Information and Incentives Project
Audit of Incident Reporting 2004/05
Final Report

September 2005

Information and Incentives Project

Audit of Incident Reporting 2004/05

Final Report

Submitted to:

Ofgem

Submitted by:

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Document Status

Title: IIP - Audit of Incident Reporting 2004/05

Reference: Final Report

Issue: 2.0

Date: 8 September 2005

Electronic Doc Ref: M:\BPIUSER\Projects\Current\UK\UK - Ofgem\Ofgem 882 - IIP Audit 2003-05\IIP Audit 2004-05\Final report\IIP Overall Report 2005 - V2.0.doc

Authorisation

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History

Issue	Date	Originator	Checker	Description
2.0	8 September 2005	Oliver Joseph		Final version after incorporating Ofgem Appendix P comments
1.1	10 August 2005	Oliver Joseph	Bill Howieson Geoff Stott	Incorporation of Ofgem comments & Appendix P
1.0	22 July 2005	Rob Shackleton	Isabel Boira-Segarra	Consolidated draft for Ofgem
0.7	19 July 2005	Rob Shackleton	Phil Napier-Moore	Draft complete with QA'd audit results
0.6	15 July 2005	Rob Shackleton		Development Draft
0.5	5 July 2005	Rob Shackleton		Discussion Draft for Ofgem
0.4	21 June 2005	Rob Shackleton		Development draft
0.3	21 June 2005	Rob Shackleton		Development draft
0.2	23 May 2005	Rob Shackleton		Draft section 2 added
0.1	10 March 2005	Rob Shackleton		Template

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Glossary

BPI	British Power International
CE	CE (UK) Ltd. Incorporating the NEDL and YEDL licensed areas
Central Team	James Hope (Ofgem), Oliver Joseph (BPI), Geoff Stott (BPI), Bill Howieson (MM), Rob Shackleton (BPI)
CI	Customer Interruptions – calculated as per the formula below
CML	Customer Minutes Lost – calculated as per the formula below
CN	Central Networks incorporating CN - East (formerly East Midlands Electricity) and CN - West (formerly Midlands Electricity and Aquila) licensed areas
Consortium	The consortium of BPI and MM
DNO	Distribution Network Operator
DPCR3	Distribution Price Control Review for Period 1 April 2000 to 31 March 2005
DPCR4	Distribution Price Control Review for Period 1 April 2005 to 31 March 2010
EDF	EDF Energy Group incorporating EPN, LPN and SPN licensed areas
EE	Exceptional Event(s)
EHV	Extra High Voltage – all voltages above 22kV up to but excluding 132kV
ENMAC	The GE Harris proprietary Energy Network Management and Control System
HV	High Voltage – all voltages above 1kV up to and including 22kV
LV	Low Voltage – voltages of less than 1kV
MM	Mott MacDonald
MPAN	Meter Point Administration Number
MPAS	Meter Point Administration Service
MPRS	Meter Point Registration System
NaFIRS	National Fault and Interruptions Reporting Scheme
NEDL	Northern Electricity Distribution Limited
Ofgem	Office of Gas and Electricity Markets
OMS	The LeT Systems proprietary eRespond Outage Management System
PC-NaFIRS	Langhorne Computers' proprietary software used by DNOs for NaFIRS data capture and reporting to Ofgem
QA	Quality Assurance checking of auditing workbooks carried out as a follow-up to relevant audit visits
RIGs	Regulatory Instructions and Guidance – Version 2 is used as the basis for this report. Although Version 3 came into force during the reporting year 2004/05 the changes from Version 2 occurred outside of the scope of IIP audit work for 2004/05.

SCADA	Supervisory Control and Data Acquisition
SI	Short interruption – an incident in which the loss of supply is less than 3 minutes in duration
SP	ScottishPower - SP Transmission and Distribution incorporating the SPD and SPM licensed areas
SPD	SP Distribution licensed area
SPM	SP Manweb licensed area
SEPD	Southern Electric Power Distribution
SHEPD	Scottish Hydro-Electric Power Distribution
SSE	Scottish and Southern Electricity incorporating the SEPD and SHEPD licensed areas
UU	United Utilities
WPD	Western Power Distribution incorporating the South Wales and South Western licensed areas
YEDL	Yorkshire Electricity Distribution Limited

Note:

Within this document:

The term “higher voltage” is used to indicate all voltages greater than 1kV.

The term “licensed area” is used, where necessary, to indicate the geographical area under consideration and to differentiate between areas in those situations where a parent company holds more than one distribution licence.

The calculations of Customers Interrupted (CI) and Customer Minutes Lost (CML) within this document are adapted from the formulae contained in the RIGs to reflect the CI and CML generated by each stage of the incidents being audited.

CI is the number of customers interrupted in the relevant restoration stage per 100 connected customers. It is calculated as:

- CI = (The sum of the number of customers interrupted) * 100 / (The total number of connected customers)

CML is the duration of interruption to supply expressed as the number of customer minutes lost in the relevant restoration stage per connected customer. It is calculated as:

- CML = (The sum of the number of customers interrupted) * (the interruption duration in minutes) / (The total number of connected customers)

The total number of connected customers is as declared at 30th September 2004.

Summary

Overview

British Power International (BPI) and Mott MacDonald (MM) (the Consortium) was awarded the contract to carry out the Information and Incentives Project (IIP) audits for the reporting years 2003/04 and 2004/05.

This report describes the work carried out and results obtained for the audit of incident reporting for the reporting year 1 April 2004 to 31 March 2005. The main objective of the audit was to determine the accuracy under Distribution Price Control Review–3 (DPCR3) of each DNO's incident reporting based on the full set of incidents selected for audit by Ofgem. An additional objective was to pilot test Ofgem's proposed audit process for Distribution Price Control Review–4 (DPCR4) designed to audit a pre-selected subset of incidents to a higher target level of accuracy and to compare this with the results from the full sample of incidents audited. The minimum levels of accuracy that each DNO's incident reporting is required to meet under DPCR3 are set out in Section 5.3 of the Information and Incentives Project, Regulatory Instructions and Guidance, Version 2, dated March 2002 (RIGs). These minimum levels of accuracy together with the accuracy levels expected from the pilot trial of Ofgem's proposed DPCR4 process are shown in the following Table.

Required Minimum Level of Accuracy	Overall – Full Audit Sample (DPCR3 Process)	Overall – Pilot Trial Subset of Audit Sample (Proposed DPCR4 Process)	LV – Full Audit Sample (DPCR3 Process)	LV – Pilot Trial Subset of Audit Sample (Proposed DPCR4 Process)
Customer Interruptions (CI)	95%	97%	90%	92%
Customer Minutes Lost (CML)	95%	97%	90%	92%

Audit Process

A three stage audit process was used to determine the final reporting accuracies under the DPCR3 audit process. Stage 1 involved calculating the MPAN accuracy for the relevant licensed area. In addition a questionnaire was used to evaluate progress on the relevant connectivity model although connectivity model accuracy was not used in the calculation of final reporting accuracy. Stage 2 covered the audit of reporting for the full sample of incidents selected by Ofgem and in Stage 3 the MPAN and incident reporting accuracies were combined to give the final DPCR3 reporting accuracies for CI and CML at both the Overall and LV levels. Stage 3 was carried out automatically within Ofgem's incident auditing workbook and enabled robust interim results to be given to DNOs at the conclusion of the audit visits. The pilot trial calculations of the accuracies for Ofgem's proposed DPCR4 audit process were also carried out automatically by means of functionality embedded in the auditing workbook.

Ofgem circulated the automated incident auditing workbook to DNOs prior to the audit visits and this contained the incident sample for audit together with the pre-selected

subset of incidents for the pilot trial of Ofgem's proposed DPCR4 audit process. The incidents selected for audit were disaggregated proportionately across the various voltage levels by Ofgem. Several spare incidents were provided and all spare incidents were audited. The purpose of this was to enable the substitution of spare incidents where incidents were too complex or impossible to audit. A review of reported and audited CI and CML results indicated that each DNO had outlying results that were outside four standard deviations from the statistical mean of the Overall and LV CI and CML variances. The incidents associated with outlying results were automatically removed from the assessment of Stage 2 reporting accuracy for each DNO by logic embedded in the incident auditing workbook.

The calculation processes used within the automated incident auditing workbook are described in detail in Appendix A.

Audit Results – DPCR3 Process

The planning and logistics of the IIP audit have evolved over the last four years and further improvements in the current year have contributed to the smooth running of the audit visits. All audit visits were undertaken within the published time scale and the audited CI and CML numbers agreed between visiting auditors and DNOs during the visits. Visiting auditors were able to provide the DNOs with robust interim, i.e. pre Quality Assurance (QA) checked, estimates of the final audit results at the end of each audit visit through the use of the calculations embedded within the auditing workbook. Company specific reports have been prepared by the visiting auditors for each licensed area and agreed with the DNOs. These company specific reports are presented in the Appendices B to O of this report.

DNOs were generally well prepared for the visits and provided an appropriate level of support. The visiting auditors found that the DNOs conducted the process in an open manner and readily accepted genuine reporting errors.

Before the final accuracy results could be confirmed each incident auditing workbook underwent a QA check following the audit visits.

All DNOs passed the audit by exceeding the minimum requirements for CI and CML accuracy at both the Overall and LV levels.

The DNOs have continued to improve the accuracy of their measurement systems. In addition there is evidence that they are implementing the recommendations made during the audit of the 2003/04 reporting year.

There are a number of different sources of audit variances still remaining in reporting systems and processes. Some of these are specific to individual DNOs, whereas others are common to a number of DNOs. The common areas of inaccuracy include:

- Changes to customer numbers between the date of the incident and the audit visit;
- Network reconfigurations between the date of the incident and the time of the audit visit; and
- Manual mis-reporting and transcription error.

The latter category is most prevalent where DNOs still rely on manual stages within their reporting systems and processes. The Consortium noted that the quality of audit

information in the reporting systems in some licensed areas was less than it was at the audit for reporting year 2003/04.

The post QA checked IIP audit results from the DPCR3 audit process, with an indication of over/under reporting, are summarised below.

:

Licensed Area	Overall CI (Minimum Requirement 95%)	Overall CML (Minimum Requirement 95%)	LV CI (Minimum Requirement 90%)	LV CML (Minimum Requirement 90%)
CE NEDL	99.62% O	99.80% O	99.72% U	94.00% U
CE YEDL	98.57% U	98.62% U	97.53% O	99.78% O
CN East	99.95% U	99.72% U	97.55% U	97.84% U
CN West	98.83% U	98.86% U	99.74% O	99.42% U
EDF – EPN	99.77% U	99.40% O	96.23% U	96.52% U
EDF – LPN	99.85% O	99.23% U	99.14% O	99.45% O
EDF – SPN	99.99% O	99.81% O	95.81% O	94.53% O
SSE – SEPD	99.22% U	98.40% U	98.12% O	93.95% O
SSE – SHEPD	99.89% U	99.79% U	99.36% U	99.40% U
SPD	99.05% U	98.84% U	97.88% U	96.37% U
SPM	98.97% U	98.63% U	99.26% U	92.23% U
UU	99.48% O	99.42% U	95.08% U	95.16% U
WPD – S Wales	98.02% U	96.11% U	99.91% U	99.75% U
WPD – S West	99.84% U	99.81% U	99.74% U	99.85% U

In the above Table O signifies over reporting and U signifies under reporting.

Most DNOs felt that the incident samples were a reasonable representation of the types of incidents they experienced. One DNO noted that the incidents selected for audit at the EHV and 132kV levels represented 60% of the CI and CML of the total sample. Two DNOs commented that the installation of increased levels of automation has resulted in an increased proportion of customers being restored within 3 minutes of supply interruption and thus falling into the “Short Interruption” (SI) category.

No changes to DNO’s measurement systems were found that materially affected accuracy. All calculations presented by the DNOs to support the accuracy of their measurement systems were reviewed and accepted by the auditors.

Most DNOs expressed concern about the variances between the customer numbers recorded in their measurement systems at the time of the incident and those recorded at the time of the audit visit. DNOs’ measurement systems generally use current data and in the absence of a DNO being able to demonstrate otherwise these are the figures used as audited values. Variances between audited and reported figures can be due to a number of reasons including transcription errors when transferring information between systems. However, it is clear that many variations are due to changes in the distribution network and associated MPAN allocation since the incident took place. Some DNOs’ measurement systems retain the data recorded at the time of the incident. This audit trail

makes it easier for visiting auditors to check the actual situation at the time of the incident.

The majority of DNOs elected to explain variances if it was relatively easy to do so or where the variance was significant. All DNOs used the option within the incident auditing workbook to record their view if they disagreed with the audited figures. During the audit of reporting year 2003/04 there was debate during one audit visit on the evidence that is acceptable to verify network changes since the time of the incident. This year examples of acceptable evidence were discussed as part of the team training day for visiting auditors. Lead auditors were advised to contact DNOs in advance to agree on the nature of audit evidence to be presented and resolve any foreseeable problems in advance of the audit visit.

In some instances visiting auditors found that pre-arranged interruptions were difficult to audit. Generally, however, the Consortium noted that DNOs had improved since last year in reporting pre-arranged interruptions.

The information provided to support the audit of LV incidents was variable where it was derived from non-system sources. The Consortium is pleased to note that DNOs have trained their field staff to provide more definitive information on interruption and restoration times.

In addition to the audit of the sample incidents, in the licensed areas that had made severe weather exceptional events claims the visiting auditors also audited a small sample of incidents from these events. There appeared to be no noticeable drop in reporting accuracy associated with these incidents and they were not included in any of the accuracy calculations.

The results of reporting accuracy contained in this report have been reviewed by the relevant DNOs. Whilst no DNOs have challenged the results of this year's audits they may suggest amendments to the process for future audits.

The IIP audit of reporting year 2004/05 included examples of updating of connectivity models. The Consortium noted that DNOs are still managing this aspect of their measurement systems and keeping their connectivity models up to date.

Audit Results – Trial of DPCR4 Process

In general the trial ran very smoothly and visiting auditors did not encounter any significant complications or difficulties. Only one DNO failed based on the DPCR4 reduced sample but passed when the full audit sample was taken into account. As such the pass/fail conclusions from the proposed DPCR4 audit process were the same as from the DPCR3 process with a saving of auditing time in all but one case. However, the results show significant volatility in the LV sample.

Although it did not happened this year the view of the Consortium is that there is the distinct possibility for the LV audit that a DNO could pass on the audit of the restricted incident sample but fail on the full sample audit. This possibility appears much less for the overall sample audit but could occur if for example a large EHV or 132kV incident variance were to affect the final result significantly.

General Recommendations

Based on the above comments and observations, the following general recommendations are made:

- The work carried out to establish agreed acceptable forms of audit evidence was found to be very helpful this year, but audit flexibility is still needed to include the small number of cases in which alternative evidence may be presented and found to be acceptable;
- There should be greater formality attached to the visit closure meeting with Ofgem's presence in addition to the DNO and visiting audit teams. The use of the automated auditing workbook together with a streamlined form of visit report would then enable the audit results and visit reporting to be agreed and signed off without the need for further iteration;
- A proportion of unseen exceptional events incidents were included in the early DNO visits this year and the audit of these did not give rise to significant difficulty. It may therefore be worth including a sample of unseen incidents in future audits;
- A sample of updates to connectivity models should be retained as part of the audit to encourage DNOs to maintain accuracy;
- In order to gain a better feel for the likely duration of a 'typical' audit visit, consideration should be given to future pilot audits being conducted by visiting auditors from outside the central team with central team people on hand to advise and provide assistance as necessary; and
- With regard to the DPCR4 audit process trial, the number of cases in which the results from the audit of the restricted sample differed significantly from the results obtained from the full sample of incidents suggests the possibility that inconsistent pass/fail conclusions could be drawn in particular for the LV accuracies.

Learning Points

The following learning points have been noted by the visiting auditors:

- Setting and confirming the timetable well in advance considerably aided the smooth running of the process and consequently each visiting auditor was able to attend the team training day and no substitutions of visiting auditors were made;
- The automated incident auditing workbook was well received as it provided the DNOs with an 'instant' interim indication of the accuracy results;
- Hand written incident logs used by DNOs should be designed to prompt the capture of IIP-specific data such as incident start and finish times, number of customers affected and the location of the fault;
- No incident is now considered too complex to audit given the experience of the visiting audit teams, but incidents with more than ten restoration stages tend to slow down the audit process. However where no audit trial exists incidents will still be impossible to audit;
- This year a central team of people from Ofgem and the auditors were again made available to deal with issues that arose from audits - this worked well and promoted good communication with the audit teams;

- To improve the quality of the audit further, aspects of the auditing process need to be kept under review – in particular the overall number of auditors;
- The background instruction and training given to visiting auditors must continue to focus on key issues;
- DNOs should consider periodic rotation of staff responsible for IIP reporting so as to spread experience and provide for strength in depth in the team;
- Liaison between the lead auditor and the DNO prior to the visit is essential to the smooth running of the audit;
- Volatility of the DPCR4 results suggests that a full incident audit may still be required in particular for the LV incidents;
- The amount of pre-visit preparation work required by DNOs for the proposed DPCR4 audit process is likely to be the same as that required under the DPCR3 audit process; and
- There will be the need to have the visiting audit team available to extend the visit in the event of the DPCR4 audit process requiring the full sample to be audited.

1 Introduction

Background

1.1 The Office of Gas and Electricity Markets (Ofgem) is committed to an ongoing programme of work to strengthen incentives on Distribution Network Operators (DNOs) to deliver an appropriate quality of service to customers. This involves defining appropriate output measures. In addition, reporting and audit arrangements have been put in place to help maintain the consistency and accuracy of DNOs' reporting. Amongst the output measures DNOs are required to report on are the number and duration of interruptions to supply per year.

1.2 Ofgem introduced standard definitions and guidance and minimum levels of accuracy that DNOs must meet for reporting quality of supply data. These are set out in the Regulatory Instructions and Guidance (RIGs)[1]. The number and duration of interruptions must be measured to a level of accuracy of at least 90 per cent at low voltage and at least 95 per cent for the overall network, i.e. including interruptions at all voltage levels.

Audit of DNOs' Measurements Systems and Reporting

1.3 In 2001 Ofgem commissioned the consortium of BPI and MM to develop a framework for annual auditing of incident reporting systems used by DNOs under IIP. The initial contract ran for three years during which time DNOs undertook a significant amount of development work on their measurement systems. Development of the incident reporting process has taken place through a collaborative approach between Ofgem and the DNOs with BPI/MM providing technical and analytical support on Ofgem's behalf as required. Under the initial contract an interim review was carried out in 2001 and audits of measurement systems followed in 2002 and 2003. The contract to carry out the IIP audits for the reporting years 2003/04 and 2004/05 was also awarded to BPI/MM and the present report covers the reporting year 2004/05. Full details of all audits carried out to date are available on the Ofgem website[2].

Aims of the Audit

1.4 The aims of the audit of DNOs' Measurement Systems and Incident Reporting for the reporting year 1 April 2004 to 31 March 2005 are to:

- Review the accuracy of DNOs' measurement systems and the impact of any changes on the accuracy of reported information;
- Identify whether there are any significant weaknesses in the measurement systems that DNOs have in place to report incidents, CI and CML and provide recommendations for improvement(s) in these systems;

[1] Information and Incentives Project, Regulatory Instructions and Guidance version 5, Ofgem, April 2005 is the version as at June 2005. However it should be noted that RIGs version 2 was used as the basis for the audit work described in this report. The difference between RIGS version 2 and RIGs version 5 does not impact on the 2004/05 audit.

[2] Report by Mott MacDonald/British Power International - Information and Incentive Project, Audit of Incident Reporting 2001/02. Final Report, Report by Mott MacDonald/British Power International - Information and Incentive Project, Audit of Incident Reporting 2002/03, Final Report, Report by Mott MacDonald/British Power International - Information and Incentive Project, Audit of Incident Reporting 2003/04, Final Report.

- Determine whether the DNOs are complying with the RIGs requirements for reporting;
- Determine the extent to which recommendations from previous audits have been implemented;
- Identify best practice and where further improvements can be made;
- Estimate the accuracy of DNOs' measurement systems, their accuracy of reporting and the overall accuracy of reported information; and
- Pilot test Ofgem's proposed audit process for DPCR4 and to compare this with the results from the full sample of incidents audited.

Changes to the Audit Approach from the Previous Year

1.5 Following suggestions from Ofgem and discussion with DNOs there have been several changes in approach to the audits and calculation of accuracy from the audit of reporting year 2003/04. These include:

- The calculation of Overall and LV accuracy based on MPAN accuracy and audited incident reporting accuracy in Ofgem's automated incident auditing workbook;
- A review of connectivity model accuracy was carried out to ensure that this aspect of the measurement systems is constantly being updated;
- Omission of the data extract and re-population exercise for Ofgem's IIP reporting template; and
- The pilot-study audit of the DPCR4 process for a smaller sample of incidents to a higher level of required accuracy.

Report Structure

1.6 This main body of this report sets out the audit findings and accuracy of reporting figures under the DPCR3 audit process for DNOs for the reporting year 2004/05. Results and analysis from the trial of the proposed DPCR4 audit process are included in the Appendices.

1.7 The report is structured as follows:

- Section 2 of this report gives a description of the audit process;
- Section 3 sets out the key results of the audit together with any differences in interpretation of the RIGs found across DNOs;
- Section 4 gives details of key lessons learned as a result of this year's audit and identifies areas of best practice;
- Appendix A gives details of the procedure used in the automated auditing workbook for determining the combined systems and reporting accuracy;
- Individual audit reports for each licensed area are set out in Appendices B to O;
- Appendix P contains the feedback gained from the DNOs and additional points gained from the post-audit workshop held on Tuesday 26 July 2005;
- Appendix Q contains the overall results and discussion points from the trial of the proposed DPCR4 audit process; and

- Appendix R contains the Consortium's suggested streamlined audit visit report to be used together with the automated auditing workbook in the DPCR4 period.

