Grid Substation as part of SPN's mitigating measures.

1.6 At the time of the incident however, the 33kV infeeds to Ham Primary Substation were being supplied from Twickenham Grid Substation due to an incident that affected the 132kV infeeds to Kingston Grid Substation and the need to mitigate against further problems affecting Kingston Grid Substation.

1.7 SPN's protection operated to clear the incident from its distribution network.

1.8 As a result of the incident, 51,703 of SPN's customers suffered a supply interruption.

1.9 All supplies were restored via tele-controlled switching on SPN's 11kV and 33kV networks.

1.10 A simplified view of the section of SPN's 132/33kV network affected by this event is shown in Figure 1.

Diagram Redacted

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

Notes:

1. Prior to the outage on the n° 1 feeder SPN's 33kV network had been reconfigured in order to mitigate the consequences of an incident affecting the n°2 feeder by transferring the 33kV infeeds to Ham Primary Substation from Twickenham Grid Substation to Kingston Grid Substation.
2. On 06 April 2010, due to an incident on the 132kV infeeds to Kingston Grid Substation, the 33kV infeeds to Ham Primary Substation were transferred to Twickenham Grid Substation to mitigate against a further incident affecting Kingston Grid Substation.
3. This network arrangement remained after the restoration of the incident affecting Kingston Grid Substation because of the known potential weakness in changing the loadings on pressurised gas cables.
4. Hence, at the time of the incident on the n°2 feeder between Laleham and Twickenham Grid Substations, supplies to Ham Primary Substation were lost, together with those to Richmond and Twickenham Primary Substations.
5. Hampton Primary substation remained on supply via the n°1 feeder from Kingston Grid Substation.
6. All supplies were restored from the 11kV and 33kV networks by SPN's control engineers using tele-controlled switching.

Exceptionality requirements

Does the event qualify for exclusion?

1.11 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.

1.12 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.

Exceptionality test results

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

Table 1-1: 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

1.14 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 1-2.

Table 1-2: Summary of exceptionality test results

Test	Threshold	Claimed number	Audited number	Pass / Fail	Amount above threshold
CI exceptionality	1.1	2.32	2.32	Pass	1.22
CML exceptionality	0.9	0.88	0.92	Pass	0.02

Notes:

1. Ofgem's CI and CML exceptionality criteria are set out in the AE's ToR[1].
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.

SPN's views of its performance

1.15 SPN's underground cables between Laleham 275/132kV Grid Substation and its Twickenham 132/33kV Grid Substation are of the gas compression type and were installed in 1965.

1.16 The gas pressures are constantly monitored through SPN's SCADA system and the feeders are therefore considered to be under constant inspection for electrical integrity.

1.17 Whilst five faults had occurred on the n°1 feeder at various intervals between 1980 and 2003, no faults had occurred on the n°2 feeder. Following the most recent failure, SPN had commissioned a specialist report to determine the electrical integrity of the n°1 feeder.

1.18 As part of its ongoing review of system reliability, including the likely end of service life for various components, SPN identified the n°1 132kV gas compression cable between Laleham and Twickenham Grid Substations as a potential weakness and in need of replacement.

1.19 SPN had also decided to replace the n°2 feeder in the year following the completion of the replacement work on the n°1.

[1] Audits of Electricity Distribution Network Operators' One-off Exceptional Events Claims for 2010/11

1.20 Prior to the commencement of the work to replace the n°1 feeder, SPN reinforced its 33kV network between Twickenham and Kingston Grid Substations to mitigate against the loss of the n°2 feeder during the outage of the n°1.

1.21 So as to minimise the duration of the outage of the n°1 feeder and to reduce the inconvenience to road users, SPN had investigated several possible methods for replacing the gas compression cable, including innovative installation techniques and international experience of using different types of cable.

1.22 In its pre-planning preparations, SPN was cognisant of the need to complete its work well ahead of the London Olympic Games, scheduled for 2012. It had fully discussed its approach to the work with the local authorities and explained that its cable contractor would be removing the gas compression cable from the steel pipes and using the vacated steel pipes as a duct for the solid type cable.

1.23 Prior to the outage of the n°1 feeder, which started on 31 March 2010, SPN is satisfied that its outage procedures were fully applied. This included rearranging its 33kV network by transferring the infeeds to Ham Primary Substation from Twickenham Grid Substation to Kingston Grid Substation so as to reduce the number of customers whose supplies would be affected if an incident occurred on the n°2 feeder.