2 Audit Processes

Overview

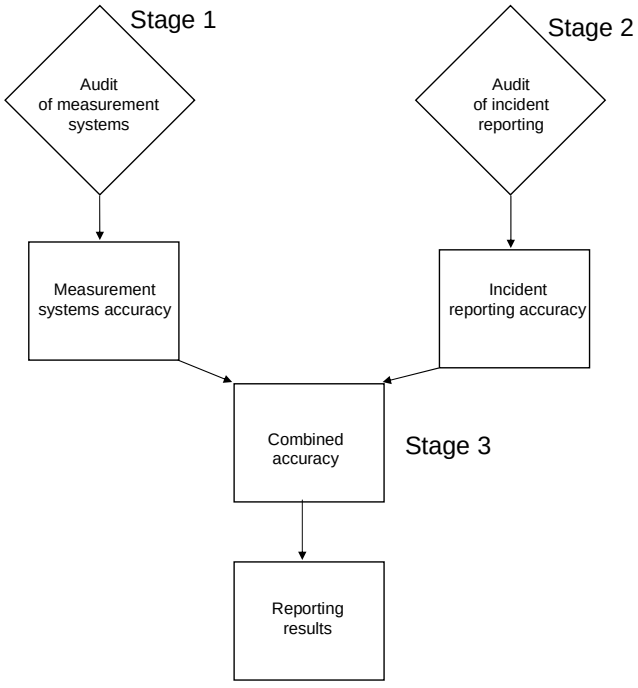
2.1 As in previous years the central component of the audit process was an audit visit to each licensed area. The audit visits were carried out by two visiting auditors working together with the DNO audit team. The aim was to foster a collaborative approach to achieve agreement during the visit wherever possible.

2.2 A comment made consistently in previous audits was that visiting auditors were not able to give an indication of the final reporting accuracies achieved by the DNO at the conclusion of the visit. This was because, following the visit, a considerable amount of statistical and calculation work was necessary to process the information gathered in the incident auditing workbook during the visit. Outlying incidents had to be manually removed and incidents that were too difficult to audit substituted with spare incidents in the required order. For the audit of reporting year 2004/05 Ofgem developed a fully automated incident auditing workbook. This enabled the calculation and statistical work to be done in parallel with the collection of information on the audit visit. Visiting auditors were therefore able to give a robust interim estimate of the final results of the audit immediately on completion of the audit visit. The results at this point were considered to be “interim” because the Consortium subjected all completed incident auditing workbooks to an independent QA check.

Audit Process for DPCR3

2.3 Figure 1 shows the three stage audit process that was during the DPCR3 price control period.

Figure 1 Audit Process Flow Chart for DPCR3



The approach to Stages 1 and 2 was to circulate an audit questionnaire and incident auditing workbook in advance of carrying out an audit visit to each DNO. Updated accuracies of each DNO's measurement systems and the accuracies of each DNO's reporting using these systems were then calculated based upon the information gained during the audit visit. A list of issues arising together with agreed resolutions was compiled during each visit. Stage 1 and Stage 2 accuracies were then combined automatically in Ofgem's auditing workbooks to give the Stage 3 Overall reporting accuracy for each licensed area. This process built directly upon the lessons learned from previous audits.

DPCR3 Audit Process Stage 1

2.4 This relates to the calculation of HV and LV MPAN accuracy. The calculation of MPAN accuracy is the same as last year's audit and reflects the number of primary traded MPANs active in a DNO's connectivity model relative to its MPRS. Taking MPAN count in MPRS as 100% accurate, the MPAN accuracy for HV and LV is then taken as the number of MPANs in the connectivity model capable of attracting CI and CML at the relevant voltage expressed as a percentage of MPANs in MPRS. It is calculated as follows:

- HV/LV MPAN Accuracy = (Total number of primary traded MPANs assigned to true feeders at HV and above or LV as appropriate) / (Total number of primary traded MPANs).

MPAN accuracy can be greater than 100% if there is a delay in removing disconnected MPANs in the connectivity model relative to MPRS.

2.5 At LV, MPANs attached to true feeders (as opposed to dummy feeders or other temporary holding arrangements) in the DNO connectivity model will be registered as losing supply when the feeder or substation to which they are attached becomes disconnected. These are therefore capable of attracting CI and CML even though they may not be correctly connected. By comparison LV MPANs not connected to true feeders (e.g. connected to dummy feeders or postcodes that never lose supply) are not capable of attracting CI and CML. At the higher voltage levels, MPANs attached to dummy LV feeders will lose supply when the substation becomes disconnected and, in this case, could attract CI and CML.

2.6 MPANs attached to true feeders may not be attached to the correct feeder or substation for a variety of reasons, and this would give rise to incorrect reporting of CI and CML for a proportion of individual incidents. However, audit work in previous years supports the view that the number of MPANs connected to incorrect feeders or substations is low, evenly distributed and diminishing in all licensed areas.

2.7 An audit questionnaire was prepared to enable visiting auditors to check on the development of connectivity model accuracy in each licensed area and to ensure that DNOs are retaining the focus on its continual improvement.

2.8 The questionnaire circulated to DNOs prior to the audit visits examined the following:

- any changes that DNOs have made to the way that they interpret the definition and guidance contained in the RIGs;
- any changes that DNOs have made to the way in which they identify primary traded MPANs;

- the number of primary traded MPANs active within the DNOs connectivity models and how these are both determined and managed;
- the underlying assumptions that the DNOs have used to link customer MPAN information to their network connectivity models;
- the numbers and location of unallocated MPANs across the licensed area;
- any future changes planned to DNOs' measurement systems; and
- a follow-up to any recommendations that had been made as a result of the audit for the 2003/04 reporting year.

2.9 In their answers to the questionnaire the DNOs were asked to identify the effects of their methodologies on connectivity model accuracy together with supporting calculations. DNOs were expected to have completed the questionnaire by the commencement of the audit visit to facilitate face-to-face discussion of their responses.

2.10 DNOs were also asked to provide actual examples of instances where connectivity models have been updated during the 2004/05 reporting year where:

- previously inactive primary traded MPANs have become active as a result of them now being located in the DNO's connectivity model; and
- an existing active primary traded MPAN has been relocated within the connectivity model as a result of information arising out of an incident on the distribution network.

In addition to these examples being examined during the audit visits, additional instances were found during the audit of the sample incidents, thus supporting the view that DNOs are still managing this aspect of their measurement systems.

DPCR3 Audit Process Stage 2

2.11 Stage 2 of the 2004/05 audit consisted of the audit of incidents and the combination of results into the final reporting accuracies by means of Ofgem's automated incident auditing workbook.

2.12 The audit visits and automated workbook process are designed to establish an audit opinion on the likely accuracy of the measurement systems of each DNO and to establish a robust estimate of incident reporting accuracy based upon the detailed auditing of a sample of incidents. Stage 2 final accuracies under DPCR3 were calculated using the results of auditing Ofgem's full incident sample.

2.13 Each audit visit concluded with a review session where the main points arising from the visit were discussed with the DNO team and any learning points relevant to the conduct of future audit visits were shared. Both the visiting auditors and the DNO audit team retained the following audit visit documentation:

- A date stamped signed hard copy of each of the following: completed audit questionnaire, final consolidated issues list, summary results table from the initial page of the auditing workbook, and overall sign-off sheet;
- Hard copy of the audit trail evidence presented by the DNO audit team for two incidents to use for training purposes in future audit programmes;
- An electronic copy of the completed audit questionnaire; and

- An electronic copy of the completed incident auditing workbook for QA.

2.14 In order to determine the finalised Stage 1 MPAN accuracy for the overall sample used in the combined accuracy calculation, Ofgem's automated incident auditing workbook calculated a weighted average of the HV & above MPAN accuracy and LV MPAN accuracy based on the CI contribution to overall annual HV & above and LV CI. This is explained in detail in Appendix A.

2.15 Ofgem circulated the automated incident auditing workbook to DNOs prior to the audit visits. For each licensed area, the workbook was accompanied by the full schedule of incidents disaggregated proportionately across the various voltage levels as selected for audit by Ofgem. Several spare incidents were included to substitute for incidents that might prove too complex or impossible to audit. Ofgem had pre-populated the relevant parts of the incident auditing workbook prior to the commencement of the audit visit. All incidents in the workbook were audited including spares.

2.16 To establish consistency of approach the two visiting auditors first examined several higher voltage and LV incidents together. In order to make the most efficient and effective use of time the visiting auditors then separated[3] with one generally working on the higher voltage incident sample and the other on the LV sample. However this parallel tracking of the majority of the higher voltage and LV audits did not prevent discussions between visiting auditors where questions of understanding or interpretation arose. In several cases the audit of the LV sample was completed before that of the higher voltage sample, both visiting auditors then working separately to complete the audit of the higher voltage sample. To further ensure consistency of approach between audit teams Ofgem representatives observed a number of the audit visits.

2.17 A central audit team consisting of Ofgem representatives and key BPI/MM consultants was available to contact in the event of guidance on unforeseen issues being needed during audit visits. This facility was used on several occasions and proved helpful in resolving issues, communicating decisions promptly, and furthering consistency across all the audit teams.

2.18 Consistency between audit visits was further gained by:

- training of visiting auditors;
- consultations with the central team;
- the compilation and circulation of updated lists of issues with associated resolutions;
- limiting the total number of visiting auditors;
- using visiting auditors with previous IIP audit experience; and
- the presence of representatives from Ofgem during most visits.

2.19 The accuracy of incident reporting was estimated for each licensed area through detailed audit of each incident in the relevant higher voltage and LV samples. The

[3] In the case of one DNO it was not possible to parallel track the HV and LV incident sample audits as these occurred at separate locations. This would have removed the opportunity for face-to-face discussion between visiting auditors during the course of the audit of incidents.

audit of incidents examined the consistency and accuracy of the following processes:

- data capture by telephone operators;
- network control room data capture;
- capture of field data within DNOs' measurement systems; and
- data links to the fault reporting system (e.g. PC-NaFIRS).

Each sample incident was checked for consistency and accuracy of the following information from relevant DNO measurement systems:

- identification of restoration stages within the incident;
- time stamping of the start and finish of each restoration stage within the incident;
- location of the incident; and
- identification of the number of customers affected by each restoration stage within the incident.

Information was extracted through live online access to current DNO systems or through examination and verification of time stamped system printouts taken at the time of the incident together with time stamped reports from field staff.

2.20 Audited values for CI and CML were established for each incident and entered into the incident auditing workbook. In the event of particular incidents being too complex or impossible to audit, spare incidents were substituted in a pre-determined sequence provided by Ofgem. If disagreement occurred between the visiting auditors and the DNO team, the DNO had the opportunity to retain or revise its view of the reported figures for customer numbers and restoration stage duration in separate columns in the workbook. Free format comment columns were also included in the workbook to capture further information on numbers of customers interrupted and restoration stage duration where appropriate.

2.21 DNOs took the opportunity to record their views in the DNO figure columns and the comments columns of the auditing workbook. This generally occurred where significant variance was found between the current system customer number and the original DNO reported number, or where particular issues of interpretation arose during the audit visit. Although the visiting auditors' figure was used in the calculation of accuracy, the extra information captured in the workbook was designed to enable relevant incidents to be further examined by the central audit team and Ofgem in the event of material impact on the final DNO reporting accuracy and the need for dispute resolution.

2.22 Visiting auditors annotated, signed and dated the PC-NaFIRS and other incident report paperwork provided by the DNOs for audit purposes in order to provide an audit trail for the work carried out during the visit. This was done to provide for easy re-examination of audit information after the audit visit in the event of any query over work carried out or dispute over final results. This year there was no need to revisit any of this annotated material as there were no queries or disputes arising.

2.23 This year it was decided to exclude restoration stages with zero reported CI from the auditing workbooks circulated in advance of the visits. This gave rise to auditing difficulty in two cases where there were found to be reporting errors in these stages

leading to the need to record non-zero audit CI for them. Visiting auditors were then obliged to re-insert these stages into the auditing workbook and these then appeared erroneously as “missing restoration stages”. In future it is recommended that stages with zero CI associated are included in the auditing workbooks circulated in advance of the audit visits. However, whole incidents with zero CI should continue to be excluded from the audit samples.

DPCR3 Audit Process Stage 3

2.24 The Stage 3 Overall and LV reporting accuracies based on the DPCR3 audit calculation process were calculated in the automated auditing workbook, and the procedure used is described in detail in Appendix A. The final audit accuracies used by Ofgem in the assessment of DNO performance for the IIP reporting year 2004/05 are based on the results from the audit of Ofgem’s full sample of incidents under DPCR3.

3 Audit Results

Overview

3.1 The IIP audit visits to DNOs for reporting year 2004/05 took place during May, June and July 2004. Audits for each licensed area were carried out at a single location with the exception of UU where HV and LV control centres are at separate locations. Visits were completed in three working days excluding travelling time except for UU where four days were needed. A summary of the visit programme is set out in Table 1.

Table 1 Audit visit Programme

Licensed Area	Date – W/c	Location
CE – NEDL	20 June	Penshaw
CE – YEDL	17 June	Leeds
CN East	6 June	Castle Donnington
CN West	6 June	Tipton
EDF – EPN	4 July	Ipswich
EDF – LPN	4 July	Ipswich
EDF – SPN	13 June	East Grinstead
SPD	13 June	Hamilton
SPM	27 June	Prenton
SSE – SEPD and SHEPD	23 May	Portsmouth
UU	6 June	Manchester and Preston
WPD – S Wales	9 May	Church Village
WPD – S West	9 May	Exeter

3.2 Two visiting auditors from the consortium of BPI/MM carried out each audit visit and worked collaboratively with the relevant DNO audit team. The visiting auditors were well supported by the DNO audit teams and the pre-visit preparation by each DNO team was of a high standard. The visiting auditors generally separated to work in parallel on auditing higher voltage and LV samples. It was the lead auditor's responsibility to retain the master consolidated incident auditing workbook at the end of each day's work.

3.3 The results of the DPCR3 audit process are set out in this section. The results of the pilot trial of Ofgem's proposed DPCR4 audit process are set out and discussed in Appendix Q.

MPAN Accuracy

Summary of Findings

3.4 Table 2 summarises the results of the auditing workbook calculation used to determine the Overall MPAN accuracy from the HV and LV MPAN accuracy

results. This is the average of the HV MPAN accuracy and LV MPAN accuracy weighted by their respective CI and CML contributions. Further details of this calculation are provided in Appendix A.

Table 2 HV, LV and Overall MPAN Accuracies

Licensed Area	HV MPAN Accuracy	LV MPAN Accuracy	HV Weighting	LV Weighting	Overall MPAN Accuracy
CE NEDL	100.22%	100.12%	81.19%	18.81%	100.20%
CE YEDL	98.75%	98.71%	84.48%	15.52%	98.75%
CN East	99.66%	99.44%	87.94%	12.06%	99.64%
CN West	98.81%	98.82%	86.55%	13.45%	98.82%
EDF – EPN	100.00%	99.23%	88.20%	11.80%	99.91%
EDF – LPN	100.00%	99.93%	70.51%	29.49%	99.98%
EDF – SPN	100.00%	100.00%	90.95%	9.05%	100.00%
SSE – SEPD	100.00%	99.95%	85.30%	14.70%	99.99%
SSE – SHEPD	100.00%	100.00%	88.82%	11.18%	100.00%
SPD	99.20%	99.20%	85.56%	14.44%	99.20%
SPM	99.08%	99.08%	84.06%	15.94%	99.08%
UU	99.95%	99.36%	81.79%	18.21%	99.85%
WPD – S Wales	100.00%	99.91%	91.77%	8.23%	99.99%
WPD – S West	99.99%	99.84%	85.56%	14.44%	99.97%

DNO Changes since 2003/04

3.5 The key points on DNO systems and reporting procedure changes are set out in the following paragraphs. Full details for each licensed area are set out in Appendices B to O of this report.

Interpretation of RIGs

3.6 Ofgem's publication of RIGs Version 5 has addressed most of the issues identified in previous years' audits.

MPAN accuracy

3.7 DNOs generally have not made changes to the processes they use for new connections and disconnections of MPANs although there have been further steps towards automation of processes thus avoiding transcription errors, and in ensuring better follow-up and timely completion of updates. Links between MPRS and connectivity models have not generally changed. Many DNOs confirm they have reached the stage at which the accuracy of MPAN count is very near to 100%, and in view of the daily processing of MPANs connected and disconnected they believe it is not practicable to achieve further improvements. DNOs generally have well

developed data quality processes and these have been used throughout the reporting year to maintain the high standards of accuracy achieved.

Connectivity model

3.8 The calculation required to complete the "Connectivity Model" accuracy is the same as that used during previous years' IIP audits and therefore provides for consistency across successive audit visits.

3.9 Most DNOs have not made significant changes to their connectivity models but in many cases have made incremental improvements to accuracy by moving MPANs to the correct feeder where new information is collected from customer no-supply calls, fault restoration work, planned interruptions and construction and maintenance work. The Consortium was pleased to note that DNOs have processes in place to update and refine connectivity models and that these processes appear in general to be working well.

3.10 The approach adopted this year was to examine specific examples of DNOs' connectivity model updates and to audit the DNO's claimed accuracy change calculations. Audited accuracy changes were added to last year's audited accuracy figures. The Consortium notes that DNOs are continuing to manage this aspect of their IIP measurement systems.

Potential sources of error remaining in measurement systems

3.11 Most DNOs still consider that the remaining sources of error in measurement systems are minor and from known sources, such as the difficulty of attaching MPANs to the correct feeder in urban areas and near feeder boundaries, and a combination of inaccurate supplier information, unrecorded disconnected MPANs and address errors. DNOs adopt various day to day incremental improvement strategies to refine accuracy and some consider that have reached the trade-off balance between accuracy and cost in measurement systems.

Future changes

3.12 Most DNOs do not anticipate significant future changes to their measurement systems. DNOs with more than one licensed area are still working to share best practice between areas and standardise systems wherever practical. One DNO is anticipating introducing new LV measurement systems next year and a second is still considering changes subject to a general strategic review that is expected to conclude within the 2005/06 reporting year.

Accuracy of Incident Reporting

Summary of Findings

3.13 Table 3 summarises the findings across the licensed areas on the accuracy of incident reporting.

Table 3 Accuracies of Incident Reporting

Licensed Area	Overall Reporting Sample - CI	Overall Reporting Sample - CML	LV Reporting Sample - CI	LV Reporting Sample - CML
CE NEDL	100.18%	100.00%	99.60%	93.88%
CE YEDL	99.82%	99.87%	103.81%	101.53%
CN East	100.31%	100.08%	98.10%	98.39%
CN West	100.01%	100.05%	101.45%	100.60%
EDF – EPN	99.86%	100.70%	96.98%	97.27%
EDF – LPN	100.17%	99.25%	100.93%	100.62%
EDF – SPN	100.01%	100.19%	104.19%	105.47%
SSE – SEPD	99.24%	98.41%	101.93%	106.10%
SSE – SHEPD	99.89%	99.79%	99.36%	99.41%
SPD	99.85%	99.63%	98.67%	97.14%
SPM	99.89%	99.54%	100.19%	93.08%
UU	100.67%	99.58%	95.69%	95.77%
WPD – S Wales	98.03%	96.11%	100.00%	99.84%
WPD – S West	99.87%	99.84%	99.90%	100.01%

In the above Table over reporting is signified by values of over 100% and under reporting by values below 100%.

3.14 For audit consistency across licensed areas the audit guidelines required the visiting auditors to enter the current system CI as the audit CI for each restoration stage unless the DNO was able to prove with appropriate records any changes in customer numbers that had occurred between the incident and the time of the audit visit. For example, these might be:

- new connections and/or disconnections;
- changes to system running conditions; or
- abnormal feeding arrangements at the time of the incident.

3.15 Authorised and time stamped measurement system printouts of numbers taken by the DNO at the time of the incident and kept for audit purposes were also accepted as evidence. Under no circumstances did visiting auditors allow overall adjustments to any figures to take account of overall growth in customer numbers.

Sources of Reporting Variances

3.16 Details of the audit of incident reporting for each licensed area are set out in the relevant Appendix to this report. Comments on the common issues are discussed in the following paragraphs.

Manual transcription errors

3.17 In general DNOs that had fewer measurement system stages requiring manual intervention to transfer information to fault reporting systems experienced fewer

transcription errors. In licensed areas where progress on the reduction of transcription errors had been made, visiting auditors noted that this was achieved by putting on-going effort into:

- staff understanding the importance of capturing information accurately to meet regulatory reporting obligations;
- staff training in the use and capability of measurement systems and the overall fault reporting process; and
- self-auditing of incident reporting to reduce problems and identify and introduce changes to minimise common types of errors.

Network reconfiguration

3.18 Network reconfiguration can introduce variances when comparing reported numbers of customers interrupted with current system values. These are normally due to a new section of network being added since the date of the incident or abnormal running conditions at the time of the incident. Certain DNOs had systems more capable of producing evidence of the running arrangement at the time of the incident than others. However, in most cases it was possible to get back to the network configuration at the time of the incident. Visiting auditors noted a general improvement in the audit trails associated with this aspect of the DNOs' operations.

Customer number changes since the incident

3.19 Changes in customer numbers since the incident can be caused by:

- network reconfiguration;
- MPAN commissioning/decommissioning; and
- data cleansing.

3.20 Differences were noted between the DNOs on the ability to track MPAN changes and the associated network connectivities. DNOs that can accurately track MPANs are better able to explain variances. DNOs generally have no need to determine the erstwhile connectivity of decommissioned MPANs and have no measurement systems in place to do so. Consequently, there were fewer corresponding variances recorded in the incident auditing workbooks of those DNOs that were able to provide robust auditable evidence of the number of customers affected at the time of an incident.

Quality of fault reports

3.21 Whilst generally, the visiting auditors noted that there has been a considerable improvement in the quality of information captured in DNOs' measurement systems, the frequency of transcription errors during the transfer of source data into fault reports is still an area of weakness for some. As mentioned in previous years, the retention of more information to assist in establishing a clear audit trail (e.g. storing information about abnormal running conditions at the time of the incident) would be useful.

Combined Stage Reporting Accuracy

Summary of Findings

3.22 Table 4 summarises the findings across the licensed areas on Overall and LV reporting accuracies.

Table 4 Overall Reporting Percentage Accuracies

Licensed Area	Overall CI (Minimum Requirement 95%)	Overall CML (Minimum Requirement 95%)	LV CI (Minimum Requirement 90%)	LV CML (Minimum Requirement 90%)
CE NEDL	99.62% O	99.80% O	99.72% U	94.00% U
CE YEDL	98.57% U	98.62% U	97.53% O	99.78% O
CN East	99.95% U	99.72% U	97.55% U	97.84% U
CN West	98.83% U	98.86% U	99.74% O	99.42% U
EDF – EPN	99.77% U	99.40% O	96.23% U	96.52% U
EDF – LPN	99.85% O	99.23% U	99.14% O	99.45% O
EDF – SPN	99.99% O	99.81% O	95.81% O	94.53% O
SSE – SEPD	99.22% U	98.40% U	98.12% O	93.95% O
SSE – SHEPD	99.89% U	99.79% U	99.36% U	99.40% U
SPD	99.05% U	98.84% U	97.88% U	96.37% U
SPM	98.97% U	98.63% U	99.26% U	92.23% U
UU	99.48% O	99.42% U	95.08% U	95.16% U
WPD – S Wales	98.02% U	96.11% U	99.91% U	99.75% U
WPD – S West	99.84% U	99.81% U	99.74% U	99.85% U

In the above Table O signifies over reporting and U signifies under reporting.

3.23 It is the Consortium's opinion that all reporting under the IIP scheme for the reporting year 2004/05 meets the required level of accuracy.

4 Key Lessons Learnt

Comments on DNO Practice

Pre-visit preparation

4.1 Thorough preparation by the DNO before the audit visit is still essential to ensure smooth progress of the audit. BPI/MM wishes to acknowledge the high levels of pre-visit preparation work carried out by DNOs.

4.2 It is essential for the DNO to make sure that adequate audit trails are available with supporting documentation to hand from local office files and field logs. Audit visits progressed more smoothly where DNOs had prepared evidence files in advance for the visiting auditors.

4.3 All DNOs responded well to the audit of the small sample of exceptional events related incidents that were tabled at the start of the audit visit. Audit trail information was provided within the time span of the visit in all cases and this allowed audit of the incidents without the need for significant additional visit time.

Visit logistics

4.4 Audits progressed more smoothly at DNOs that provided a small number of experienced and well prepared experts with system operation skills to enable incidents to be re-created on the DNO's measurement system, explain the audit trail, and respond promptly to the visiting auditors' questions.

4.5 The facilities provided by the DNO for conduct of future audits should meet the following requirements:

- Quiet areas way from the general office environment for the higher voltage and LV audits with space to spread out drawings and other paperwork and power points for laptop PCs;
- Facilities to access DNO measurement systems;
- Experienced operators fully briefed by managers with overall responsibility for IIP and empowered to make decisions on variations on behalf of DNOs; and
- Appropriate facilities for a formal sign-off meeting.

Audit Trail

4.6 DNOs should be able to demonstrate why changes in customer numbers have occurred between the date of the incident and the date of the audit visit. Without this information it is very difficult for audit teams to verify the accuracy of the original report. Best practice audit trails were again found to include:

- Electronic records of those customers affected at the time of the incident as compared with current system values;
- Automatically time-stamped computer-generated printouts showing the number of customers affected at the time of the incident where this can be compared with the equivalent number re-created during the audit visit; and

- A well laid out log book specifically designed for IIP reporting and containing fields for all the necessary IIP related data such as time of interruption, time of restoration, number of customers affected and location of the fault.

4.7 It is essential that audit trail information is date stamped or robustly date-verified by other means otherwise it cannot be relied upon as robust and auditable evidence unless extra work is carried out at the time of the visit to verify the accuracy and source of the information. For example, an audit trail to verify the state of the network and the numbers of customers affected at the time of an incident can be provided by either an electronic record or a computer-generated hard copy printout produced at the time of the incident. In either case the record should carry an automatically generated time stamp so that its validity can be established.

4.8 Whatever technique is adopted it remains essential that there is a clear trail back to the original information, either paper based or electronically. One DNO currently uses a measurement system that does not always automatically time-stamp computer generated printouts. However, non time-stamped printouts or detailed incident investigation reports may constitute a valid audit trail providing that they can be readily cross-referenced to the associated incident reports that do carry an automatically generated time stamp.

4.9 Several instances were found where incident reports had been endorsed to indicate that the distribution network was abnormal at the time of the incident. This information greatly facilitated the auditability of these incidents. Where DNOs' electronic measurement systems hold historic data on the state of individual items of switchgear, it is helpful for audit purposes if this information is stored for a period of at least 24 months.

4.10 The Consortium noted that most DNOs have improved the quality of information presented in audit trails for pre-arranged incidents.

4.11 Some DNOs continue to carry out periodic self auditing of incident reporting to reduce review problems during the annual IIP audit visit and to identify areas of improvement at an early stage to minimise common types of errors. Visiting auditors again found this helpful.

Points for the Audit Process

4.12 Learning points for the audit process and issues that arose and were resolved during the visits are set out in the following sections. A discussion of points arising from the trial of the proposed DPCR4 audit process is included in Appendix Q of this report.

Visit timetable and organisation

Pre-visit preparation

4.13 As with last year, the timely return by the DNOs of their IIP templates to Ofgem coupled with Ofgem's pre-arranged programme of visits well in advance saved time and enabled the visits to be conducted earlier than last year. This avoided visits taking place in the summer holiday period and enabled workbook QA and report writing to be completed before the holiday period.

4.14 It was again helpful to forward the auditing workbook and sample of incidents for audit in advance of the visit to allow thorough pre-visit preparation to be carried out by the DNO.

4.15 Difficult incidents that were encountered last year were reviewed as examples at the training day this year. It was important that visiting auditors agreed on issues such as acceptable audit trail information and the amount of effort that should be put into incidents that are thought to be too complex to audit.

4.16 The early pilot visit to a DNO was again successful in picking up issues potentially affecting a number of DNOs. Sufficient time was available to alert visiting auditors and DNOs involved in subsequent visits. Implementing another of last year's learning points, this year's early pilot visit immediately preceded the team training day and this enabled information on current issues to be presented and discussed promptly.

4.17 Pre-visit contact to DNOs made by the audit team leaders is invaluable in preparing for the visit itself. Of particular relevance at this time is a discussion on the type of evidence that will be acceptable in support of any variances between reported and system figures. It is important that the audit team leaders determine the type of evidence that will be presented to them by the DNO and, if they have any doubts, they should contact the central team for advice at an early stage. In some cases there was not enough dialogue between the visiting audit team leader and the DNO prior to the visit commencing and this will need to be improved in future years.

Pilot audit visit

4.18 In order to gain a better feel for the likely duration of a 'typical' audit visit, consideration should be given to future pilot audit visits being conducted by visiting auditors from outside the central team with central team people on hand to advise and provide assistance as necessary.

4.19 Carrying out the pilot visit immediately before the team training day was found to be very helpful as it ensured the learning points were communicated effectively to the full audit team whilst still fresh in the minds of the pilot visit auditors.

4.20 Ofgem presence during the pilot visit is important because this allows any issues identified to be resolved promptly. This year it was particularly helpful to resolve operating points arising from the use of Ofgem's new automated auditing workbook. It also facilitated the compilation and update of agreed guidance notes for auditors without the need for e-mail interchange of draft copies and comments.

Visit logistics

4.21 Visiting audit teams again made logistical arrangements on a self-managed basis. This generally worked well and again enabled the central team to concentrate on deliverables to a greater extent. Continuity was provided wherever possible by using at least one auditor who had visited the DNO in a previous IIP audit.

4.22 The visiting auditors' incident auditing workbooks were used to record the results of the audit of the incident sample and this avoided the need to cross-refer Ofgem's sample numbers with the DNO's versions of the workbook. To ensure transparency, the DNO and the visiting auditors each retained an electronic copy of the saved workbook at the end of each working day. The re-opening of the time-

stamped electronic workbook was jointly witnessed at the start of the next working day to ensure it was the correct version.

4.23 During this year's audit the visiting auditors annotated, initialled, and dated all incident reports and other relevant paperwork witnessed during the course of the audit visit so as to provide an audit trail of the work. This was to provide for consistent checking in the event of the need to investigate any areas requiring clarification after the audit visit.

4.24 The audit sign-off page was jointly completed after ensuring that the wording of the attachments has been jointly agreed and initialled by the DNO and the visiting auditors. The DNO retained both hard and electronic copies of the audit documentation.

4.25 Compressing the time table was successful with the training day immediately after the pilot visit. This facilitated the prompt communication of lessons learned from the pilot trial to the visiting audit teams and also ensured that the audit visits were carried out whilst the training day information remained fresh in auditors minds. This was also particularly helpful in view of the decision to concentrate the training day content on practical aspects of incident auditing so as to ensure that auditors were both consistent in approach and aware of the detail of differing types of audit evidence that might be presented by DNOs.

4.26 Although subject to QA checking it was very helpful to provide DNOs with immediate feedback of audit results from the automated workbook calculations on completion of the audit of incident samples at the end of each visit. In previous years manual spreadsheet calculations subsequent to the visit were needed to establish a robust result with the overall results and conclusions released only when calculations were completed for all DNOs. This gave rise to a delay of over a month in some cases before DNOs visited early in the programme received confirmation of their results. In all cases this year the auditing workbooks passed QA checking without the need for significant amendment and alteration of the audit pass/fail results.

4.27 The audit of a sample of exceptional event related incidents outside the main IIP audit was carried out this year to investigate:

- Any reduction in the accuracy of reporting by DNOs during exceptional events; and
- Whether DNOs could get information together at short notice with an element of surprise over the selection of incidents.

This aspect of the audit proceeded smoothly in all cases and showed no significant reduction in reporting accuracy by DNOs during the exceptional events examined. In addition all DNOs produced the information required without significant difficulty within the time scale of the audit visit indicating that the approach of requiring the audit of a proportion of incidents without prior notice may be an option worth developing further in future.

4.28 With the advent of the automated workbook and the production of robust audit results and conclusions immediately at the conclusion of the audit visit it would be possible to achieve a much higher degree of audit sign-off at the end of the visit. This could be achieved by making the wrap-up meeting at the conclusion of the visit more formal. This could include the discussion, agreement and formal sign-off

of the interim report as a true and accurate record of the visit. In addition the presence of Ofgem representation at this final meeting would allow all comments and conclusions to be agreed without the needed for rounds of checking and comment on draft reports. This could save up to two weeks on overall programme duration. A suggested format for the pro-forma streamlined audit visit report is set out in Appendix R.

4.29 Last year visiting auditors were asked to witness a re-run of the IIP Template population process by DNOs. Only minor variances were discovered between the template data submitted to Ofgem at the end of April and the results of the re-population exercise carried out during the audit visits, and such that were found were explained by minor data updates after the main data extract. For this reason the re-run of the IIP template population was not carried out this year and this saved time during the audit visits.

4.30 This year it was decided to concentrate the content of the team training day on practical aspects of incident auditing using copies of audit information provided by DNOs. The was found to be beneficial for visiting auditors and to facilitate this approach in future years hard copies of the audit evidence presented for two incidents from each licensed area were taken and returned to the central team. This was also found to be a worthwhile means of comparing audit evidence and consolidating consistency of audit approach to the varying types of DNO evidence presented during the audit visits.

4.31 Mixed BPI/MM teams were found to be the optimum approach combining as it does the distribution engineering skills and experience of BPI with the numerical analysis and spreadsheet expertise of MM.

Points for audit consistency

Prearranged Interruptions to Supply

4.32 The quality of audit information in prearranged interruption reports was better than in previous years but still remains the weakest link in DNO incident reporting. There is still scope for improvement.

4.33 To provide a robust audit trail, the following information needs to be available;

- Evidence that the prearranged interruption happened;
- The areas affected,
- The customers affected; and
- Accurate and auditable evidence of start and completion of each stage of the interruption.

Duration of an interruption

4.34 Clarification is sought from Ofgem on the issue of rounding incident start and finish times. The Consortium's suggested approach would be to recommend that start and end times for incidents of 3 minutes or over are rounded consistently up or down to the nearest minute.

4.35 The Consortium suggests that any option from rounding up or down or truncation can be used but individual DNOs must be self-consistent throughout. Clearly if the

incident is within the 3 minute threshold then duration timing down to seconds or a rounded down value is required.

Points of interpretation of the RIGs.

Reinterruptions

4.36 DNOs are still concerned over the classification of supply restoration through backfeeding arrangements and the consequent treatment of reinterruptions under the 3 hour rule or 18 hour rule. DNOs generally prefer the interpretation that reinterruptions resulting from the same root-cause should be kept in the same incident rather than raising a new incident. However RIGs 5 clearly defines how these interruptions should be treated and the circumstances where new incidents should be created. Ofgem will expect future audits under DPCR4 to work to the rules set out in RIGs 5 with respect to these matters.

Points for Ofgem

Sampling regime

4.37 Pre-agreement of the sampling regime between Ofgem and the DNOs, introduced by Ofgem well before the visits commenced saved programme time. The general impression was that the sample of incidents was reflective of the DNOs' reported performance and was thus a fair representation of the 2004/05 reporting year.

4.38 Review number of spares in each voltage category as it was found in several licensed areas that the stock of spares was exhausted due to the number of incidents that could not be audited. Lack of sufficient spare incidents is a particularly important factor for the reduced sample sizes proposed for the DPCR4 audit process.

4.39 The sample of incidents for audit should be reviewed prior to circulation to ensure that a proportionate number of restoration stages (in addition to numbers of incidents) are specified for audit at each voltage level.

4.40 Restoration stages with no CI should be left in the auditing workbook as initially circulated as reporting errors discovered during the audit may give rise to the need to attach CI variances to them.

4.41 Incidents selected should be limited to 10 stages as a maximum to avoid spending excessive time on incidents that might subsequently be removed as outliers. The elimination of the entire CI and CML for a longer incident in the event of one stage being an outlier might otherwise result in a disproportionate reduction to the sample total CI and CML and a waste of audit time and effort.

Visit Sign-off

4.42 Given the more formal status proposed for the visit sign-off meeting (see paragraph 4.28) with the streamlined pro-forma audit report it is also recommended that an Ofgem representative is present. This would add weight to the discussions and allow Ofgem to witness the direct discussion of findings between DNOs and the Consortium.

Appendix A. Accuracy Calculation Details

This year the accuracy calculations were carried out automatically by means of embedded functionality within Ofgem's automated auditing workbooks. The following paragraphs set out in general terms the calculation steps used. For a fuller description of the method with reference to the way in which it was applied in previous audits reference should be made to the 2003/04 audit report[4].

Calculation of Overall MPAN Accuracy and LV MPAN Accuracy

The LV MPAN accuracy used in the calculation of combined LV accuracy is the audited LV MPAN accuracy. The Overall MPAN accuracy is calculated by giving a weighting to each reporting category in the 2004/05 report template. This reflects the degree of responsibility the DNO is deemed to have for CI and CML in the relevant category and is set to 100% apart from those shown in the following Table:

Unplanned incidents	Voltage Level	CI Weighting	CML Weighting
NGC or transmission companies	HV & above	0.0%	10.0%
Other DNO/connected systems	HV & above	0.0%	10.0%

Having applied these weighting factors to the CI and CML for each reporting category, the percentage contribution of each category to the total annual CI and CML is then calculated. This is the arithmetic average of the category's CI percentage and CML percentage contribution to CI and CML annual totals respectively.

The final percentage HV contributions to the annual CI and CML totals are determined by adding the average CI/CML percentage contribution of each HV reporting category. Similarly, the LV contributions to the annual CI and CML totals are determined by adding the average CI/CML percentage contribution of each LV reporting category.

The overall MPAN accuracy is then calculated using the following formula and expressed as a percentage:

- Overall MPAN Accuracy = (HV & above MPAN accuracy * Proportion of HV CI contribution to annual totals) + (LV MPAN Accuracy * Proportion of LV CI contribution to annual totals).

Accuracy of Incident Reporting

The following steps were taken to calculate incident reporting accuracy results in the auditing workbooks completed during the audit visits:

Incidents that could not be audited

During the audits the workbooks were updated by the replacement of HV incidents that could not be audited by relevant spare incidents and by the removal of unneeded spare incidents as follows:

[4] Information and Incentives Audit of Incident Reporting 2003/04 (Ofgem 2005) Appendix A

- HV incidents that were not audited were identified;
- Corresponding spare incidents for the HV incidents that were not audited were identified from the list of spares provided by Ofgem. Where there was more than one spare incident for an equipment type, then the spares were used in the order provided by Ofgem;
- The HV incidents that were not audited were removed; and
- The spare incidents not used were eliminated from the calculations.

A similar process for LV incidents that could not be audited was used as follows:

- LV incidents that were not audited were identified;
- Corresponding spare incidents for the LV incidents that were not audited were identified from the list of spares provided by Ofgem. Where there was more than one spare incident for a equipment type, then the spares were used in the order provided by Ofgem;
- The LV incidents that were not audited were removed; and
- The spare incidents not used were eliminated from the calculations.

The following Table summarises the number of incidents substituted for each DNO, the voltages involved, and the key reasons for substitution:

Licensed Area	Number of incidents substituted	Voltage levels and key reasons
CE NEDL	1	1 at LV – 'No audit trail'
CE YEDL	5	2 at HV – 'Data entry error' in one case & 'Not able to determine where open points were on the day of fault due to abnormal running' in other 3 at LV – 'No audit trail'
CN East	2	2 at HV – 'No field notes' in one case, 'No audit trail' in other
CN West	1	1 at LV – Network Change
EDF – EPN	2	1 at HV – 'No log data for restoration times available to support fault log' 1 at LV – 'Audit evidence for stage 2 start time'
EDF – LPN	2	2 at LV – 'No data to support customer numbers given network changes' in one case, '2 stages on report with nil customers obviously had some on at the time - possible transformer change' in other
EDF – SPN	1	1 at LV – 'Multistage incident with some possible network change - limited information available'
SSE – SEPD	2	2 at HV – 'Network change could not be unravelled to explain where customers had gone' in one case and 'Data not available to verify trip times or how the system was running abnormally at time of incident' in other
SSE – SHEPD	0	n/a
SPD	0	n/a
SPM	3	1 at HV – 'Some customers lost supply due to partial failure of the LV interconnected system - but no record of how many' 2 at LV – both 'Too difficult to audit'
UU	4	2 at HV – 'Information lacking in stage 8' in one case and 'Shut down cards not available – cannot verify reported information' in other 2 at LV – 'No audit trail' in both cases
WPD – S Wales	2	1 at HV and 1 at LV – both 'Too difficult to audit'
WPD – S West	1	1 at LV – 'Too difficult to audit'

Identification of restoration stages with outlying results

The next step in calculating incident reporting accuracy was to remove whole incidents with restoration stages considered to contain outlying results. Assessments for CI and CML were carried out separately and outlying incidents were removed from the CI and/or CML accuracy calculations as appropriate. A restoration stage with an outlying result is defined as being one in which the variance between the reported CI or CML and audited

CI or CML is outside of the mean of the differences plus or minus four standard deviations of the differences. This calculation was carried out separately in the automated workbook for CI and CML variances in both the Overall and the LV data sets. Total incident CI or CML was removed where one or more restoration stage CI or CML was calculated to be an outlier.

The following Table summarises the number of outlying incidents for each DNO at relevant voltage levels, using overall stage 3 as the illustrative sample:

Licensed Area	Number of outlying incidents	Voltage breakdown	
		HV	LV
CE NEDL	3	1 on CI	2 on CML
CE YEDL	2	2 on both CML and CI	
CN East	6	1 on CML, 1 on CI and 3 on both CML and CI	1 on CML
CN West	5	3 on CML, 1 on CI	1 on both CML and CI
EDF – EPN	3	1 on CML, 2 on CI	
EDF – LPN	6	1 on CML, 5 on CI	
EDF – SPN	2	1 on CML, 1 on both CML and CI	
SSE – SEPD	7	5 on CML, 1 on CI, 1 on both CML and CI	
SSE – SHEPD	3	1 on CI, 2 on both CML and CI	
SPD	4	1 on CML, 1 on both CML and CI	2 on CML
SPM	5	1 on CML, 1 on CI, 1 on both CML and CI	2 on CI
UU	6	1 on CML, 1 on CI, 3 on both CML and CI	1 on CML
WPD – S Wales	1	1 on both CML and CI	
WPD – S West	5	4 on CI	1 on CML

The following Table sets out a summary breakdown from the auditing workbooks of the numbers of pre-arranged interruptions:

Licensed Area	Total Number of pre-arranged interruptions	Number successfully audited	Number not audited	Key reasons for failure to audit
CE NEDL	19	19	0	n/a
CE YEDL	11	10	1	1 at HV – 'Figures in spreadsheet appear to have been copied from another incident'
CN East	15	13	2	2 at HV – 'No field notes' in one case & 'no audit trail' in other
CN West	19	19	0	n/a
EDF – EPN	18	18	0	n/a
EDF – LPN	7	7	0	n/a
EDF – SPN	14	14	0	n/a
SSE – SEPD	17	16	1	1 at HV – '5 generators applied with no individual start and end times'
SSE – SHEPD	24	24	0	n/a
SPD	7	7	0	n/a
SPM	18	18	0	n/a
UU	8	5	3	1 at HV – 'Shutdown cards not available, cannot verify reported info.' 2 at LV – 'No audit trail'
WPD – S Wales	18	18	0	n/a
WPD – S West	21	20	1	1 at LV – 'Incident too difficult to audit'

Calculation of incident reporting accuracy

Once the outlying results were automatically removed, the Overall and LV accuracies of incident reporting were then automatically calculated using the following formulae:

- Overall CI = (Sum of reported CI in Overall data set) / (Sum of audited CI in Overall data set)
- Overall CML = (Sum of reported CML in Overall data set) / (Sum of audited CML in Overall data set)
- LV CI = (Sum of reported CI in LV data set) / (Sum of audited CI in LV data set)
- LV CML = (Sum of reported CML in LV data set) / (Sum of audited CML in LV data set)

Combined Accuracy of Reporting

The combined accuracy of reporting is then calculated in the workbook. This is carried out by combining the MPAN accuracies with the relevant audited accuracies of incident reporting.

Overall MPAN accuracy is arrived at by weighting the HV and LV MPAN accuracy results by the respective contribution to average IIP CI and CML in 2004/05 of HV and above incidents and LV incidents. This is then multiplied with the accuracy of incident reporting results for CI and CML. For the LV data set, the calculation is the product of the audited LV MPAN accuracy for 2004/05 and the LV CI and CML audited accuracy of incident reporting. In this procedure the over counting of MPANs will be offset by an under reporting of incident CI and CML and vice versa.

The formulae for producing the combined accuracies of reporting are as follows:

- Combined Overall CI accuracy = 1 – the absolute value of (1- (2004/05 Overall MPAN accuracy) * (Overall CI audited accuracy))
- Combined Overall CML accuracy = 1 – the absolute value of (1- (2004/05 Overall MPAN accuracy) * (Overall CML audited accuracy))
- Combined LV CI accuracy = 1 – the absolute value of (1- (2004/05 LV MPAN accuracy) * (LV CI audited accuracy))
- Combined LV CML accuracy = 1 – the absolute value of (1- (2004/05 LV MPAN accuracy) * (LV CML audited accuracy))

In the results Tables these are expressed as percentages with an indication of over/under reporting as relevant.

Appendix B. Central Networks West Region Ltd. (CN West)

Summary

Area	Main findings
Interpretation of the RIGs	CN West confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed CN West's calculations and support its estimates of the accuracy of its MPAN counts for its licensed area as 98.81% at the Higher Voltage level and 98.82% at the LV feeder level.
Connectivity model	The visiting auditors have witnessed the various routines by which CN West updates its connectivity model and confirm that the DNO is proactive in devoting resources to the continuous improvement of its connectivity model.
Overall reporting	The accuracy of overall reporting was high with few input errors. The functionality of CN West's measurement systems enabled it to prove increases in customer numbers between the time of the incident and that of the audit visit.
LV reporting	The visiting auditors noted more inconsistencies in reporting at the LV level. Two incidents had missed restoration stages and there were also a number of miscalculations and input errors. The auditors considered one incident to be 'unauditable' due to a network change resulting in an inability to recreate the incident.