1.24 On 06 April 2010 a severe fluid leak on one of the 132kV cables between Wimbledon and Kingston Grid Substations necessitated its being de-energised, thus requiring mitigating measures to secure customers' supplies fed from Kingston Grid Substation.

1.25 The above 132kV cable was restored to service on 10 June 2010 but the infeeds to Ham Primary Substation were not transferred from Twickenham Grid Substation to Kingston Grid Substation because of a potential problem that can affect pressurised gas cables of the type between Laleham and Twickenham Grid Substations, where frequent changes in loading may lead to cable failure.

1.26 SPN's outage planning engineers therefore used their engineering judgement to leave Ham Primary Substation supplied from Twickenham Grid Substation.

1.27 At 15:20 on Wednesday, 23 June 2010, supplies from Twickenham Grid Substation were lost when the circuit-breakers controlling the n°2 132kV feeder between Laleham and Twickenham Grid Substation tripped.

1.28 SPN deployed three control engineers who used tele-controlled switching to restore all supplies from SPN's 11kV and 33kV networks.

1.29 SPN considers that its duty control engineers reacted well in assessing the alarms generated by the event and beginning to restore supplies via tele-controlled switching within six minutes.

SPN's answers to questions on its performance

1.30 Within the last four years, the AE has reviewed SPN's design standards, construction methods and maintenance procedures during previous visits to audit exceptional event claims and found them fit for purpose.

1.31 The AE confirms that SPN's emergency procedures provide for the type of event being examined here.

1.32 To aid understanding of the background to SPN's SoF, the AE prepared a list of initial questions regarding this incident. These questions were used as the basis for the examination of SPN's claim.

1.33 The initial questions were discussed during the AE's visits to UKPN's Bury St Edmunds offices on 30 June and 12 July 2011, when the records of SPN's SCADA system, the incident report and other information were made available.

1.34 SPN 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 SPN's answers being printed in normal font.

Q1. What learning points did UK Power Networks immediately apply to its outage planning criteria for 132 kV circuits following the incident at Great Yarmouth Grid on 07 June 2011? *[AE's note:* *the incident at Great Yarmouth preceded that at Twickenham. The AE is here seeking to understand what, if any, learning points from the incident at Great Yarmouth UKPN could have possibly applied as mitigation for the incident at Twickenham. Following the audit visits to UKPN, the AE is satisfied that UKPN's procedures were properly applied in both cases and no immediate learning points from the incident at Great Yarmouth have a bearing on the incident at Twickenham]*.

A1. UKPN has comprehensive, company-wide procedures that cover the planning of outages at EHV and above. These procedures were reviewed with revisions being issued on 25 June 2010 and 30 March 2011. The revisions include the applicable lessons learned from all post incident investigation reports.

Q2 What is SPN's policy for assessing the risk associated with a 132 kV outage? How widespread have these been promulgated throughout SPN?

A2. UKPN has comprehensive, company-wide, procedures that will be made available to the visiting auditor:

COP 01 – 005 *System outage planning (EHV and above)*; and

NOP 50 – 001 *Pre- and post- outage checks at EHV and above.*

Q3 What explanatory evidence can SPN provide to demonstrate that sufficient pre-event mitigation and preventative actions were taken prior to this incident occurring?

A3. The procedures outlined at A2 above were followed as confirmed in the associated switching log.

A copy of SPN's documentation concerning its commercially confidential investment case, which will be made available during the audit visit, also shows the

reinforcement work that was to be completed on SPN's 33kV network prior to the outage of the n°1 gas compression feeder.

Q4. How does SPN's policy incorporate the requirements of Appendix 4 to paragraph 8.58 of its Special Licence Condition CRC8; in particular, the requirements on SPN to take 'all appropriate steps within its power … to limit the number of Customers interrupted by the event…and restore customers' supplies quickly and efficiently'?

A4. The procedures outlined in A2 above demonstrate that UKPN takes appropriate steps both pre- and post- outage to ensure that an outage has limited impact on its customers.

In this case, the 33kV system reinforcement work outlined in A3 above were part of SPN's mitigating actions as was the transfer of Ham Primary Substation from Twickenham Grid Substation to Kingston Grid Substation.

Q5. What evidence can SPN provide to demonstrate that its policy was applied to the outage of the n°1 132kV feeder between Laleham and Twickenham Grids?

A5. The procedures outlined at A2 above were followed as confirmed in the associated switching log.

In addition, the 33kV network reinforcement, outlined in A3 above, had been completed.