At the end of the audit visit the interim values for the calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	98.83%	Under	95%	Pass
Overall Sample CML	98.86%	Under	95%	Pass
LV Sample CI	99.74%	Over	90%	Pass
LV Sample CML	99.42%	Under	90%	Pass

It is auditors' opinion that reporting of CN West under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at the CN West offices at Tipton from 6 June to 7 June 2005. The visiting auditors were Geoff Stott (Team Leader) from BPI and David Holding from Mott MacDonald. Andrzej Michalowski managed the audit on behalf of the DNO with

David Higgs, Richard Hollins, Carl Lowe, Mark Porter and Ruth Turton. Martin Crouch and David Broster from Ofgem attended the audit on Monday 6 June 2005.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the CN West team members for their participation in the audit. In particular, the visiting auditors would like to acknowledge the large amount of pre-visit preparation undertaken by CN West which contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by CN West was set out in the audit report for reporting year 2002/03[5]. The 2005 audit visit confirmed that there have been no new systems introduced since the reporting year 2003/04. The Control & Incident Room Automation System (CIRAS) is used for recording calls, planned shutdowns, incident management and network operations. It also holds the connectivity model for all voltages. CN West uses PC-NaFIRS to record, extract and report data on incident information. The interface between CIRAS and PC-NaFIRS is automated at the LV and HV levels, thus reducing the risk of transcription errors.

Changes since last year

The information in the following paragraphs was presented to the visiting auditors by CN West:

Interpretation of the RIGS

CN West confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.

MPAN count

CN West confirms that there have been no changes to the way in which it identifies customers by MPAN count. CN West bases its MPAN accuracy estimates on the results of measurement by its Network Records Management team.

CN West's connectivity model only contains primary traded MPANs.

Connectivity model

There has been no change in the structure and operation of CN West's connectivity model since the previous year. CN West does not adopt solutions such as scattering or assigning to dummy feeders those of its MPANs that cannot be tied-down to known positions in its connectivity model.

At the time of the audit visit for reporting year 2002/03 there were 22,539 customers (MPANs) that were in CN West's connectivity model but were not connected to a defined cable due to the poor quality of address data. There were also a further 14,869

[5] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix E3.1

customers in CN West's Network Records System (NRS) whose addresses were insufficiently structured to pass to the connectivity model, i.e. it was not possible for CN West to accurately pin-point these MPANs on its connectivity model.

The visiting auditors understand that all MPANs are now been passed to CN West's connectivity model, including those with un-structured addresses. The visiting auditors were shown CN West's processes for managing this aspect of its activities and concluded that they are robust. At 30 September 2004, there were 28,092 inactive (i.e. not connected to a defined cable) MPANs in CN West's connectivity model.

During the audit of the incidents, the visiting auditors witnessed an example where a previously inactive primary traded MPAN became active as a result of becoming accurately located in the connectivity model.

CN West's internal target for the total number of customers (MPANs) held in its connectivity model but not physically connected is 1.5% of its total customer base. This figure represents approximately 35,000 customers. The visiting auditors consider that this demonstrates that CN West is actively measuring and managing this aspect of its IIP processes.

Future changes

CN West intends to continue its business as usual work to continue improving the accuracy of its connectivity model as well as continuing to correct connection errors as they are discovered. The visiting auditors consider CN West to be proactive in the measures it undertakes and do not consider additional measures are required. CN West intends to update its ISO 9002 documented procedures to gain ISO 9001:2000 certification for updating network records and connectivity when alterations are made to the electrical network. These operate in tandem with CN West's connectivity model updating procedures.

CN West operates an internal audit programme that feeds results into the ongoing training and improvement of its staff.

No significant changes to systems are envisaged.

Audit opinion on measurement systems

Based on detailed work done during previous audit visits and information gathered on this visit, the visiting auditors conclude that CN West has highly accurate procedures for counting primary traded MPANs, a highly accurate connectivity model, and employs robust procedures for maintaining their accuracies. The visiting auditors support the figures produced by CN West.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of reporting at the higher voltage level was high with few input errors, all of which were agreed with Central Networks.

In all cases CN West elected to verify increases in customer numbers since the time of the incident, providing diagrammatic representations of its searches within its MPAN/connectivity database. In common with most DNOs, CN West is not able to track where disconnections have been made from its connectivity model. However, CN West's

measurement systems record the number of customers affected by an incident and this enabled it to provide a robust audit trail to verify that the reported numbers were correct.

During the course of its preparations for the audit visit, CN West observed that the incidents chosen for the EHV/132kV element of the sample contributed approximately 60% of the total CI and CML for the whole sample. The visiting auditors had verified the tracking capability of CN West's measurement systems for incidents of this kind during previous audit visits and this, together with verification during the 2005 audit visit, enabled CN West to prove a satisfactory audit trail for the selected EHV and 132kV incidents.

The functionality of CN West's measurement systems also enabled it to prove where customer numbers had changed due to changes in its higher voltage distribution networks between the time of the incident and the audit visit.

One HV incident was found to have a restoration stage misclassified and should have been a reinterruption, one incident was found to have an additional restoration stage and there were two input errors. There were two minor errors on reporting of times. No incidents were found to be unauditable.

The accuracy of reporting at the LV level was generally good. However, there were five incidents with apparent miscounts of customer numbers. The visiting auditors conclude this was due to the misinterpretation of the information by the person compiling the fault report. The quality of the information from the field notes supporting the incidents was generally very good.

One LV incident was found to have four missed restoration stages and reported CI appreciably different to the audited numbers. This was the most significant inaccuracy at the LV level (The visiting auditors noted that the inaccuracy for this incident was spread over a number of restoration stages and that not all the stages of the incident were treated as outliers in the incident auditing workbook). Another LV incident was found to have a missed restoration stage and a further incident was found where one restoration stage should have been classified as a reinterruption.

There were a number of LV incidents where the audited customer numbers differed from the reported numbers. In one case CN West provided evidence to explain an increase in customer numbers since the incident. In the other cases the numbers involved were small and involved disconnections from the network since the incident, which CN West are unable to track in the model.

CN West was found to be accurate at reporting start and stop times for LV incidents. There were, however, two incidents where the second call time was used instead of the first call time although the overall impact in both cases was small.

The audit trail for planned incidents was considered less robust than that seen for 'normal' incidents. In some cases no field notes were recorded in the measurement systems and work packs were provided from the engineering Delivery Centres to verify customer numbers.

CN West has a policy of not 'stopping the clock' for incidents. One LV incident was found where the DNO might have stopped the clock but didn't and hence incurred additional CMLs that maybe other DNOs would not.

Only one LV incident was considered to be unauditable due to a network change in the period between the time of the incident and the time of the audit visit.

Audit opinion on accuracy of incident reporting

The accuracies from Stage 1 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	98.81%
	Overall MPAN Measurement	98.82%
	LV MPAN Measurement	98.82%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.01%	Over
	Overall CML	100.05%	Over
	LV CI	101.45%	Over
	LV CML	101.60%	Over
Combined Accuracy	Overall CI	98.83%	Under
	Overall CML	98.86%	Under
	LV CI	99.74%	Over
	LV CML	99.42%	Under

It is auditors' opinion that reporting of CN West under the IIP scheme meets the required levels of accuracy.

As part of the 2003/04 IIP audit, where a restoration stage variance was greater than the sample mean plus or minus 4 standard deviations, this was identified as being an outlying restoration stage. This stage was then removed from the sample before the sample accuracy was calculated. Based on comments received from some DNOs this approach to removing outlying restoration stages has been modified for the 2004/05 IIP audit. For the 2004/05 audit when an outlying restoration stage has been identified, the whole incident is now removed from the sample and not just the outlying restoration stage. This process is carried out for the accuracy calculation for CI and CML separately.

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2003/04 Audit</u>

CN West has responded to the three recommendations made in the audit report for 2003/04. These were:-

Continue the drive to minimise manual input and transcription errors;

- There is already a large amount of automation in CN West's reporting process. In April 2004 this automation was extended to include the transfer of prearranged data into PC-NaFIRS.

Continue the emphasis on the structured internal audit regime; and

- Based on discussions with CN West the visiting auditors confirm that it continues to operate an internal audit programme where samples of incidents are taken on a monthly basis with the results being fed back into a continuing training programme.

Monitor any changes in reporting performance following the introduction of the automated interface between CIRAS and PC-NaFIRS for pre-arranged incidents.

- The automated interface has been successfully implemented. CN West continues to measure the accuracy of its reporting through the ongoing audits outlined above.

CN West has also responded as follows:

The reporting of HV and LV fault reports are already highly automated via the automatic interface that exists between CIRAS and PC-NaFiRS. This interface was extended in April 2004 to include the transfer of prearranged (PA) data. All restoration information is automatically transferred from CIRAS to NaFIRS leaving only minor manual updating of G43/3 coding to PA reports in NaFIRS.

The importance of accurate fault reporting is well recognised within Central Networks. To supplement this continued emphasis is placed upon recording accurate data, a comprehensive refresher train CN West staff involved in the fault reporting process.

Over the last year, CN West has maintained its approach to internal auditing whereby complicated, or high customer number faults are targeted for checking. This has been reinforced by further root cause analysis aimed at identifying potential problem areas with restoration performance that has been introduced into CN West by Operational Performance.

As part of its approach to the spread of best practice across its two licensed areas, CN West will shortly be introducing an audit module into its PC-NaFIRS system that is presently used in CN East. This will introduce a more structured approach to auditing and the reporting of audit output.

<u>2004/05 Audit</u>

- Build upon the recent centralisation of the System Operations activities by re-emphasising the importance of accuracy of reporting, both from the field and from the measurement system reports;
- Monitor the introduction of the newly introduced grid reference requirement for new connections associated with a plot number with a view to determining its affect upon accuracy of reporting; and
- The audit trail and information included in the notes / reports for planned LV incidents need review and improvement.

Recommendations for Ofgem

- Consider the make-up of future IIP samples with a view to minimising the contribution of EHV and 132kV incidents as these can take proportionally longer to audit than an equivalent number of HV incidents.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.02%	98.82%	98.84%	97%	Pass
Overall CML Accuracy	100.16%	98.82%	98.97%	97%	Pass
LV CI Accuracy	98.28%	98.82%	97.13%	92%	Pass
LV CML Accuracy	100.49%	98.82%	99.31%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.01%	98.82%	98.83%	95%	Pass
Overall CML Accuracy	100.04%	98.82%	98.86%	95%	Pass
LV CI Accuracy	101.45%	98.82%	99.74%	90%	Pass
LV CML Accuracy	100.60%	98.82%	99.42%	90%	Pass

NB: Stage 2 refers to the reduced audit and Stage 3 the full audit of the DPCR4 Process described in RIGs version 5.

Issues Encountered

At CN West the incidents were not presented to the auditors in an order that naturally lead itself to the trialling of the DPCR4 methodology with the need to initially audit the reduced Stage 2 sample. CN West offered to re-order the incidents, however it was agreed that in order to make effective use of the time available that the incidents would be audited in the order provided with the DPCR4 results being reviewed at the end of the audit.

Additional Exceptional Events Incidents

All exceptional event incidents were audited with only minor issues. One LV incident had a restoration stage not classified as a reinterruption, whilst at HV there were some very

minor differences in reported customer numbers. The visiting auditors considered the audit trail to be as good as that for ‘normal’ incidents.

Appendix C. Central Networks East Region Ltd. (CN East)

Summary

Area	Main findings
Interpretation of the RIGs	CN East confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed CN East's calculations and support its estimates of the accuracy of its MPAN counts for its licensed area as 99.66% at the Higher Voltage level and 99.44% at the LV feeder level.
Connectivity model	The visiting auditors have witnessed the various routines by which CN East updates its connectivity model and confirm that the DNO is proactive in devoting resources to the continuous improvement of its connectivity model.
Overall reporting	The accuracy of overall reporting was very high despite several input errors. The functionality of CN East's measurement systems enabled it to prove increases in customer numbers between the time of the incident and that of the audit visit.
LV reporting	The visiting auditors noted a larger number of inaccuracies at LV. These were largely related to problems with interpreting the information shown on the field notes and a number of unexplained errors.

At the end of the audit visit the interim values for the calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.95%	Under	95%	Pass
Overall Sample CML	99.72%	Under	95%	Pass
LV Sample CI	97.55%	Under	90%	Pass
LV Sample CML	97.84%	Under	90%	Pass

It is auditors' opinion that reporting of CN East under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at the CN East's Castle Donnington Headquarters from 8 June to 9 June 2005. The visiting auditors were Geoff Stott (Team Leader) from BPI and David Holding from Mott MacDonald. Ruth Turton managed the audit on behalf of the DNO with Rob Cooper, Stephen Hayward, Jane Holmes, Nigel Hoult, Ian Jacob, Mark Porter, Colin Randle and Steven Waller. William McKenzie from Ofgem attended the audit on 8 June 2005.

The visit arrangements were similar to those for the previous year with the exception of a significantly shortened introductory session on the first morning. The visiting auditors would like to thank the CN East team members for their participation in the audit. In particular, the visiting auditors would like to acknowledge the large amount of pre-visit preparation undertaken by CN East which contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by CN East was set out in the audit report for reporting year 2002/03[6]. There have been some recent changes to the systems used by CN East.

Previously, data relating to system alarms and loss of supply calls was transferred manually from the Control Room Graphical Operating System (CORGOS) into the Call Logging and Sorting System (CLASS) in order to derive incident details. These details were then transferred manually into the PC-NaFIRS reporting system.

CN East has been continuing the work to replace its CLASS and CORGOS systems with the GE Harris Energy Network Management and Control System (ENMAC) and the LeT Systems eRespond Outage Management System (OMS). OMS was introduced on 1 April 2003 and has the advantage of automatic data transfer to PC-NaFIRS. The changes during the 2004/05 reporting year were:-

- ENMAC was introduced in October 2004 – this is the Network Management System; and
- In February 2005 the Network Records System (NRS) replaced the PDS Premise Database System (a module of eRespond). This is the same system as used in CN West's licensed area.

Changes since last year

The information in the following paragraphs was presented to the visiting auditors by CN East:

Interpretation of the RIGS

CN East confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.

MPAN count

CN East confirms that there have been no changes to the way in which it identifies customers by MPAN count.

CN East's connectivity model only contains primary traded MPANs.

[6] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section F3.1

The visiting auditors have viewed CN East's calculations and support its estimates of the accuracy of its MPAN counts for its licensed area as 99.66%[7] at the Higher Voltage level and 99.44% at the LV feeder level.

CN East uses "way 99" as a means of locating MPANS that it cannot accurately place on a live LV feeder within its connectivity model. As at 30 March 2005 CN East reports that there were 1,376 customers assigned to Distribution Transformer LV way 99. This figure has reduced significantly in recent years and represents the difference between LV and HV accuracy.

Connectivity model

CN East reports that it has made no system changes to its HV and LV connectivity model since the audit for reporting year 2002/03 and that connectivity model accuracy has improved during the 2004/05 reporting year as a result of continued data cleansing work.

Future changes

CN East will continue to work on improving the accuracy of its model and intends to update its documented procedures to gain ISO 9001:2000 certification for updating network records and connectivity when alterations are made to the electrical network. These operate in tandem with CN East's connectivity model updating procedures.

CN East operates an internal audit programme that feeds results into the ongoing training and improvement of its staff.

No significant changes to systems are envisaged.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that CN East has accurate procedures for counting primary traded MPANs and has a highly accurate connectivity model. CN East continues to employ robust procedures to ensure this accuracy is maintained by giving IIP a high profile. The visiting auditors support CN East's estimates of its accuracy figures.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

In the majority of the more complex higher voltage incidents CN East provided good auditable evidence to verify the accuracy of the reported number of customers affected by a higher voltage incident. In common with most DNOs, CN East is not able to track where disconnections have been made from its connectivity model. However, CN East's measurement systems record the number of customers affected by an incident and in the majority of cases this enabled it to provide a robust audit trail to verify that the reported numbers were correct.

The visiting auditors were pleased to note that CN East's incident reports had generally been annotated where an abnormal feeding arrangement obtained at the time of the incident. This greatly facilitated the audit of those incidents.

[7] These figures are based on mid year estimates of Way 99 customers (1,376 customers as at 30/3/05, 9,768 as at 30/3/04) and MPANs in the connectivity model.

In some cases the audit trail for planned incidents was found to be poor with limited or no field operator notes captured in CN East's measurement systems.

At LV a larger number of inaccuracies were found although these were largely of a minor nature in terms of their impact on CML and CI. In particular, misinterpretation of the notes in relation to calculating the number of customers affected by an incident with reference to phase information was a problem in a number of cases. Unexplained errors were noted in five incidents and there were two examples of missed restoration stages, one of which should have been classified as a reinterruption. For the planned incidents the planned start time was used rather than the actual start time on two occasions.

One 'clock-stopping' incident was observed. In this case the customer was carded but access could not be gained for nine days (reported as being due to the customer being away on holiday). Strictly speaking because the customer was not available there could be no record in CN East's measurement systems to confirm that the customer agreed to remain off supply. However, in this case the visiting auditors accepted that CN East had done everything possible and accepted the restoration time entered in its measurement systems.

No incidents were considered too difficult to audit.

The audit trail was generally good with good information contained in the field notes and fault reports.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	99.66%
	Overall MPAN Measurement	99.64%
	LV MPAN Measurement	99.44%

The interim values for the Stage 2 results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.31%	Over
	Overall CML	100.08%	Over
	LV CI	98.10%	Under
	LV CML	98.39%	Under
Combined Accuracy	Overall CI	99.95%	Under
	Overall CML	99.72%	Under
	LV CI	97.55%	Under
	LV CML	97.84%	Under

It is auditors' opinion that reporting of CN East under the IIP scheme meets the required levels of accuracy.

As part of the 2003/04 IIP audit, where a restoration stage variance was greater than the sample mean plus or minus 4 standard deviations, this was identified as being an outlying restoration stage. This stage was then removed from the sample before the sample accuracy was calculated. Based on comments received from some DNOs this approach to removing outlying restoration stages has been modified for the 2004/05 IIP audit. For the 2004/05 audit when an outlying restoration stage has been identified, the whole incident is now removed from the sample and not just the outlying restoration stage. This process is carried out for the accuracy calculation for CI and CML separately.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

No specific recommendations were included in last years audit report. However, based on discussions with CN East it is apparent to the visiting auditors that the DNO has continued to be proactive in improving processes in particular with regard to LV reporting. The following examples were highlighted by the DNO:-

Training programmes have been developed. In particular an IIP LV LOS reporting training package was delivered to all members of CN East's Incident Team during the first quarter of 2005 (completed 3 March 2005);

LV incidents are now "self" audited weekly by the Network Management Centre (NMC) – a weekly summary report is received by CN East's Operational Performance team so as to monitor the process. A categorisation of the audit findings is being developed so that the quality of the output can be readily monitored; and

Auditing – CN East now has an audit module in its PC-NaFIRS measurement and reporting system. Additionally, audit reports are contained within individual monthly excel workbooks, kept electronically and split HV / LV / PA.

2004/05 Audit

- Build upon the recent introduction of the "ENMAC" network control system and the accuracy with which it can track switching operations at the higher voltages.
- Continue the excellent work on the connectivity model by further reducing the number of customers associated with LV feeder "way 99".
- Continue the internal audit training programme to reduce the number of errors at the LV level.

Recommendations for Ofgem

- None.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.07%	99.64%	99.70%	97%	Pass
Overall CML Accuracy	99.70%	99.64%	99.33%	97%	Pass
LV CI Accuracy	98.40%	99.44%	97.85%	92%	Pass
LV CML Accuracy	94.60%	99.44%	94.07%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.20%	99.64%	99.83%	95%	Pass
Overall CML Accuracy	100.07%	99.64%	99.70%	95%	Pass
LV CI Accuracy	98.10%	99.44%	97.55%	90%	Pass
LV CML Accuracy	98.39%	99.44%	97.84%	90%	Pass

NB: Stage 2 refers to the reduced audit and Stage 3 the full audit of the DPCR4 Process described in RIG version 5.

Issues Encountered

At CN East the incidents were not presented to the auditors in an order that naturally lead itself to the trialling of the DPCR4 methodology with the need to initially audit the reduced Stage 2 sample. CN East offered to re-order the incidents, however it was agreed that in order to make effective use of the time available that the incidents would be audited in the order provided with the DPCR4 results being reviewed at the end of the audit.

Additional Exceptional Events Incidents

All exceptional event incidents were audited with one minor issue. One HV incident had a misreport of customer numbers. The visiting auditors considered the audit trail to be as good as that for ‘normal’ incidents.

Appendix D. EDF Energy Networks – EPN

Summary

Area	Main findings
Interpretation of the RIGs	EPN confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGs in regard to reporting on the number and duration of interruptions since the 2003/04 audit.
MPAN Count	Visiting auditors have reviewed EPN's calculations and processes on previous audit visits. These were reviewed again and nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracy of its MPAN counts for its EPN licensed area as 100.00% at the Higher Voltage and 99.23% at the LV feeder levels.
Connectivity model	Visiting auditors have witnessed the various processes by which EPN updates its connectivity model on previous audit visits. These were reviewed again and nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracy of its connectivity model for its EPN licensed area as 98.06% at the Higher Voltage and 96.22% at the LV feeder level. For both MPAN and Connectivity model accuracies, visiting auditors noted robust processes to maintain and improve these values.
Overall reporting	The accuracy of overall reporting was found to be high for both CI and CML. The main reasons for variations were due to normal day to day changes in customer connections and transcription errors. Although the transcription errors had little effect on the results, the numbers were higher than expected and some of the improvements made in previous years have been lost.
LV reporting	The accuracy of LV reporting was found to be reasonably high for both CI and CML. The points concerning variations and transcription errors are similar to Overall reporting.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.77%	Under	95%	Pass
Overall Sample CML	99.40%	Over	95%	Pass
LV Sample CI	96.23%	Under	90%	Pass
LV Sample CML	96.52%	Under	90%	Pass

It is auditors' opinion that reporting of EPN under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at EDF Energy's (EPN/LPN) Control Centre at Fore Hamlet in Ipswich between 4 and 7 July 2005. The visiting auditors were Alan Taylor (Team Leader) from Mott MacDonald and Oliver Joseph from BPI. Bill d'Albertanson managed the audit on behalf of EDF Energy with Dave Young assisting and Dave Williams, Chris Barker, Ken Tew, and Martin Woodhouse working with the visiting auditors. Chris Watts and Imran Jami from Ofgem attended for the first day. Pernille Kjaersgaard and Angela Bourke from Ofgem attended for the second day.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the EDF Energy team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of EPN's measurement systems is set out in the 2002/03 audit report[8]. The key system in use for operational purposes and for providing IIP data are the Energy Network Management and Control System (ENMAC). Supply incident management is performed by using "TroubleCall" which is part of ENMAC. SCADA operations are time stamped and recorded in the "Trouble Call" incident log which also records system generated customer numbers for HV faults. IIP data is manually input from various sources into the Fault Recording System (FRS). EDF Energy provided the visiting auditors with current information on the systems used and how they are integrated.

Changes since last year

Interpretation of RIGS

EDF Energy confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.

[8] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section G3.1

MPAN count

EDF Energy confirms that there have been no changes to the way it identifies customers by MPAN counts and examined during the 2002, 2003 and 2004 audits.

- Active Primary Traded MPANs in EPN connectivity model (September 2004): 3,463,100.
- Primary Traded MPANs in EPN MPRS (September 2004): 3,463,100.

The systems and processes used to connect and disconnect MPANs dynamically from the connectivity model were reviewed during this audit. An automated daily transfer from MPRS is made and MPAN new connections and disconnections are immediately reflected in the network model. All MPANs are associated with the HV network and can attract CI & CML. MPANs which cannot be accurately placed on the LV network are placed on a dummy feeder "way 0" awaiting referencing and generally cannot attract CI & CML. EPN are reducing this number significantly (26,000 June 05 compared with 149,000 June 04).

Connectivity model

There has been no change in the structure and operation of EPN's connectivity model since the audit for reporting year 2003/04. There is a spatial inaccuracy and is accounted for by the MPAN which has insufficient address data to locate it spatially when the model was first populated. The auditors witnessed the ongoing process to re-reference MPANs to correct points on the network where new information becomes available (generally as a result of incidents and phone calls). Examples as recent as 4/7/2005 were shown. This is a defined process within the control room with a data administrator to monitor overall accuracy.

EDF Energy's current estimates of the accuracy of its connectivity model for its EPN licensed area are 98.06% at the Higher Voltage and 96.22% at the LV feeder level.

For both MPAN and connectivity model accuracies, visiting auditors noted robust processes to maintain and improve these values.

Future changes

EDF Energy plans no immediate changes to its EPN licensed area's measurement systems. However EDF Energy has plans to automate the population of IIP required data from its measurement systems and other sources into FRS in the future.

Audit opinion on measurement systems

Based on detailed work done in previous audits and further information gathered on this visit, the visiting auditors conclude that EPN has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs robust procedures for maintaining and improving the accuracy of both of them. Nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracies of MPAN count and connectivity model accuracies for its EPN licensed area.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

HV Incidents

One hundred and one HV incidents, including spares, were audited. These contained 320 stages, with one incident having 66 stages. This was a relatively large number of stages to audit. One HV incident could not be audited because no information to support the stage interruption time was available. One additional stage had to be inserted into the HV sample.

All data input into the Fault Reporting System is input manually from other reports. ENMAC switching logs indicate incident timing details, which are automatically entered if SCADA operations are carried out, or manually entered otherwise. Customer numbers are automatically entered into the ENMAC switching logs if SCADA automatically raises an incident, otherwise ENMAC tracking data is entered to determine customer numbers associated with incidents. These data are derived some time after the start of the incident. Other data sources are TroubleCall and telephone logs.

Manual entry of data inevitably leads to transcription errors. During the 2003 audit 33% of the sample was found to contain errors, in 2004 the error rate was 18%. This year it increased to 23%.

There were three errors relating to incorrect incident identification: one should have been a short interruption, one should have been a separate incident, and another was a mis-reported re-interruption. The remaining 20 were transcription errors in incident times or customer numbers when transferring data into the Fault Reporting System.

The number of transcription errors is high and worsening, some of the significant improvement noted last year appears to have been lost.

LV Incidents

Fifty eight incidents, including spares, were audited. One LV incident could not be audited because no information to support the stage interruption time was available and only one additional stage had to be inserted into the LV sample.

On the LV sample there were variations generally of a minor nature in customer numbers. These were due to changes in numbers since the event (the audit was conducted on systems using the current data) and possible errors in counting customer numbers using the polygon tool.

The number of transcription errors on LV stage start and end times was higher than expected as year on year improvements had been noted in previous audits. It was apparent that some of the improvement has been lost.

It was noted during the audit of the LPN licensed area's LV sample that the use of a different paper incident log appeared to help prevent transcription errors. This log had specific boxes to record core IIP data rather than the "free format" style of log used by EPN and makes the transfer of data to FRS much less prone to error.

Audit opinion on accuracy of incident reporting

Although transcription error rates appear high for both HV and LV samples, these did not significantly compromise the overall incident reporting accuracies as the errors did tend to balance out and the most significant errors were removed from the sample as outliers.

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	99.91%
	LV MPAN Measurement	99.23%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.86%	Under
	Overall CML	100.70%	Over
	LV CI	96.98%	Under
	LV CML	97.27%	Under
Combined Accuracy	Overall CI	99.77%	Under
	Overall CML	99.40%	Over
	LV CI	96.23%	Under
	LV CML	96.52%	Under

It is auditors' opinion that reporting of EPN under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2002/03 Audit</u>

The following recommendations were made by the visiting auditors as a result of the 2003 audit visit to EPN.

Reduce reliance on manual recording and transcription.

- EPN still relies on the manual creation of fault reports at the HV and LV levels although there are future plans which would automate much of this process. In previous years it had been noted that the levels of transcription errors were decreasing with the raising of the profile of IIP and training within the company. This year's findings will be discussed in the recommendations following the 2004/05 Audit

Re-emphasise to Control Engineers the importance of correcting any customers not on correct feeders, when identified during the creation of fault reports.

- As described earlier in this report, the visiting auditors noted robust processes in place to manage this and saw examples of where customers were being re-referenced to correct feeders when evidence became available.

Create a more robust audit trail

- In previous years audits the consistency and clarity witnessed in switching logs and fault reports was improving. This year' findings will be discussed in the recommendations following the 2004/05 Audit.

Keep a record of network changes

- Like most DNOs, EDF do not keep information which is readily available on network running conditions that were prevailing at the time of incidents. However since the 2002/03 audit it produces a full report on all EHV incidents and some HV incidents which details the network running conditions.

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to EPN.

Provide a more consistent audit trail particularly for incidents at the EHV level.

- As mentioned above, EPN produces reports on all EHV incidents. Examples were seen during the course of the 2004/05 audit.

Improve the process of collecting and recording information for planned interruptions.

- During the 2004/05 audit, the visiting auditors noted that improvements in this area were being made.

Continue the process of education and training that appears to have resulted in significant improvements to reporting accuracy.

- This will be discussed in the recommendations following the 2004/05 Audit

2004/05 Audit

- Review the processes which lead to the creation of the fault reports. In previous years visiting auditors noted improvements in the reduction of incorrect information and transcription errors being transferred into fault reports from hand written logs or systems. During this audit, there appeared to be an increase in the number of errors of this nature and some of the improvements of previous years seem to have been lost. The use of a different paper incident log which is more focussed on IIP reporting in the LPN licensed area seemed to be one good point that should be considered for EPN. EDF Energy recognised these issues during the EPN audit and is confident that this is a temporary setback which they will rectify quickly.

Recommendations for Ofgem

- Evidence to support variations in customer numbers does need some more clarification. Although EDF Energy generally will provide time stamped information in these cases, it considers that a full report written at the time of the incident which details system running conditions and other parameters should be acceptable if some of the information is not time stamped. The auditors support this position. EPN considers that making any substantive changes on evidence or any other aspects of the audit requirements should be made clear before the reporting year in question and the RIGs should reflect any changes in audit requirements.
- In common with most DNOs, EDF Energy considers that creating new incident reports for reinterruptions for the same fault cause outside 3 hours and 18 hours for permanent and temporary restorations respectively is not right unless there is an excessive delay between the incident and work. However RIGs 5 clearly defines the procedures that need to be followed for future audits under DPCR4 and Ofgem will expect DNOs to work to them.
- EPN & LPN have deployed extensive automation schemes on their HV networks. Typically these are restoring between 50 & 75% of customers in under 3 minutes. As the audit is run now this is not visible. EDF Energy will take this up directly with Ofgem.
- The facility to provide accuracy results subject to QA does seem to be beneficial and outweighs the extra complexity of the incident workbook. This should be noted for future years.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.36%	99.91%	99.74%	97%	Pass
Overall CML Accuracy	101.14%	99.91%	98.96%	97%	Pass
LV CI Accuracy	96.93%	99.23%	96.18%	92%	Pass
LV CML Accuracy	98.09%	99.23%	97.34%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.34%	99.91%	99.25%	95%	Pass
Overall CML Accuracy	100.15%	99.91%	99.95%	95%	Pass
LV CI Accuracy	96.98%	99.23%	96.23%	90%	Pass
LV CML Accuracy	97.27%	99.23%	96.52%	90%	Pass

Issues Encountered

No problems were encountered in performing this trial. It did add marginally to the overall time taken to carry out the audit than would have been expended if a DPCR3 audit only had been undertaken.

Additional Exceptional Events Incidents

Five incidents were audited associated with exceptional events in the 2004/05 reporting year. All were audited and no major issues were found. Extracting data to support this part of the audit was not done prior to the audit and did not pose any problems for EPN. The reported figures were accurate with only two minor variances.

Appendix E. EDF Energy Networks (LPN)

Summary

Area	Main findings
Interpretation of the RIGs	LPN confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.
MPAN Count	Visiting auditors have reviewed LPN's calculations and processes on previous audit visits. These were reviewed again and nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracy of its MPAN counts for its LPN licensed area as 100.00% at the Higher Voltage and 99.93% at the LV feeder levels.
Connectivity model	Visiting auditors have witnessed the various processes by which LPN updates its connectivity model on previous audit visits. These were reviewed again and nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracy of its connectivity model for its LPN licensed area as 99.35% at the Higher Voltage and 95.88% at the LV feeder level. For both MPAN and Connectivity model accuracies, visiting auditors noted robust processes to maintain and improve these values.
Overall reporting	The accuracy of overall reporting was found to be high for both CI and CML. The main reasons for variations were due to normal day to day changes in customer connections and transcription errors. The trend noted in previous years of a reducing number of transcription errors was reversed during this year's audit.
LV reporting	The accuracy of LV reporting was found to be reasonably high for both CI and CML. Variations were generally due to issues with CI caused by customer changes since the time of the incident and the tool used to count customers.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.85%	Over	95%	Pass
Overall Sample CML	99.23%	Under	95%	Pass
LV Sample CI	98.14%	Over	90%	Pass
LV Sample CML	98.45%	Over	90%	Pass

It is auditors' opinion that reporting of LPN under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at EDF Energy's (EPN/LPN) Control Centre at Fore Hamlet in Ipswich between 4 and 7 July 2005. The visiting auditors were Alan Taylor (Team Leader) from Mott MacDonald and Oliver Joseph from BPI. Bill d'Albertanson managed the audit on behalf of EDF Energy with Dave Young assisting and Dave Williams, Chris Barker, Ken Tew, and Martin Woodhouse working with the visiting auditors. Chris Watts and Imran Jami from Ofgem attended for the first day. Pernille Kjaersgaard and Angela Bourke from Ofgem attended for the second day.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the EDF Energy team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of LPN's measurement systems is set out in the 2002/03 audit report [9]. The key system in use for operational purposes and for providing IIP data is the Energy Network Management and Control System (ENMAC). Supply incident management is performed by using "TroubleCall" which is part of ENMAC. SCADA operations are time stamped and recorded in the "Trouble Call" incident log which also includes system generated customer numbers for HV faults. LPN uses CORGIS as its connectivity model and, unlike EPN and SPN, network configuration changes are not automatically registered. Normal system configuration is assumed by CORGIS and customer numbers are reported for incidents on this basis. CORGIS numbers are manually entered into ENMAC and the resulting ENMAC customer numbers reported in the "Crystal" report must therefore be manually altered on the printed output if the system is abnormal before being manually input into the Fault Reporting System (FRS). IIP customer numbers and incident time data are manually input from various sources into FRS. EDF Energy provided the visiting auditors with current information on the systems used and how they are integrated.

Changes since last year

<u>Interpretation of RIGS</u>

EDF Energy confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.

<u>MPAN count</u>

[9] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section H3.1

EDF Energy confirms that there have been no changes to the way it identifies customers by MPAN counts and examined during the 2002, 2003 and 2004 audits.

- Active Primary Traded MPANs in EPN connectivity model (September 2004): 2,247,653
- Primary Traded MPANs in EPN MPRS (September 2004): 2,247,653.

The systems and processes used to connect and disconnect MPANs dynamically from the connectivity model were reviewed during this audit. An automated daily transfer from MPRS is made and MPAN new connections and disconnections are immediately reflected in the network model. All MPANs are associated with the HV network and can attract CI & CML. MPANs which cannot be accurately placed on the LV network are placed on a dummy feeder "way 0" awaiting referencing and generally cannot attract CI & CML. LPN only has a small number in this category (1,500 in June 05).

Connectivity model

There has been no change in the structure and operation of LPN's connectivity model since the audit for reporting year 2003/04. There is a spatial inaccuracy and is accounted for by the MPAN which has insufficient address data to locate it spatially when the model was first populated. The auditors witnessed the ongoing process to re-reference MPANs to correct points on the network where new information becomes available (generally as a result of incidents and phone calls). Examples as recent as 4/7/2005 were shown and one was seen during the course of the audit of an LV incident. This is a defined process within the control room with a data administrator to monitor overall accuracy.

EDF Energy's current estimates of the accuracy of its connectivity model for its LPN licensed area are 99.35% at the Higher Voltage and 95.88% at the LV feeder level.

For both MPAN and Connectivity model accuracies, visiting auditors noted robust processes to maintain and improve these values.

Future changes

EDF Energy plans no immediate changes to its LPN licensed area's measurement systems. However EDF Energy has plans to automate the population of IIP required data from its measurement systems and other sources into FRS in the future.

Audit opinion on measurement systems

Based on detailed work done in previous audits and further information gathered on this visit, the visiting auditors conclude that LPN has highly accurate procedures for counting primary traded MPANs. It has an accurate connectivity model, although its accuracy is reduced by the need to update customer numbers manually when the system is running abnormally. It employs robust procedures for maintaining and improving the accuracy of both its MPAN count and Connectivity model. Nothing arose during the course of the audit which prevents the auditors supporting EDF Energy's estimates of the accuracies of MPAN count and Connectivity model accuracies for its EPN licensed area.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

HV Incidents

Sixty HV incidents, including spares, were audited. All of the sample's incidents were auditable; one additional stage had to be inserted into the HV sample worksheet.

All data input into the Fault Reporting System is input manually from other reports. SCADA switching logs or Automation Control logs automatically indicate incident timing details. In the absence of these, switching or reporting times are read from the control room clock and noted for input into FRS.

Customer numbers are automatically produced by CORGIS, but relate only to the normal system configuration for HV feeder connections and feed points, and Transformer Chambers (TC) fed from these feeders. Any abnormal arrangements have to be accounted for by examining system changes and recalculating customer numbers before manually inputting data into FRS.

Manual entry of data inevitably leads to transcription errors. During the 2004 audit 10% of the sample was found to contain errors this year it increased to 22%.

There was one error this year relating to incorrect incident identification, an incident should have been reported as a short interruption. The remaining 12 were transcription errors in incident times or customer numbers when transferring data into the Fault Reporting System.

The number of transcription errors has increased since last year, when only two were noted.

LV Incidents

Ninety four incidents, including spares, were audited. Two LV incidents could not be audited because there was no auditable information to support customer number changes following network changes.

Twelve additional stages had to be inserted into the LV sample. This is a relatively large number. The majority of the cases were caused due to not always flagging customers as being reinterrupted who were taken off supply for a second time in order that permanent repairs could be made.

On the LV sample there were variations generally of a minor nature in customer numbers. These were due to changes in numbers since the event (the audit was conducted on systems using the current data) and possible errors in counting customer numbers using the polygon tool. Counting customer numbers on the LPN LV networks is particularly complicated.

The number of transcription errors on LV stage start and end times was reasonably small and the improvements noted in previous audits were maintained.

It was noted during the audit of the LPN licensed area's LV sample that the use of a different paper incident log appeared to help prevent transcription errors. This log had specific boxes to record core IIP data rather than the "free format" style of log used by some DNOs and makes the transfer of data to FRS much less prone to error.

Audit opinion on accuracy of incident reporting

Although transcription error rates appear high for the HV sample, these did not significantly compromise the overall incident reporting accuracies as the errors did tend to balance out and the most significant errors were removed from the sample as outliers.

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	99.98%
	LV MPAN Measurement	99.93%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.17%	Over
	Overall CML	99.25%	Under
	LV CI	100.93%	Over
	LV CML	100.62%	Over
Combined Accuracy	Overall CI	99.85%	Over
	Overall CML	99.23%	Under
	LV CI	98.14%	Over
	LV CML	99.45%	Over

It is auditors' opinion that reporting of LPN under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

The following recommendations were made by the visiting auditors as a result of the 2003 audit visit to EPN.

Reduce reliance on manual recording and transcription.

- LPN still relies on the manual creation of fault reports at the HV and LV levels although there are future plans which would automate much of this process. In previous years it had been noted that the levels of transcription errors were decreasing with the raising of the profile of IIP and training within the company. During the current audit, it was noted that these improvements were maintained in LV reporting but not HV reporting.

Re-emphasise to Control Engineers the importance of correcting any customers not on correct feeders, when identified during the creation of fault reports.

- As described earlier in this report, the visiting auditors noted robust processes in place to manage this and saw examples of where customers were being re-referenced to correct feeders when evidence became available.

Create a more robust audit trail

- In previous years audits the consistency and clarity witnessed in the incident logs and fault reports was improving. During the current audit, the visiting auditors generally found good audit trails in these sources.

Keep a record of network changes

- Like most DNOs, EDF do not keep information which is readily available on network running conditions that were prevailing at the time of incidents. However since the 2002/03 audit it produces a full report on all EHV incidents and some HV incidents which details the network running conditions.

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to EPN.

Further improve the quality of audit trail for HV incidents

- As mentioned above, LPN now produces reports on all EHV incidents. Examples were seen during the course of the 2004/05 audit.

Improve the process of collecting and recording information for planned interruptions.

- During the 2004/05 audit, the visiting auditors noted that improvements in this area were being made.

Continue the process of education and training that appears to have resulted in significant improvements to reporting accuracy.

- During the current audit the evidence suggests that this is being done in relation to LV incidents, although transcription errors seem to be increasing at HV.

2004/05 Audit

- Revive the processes that delivered the improvements to reporting accuracy, particularly with respect to transcription errors, in earlier years and look for enhancements. Although LPN was previously doing well with respect to this, evidence seen elsewhere, coupled with LPN's declining performance, suggests that if the emphasis is taken off reporting accuracy then the number of errors can rise. With regard to customer numbers, LPN uses a polygon tool within a CAD system to establish the numbers involved in LV incident stages. Considering how complicated some parts of the LPN LV network are, the visiting auditors consider the information provided to be generally good. However there were a few incidents where more accurate information would have been provided with a little more care. It should be noted that only a few DNOs can provide a system capable of allowing a more thorough audit at LV sub-feeder level like LPN.
- Customer numbers are not automatically produced by CORGIS when the system is configured abnormally. At the time of audit it is not easily possible to replicate customer numbers for incidents involving abnormal operating conditions without knowing the system configuration at the time of the incident. Therefore it is important for audit purposes to note system abnormalities when producing the fault report.

- On LV reporting, the basic rules on when to flag up customers as being reinterrupted needs to be made clear to some staff preparing fault reports.

Recommendations for Ofgem

- Evidence to support variations in customer numbers does need some more clarification. Although EDF Energy generally will provide time stamped information in these cases, it considers that a full report written at the time of the incident which details system running conditions and other parameters should be acceptable if some of the information is not time stamped. The auditors support this position. LPN considers that making any substantive changes on evidence or any other aspects of the audit requirements should be made clear before the reporting year in question and the RIGs should reflect any changes in audit requirements.
- In common with most DNOs, EDF Energy considers that creating new incident reports for reinterruptions for the same fault cause outside 3 hours and 18 hours for permanent and temporary restorations respectively is not right unless there is an excessive delay between the incident and work. However RIGs 5 clearly defines the procedures that need to be followed for future audits under DPCR4 and Ofgem will expect DNOs to work to them.
- LPN & EPN have deployed extensive automation schemes on their HV networks. Typically these are restoring between 50 & 75% of customers in under 3 minutes. As the audit is run now this is not visible. EDF Energy will take this up directly with Ofgem.
- The facility to provide accuracy results subject to QA does seem to be beneficial and outweighs the extra complexity of the incident workbook. This should be noted for future years.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.16%	99.98%	99.86%	97%	Pass
Overall CML Accuracy	99.04%	99.98%	99.02%	97%	Pass
LV CI Accuracy	105.74%	99.93%	94.33%	92%	Pass
LV CML Accuracy	100.20%	99.93%	99.87%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.15%	99.98%	99.87%	95%	Pass
Overall CML Accuracy	99.46%	99.98%	99.44%	95%	Pass
LV CI Accuracy	100.93%	99.93%	99.14%	90%	Pass
LV CML Accuracy	100.62%	99.93%	99.45%	90%	Pass

Issues Encountered

No problems were encountered in performing this trial. It did add marginally to the overall time taken to carry out the audit than would have been expended if a DPCR3 audit only had been undertaken.

Additional Exceptional Events Incidents

No exceptional event incidents were audited for EDF Energy's LPN licensed area as it has no overhead line circuits and therefore does not suffer weather related events.

Appendix F. EDF Energy Networks - SPN

Summary

Area	Main findings
Interpretation of the RIGs	SPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2003/04 audit.
MPAN Count	SPN has not made any changes since last year in the way it counts MPANs. The visiting auditors support SPN's estimate of 100% accuracy for MPAN accuracy. SPN demonstrated that all MPANs are attached to "true" LV feeders in its connectivity model during last year's audit.
Connectivity model	The visiting auditors support SPN's estimate of 98.8% accuracy at the HV level, and 96.3% at the LV level based on a previously audited process.
Overall reporting	No systemic errors were found in the reporting of HV incidents. Manual transcription errors were the only problem identified and this is minor since most data is input automatically into the fault reporting process.
LV reporting	The visiting auditors considered the accuracy of LV reporting at SPN to be high. Significant progress has been made in relation to information contained on the fault reports. The internal audit process appears successful in identifying and rectifying any mistakes that do occur.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.99%	Over	95%	Pass
Overall Sample CML	99.81%	Over	95%	Pass
LV Sample CI	95.81%	Over	90%	Pass
LV Sample CML	94.53%	Over	90%	Pass

It is auditors' opinion that reporting of SPN under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at SPN's offices at Wealden House, East Grinstead on 13 and 14 June 2005. Ofgem's visiting auditors were Alan Taylor (Team Leader) and David Holding, both from Mott MacDonald. These auditors also carried out last year's audit.