Q6. When did the outage begin on the n°1 feeder?

A6. As stated in the SoF, the outage on the n°1 feeder began on Wednesday, 31 March 2010.

Q7. What was the duration of the planned outage on the n°1 feeder?

A7. The outage to replace the n°1 feeder began on 31 March 2011. The feeder was returned to service on 15 August 2011 following the completion of the cable replacement work.

Q8. When was the faulted 132kV gas compression cable installed?

A8. The faulted cable was installed in 1965.

Q9. What is SPN's policy for inspecting the condition of its gas compression cables?

A9. Whilst there is no routine inspection of buried / underground cables, the gas pressure is continuously monitored in UKPN's control centre via its SCADA system.

In addition, following failures of the n°1 feeder, specialist reports have been commissioned, including one following the most recent failure in 2003.

Q10. When were the 132kV gas compression cables between Laleham and Twickenham last inspected?

A10. Please see A9 above.

Q11. How did SPN determine that the Laleham to Twickenham n°1 132 kV cable was in a 'poorer condition' than the n°2 cable?

A11. Whilst of the same vintage, the n°1 feeder had faulted five times between 1980 and 2003, whereas the n°2 feeder had no fault history.

The specialist report commissioned after the failure in 2003 indicated that the n°1 feeder was approaching the end of its useful life and would become increasing unreliable.

Commensurate with its policy of replacing potentially unreliable assets, SPN took the decision to replace the n°2 feeder during the summer following that in which the n°1 feeder was replaced.

Q12. What learning points have SPN incorporated into its procedures as a result of this incident?

A12. SPN's post-incident investigation has shown that UKPN's company-wide outage planning and pre-check procedures are appropriate and that they were rigorously applied to the planning of the outage of the n°1 132kV feeder between Laleham and Twickenham Grids.

The investigation has also shown that the decision to carry out the 33kV system reinforcement as part of the pre-outage mitigating measures was correct.

Examination of the n°2 132kV feeder at the point of failure concludes that, despite it not having any previous fault history, it is also likely to become unreliable.

This latter point vindicates SPN's decision to replace the n°2 132kV feeder so as to maximise the security of its customers' supplies.

Q13. What further learning points should be considered as a result of the application of the revised Exceptional Event Claims process?

A13. SPN considers that the existing process continues to work well, where Ofgem engages an experienced AE to examine an EE claim for a 'one-off' event.

1.35 SPN also provided further information both during and subsequent to the audit visits. This includes:

- a discussion regarding the running arrangements of the 132kV and 33kV networks;
- a copy of the relevant 33kV SLD;
- a discussion on how the customers' supplies were restored;
- sight of the latest version of UKPN's procedure for system outage planning at EHV and above;
- sight of UKPN's latest version of its procedure for pre- and post- fault checks for outages at EHV and above;
- sight of SPN's post-incident investigation, including photographs of the n°2 feeder at the point of failure;
- copies of SPN's incident reports from which it calculated the CI and CML attributed to the event;
- a representation of the incident on SPN's SCADA system;
- a copy of SPN's SCADA alarms received during this incident; and
- copies of the various switching logs from SPN's SCADA system.

2. Audit part 2

SPN's performance in preventing the event

2.1 In viewing SPN's performance in preventing this event, the AE has considered what more SPN could have reasonably done to optimise the security of supply to its customers whilst essential work was underway to replace the gas compression cable of its n°1 132kV feeder between Laleham and Twickenham Grid Substations.

2.2 The AE has discussed SPN's commercially confidential investment case for the replacement of the 132kV gas compression cables between Laleham and Twickenham which includes a review of the fault history of both feeders. The AE is satisfied that SPN's decision to tackle the n°1 feeder first was sound, there being no reason to suspect the integrity of the n°2 feeder.

2.3 The AE has seen SPN's photographs of the fault on its n°2 132kV feeder which show the cable failed 'along the run' and not at a joint position.

2.4 SPN's measurement systems clearly show the tripping of the circuit-breakers controlling the n°2 feeder at Laleham and Twickenham Grid Substations at 15:20 on 23 June 2010.

2.5 SPN's measurement systems confirm the initial restoration of supplies at 15:26, and subsequent restoration stages, the final one of which was at 17:59, as reported in SPN's SoF.

2.6 An examination of SPN's documentation shows that its outage planning / risk assessment policy is comprehensive and that it was rigorously applied during the planning of the outage of the n°1 feeder, including both reinforcing and reconfiguring its 33kV network to mitigate against the consequences of an incident affecting the n°2 feeder.