The visiting auditors would like to thank the SPN team for their participation and assistance during the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A detailed summary of SPN's measurement systems is given in the audit report for 2002/03 [10]. In overview, Meter Point Reference System (MPRS) information is interfaced with the Map Management System (MMS), which attaches LV distributor and HV site details to MPANs. These data are then stored in Discovery, the data warehouse. The Fault Management System (FMS) for LV faults is fed by information from customer calls and field staff feedback. The Network Management System (NMS) collects real-time outage data for HV faults from telemetry and real time addressing of the NMS network diagram for non-telemetered operations.

Fault reports are automatically pre-populated with incident data from FMS and NMS, based on connectivity and incident data. RIG logic is applied to the data sets to generate IIP and other reporting information.

Changes since last year

There have been no material changes since last year.

Interpretation of RIGS

SPN has made no changes in the way it interprets the definitions and guidance contained in Version 2 of the RIGs since last year's audit.

MPAN count

SPN has made no changes to its MPAN counting system since last year's audit. Reports were run last year to demonstrate that all MPANs are assigned to real feeders and that none are assigned to dummy feeders.

Connectivity model

SPN has made no changes to its connectivity model at LV or HV levels since last year's audit.

Future changes

Following last year's audit the process to notify network records of incorrect connections that were identified during incidents was revised. This process should have improved the accuracy of reporting. However, this revision is not yet fully operative and further changes are expected to be implemented soon to ensure the connectivity model can be progressively updated.

In Q4 2006 SPN's control system is due to be replaced. The new system will incorporate a new fault reporting tool although the existing connectivity model will remain. Connectivity model accuracy will therefore not change, although other processes may need to be rechecked when the changeover takes effect. For the IIP reporting year 2005/06 the current system will be used, changes will take place for 2006/07.

[10] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section I3.1

Audit opinion on measurement systems

The visiting auditors support SPN's estimate of 100% MPAN accuracy. SPN has previously demonstrated that all MPANs are attached to "true" LV feeders in its connectivity model and will therefore attract CIs and CMLs.

SPN claims a connectivity model accuracy level at HV of 98.8% and at LV of 96.3% for 2004/05. This is an improvement on previous years. The accuracy calculation process was audited previously and the visiting auditors have seen the revised data for recalculation of these accuracies. Consequently, the visiting auditors support SPN's current estimate of the accuracy of the connectivity model.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

HV Audit:

SPN has an MPAN change facility which can track customer movements and is able to reconcile customer number changes between incident and audit dates in a Change Report. This facility was audited last year and shown to work accurately. This year it was again audited and its accuracy was confirmed. As a consequence, report customer numbers were accepted as being correct since an auditable process is in place to confirm them.

Most incident times are entered into the fault reporting system automatically by telemetered times or by automatic time stamping by the control engineer clicking a screen at the time of a verbal report. Consequently, there are only a few time data entry cases where errors can occur. Principally these are:

- A customer call time can be incorrectly manually transferred from the call register into the log.
- Sometimes delays in polling out-stations can cause differences of a number of seconds in restoration times and subsequent interruption times when closing onto a fault and subsequently tripping. These timing differences can mislead the logic that defines reinterruptions and manual correction of the log times is needed. These manual corrections can lead to errors.

Input errors associated with both of these causes were noted during the audit.

The HV audit sample size was 95 incidents plus 11 spares, all of which were audited. Two missing restoration stages were noted (associated with one incident), due to incorrect manual correction of incident times. Six input errors were noted, caused by incorrect manual input of call times or correction of incident times. In one incident its report start time could not be verified from automatic time stamping and the time was altered to the customer call time. The resulting CI and CML differences caused by report and audit data differences were not large.

The auditing workbook was populated from data submitted to OFGEM by SPN. This data treated a short interruption associated with an unsuccessful restoration as a reinterruption and the workbook contained many separate rows showing associated restoration stages. This creates no problems unless the restoration time and the following short interruption time differ (as they can by up to 3 minutes). If they differ, any calculation of CMLs in the workbook will be missing the CMLs associated with the time

difference between restoration and the subsequent interruption. This is an audit problem but not a problem in IIP reporting terms since SPN's systems automatically eliminate this error when formally reporting to OFGEM. However, any reconciliation between auditing workbook data and actual incident reported data is not possible.

The OFGEM auditor present concluded that it was not necessary to make alterations to the workbook to remove the errors since they were small. It is, however, an issue worth noting.

Data submitted for auditing workbook population for a single incident also included separate-incident data if another incident occurred on the same equipment following complete restoration e.g. interruptions for removal of generators several days after the actual incident. This separate-incident data correctly identifies CIs and CMLs; it is just superfluous to the audit.

For HV incidents the audit trail and supporting information were of good quality.

LV Audit:

Only two of the LV incidents audited were found to have significant customer number variances. One of these was due to misinterpretation of the information on the fault report. Two incidents had two stages which should have been classified as reinterruptions. This resulted in significant variances in CIs. The DNO was able to prove changes in customer numbers where the reported customer numbers were different to the system numbers through a previously audited process. There were a small number of other input errors.

There were six errors (mostly minor) discovered in relation to reporting times. One of these involved the use of the time the incident was created rather than the actual time. The remainder were mainly input errors.

There was one incident where the 'clock was stopped'. At the request of the customer work was delayed until the customer returned home from work.

One incident was deemed too complex to audit and a spare was used.

The visiting auditors noticed a considerable improvement to the quality and quantity of information provided on the LV fault reports. This also included (on most reports) a reference to the internal audit carried out on the incident. In many cases it was noted that an incident had been corrected as a result of this audit. Clearly SPN's internal auditing process has been improved and has had a noticeable impact on reporting accuracy.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	100.00%
	LV MPAN Measurement	100.00%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.01%	Over
	Overall CML	100.19%	Over
	LV CI	104.19%	Over
	LV CML	105.47%	Over
Combined Accuracy	Overall CI	99.99%	Over
	Overall CML	99.81%	Over
	LV CI	95.81%	Over
	LV CML	94.53%	Over

It is auditors' opinion that reporting of SPN under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

Last year's recommendations and the auditor's comments in relation to their implementation are given below:

Exclude short interruptions from the data in the auditing workbook

- All such data are excluded in this year's workbook.

Revise the process for identifying and correcting customers not attached to the correct LV feeder

- The process has been revised but is not yet fully implemented.

Devote continued attention to training to improve the consistency and quality of fault reports

- There is now a review of LV incidents and the conclusions are noted on relevant fault reports; this process has noticeably reduced the errors appearing on LV fault reports.

2004/05 Audit

- If SPN data capture procedures permit, submit HV incident data for worksheet population such that short interruptions are not included within an incident so that CML data is correct and can be reconciled between auditing workbook and formal IIP data submissions to OFGEM.
- If SPN data capture procedures permit, remove follow-on incident data from actual HV incident data submitted for workbook production.

- Audit internally HV incidents that require manual data entry to reduce input errors.
- Implement fully the procedure for reallocating LV customers identified as being on the wrong feeder onto the correct feeder.

Recommendations for Ofgem

None.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.03%	100.00%	99.97%	97%	Pass
Overall CML Accuracy	100.52%	100.00%	99.48%	97%	Pass
LV CI Accuracy	103.26%	100.00%	96.74%	92%	Pass
LV CML Accuracy	106.02%	100.00%	93.86%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.06%	100.00%	99.94%	95%	Pass
Overall CML Accuracy	100.27%	100.00%	99.73%	95%	Pass
LV CI Accuracy	104.19%	100.00%	95.81%	90%	Pass
LV CML Accuracy	105.47%	100.00%	94.53%	90%	Pass

Issues Encountered

No issues were encountered during the trial of the DPCR4 process.

Exceptional Events incidents

Three HV and two LV Exceptional Event incidents were audited. No difficulties were encountered during their audit. All documentation was provided, in the same way as for the normal event audit. An input error was noted for one of the LV events.

Appendix G. CE Electric UK – Northern Electricity Distribution Ltd. (NEDL)

Summary

Area	Main findings
Interpretation of the RIGs	NEDL was consistent in its interpretation of the RIGs in relation to both HV and LV incidents and was in the opinion of the visiting auditors compliant with Version 2.
MPAN Count	NEDL has not changed its methods of creating and counting MPANs since last year. The visiting auditors support NEDL's estimate of MPAN accuracy of 100.20%.
Connectivity model	Apart from some data cleansing NEDL's connectivity model is unchanged from last year.
Overall reporting	NEDL had a good audit trail for the HV incidents with date and time stamped documents available for inspection. However, some data entry errors were noted where data was entered from another person's hand written NaFIRS report proforma. In addition there were some calculation errors in relation to the two thirds rule for a single phase HV fuse operation on a three phase line. Also some HV or EHV connected customers were not included in the (automatic) system customer count resulting in errors being introduced through mistakes during the manual entry of the data.
LV reporting	NEDL's LV reporting was generally good. The most significant source of error was the poor quality of the audit trail in a very small number of LV incident reports. The quality of the information recorded by NEDL has improved since last year and this needs to be maintained in the current year.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.62%	Over	95%	Pass
Overall Sample CML	99.80%	Over	95%	Pass
LV Sample CI	99.72%	Under	90%	Pass
LV Sample CML	94.00%	Under	90%	Pass

It is auditors' opinion that reporting of NEDL under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out on 20 June and 21 June 2005 at NEDL's control centre at Manor House, Houghton-le-Spring. The arrangements and facilities provided were identical to those provided last year and once again the emergency system management room was provided for the audit. The audit was undertaken by John Woodhouse of Mott MacDonald and Bill Slegg of BPI. The auditors wish to thank NEDL staff for their comprehensive assistance in undertaking the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

NEDL reported that there had been no material changes to the trouble management or information technology systems associated with the fault reporting systems.

Trouble Management System (TMS) and Incident Reporting and Information System (IRIS) are used for data capture and incident management and there are automatic links from the New Connections System (NCAS) and the Meter Point Registration System (MPRS). HV and LV reporting is undertaken through IRIS in which reportable incidents are automatically captured as determined by the incident type in TMS. Users are required to complete IRIS reports before incidents can be closed down.

A more detailed description of the NEDL measurement systems can be found in the 2002/03 audit report [11].

Changes since last year

Communication between field and trouble call centre

The main recommendations in the 2003/04 audit were to implement a standardised phraseology (in relation to LV incidents since one already exists for higher voltage incidents) and to describe the location and nature of the fault such that the auditors could follow the narrative and retrace the incident. This has been implemented and the result is a much improved audit trail and better communication between field and trouble call centre. This has in the view of the auditors resulted in an improvement in the accuracy and clarity of LV incident reporting.

Interpretation of RIGS

NEDL has made no changes to its interpretation of Section 2 of Version 2 of the RIGs.

MPAN count

NEDL has not made any changes to the way in which it identifies primary traded MPANs. Currently there are 1,540,889 primary traded MPANs associated with the higher voltage networks and LV network. Some 1,500 customers are connected to the higher voltage networks, the rest to the LV network.

[11] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section J3.1

Connectivity model

All new MPAN are imported daily into an Access database. This allows NEDL to record the reasons why an MPAN cannot be located or cannot be connected. It also records the MPANs that have been successfully located and connected. This database also imports and records disconnected MPANs.

NEDL has some 501 MPANs not connected in the model. This number includes some 300 MPANs which are historic despite having been reviewed cannot be associated with a network connection. The remaining MPANs, approximately 200, represent work in progress relating to current ongoing transactions.

Once an MPAN has been placed within the connectivity model the historic records are not retained. This makes it difficult to determine the numbers corrected over the year.

The numbers of annual corrections are now small and the impact of these and the un-allocated MPANs are very small in relation to the total connected numbers.

NEDL carried out four audits in 2001/02 which looked at 42 000 MPANs and the resulting accuracy was 93% on LV and 97% on higher voltage. Over the last fours years NEDL has annually audited the accuracy of new MPANs connected and this has produced accuracy levels of 96% at LV and 98% at higher voltage. As the new MPAN level is some 15 000 per annum (0.1% of total) the change in overall accuracy is slight.

NEDL's connectivity model is 93.5% accurate at the LV level and 97% accurate at the higher voltage level. This has not changed since 2003/04.

The remaining inaccuracy is due to the initial allocation of MPANs to the connectivity model including inaccuracies in the allocation of some higher voltage MPANS.

Future changes

There are no immediate plans in NEDL to make future changes to its systems that will affect the accuracy of reporting. NEDL is continuing its internal audit process and uses feedback from all incidents and pre-arranged outages to correct any errors found in the connectivity model in the group.

Audit opinion on measurement systems

The auditors, having reviewed NEDL's systems and audited the incidents selected by Ofgem and studied the MPAN and connectivity update processes are of the opinion that NEDL's estimation of accuracy is correct.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

During the audit of the higher voltage incidents no persistent or chronic source of significant errors were observed. The errors that did occur over-reported the higher voltage incident CIs by 0.81% and underreported CMLs by 0.23% which is well within the permitted tolerance.

A small number of errors were caused by the fact that some HV substations recorded zero customers, although there was a traded MPAN, which resulted in manual corrections being required. In addition, the use of the two thirds rule concerning a single

phase fuse operation on the HV network was on some occasions incorrectly applied. In one case it was not applied at all resulting in over-reporting.

The need for manual intervention for incidents where customers are directly connected to the E/HV network is normally due to incorrect snapping.

A zero return can occur for one of the following reasons:

- Idle Services.
- Incorrect snapping where the customer is connected to an adjacent S/S.
- Where a customer has more than one supply, but only one MPAN, one of the supply points will count as zero customers.

In NEDL, when a substation shows zero customers (from the output of the connectivity model), the control engineer will add a single customer to the count for that substation, unless he or she can be certain that the zero is correct.

In general NEDL had a good audit trail for the HV incidents with date and time stamped documents available for inspection. However, some data entry errors were noted where data was entered from another person's hand written NaFIRS report proforma.

LV incident reporting has improved compared with previous years. This improvement is noticeable through the increased clarity of information provided in the reports seen by the auditors. This assists the auditors and also aides the entry by the dispatchers of fault data for the reporting of CMLs and CIs to Ofgem.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.22%
	Overall MPAN Measurement	100.20%
	LV MPAN Measurement	100.12%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.18%	Over
	Overall CML	100.00%	Over
	LV CI	99.60%	Under
	LV CML	93.88%	Under
Combined Accuracy	Overall CI	99.62%	Over
	Overall CML	99.80%	Over
	LV CI	99.72%	Under
	LV CML	94.00%	Under

It is auditors' opinion that reporting of NEDL under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

The following recommendations were included in the 2003/04 audit;

NEDL develops a standard phraseology for use in conveying information from the field to the dispatcher and to assist in the audit LV of incidents.

- This year the LV audits were much improved and easier to follow due to the use of standard phraseology.

NEDL logs the nature and location of the LV incident (once found) as well as any protective devices that operated. This is required to permit the visiting auditors to verify the customer numbers.

- This year the LV audits were improved by the reporting and recording of the nature and location of the incident.

NEDL continues to benchmark itself against industry best practice to ensure that it maintains or improves its position in relation to the industry's leaders.

- NEDL have continued to improve and are looking to introduce best practice across its two licence areas.

2004/05 Audit

Recommendations for NEDL concerning the current year are as follows;

- NEDL should now consider correctly capturing all higher voltage connected customers onto the associated substations within the connectivity model;
- The use of standard terminology in fault reports should be continued: and
- NEDL should continue to ensure that full details of the fault, its nature and location and the restoration of supply stages are included in the reports and retained as part of the audit trail.

Recommendations for Ofgem

Recommendation for Ofgem is as follows:

- The inclusion of the DNO's reported times in the work book adds clarity and helps to streamline the audit process and should be continued.

Trial of DPCR4 Audit Process

Results

DPCR4 trail Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.96%	100.20%	99.85%	97%	Pass
Overall CML Accuracy	99.62%	100.20%	99.82%	97%	Pass
LV CI Accuracy	101.75%	100.12%	98.13%	92%	Pass
LV CML Accuracy	101.69%	100.12%	98.19%	92%	Pass

DPCR4 trail Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.29%	100.20%	99.51%	95%	Pass
Overall CML Accuracy	99.97%	100.20%	99.83%	95%	Pass
LV CI Accuracy	99.60%	100.12%	99.72%	90%	Pass
LV CML Accuracy	93.88%	100.12%	94.00%	90%	Pass

Issues Encountered

No issues were encountered during the trial of the DPCR4 audit process.

Additional Exceptional Events Incidents

All five exceptional event incidents were audited and only one error was found. This concerned a restoration input time error. All changes in customer numbers since the incident were explained.

Appendix H. CE Electric UK - Yorkshire Electricity Distribution Ltd. (YEDL)

Summary

Area	Main findings
Interpretation of the RIGs	There have been no changes in the way in which YEDL has interpreted the definition and guidance contained in Version 2 of the RIGs with regard to the reporting on the number and duration of interruptions.
MPAN Count	YEDL confirms that there have been no changes to the way in which it identifies customers by MPAN count.
Connectivity model	There have been no significant changes to the YEDL GIS based connectivity model.
Overall reporting	The auditing of the higher voltage incidents was assisted by the provision of system time stamped customer numbers recorded at the time of the incident. Most errors were due to mistakes in the manual transcription of data from hand written logs into the fault report or arithmetic errors in calculating the number of customers involved. Problems were experienced in determining higher voltage customer counts.
LV reporting	The quality of the audit trail for LV incidents was patchy. This was primarily due to the lack of sufficient information contained in TMS for some faults. It is essential that YEDL carry out additional training to ensure that all staff are aware of the importance of logging the complete incident information into the TMS system to ensure that a full audit trail is kept.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	98.57%	Under	95%	Pass
Overall Sample CML	98.62%	Under	95%	Pass
LV Sample CI	97.53%	Over	90%	Pass
LV Sample CML	99.78%	Over	90%	Pass

It is auditors' opinion that reporting of YEDL under the IIP scheme meets the required levels of accuracy.

Introduction

The audit of 2004/5 IIP reporting for the YEDL Distribution Network Area was carried out at the YEDL offices in Gelderd Road, Leeds, from 27 to 29 June 2005. Ofgem's Auditors were John Woodhouse (Team Leader) and Chee K Lee, both from Mott MacDonald.

The Auditors would like to thank YEDL for their full cooperation and for making key members of staff available to assist the visiting auditors in carrying out the higher voltage and LV audits.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

Trouble Management System (TMS) and Incident Reporting and Information System (IRIS) are used for data capture and incident management and there are automatic links from the New Connections System (NCAS) and the Meter Point Registration System (MPRS). Higher voltage and LV reporting is undertaken through IRIS in which reportable incidents are automatically captured as determined by the incident type in TMS. Users are required to complete IRIS reports before incidents can be closed down.

A more detailed summary of YEDL's measurement systems can be found in the 2002/03 audit report [12].

As explained in the 2003/04 audit report[13], TMS has now completely replaced the CCH (Customer Call Handling) system since June 2004. YEDL reported that they are in the process of migrating the HV control systems to a common standard to NEDL (i.e. NMS) and that the HV control room would be moved to share the same site with NEDL.

Changes since last year

Interpretation of RIGS

YEDL confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS with regard to the reporting on the number and duration of interruptions.

MPAN count

YEDL confirms that there have been no changes to the way in which it identifies customers by MPAN count.

A summary of the MPANs count together with a description of the accuracy calculation was provided to the visiting auditors during the 2005 audit visit.

As of 24 June 2005, there were 2,197,043 Active Primary Traded MPANs in the connectivity model, with 1,065 HV MPANs and the remaining LV MPANs.

Connectivity model

There have been no reported changes to the YEDL GIS based connectivity model.

A monthly report is run against MPRS to identify MPANs that are not loaded into GIS, this is then passed to the Information Management Section to be followed up.

A summary of the overall accuracy of the connectivity model (data as of 24 June 2005):

- No. of MPANs from MPRS = 2,206,527

[12] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Section R3.1

[13] Information and Incentives Audit of Incident Reporting 2003/04 (Ofgem September 2004) Appendix H

- No. of MPANs loaded into GIS = 2,197,386
- No. of MPANs not loaded (no matching address) = 9,141
- The number of MPANs "unconnected" (correctly matched address but the property is no longer serviced or demolished) = 18,343
- The number of "phantoms" (no exact matching address but still placed in GIS, allocated to the relevant post code area) = 125,630

YEDL's connectivity model accuracy quoted for both HV & LV levels = 97.4%

Some 11,000 problems were resolved when the MPAN data was imported into the TMS system (6,500 MPANs which were connected to the Network but not being fed by a substation, mainly due to conflicting "open point" issues).

Once an MPAN has been placed within the connectivity model, YEDL do not retain the historic status of MPANs.

Future changes

There are no immediate plans in YEDL to make future changes to its systems that will affect the accuracy of reporting. There are ongoing projects to correctly assign the phantom MPANs and to resolve the issues associated with improving the overall accuracy of the connectivity model.

Audit opinion on measurement systems

The auditors have reviewed the MPAN and connectivity model update processes and are of the opinion that YEDL's estimation of accuracy is accurate.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

In general YEDL had a good audit trail for the higher voltage incidents with date and time stamped documents available for inspection. The following are issues identified during the audit of the higher voltage incidents:

There were a number of transcription errors involving the incorrect entry of data taken from hand written sheets and some arithmetic errors. These introduced errors into customer numbers and interruption times and were the main source of error observed.

Two HV incidents could not be audited – in one incident, abnormal running arrangements at the time of incident meant that it was not possible to determine the system open points at the time. In the other incident, the date given in the auditing workbook did not match the incident date. The auditors were of the view that the workbook information probably related to another incident.

Where customer numbers differed from current system numbers, YEDL provided evidence of original customer numbers involved at the time of the incident, from system time and date stamped reports.

The exclusion of higher voltage connected customers from the connectivity model made it difficult to audit those incidents where a significant number of these customers were present.

The quality of the audit trail for LV incidents was generally poor. This is primarily due to a lack of a fault log[14] in TMS. In 11 LV incidents, either the start or end times of the restoration stages could not be verified due to the unavailability of the information in the TMS report. These had been reported through Cable Jointers Report or Rapid Response Team Report which were not entered into TMS. Such reports are not kept but were available to the YEDL staff when inputting the IRIS report at the time of incident. Audit times were assumed to be equalled to reported times in order to complete the workbook entries. This meant the Auditors could not verify the missing times or check they had been correctly transcribed. This is the "when" of the fault log.