2.7 The AE therefore concludes that SPN had done all it could reasonably have been expected to do in its approach to the mitigating measures needed during the necessary outage to replace its n°1 132kV gas compression cable between Laleham and Twickenham Grid Substations.

SPN's performance in mitigating the effects of the event

2.8 SPN's measurement systems clearly show the cause of the incident to be a fault on the n°2 132kV gas compression cable between Laleham and Twickenham Grid Substations as depicted in SPN's photographs of the cable at the point of failure.

2.9 The AE has discussed SPN's commercially confidential documentation concerning the replacement of the n°1 feeder with the company's engineering personnel and is satisfied that SPN's decision is sound.

2.10 The examination of the protection arrangements applied to the 132kV feeders between Laleham and Twickenham Grid Substations shows that SPN's protection schemes operated correctly to clear the fault from its network.

2.11 The AE concludes that SPN did all it could to restore supplies as expeditiously as possible, thereby minimising the duration of the interruption.

2.12 The AE is pleased to note that SPN has reviewed this incident and concluded that its procedures were properly applied for the outage of the n°1 feeder.

2.13 The AE is also pleased to note the conclusion of SPN's post-incident investigation regarding its pre-incident decision to replace the n°2 feeder so as to maximise the security of supply to its customers.

Recommended performance adjustment(s)

2.14 The AE's recommendations to Ofgem are shown in Table 2-1.

Table 2-1: Audit part 2 recommended adjustment(s)

	Amount above threshold	Audit part 2 recommendation
CI	1.22	1.22
CML	0.02	0.02

Detailed justification

2.15 In reaching a judgement on a recommendation, the AE has firstly considered whether or not SPN could have reasonably taken any different course of action that would have prevented the incident on its n°2 132kV feeder between Laleham and Twickenham Grid Substations.

2.16 In viewing SPN's performance in preventing this event, the AE has taken into account the lack of any previous incidents on the n°2 feeder and the rigorous application of SPN's comprehensive procedures for outage planning and pre-outage checks associated with the work on the n°1 feeder.

2.17 Prior to the outage on the n°1 feeder, SPN's mitigating measures included carrying out reinforcement work on its 33kV network between Twickenham and Kingston Grid Substations. This was to minimise the effect on SPN's customers of an incident affecting the n°2 feeder during the outage on the n°1 feeder.

2.18 The AE judges that SPN's decision to transfer the infeeds to Twickenham Grid Substation due to the incident affecting the 132kV infeeds to Kingston Grid Substation to be correct when considering the security of supplies to all its customers in the locality.

2.19 Following the restoration of the incident affecting the 132kV infeeds to Kingston Grid Substation, the AE concludes that SPN's engineering judgement to continue to supply Ham Primary Substation from Twickenham Grid Substation to be correct so as to minimise the risk of a failure of the n°2 132kV gas compression cable between Laleham and Twickenham Grid Substations.

2.20 The AE has also discussed this incident with his colleagues who have considerable operational experience of incidents with many differing causes; they agree with the visiting auditor's conclusions and recommendations.

2.21 In considering SPN's restoration strategy, the AE is conscious that SPN's duty control engineers acted with commendable skill and speed in assessing the situation and beginning to restore supplies within six minutes.

2.22 The AE is satisfied that the work on the n°1 feeder was essential and that SPN had adopted an innovative and appropriate approach to the work, including the minimisation of the outage duration.

2.23 The AE is also satisfied that SPN's pre-outage planning arrangements included detailed discussions with local authorities and SPN's cabling contractors on the innovative methods to be employed to minimise the interference with users of the public highway.

2.24 The AE is satisfied that the affected sections of SPN's distribution network comply with the requirements of Security of Supply Standard P2/6.

2.25 The AE has discussed SPN's review of this incident with its engineering personnel and is pleased to note that SPN's procedures were considered to be appropriate and that they were fully applied in the pre-outage planning for the essential outage of the n°1 feeder.

2.26 The AE is also pleased to note that SPN's post-incident investigation included an analysis of the faulted cable at the point of failure. The AE concurs with SPN's pre-incident decision and commends the company for its foresight in judging that the n°2 feeder was likely to prove increasingly unreliable.

2.27 The AE is satisfied that SPN has met the criteria for preventative and mitigating actions set out in Appendix 4 to paragraph 8.58 of Special Licence Condition CRC 8.

2.28 The AE therefore concludes that SPN's claim is justified and recommends to Ofgem that the amount of CI and CML above the threshold values should be excluded from its performance for regulatory reporting year 2010/11.