A total of four LV incidents could not be audited as there were insufficient audit trail and these had to be replaced with spare incidents. However, due to the type of fault, only three of the LV incidents could be replaced with spares while the remaining incident was omitted from the overall sample.

In addition, there were a number of incidents during the audit where YEDL had to speak to its field staff in order to identify the location of a fault when it was part way down a feeder. This is the "where" of the fault log. If this information had not been made available during the audit, say due to staff retirement or holidays, then the number of customers involved in these incidents could not have been verified. This information clearly needs to be recorded in the fault log at the time of the incident to act as an audit trail.

The following are other issues identified during the audit of the LV incidents:

- There were missing restoration stages in two incidents;
- Two 11kV pre-arranged incidents were wrongly classified as LV;
- One incident involving 'clock-stopping' at the customer request;
- In one pre-arranged incident, the actual start time was reported earlier than the carded start time; and
- Some errors associated with calculating customer numbers involved with single phase fuse outage – YEDL connectivity model details the number of LV single phase and three phase customers.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	98.75%
	Overall MPAN Measurement	98.75%
	LV MPAN Measurement	98.71%

[14] A "fault log" is similar to a higher voltage control room log that contains step by step details of what was found, where it was found and when it was found. Likewise, actions taken to repair and restore supplies should include these "what, where and when" aspects in the incident report in the TMS fault log to provide a full history of each incident.

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.82%	Under
	Overall CML	99.87%	Under
	LV CI	103.81%	Over
	LV CML	101.53%	Over
Combined Accuracy	Overall CI	98.57%	Under
	Overall CML	98.62%	Under
	LV CI	97.53%	Over
	LV CML	99.78%	Over

It is auditors' opinion that reporting of YEDL under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

Further annotations on the computerised printouts would facilitate next year's audit and remove the need for some cross-referencing of the various restoration stages of an incident between YEDL's print outs and its completed NaFIRS reports.

- The introduction of NMS will reduce the need for cross-referencing.

Some further staff training in the use of the GIS connectivity model may be beneficial in reducing MPAN counting errors at the LV level.

- Further staff training carried out in line with the full introduction of IRIS recording for NAFIRS data. Training was provided to all Repairs Engineers and Dispatchers on the inputting of customer numbers.

Improvement to the quality of information in the reporting of prearranged incidents would assist in future audits.

- Prearranged incidents are now recorded and logged using TMS (this system was not fully implemented until January 05). The quality of information therefore has improved.

2004/05 Audit

- The lack of a comprehensive fault log in TMS for some LV incidents must be rectified by carrying out training to ensure that all staff are aware of the importance of recording the "what, where and when" of each incident into the TMS fault log to ensure that an adequate audit trail is always recorded for each incident.

- The exclusion of higher voltage connected customers from the connectivity model makes it difficult to audit those incidents where a significant number of these customers are present. It was observed that control staff often apply local knowledge to a zero customer return (for a substation) and record a customer present, but the risk is that with control rooms being merged and staff retiring, this knowledge will not be maintained and therefore needs to be made available to TMS electronically.

Recommendations for Ofgem

- The addition of the reported start and end times into the workbook was useful to enable the auditors to spot transcription errors and to speed up the calculation of the audit times by reducing the data entry requirements.
- Ofgem should encourage DNOs to now automatically capture the higher voltage customers in the connectivity model or the trouble management system.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.81%	98.75%	98.56%	97%	Pass
Overall CML Accuracy	99.87%	98.75%	98.62%	97%	Pass
LV CI Accuracy	101.60%	98.71%	99.72%	92%	Pass
LV CML Accuracy	96.20%	98.71%	94.95%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.95%	98.75%	98.70%	95%	Pass
Overall CML Accuracy	99.72%	98.75%	98.47%	95%	Pass
LV CI Accuracy	103.81%	98.71%	97.53%	90%	Pass
LV CML Accuracy	101.53%	98.71%	99.78%	90%	Pass

Issues Encountered

No issues were encountered during the trial of the DPCR4 audit process.

Additional Exceptional Events Incidents

One incident was not audited because there was no evidence to determine a stage end time. There were no issues with the other four incidents except for a change in customer numbers which probably was right at the time of the incident but the change could not be proved.

Appendix I. Scottish and Southern Energy – SEPD

Summary

Area	Main findings
Interpretation of the RIGs	SSE confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.
MPAN Count	Visiting auditors have reviewed SSE's calculations and processes on previous audit visits. The company indicated that there has been no change since the 2003/04 audit. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its MPAN counts for its SEPD licensed area as 100.00% at the Higher Voltage and 99.99% at the LV feeder level.
Connectivity model	Visiting auditors have witnessed the various processes by which SSE updates its connectivity model on previous audit visits. The company indicated that these processes remain unaltered since the 2003/04 audit. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its connectivity model for its SEPD licensed area as 99.90% at the Higher Voltage and 98.50% at the LV feeder level.
Overall reporting	The accuracy of overall reporting was found to be high for both CI and CML. The main reasons for variations were due to normal day to day changes in customer connections, transcription errors and missed stages. The errors in incident duration were mainly due to wrongly recorded start or finish times.
LV reporting	The accuracy of LV reporting was not quite as high as in previous years particularly where CML was concerned. This was not due to any increase in the number of errors but the effect certain incidents had on the results. The reasons for the errors generally were due to misinterpretation of data.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.22%	Under	95%	Pass
Overall Sample CML	98.40%	Under	95%	Pass
LV Sample CI	98.12%	Over	90%	Pass
LV Sample CML	93.95%	Over	90%	Pass

It is auditors' opinion that reporting of SEPD under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at SEPD's Network Management Centre (NMC) in Portsmouth between 23 and 27 May 2005. The visiting auditors were Gordon Roberts (Team Leader) from BPI and Oliver Joseph from BPI. Mike Green managed the audit on behalf of the DNO with John Blyth, Alan Cranstone and Adrian Sims working with the visiting auditors. James Hope from Ofgem attended for the first 2 days with his colleague, Leigh Williams attending for the first day.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the SSE team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

SSE uses common systems in the SHEPD and SEPD licensed areas for its Network Management process, customer call handling, resource dispatch and regulatory reporting.

The key systems in use for operational purposes and for providing IIP data are the Energy Network Management and Control System (ENMAC) and the Supply Incident Management System (SIMS). A summary of the way in which these systems are used for the SEPD licensed area is given in the audit report for reporting year 2002/03[15].

SSE uses an online system called PI to support stage start and end times. This contains historical information on main circuit breaker operations, network alarms and analogue data.

Changes since last year

Interpretation of RIGS

SSE confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.

During the 2004/05 reporting year SSE changed its policy on "stopping the clock" by moving to a policy where it no longer uses it.

MPAN count

SSE confirms that there have been no changes to the way it identifies customers by MPAN counts and examined during the 2002, 2003 and 2004 audits.

Active Primary Traded MPANs in SEPD connectivity model (May 2005): 2,802,379.

[15] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix N3.1.

Primary Traded MPANs in SEPD MPRS (May 2005): 2,802,513.

Difference (May 2005): 134.

Connectivity model

There has been no change in the structure and operation of SEPD's connectivity model since the audit for reporting year 2001/02. From the original creation of the model, all MPANs have been included in the model except those in Work In Progress in the New Connection Process. Those with insufficient information to accurately place them have been included in a "dummy" LV feeder (feeder 20). These MPANs are included in the HV model. Over time some of these have been reviewed and moved to correct LV feeders. SSE explained the process used of correcting active MPANs as more information becomes available as a result of information gained from sources including pre-arranged and unplanned incidents. The auditors did audit an incident where it was clear that re-referencing an MPAN had taken place.

Since the creation of the model the effect of these changes, although an improvement, is negligible. In most cases the change involves single customers and has meant that over the history of the model the number of premises attached to feeder 20 has reduced from over 2000 to about 1200 or about a 0.03% change to the LV model and no change to the Higher Voltage model.

Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its connectivity model for its SEPD licensed area as 99.90% at the Higher Voltage and 98.50% at the LV feeder level.

Future changes

SSE plan no future changes to its measurement systems. Ongoing corrections will be continued to be made as and when information becomes available but this will have negligible effect on accuracy.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that SEPD has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs robust procedures for maintaining the accuracy of both of them. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Including spare incidents, Higher Voltage incidents with 349 stages were audited. This was a relatively large number to audit. Two Higher Voltage incidents could not be audited and all LV incidents were audited. The reasons for not auditing these incidents were that in one case information to confirm the recorded start time was not available and in the second case despite considerable effort the effect of considerable network changes could not be unravelled satisfactorily. Some data from the online historical network data base PI was not available which would have prevented the auditing of more Higher

Voltage incidents. However SSE agreed to run a number of overnight jobs on archived ENMAC data which provided the information the auditor required.

On the Higher Voltage sample, in considering customer numbers, SSE routinely did not try to justify changes. The audit was conducted on a SEPD system loaded with the current data and was therefore up to 15 months out of date compared to the dates of the incident. This meant that on customer numbers there were many stages with small variations. There were not many errors on customer numbers due to input issues. On restoration durations there were a number of input errors caused mainly by transcription errors or misinterpreting information. Six restoration stages had to be inserted into the Higher Voltage sample.

The reporting of the LV sample was found to generally sound with some comprehensive call notes to enable the audit of the incidents. Unfortunately some errors on a few incidents caused the DPCR 3 CML accuracy not to be as high as it could have been.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	99.99%
	LV MPAN Measurement	99.95%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.24%	Under
	Overall CML	98.41%	Under
	LV CI	101.93%	Over
	LV CML	106.10%	Over
Combined Accuracy	Overall CI	99.22%	Under
	Overall CML	98.40%	Under
	LV CI	98.12%	Over
	LV CML	93.95%	Over

It is auditors' opinion that reporting of SEPD under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to SSE.

SEPD may benefit by reconsidering its decision not to update its connectivity model following planned interruptions on the LV network.

- If information arises in these instances SEPD would update its model. However it does not routinely check with all customers that they were off supply as expected. After discussions it was decided that the general processes to improve accuracy were acceptable and this recommendation should not be taken further.

It would be prudent for the company to carry out internal audit checks on all higher voltage faults where the automatic transfer between ENMAC and SIMS does not occur for whatever reason, as the manual intervention at this stage introduces a further opportunity for human error to creep in. Whilst internal audit checks are carried out regularly they do not appear to be included in the company's audit governance process and no formal records are kept. This is particularly important when there is manual intervention at various stages.

- SSE instigated a formal internal audit procedure on SEPD processes and systems part way through the 2003/04 reporting year. However internal audits were generally carried out in accordance with the new procedures throughout the current reporting year.

SEPD should stop the process of "stopping the clock" for prolonged faults in cases where the customer agrees to a deferred supply restoration for whatever reason. The clock continues to be stopped when customers deny access or request to defer their restoration for personal reasons.

- SSE ceased "stopping the clock" during this reporting year in readiness for new guidelines which come into force under DPCR4.

<u>2003/04 Audit</u>

The following recommendations were made by the visiting auditors as a result of the 2003 audit visit to SEPD.

Include the internal audit checks in the formal audit governance process.

- This has been done (see above).

Keep appropriate records of the internal audit checks.

- This is done and auditors should check samples during future audits.

Concentrate on the areas where there is still manual intervention and input to minimise input and transcription errors.

- SSE has in accordance with the auditor's recommendation instigated additional checking to detect manual entry errors. It considers that this has led to some improvements but unless 100% of reports are checked then some errors will arise. SSE considers that it has the right balance between the effort expended on improving accuracy and the improvement required to reduce/eliminate the measured inaccuracy.

2004/05 Audit

- Continue the improvements made to reduce manual entry and data interpretation errors. The auditors noted improvements and efforts put into this matter but consider that opportunities remain for further improvement.
- The information in incident logs was generally good however there were cases when more positive information would have been of value. This covers for example incident start and end times that are from non SCADA generated sources. SEPD should consider whether targeted training on certain staff would lead to further improvements.

Recommendations for Ofgem

- SSE repeated concerns made in the past that visiting auditors do not accept variances in customer numbers which were clearly a result of growth or network changes. It is not feasible for SEPD to provide information to justify all cases.
- The information required to justify the customer number figures particularly on LV networks was debated on a number of occasions. Agreement was reached on individual incidents but for future audits clearer guidelines need to be set particularly where LV faults affect part of the feeder.
- The facility to provide accuracy results subject to QA does seem to be beneficial and outweighs the extra complexity of the incident workbook.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.27%	99.99%	99.26%	97%	Pass
Overall CML Accuracy	97.82%	99.99%	97.81%	97%	Pass
LV CI Accuracy	99.04%	99.95%	99.00%	92%	Pass
LV CML Accuracy	95.35%	99.95%	95.30%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.28%	99.99%	99.27%	95%	Pass
Overall CML Accuracy	98.75%	99.99%	98.74%	95%	Pass
LV CI Accuracy	101.93%	99.95%	98.12%	90%	Pass
LV CML Accuracy	106.10%	99.95%	93.95%	90%	Pass

Issues Encountered

No problems were encountered in performing this trial. It did add marginally to the overall time taken to carry out the audit than would have been expended if a DPCR3 audit only had been undertaken.

Additional Exceptional Events Incidents

Five incidents were audited associated with exceptional events in the 2004/05 reporting year. All were audited and no major issues were found. Extracting data to support this part of the audit did not pose any problems for SSE. The reported figures were accurate with only minor variances generally caused by customer number changes which SSE could not justify because it was unaware of the incidents prior to the audit visit.

Appendix J. Scottish and Southern Energy – SHEPD

Summary

Area	Main findings
Interpretation of the RIGs	SSE confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.
MPAN Count	Visiting auditors have reviewed SSE's calculations and processes on previous audit visits. The company indicated that there has been no change since the 2003/04 audit. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its MPAN counts for its SEPD licensed area as 100.00% at the Higher Voltage and 100.00% at the LV feeder level.
Connectivity model	Visiting auditors have witnessed the various processes by which SSE updates its connectivity model on previous audit visits. The company indicated that these processes remain unaltered since the 2003/04 audit. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its connectivity model for its SHEPD licensed area as 99.90% at the Higher Voltage and 99.90% at the LV feeder level.
Overall reporting	The accuracy of overall reporting was found to be high for both CI and CML. Variations for normal day to day changes in customer connections were generally explained. There were very few input errors and missed stages.
LV reporting	The accuracy of LV reporting was found to be high for both CI and CML. Variations for normal day to day changes in customer connections were generally explained. There were few input errors and no missed stages.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.89%	Under	95%	Pass
Overall Sample CML	99.79%	Under	95%	Pass
LV Sample CI	99.36%	Under	90%	Pass
LV Sample CML	99.40%	Under	90%	Pass

It is auditors' opinion that reporting of SHEPD under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at SEPD's Network Management Centre (NMC) in Portsmouth between 23 and 27 May 2005. The visiting auditors were Gordon Roberts (Team Leader) from BPI and Oliver Joseph from BPI. Mike Green managed the audit on behalf of the DNO with John Blyth, Alan Cranstone and Adrian Sims working with the visiting auditors. James Hope from Ofgem attended for the first 2 days with his colleague, Leigh Williams attending for the first day.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the SSE team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

SSE uses common systems in the SHEPD and SEPD licensed areas for its Network Management process, customer call handling, resource dispatch and regulatory reporting.

The key systems in use for operational purposes and for providing IIP data are the Energy Network Management and Control System (ENMAC) and the Supply Incident Management System (SIMS). A summary of the way in which these systems are used for the SHEPD licensed area is given in the audit report for reporting year 2002/03[16].

SSE uses an online system called PI to support stage start and end times. This contains historical information on main circuit breaker operations, network alarms and analogue data.

Changes since last year

Interpretation of RIGS

SSE confirms that there has been no change in the way it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to reporting on the number and duration of interruptions since the 2003/04 audit.

During the 2004/05 reporting year SSE changed its policy on "stopping the clock" by moving to a policy where it no longer uses it.

MPAN count

SSE confirms that there have been no changes to the way it identifies customers by MPAN counts and examined during the 2002, 2003 and 2004 audits.

Active Primary Traded MPANs in SHEPD connectivity model (May 2005): 698,793.

Primary Traded MPANs in SHEPD MPRS (May 2005): 698,825.

Difference (May 2005): 32.

[16] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix M3.1.

Connectivity model

There has been no change in the structure and operation of SHEPD's connectivity model since the audit for reporting year 2001/02. SSE state that there are very few errors left in the allocation of MPANs to feeders. SSE explained the process used of correcting active MPANs as more information becomes available as a result of information gained from sources including pre-arranged and unplanned incidents. Auditors were shown examples where re-referencing of MPANs had taken place.

Since the creation of the model the effect of these changes, although an improvement, is negligible.

Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy of its connectivity model for its SHEPD licensed area as 99.90% at the Higher Voltage and 99.90% at the LV feeder level.

Future changes

SSE plan no future changes to its measurement systems. Ongoing corrections will be continued to be made as and when information becomes available but this will have negligible effect on accuracy.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that SHEPD has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs robust procedures for maintaining the accuracy of both of them. Nothing arose during the course of the audit which prevents the auditors supporting SSE's estimates of the accuracy.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Across both the Higher Voltage incident and the LV incident samples only one could not be audited and this was a spare. The general information provided to support the audit of incidents was very good.

On the Higher Voltage sample, in considering customer numbers, SSE routinely did try to justify changes. The audit was conducted on a SHEPD system loaded with the current data and was therefore up to 15 months out of date compared to the dates of the incident. This meant that on customer numbers there were many stages with small variations. However considerable effort was made to provide sufficient information to satisfy auditors. Two restoration stages had to be inserted into the Higher Voltage sample. There were relatively few errors caused by input error on both customer numbers and restoration durations.

The reporting of the LV sample was found to be good with some comprehensive call notes to enable the audit of the incidents. In a number of cases SSE were able to justify changes in customer numbers compared with the current system data. A few errors were noted due to transcription and misinterpretation of data issues.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	100.00%
	LV MPAN Measurement	100.00%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.89%	Under
	Overall CML	99.79%	Under
	LV CI	99.36%	Under
	LV CML	99.41%	Under
Combined Accuracy	Overall CI	99.89%	Under
	Overall CML	99.79%	Under
	LV CI	99.36%	Under
	LV CML	99.40%	Under

It is auditors' opinion that reporting of SHEPD under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

The following recommendations were made by the visiting auditors as a result of the 2003 audit visit to SSE.

SHEPD may benefit by reconsidering its decision not to update its connectivity model following planned interruptions on the LV network.

- If information arises in these instances SHEPD would update its model. However it does not routinely check with all customers that they were off supply as expected. After discussions it was decided that the general processes to improve accuracy were acceptable and this recommendation should not be taken further.

It would be prudent for the company to carry out internal audit checks on all higher voltage faults where the automatic transfer between ENMAC and SIMS does not occur for whatever reason, as the manual intervention at this stage introduces a further opportunity for human error to creep in. Whilst internal audit checks are carried out regularly they do not appear to be included in the companies audit governance process and no formal records are kept. This is particularly important when there is manual intervention at various stages.

- SSE instigated a formal internal audit procedure on SHEPD processes and systems part way through the 2003/04 reporting year. However internal audits were generally carried out in accordance with the new procedures throughout the current reporting year.

SHEPD should stop the process of "stopping the clock" for prolonged faults in cases where the customer agrees to a deferred supply restoration for whatever reason. The clock continues to be stopped when customers deny access or request to defer their restoration for personal reasons.

- SSE ceased "stopping the clock" during this reporting year in readiness for new guidelines which come into force under DPCR4.

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to SHEPD.

Include the internal audit checks in the formal audit governance process.

- This has been done (see above).

Keep appropriate records of the internal audit checks.

- This is done and auditors should check samples during future audits.

Concentrate on the areas where there is still manual intervention and input to minimise input and transcription errors.

- SSE has in accordance with the auditor's recommendation instigated additional checking to detect manual entry errors. It considers that this has led to some improvements but unless 100% of reports are checked then some errors will arise. SSE considers that it has the right balance between the effort expended on improving accuracy and the improvement required to reduce/eliminate the measured inaccuracy.

2004/05 Audit

- Continue the improvements made to reduce manual entry and data interpretation errors. The auditors noted improvements and efforts put into this matter but consider that opportunities remain for further improvement.

Recommendations for Ofgem

- SSE repeated concerns made in the past that visiting auditors do not accept variances in customer numbers which were clearly a result of growth or network changes. It is not feasible for SHEPD to provide information to justify all cases.
- The information required to justify the customer number figures particularly on LV networks was debated on a number of occasions. Agreement was reached on individual incidents but for future audits clearer guidelines need to be set particularly where LV faults affect part of an LV feeder.
- The facility to provide accuracy results subject to QA does seem to be beneficial and outweighs the extra complexity of the incident workbook.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.86%	100.00%	99.86%	97%	Pass
Overall CML Accuracy	99.70%	100.00%	99.70%	97%	Pass
LV CI Accuracy	99.47%	100.00%	99.47%	92%	Pass
LV CML Accuracy	99.49%	100.00%	99.48%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.87%	100.00%	99.87%	95%	Pass
Overall CML Accuracy	99.76%	100.00%	99.75%	95%	Pass
LV CI Accuracy	99.36%	100.00%	99.36%	90%	Pass
LV CML Accuracy	99.41%	100.00%	99.40%	90%	Pass

Issues Encountered

No problems were encountered in performing this trial. It did add marginally to the overall time taken to do the audit than would have been expended if a DPCR3 audit only had been undertaken.

Additional Exceptional Events Incidents

Five incidents were audited associated with exceptional events in the 2004/05 reporting year. All were audited and no major issues were found. Extracting data to support this part of the audit did not pose any problems for SSE. The reported figures were accurate with only minor variances generally caused by customer number changes which SSE could not justify because it was unaware of the incidents prior to the audit visit.