AE's footnote: The n°2 132kV feeder between Laleham and Twickenham Grid Substations was being replaced during the AE's visit to UKPN's Ipswich Control Centre. The AE was pleased to see that SPN had invoked its mitigating actions by feeding Ham Primary from Kingston Grid Substation, even though the now replaced n°1 feeder was of the solidly insulated type and not the erstwhile gas-compression type.

Appendix A Record of Audit part 1

Table A-1: AE's Information Log

"One-Off" Exceptional Event	Reporting Year 2010/11
Licensed Area	SPN
Date of event	23 June 2010
Cause	Fault in 132kV cable resulting in loss of 132kV supplies
Notification to Ofgem	06 July 2010
SoF received	21 April 2011
SoF information	• Twickenham 132/33kV Grid Substation is fed via two underground feeders from Laleham 275/132KV Grid Substation. • sections of the route comprise gas compression cables that need replacing. • the n°1 feeder was in the worst condition and had been switched out on Wednesday, 31 March 2010 for work to replace the suspect sections. • the n°2 feeder tripped at 15:20 on Wednesday, 23 June 2010, resulting in loss of infeeds to Twickenham Grid Substation. • SPN had drawn up a contingency plan for the outage on the n° 1 feeder, including off-loading the n° 2 feeder as far as practicable before the n° 1 feeder was shut down. • the restoration of the incident followed SPN's contingency plan. • all supplies were restored from the 11kV and 33kV networks via tele-controlled switching. • all but the Thames water Authority's (TWA) supply at Hampton was restored by 16:38. • TWA Hampton was restored at 17:59. • 3 Primary Substations affected. • the incident was due to a fault on n°2 132kV 2 feeder gas compression cable.
Additional pre-visit information provided	Based on the SoF the AE drew up a list of initial questions. These were discussed during the audit visits. This initial list of questions, together with SPN's response, is contained in paragraph 1.34 of the report.
Location of audit visits	1 and 2. UKPN's Bury St Edmunds Offices; and 3. UKPN's Ipswich Control Centre
Dates of audit visits	1 and 2. 30 June and 12 July 2011 3. 25 July 2011
Visiting Auditor	Geoff Stott (BPI)
SPN's Representatives	1 and 2. Bill D'Albertanson 3. Simon Mulcahy, John Gudger and Steve Saunders

Information provided during and subsequent to the audit visits	Comprehensive documentation / information including: • a discussion of the contingency arrangements put in place ahead of the outage on the n°1 feeder, including the preparatory 33kV system reinforcement; • the normal running arrangements for the 33kV network affected by this incident; • a copy of the relevant 33kV SLD; • a discussion of the restoration strategy for the incident using the pre-prepared contingency plan; • sight of UKPN's outage planning procedures for the EHV and 132kV voltage levels; • sight of UKPN's procedure for pre and post outage checks for the EHV and 132kV voltage levels; • sight of SPN's commercially confidential investment case for the options associated with the replacement of its Laleham to Twickenham 132kV gas compression cables; • a copy of SPN's post-incident investigation, including sight of the photographs of the n°2 feeder at the point of cable failure; • a copy of SPN's SCADA switching log that shows the alarms generated by the event; • the switching log showing the loss of supplies from Twickenham Grid at 15:20 on 23 June 2010; • a copy of SPN's incident reports that show: o the number of customers affected by the incident to be 51,703; and o the customer minutes lost to be 2,060,344; • the AE confirms that the number of customers affected agrees with that quoted in SPN's SoF; • however, the audited number of customer minutes lost is 2,060,344, which is 92,997 more than shown in SPN's SoF [**AE's note:** SPN is unable to explain why the SoF figure is less than the audited figure]; • using SPNs total connected customers at 30 September 2010 of 2,233,288 the number of customers affected equates to a CI of 2.32. [51703*100/2233288]; and • similarly, the customer minutes lost for this event equate to a CML of 0.92. [2060344/2233288]. No need to visit Twickenham Grid Substation. Confirmed P2/6 compliant (90 MVA firm). The list of initial questions was discussed. SPN provided answers to the initial questions plus additional information both during and subsequent to the audit visits. Ok re 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	2.32	2.32	0.88	0.92
EHV	0	0	0	0
HV	0	0	0	0
LV	0	0	0	0
Total	2.32	2.32	0.88	0.92
SPN 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			

SPN'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 regulatory reporting year 2010/11.