Appendix K. Scottish Power Distribution - SPD

Summary

Area	Main findings
Interpretation of the RIGs	SPD confirms that there have been no changes in the way in which it has interpreted Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed SPD's calculations and internal audit documentation and agree with its estimated accuracy of its MPAN counts.
Connectivity model	The visiting auditors have witnessed the various routines by which SPD updates its connectivity model and confirm that it has not reduced its focus on continually improving the accuracy of its model. The visiting auditors agree with SPD's estimate of MPANs that can attract CI and CML in the connectivity model as 99.2 % at the HV and above level and 99.2% at the LV feeder level.
Overall reporting	The accuracy of overall reporting for both CI and CML is similar to that for the 2003/04 reporting year. This reflects the fact that SPD is maintaining its focus on achieving high reporting accuracy.
LV reporting	The accuracy of LV reporting for CI has increased by 4% and reduced slightly for CML compared to the 2003/04 reporting year. The rise in CI reporting accuracy is due to the increased use of "Predicted Numbers" in the LV fault reports.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.05%	Under	95%	Pass
Overall Sample CML	98.84%	Under	95%	Pass
LV Sample CI	97.88%	Under	90%	Pass
LV Sample CML	96.37%	Under	90%	Pass

It is auditors' opinion that reporting of SPD under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at SPD's PowerSystem's Network Management Control Centre in Hamilton on 13 and 14 June 2005. The visiting auditors were Bill Howieson (Team Leader) from Mott MacDonald and Bill Slegg from BPI. Alyn Jones managed the audit on behalf of the DNO with Alan Russell, Alasdair McNaught and George Richardson working with the visiting auditors. A review of the workbook and audit results for SPD

was undertaken by Anne Baikie. Stewart Knox attended on the second day in order to demonstrate SPD's system for capturing MPANs and updating the connectivity model.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the SPD team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by Scottish Power in its SPD licensed area is set out in the 2002/03 audit report [17]. The 2005 audit visit confirmed that there have been no new systems introduced since the 2003/04 audit year. The ENMAC system is used for recording trouble calls, planned shutdowns, incident management and network operations and holds the connectivity model for all voltages. SPD does not use the PC-NaFIRS software package to record and extract data on incident information. Instead it uses its own system, PROSPER, to extract data from the recording systems. IIP rules in accordance with the RIGs are automatically applied to the prime data within PROSPER, ensuring consistency of application of the rules. A Business Objects enquiry report is used to extract data from PROSPER to populate the Ofgem IIP reporting template.

Changes since last year

The information in the following paragraphs was provided by SPD:

Interpretation of RIGS

There have been no changes to the way in which the definitions and guidance of the RIGs have been interpreted. However, following last year's post audit clarification on 'clock stopping', SPD has ceased to use 'clock stopping' for periods where a customer restoration is beyond its control. SPD's view is that exclusion of clock stopping will have a negligible impact on either the number or duration of interruptions.

MPAN count

No changes have been made to the way in which SPD identifies primary traded MPANs.

SPD's method of identifying customer numbers from MPANs is documented in its document (ref: IIP-13-001 issue 4), which details the process of extracting total customer numbers and LV customer numbers from MPANs in accordance with the RIGs.

The total number of active primary traded MPANs in SPD's connectivity model as at 8 June 2005 is:

- At LV: 1,987,982 (This is the HV and above number shown below less HV customers).
- At HV and above: 1,988,939.

[17] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix K3.1

The total number of SPD primary traded MPANs as at 8 June 2005 is:

- At LV: 2,003,966.
- At HV and above: 2,004,943.

The total number of active primary traded MPANs (1 and 2 above), and the total number of primary traded MPANs (3 and 4 above), have not been calculated, but are extracts from SPD's live 'TroubleCALL' and 'MPAS' systems, respectively, as of 8 June 2005.

The total number of active primary traded MPANs has been extracted from TroubleCALL, where each valid customer has a unique Network Property Link (NPL). This is a unique number used to define a supply point to an individual customer. The number of properties in TroubleCALL with an NPL is held in TCS.NETWORK_PROPERTY_LINK, and this is the number of customers at HV and above (2 above). The number of LV customers (1 above) is the number of HV and above customers minus customers connected at higher voltages. .

The total number of primary traded MPANs (3 and 4 above) has been extracted from MPAS using the method documented in process document IIP-13-001.

Connectivity model

When a new MPAN is generated in MPAS it is copied into Customer Directory. Another software programme then copies the MPAN from Customer Directory to TroubleCALL, where it is held, unlinked, until it is connected at substation or LV feeder level. The New Connections Tracking System (NCTS) is used to track the new MPAN from creation, through the various stages of connection and energisation, to final connection in the connectivity model where it can attract CI and CML.

Where the connection and energisation status of an MPAN remains uncertain then it resides in TroubleCALL without a network property link.

SPD assigns the following accuracies for its connectivity model at LV and at the Higher Voltages:

- HV and above - 99.2% (1,988,939 / 2,004,943).
- LV = 99.2% (1,987,982 / 2,003,966).

The remaining inaccuracy is as a result of uncertain connection and energisation status of MPANs, as detailed above and also the data issues being addressed by the toolbox initiatives.

Future changes

In the short term SPD will continue with the 'tool-box' initiatives discussed during last year's audit visit. These form a feedback loop and update routine roles have been integrated into SPD's business processes. This is expected to make small incremental improvements to the accuracy of LV reporting (but not HV and above), and importantly will perform a big role in maintaining accuracy. SPD considers that significant costs would be incurred in attempting to improve the accuracy of its measurement systems further (e.g. Postal Address Format (PAF) work. Cost of work £250k, estimated accuracy improvement 0.125%).

The scope for further improvements in accuracy using current measurement systems is limited. In addition, as most inaccuracies in incident reporting are related to constraints

within the measurement systems, then very little scope exists to improve the accuracy of reporting unless the measurement systems are upgraded or replaced.

In the medium to long term, as part of an SP Group strategic IT review, SPD is currently developing systems that will potentially improve the accuracy of reporting in the future. These are:

Oasis Programme – The OASIS programme (Office And Site Integrated Systems) is concerned with ways of delivering work more directly to field staff. The idea is to provide electronic work packs including, where necessary, GIS maps and job related information directly from the office to mobile devices, which would also provide navigation and routing. The overall programme is expected to improve the way information is transferred to and from the field, and is expected to improve the accuracy between the 'real world' and the IT systems.

Control 2007 Project –Included within the OASIS programme, this project is tasked with finding replacement systems for ICOND and TroubleCALL. The replacement systems will include improved interfaces to allow auto-population of PROSPER incident reports. It is expected that transcription errors will be minimised and thereby improve the accuracy of incident reports at both LV and the higher voltages.

It is anticipated that the above future changes could improve the accuracy of incident reports, but with the scope for future improvements now marginal, SPD believes it is approaching diminishing returns when comparing effort and improvement.

Target implementation is beyond April 2007.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that SPD has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs clear and effective procedures for maintaining the accuracy of both of them.

The visiting auditors support the figures produced by the company of 99.2% for HV and above and 99.2% for LV.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

<u>HV Incidents</u>

SPD have a robust process for reporting system incidents in an IIP compliant way, identifying re-interruptions, requirements for separate incidents and other RIG requirements early.

The audit has demonstrated that SPD has a slight tendency to over report on HV incidents. This is not material in its overall accuracy figures, as demonstrated by the overall audit result, and supports the impression that SPD are reporting accurately and within the rules and spirit of the RIGs.

At the margin, however, it appears that SPD run the risk of including in their returns to Ofgem incidents that should be classified as short interruptions. One example was found in the audit where a 2 minutes and12 second short interruption had been reported as a sustained incident due to rounding errors alone. The impact of this single incident was

comparable with the combined inaccuracies across all other incidents. Evidence was presented which demonstrated that SPD was aware of this issue and had provided guidance to its control engineers.

A learning point that SPD may wish to consider is recording more precisely LV system abnormalities that impact upon customer numbers affected by HV incidents. There is generally no description available in HV incident reports or switching logs to explain customer counts in an incident that significantly differ from the system figures. The supporting evidence of a network count at the time is therefore not always readily to hand. Whilst the time stamped customer count at the time of the incident where the variance is small and largely attributable to customer growth or a dynamic network is adequate, the larger variances that can occur due to system abnormalities can be more difficult to understand.

LV Incidents

SPD provided good auditable evidence of the LV incidents and supported its reported customer numbers at sub-feeder level with GIS data.

The greater use of “Predicted Numbers”, i.e. connectivity model customer number estimates at the time of incidents, in fault reports has resulted in a higher level of time stamped system data being available for audit purposes. The consequence of this has been an increase in CI reporting accuracy from last year.

There was only one incident (INCD-96192-X) where the visiting auditors and SPD agreed that there was insufficient evidence to audit the incident. This incident was a spare (LV spare 2) and therefore did not contribute to the accuracy calculation.

With regard to incident INCD-379569-U (LV26), the fault report had indicated that a number of customers had been force linked from feeder 59 to feeder 87 on the Blackburn Foundry substation. This had given rise to a forced link report which should have resulted in customers being reallocated in the connectivity model. Additionally, the monthly audit of incident reporting undertaken by SPD had indicated that a feeder (59) that does not exist had been included in the connectivity model. Despite this, during the audit the connectivity model still showed that there was a feeder 59. Although the visiting auditors are satisfied that the customers numbers were substantially reported correctly since the reported customer numbers included customers on both feeders, this is an example where the connectivity model has not been updated when an inconsistency has been identified.

SPD has undertaken to pursue this issue to ensure that its connectivity model is accurate for the substation. The visiting auditors recommend that SPD not only ensures that the connectivity model is accurate but it determines why its updating processes did not operate correctly in this case.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	99.20%
	Overall MPAN Measurement	99.20%
	LV MPAN Measurement	99.20%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.85%	Under
	Overall CML	99.63%	Under
	LV CI	98.67%	Under
	LV CML	97.14%	Under
Combined Accuracy	Overall CI	99.05%	Under
	Overall CML	98.84%	Under
	LV CI	97.88%	Under
	LV CML	96.37%	Under

It is the opinion of the visiting auditors that the accuracy of SPD reporting of incidents overall and LV incidents exceeds the thresholds of 95% for overall reporting and 90% for reporting of LV incidents.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to SPD.

Continue the drive to minimise transcription errors.

- SPD action - Following the recommendations made in the 'Audit of incident reporting 2003/04' final report, SPD raised awareness of HV transcription errors amongst control engineers. In addition, monthly audits are carried out where HV incidents are scrutinised for transcription errors.

Continue to improve the information recorded in Troublecall for all LV incidents, but particularly those where a partial feeder is affected, the thirds rule is applied or running conditions are abnormal. It is not possible improve the level of certainty of CI for LV incidents of this nature until this information is recorded or a more comprehensive system of LV system operation recording is implemented. This information may also be useful to staff in dealing with customer queries following incidents.

- SPD Action - Following the recommendations made in the 'Audit of incident reporting 2003/04' final report, SPD carried out one to one training of all staff involved in the creation and update of LV incidents using TroubleCALL. The training was carried out by SPD staff involved during the audit, and highlighted the importance of recording information in incident report log relating to partial feeder faults, single-phase faults and abnormal running conditions. In addition, monthly audits are carried out where LV incidents are scrutinised for errors.

Consider using an auditable record of changes to the connectivity model enabling current system numbers at any time to be related back to the time of the incident rather than retaining time stamped versions of the connectivity model.

- Following the recommendations made in the 'Audit of incident reporting 2003/04' final report, and the one to one training, SPD's use of "Predicted Numbers" in LV incident reports has doubled. (As HV incident reports record actual customers, this recommendation doesn't apply to HV reporting.)

2004/05 Audit

The following recommendations are made by the visiting auditors as a result of the 2005 audit visit to SPD for its consideration.

- SPD may wish to consider more formal recording of LV system operations and more precise recording of LV system abnormalities, particularly where these have an impact on customers affected by higher voltage incidents.
- SPD should pursue to its conclusion its review of INCD-379569-U (LV26). This review should examine its systems for updating its connectivity model to enable the DNO to understand why these processes did not update the connectivity model in this case.
- SPD should continue to ensure a high percentage of LV fault reports include "Predicted Numbers".

Recommendations for Ofgem

- The visiting auditors do not have any recommendations for Ofgem in relation to the 2005 SPD IIP audit.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.95%	99.20%	99.15%	97%	Pass
Overall CML Accuracy	99.23%	99.20%	98.44%	97%	Pass
LV CI Accuracy	92.86%	99.20%	92.12%	92%	Pass
LV CML Accuracy	93.56%	99.20%	92.81%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.79%	99.20%	99.00%	95%	Pass
Overall CML Accuracy	99.40%	99.20%	98.61%	95%	Pass
LV CI Accuracy	98.67%	99.20%	97.88%	90%	Pass
LV CML Accuracy	97.14%	99.20%	96.37%	90%	Pass

Issues Encountered

There were no particular problems encountered in the trialling of the DPCR4 methodology at SPD. It should however be noted that under the DPCR4 methodology the Stage 2 LV CI and LV CMI accuracies are very close to the threshold of 92%. This is despite the fact that the Stage 3 accuracies are significantly higher than the threshold. The potential volatility within the small sample size used in the approach is considered to be the cause, and to have an unpredictable impact on the result.

Additional Exceptional Event Incidents

Five Exceptional Event incidents were audited (one HV and four LV). SPD had significantly less time to prepare for the audit of these incidents compared with the incidents in the main audit. The level of support documentation provided by SPD during the audit was similar to that of the main audit.

However it was not possible to audit one of the LV events due insufficient information being available. Additionally, there were three additional restoration stages identified, 2 relating to the HV incident and 1 related to an LV incident. Variances were identified in four out of the five incidents audited.

Appendix L. Scottish Power Manweb - SPM

Summary

Area	Main findings
Interpretation of the RIGs	SPM confirms that there have been no changes in the way in which it has interpreted Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed SPM's calculations and internal audit documentation and agree with its estimated accuracy of MPAN counts.
Connectivity model	The visiting auditors have witnessed the various routines by which SPM updates its connectivity model and confirm that it has not reduced its focus on continually improving the accuracy of its model. The visiting auditors agree with SPM's estimate of MPANs that can attract CI and CML in the connectivity model as 99.1% at the HV and above level and 99.1% at the LV feeder level.
Overall reporting	The accuracy of overall reporting for both CI and CML is similar to that for the 2003/04 reporting year. This reflects the fact that SPM is maintaining its focus on achieving high reporting accuracy.
LV reporting	The accuracy of LV reporting for CI has increased by 5% and reduced slightly for CML compared to the 2003/04 reporting year. The rise in CI reporting accuracy is due to the increased amount of auditable information SPM provided in support of its reported customer numbers.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	98.97%	Under	95%	Pass
Overall Sample CML	98.63%	Under	95%	Pass
LV Sample CI	99.26%	Under	90%	Pass
LV Sample CML	92.23%	Under	90%	Pass

It is auditors' opinion that reporting of SP Manweb under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at SPM's PowerSystem Network Management Control Centre in Prenton on 27 and 28 June 2005. The visiting auditors were Bill Howieson (Team Leader) from Mott MacDonald and John Rimell from BPI. Alyn Jones, Matt Corr and Neil Aitken hosted the audit on behalf of the DNO with Russ McAdam and Dave Joseph working with the visiting auditors. A review of the workbook and audit results for SPM was undertaken by Val Ward. Pernille Kjaersgaard from Ofgem attended the audit on the

morning of the first day. Stewart Knox attended on the second day in order to demonstrate SPM's system for capturing MPANs and updating the connectivity model.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the SPM team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of SP Manweb's measurement systems is set out in the 2002/03 audit report[18]. The 2005 audit visit confirmed that there have been no new systems introduced since the 2003/04 audit year. The ENMAC system is used for recording trouble calls, planned shutdowns, incident management and network operations and holds the connectivity model for all voltages. SPM does not use the PC-NaFIRS software package to record and extract data on incident information. Instead it uses its own system, PROSPER, to extract data from the recording systems. IIP rules in accordance with the RIGs are automatically applied to the prime data within PROSPER, ensuring consistency of application of the rules. A Business Objects enquiry report is used to extract data from PROSPER to populate the Ofgem IIP reporting template.

Changes since last year

Information in the following paragraphs was presented to the visiting auditors by SPM.

Interpretation of RIGS

There have been no changes to the way in which the definitions and guidance of section 2 of version 2 of the RIGs have been interpreted. However following on from last year's determination SPM ceased to use 'clock stopping' for periods where customer restoration is beyond its control. SPM's view is that exclusion of clock stopping will have minimal impact on either the number or duration of interruptions.

MPAN count

SPM's method of identifying customer numbers from MPANs is documented in its process document (ref: IIP-13-001 issue 4), which details the process of extracting total customer numbers and LV customer numbers from MPANs in accordance with the QoS RIGs.

The total number of active primary traded MPANs in SPM's connectivity model as at 25 June 2005 is:

- At LV: 1,480,518 (This is the HV and above number shown below less 790 HV customers).
- At HV and above: 1,481,308.

The total number of SPM primary traded MPANs as at 25 June 2005 is:

[18] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix L3.1

- At LV: 1,492,281.
- At HV and above: 1,495,004.

The total number of active primary traded MPANs (1 and 2 above), and the total number of primary traded MPANs (3 and 4 above), have not been calculated, but are extracts from SPM's live 'TroubleCALL' and 'MPAS' systems, respectively, as of 25 June 2005.

The total number of active primary traded MPANs has been extracted from TroubleCALL, where each valid customer has a unique Network Property Link (NPL). This is a unique number used to define a supply point to an individual customer. The number of properties in TroubleCALL with an NPL is held in TCS.NETWORK_PROPERTY_LINK, and this is the number of customers at HV and above (2 above). The number of LV customers (1 above) is the number of HV and above customers minus customers connected at higher voltages.

The total number of primary traded MPANs (3 and 4 above) has been extracted from MPAS using the method documented in process document IIP-13-001.

Connectivity model

When a new MPAN is generated in MPAS it is copied into Customer Directory. Another routine then copies the MPAN from Customer Directory to TroubleCALL, where it is held, unlinked, until it is connected at substation or LV feeder level. The New Connections Tracking System (NCTS) is used to track the new MPAN from creation, through the various stages of connection and energisation, to final connection in the connectivity model where it can attract CI and CML.

Where the connection and energisation status of an MPAN remains uncertain then it resides in TroubleCALL without a network property link.

SPM assigns the following accuracies for its connectivity model at LV and at the Higher Voltages:

- HV and above - 99.1% (1,481,308 / 1,495,004).
- LV = 99.1% (1,480,518 / 1,494,281).

The remaining inaccuracy is as a result of uncertain connection and energisation status of MPANs, as detailed above and also the data issues being addressed by the toolbox initiatives.

Future changes

In the short term SPM will continue with the 'tool-box' initiatives discussed during last year's audit visit. The 'toolbox' initiative's performing feedback loop and update routine roles have been integrated into SPM's business processes. It is anticipated that this will make only very small incremental improvements to the accuracy of LV reporting (but not HV and above) going forward, but more importantly will perform a big role in maintaining accuracy. SPM considers that significant costs would be incurred in attempting to improve the accuracy of reporting further (e.g. Postal Address Format (PAF) work. Cost of work £250k, estimated accuracy improvement 0.125%).

The scope for further accuracy improvements using its current measurement systems is now very limited. In addition, as most of the inaccuracies in incident reporting are related to constraints within the measurement systems too, then very little scope exists to

improve the accuracy of reporting until the measurement systems are either upgraded or replaced.

In the medium to long term, and as part of an SP Group strategic IT review, SPM is currently developing IT programmes that will potentially improve the accuracy of reporting in the future. These are:

Oasis Programme – The OASIS programme (Office And Site Integrated Systems) is concerned with ways of delivering work more directly to field staff. The idea is to provide electronic work packs including, where necessary, GIS maps and job related information directly from the office to mobile devices, which would also provide navigation and routing. The overall programme is expected to positively change the way work is delivered to and from the field, and offers opportunities to improve the accuracy between the 'real world' and the IT systems.

Control 2007 Project –Included within the OASIS programme, this project is tasked with delivering replacement Distribution Management Systems for SPM's ENMAC suit (of ICOND and TroubleCALL). The replacement systems will include improved interfaces to allow auto-population of PROSPER incident reports. It is expected that transcription errors would be minimised and as a result that the accuracy of incident reports at both LV and the higher voltages would improve.

It is anticipated that the above future changes could marginally improve the accuracy of incident reports, but as the scope for further improvements is now very limited, SPM anticipates that it would see diminishing returns in attempting to improve the accuracy still further.

Target implementation is beyond April 2007.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that SPM has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs clear and effective procedures for maintaining the accuracy of both of them.

The visiting auditors support the figures produced by the company of 99.1% for HV and above and 99.1% for LV.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

During the introductory session SPM provided a presentation in relation to the fact that its LV system in some urban areas was interconnected. Customer numbers determined by its connectivity model in these areas used virtual open points rather than actual open points since the interconnected system typically ran as a closed network between 2 or more substations. Other LV networks i.e. those in rural and non-interconnected urban areas, used actual open points.

SPM records HV and LV incident start times and HV finish times to the second but consistently rounds down to the nearest minute for IIP reporting purposes. During the audit, audited incident start times were rounded to the nearest minute. Based on discussions with SPM during the visit and within the audit team after the visit it was decided after the visit to revise the audited start and finish times to reflect SPM's practice

of rounding down. This is because SPM is consistent in its application of rounding down start and finish times. The workbook was revised and the amended results agreed with SPM. This report contains the amended results.

Audit of HV Incidents

SPM provided good, auditable evidence for HV incidents. Current system customer numbers and operational configurations were available from a live version of the network management system, ENMAC, and time-stamped hard documents were available to verify customer numbers at the time of the incident. Where the network configuration had changed, SPM were able to retrieve a copy of the network arrangements pertaining to the time of the incident. The provision and quality of control room schedules and other supporting documentation was generally high.

One incident (F-5043-B) could not be audited and was replaced with HV Spare 2. The incident involved the loss of a part of the HV network which is supported by the LV interconnected system, and consequently this would normally not incur a loss of any customer supplies. However part of the LV interconnected system failed during this incident, causing the loss of some supplies, as evidenced by a number of recorded customer calls. The visiting auditors and SPM agreed that there was insufficient evidence to ascertain which part of the interconnected LV system failed, and at what time it was restored.

This incident leads to a general concern over the reporting of HV incidents involving those parts of the network normally supported by the interconnected LV system. One potential source of error is that control room staff will fail to recognise that affected parts of the HV network are supported by the LV interconnected system, and will report those customers connected to it as interrupted supplies. Similarly, there is a potential source of reporting error in the event of a partial loss of the LV interconnected system.

Although most changes to customer numbers were proven by the time stamped documents previously mentioned, in the case of 4 incidents suspected changes to customer numbers could not be proven. Of these incidents, it was thought that in some cases staff had incorrectly included Non-Primary Traded MPANs to the system-provided count of affected customers.

Other, minor sources of error included four instances of recording the instructed operational time rather than the “carried out” time, three unexplained errors in start and/or restoration times, two instances of reporting all connected customers for a single phase failure, two of not using the first of a sequence of customer calls, one failure to include a substation within the count and one transcription error.

Audit of LV Incidents

SPM provided good auditable evidence of the LV incidents and supported its reported customer numbers at sub-feeder level with GIS data. However, the amount of information contained in the fault reports was limited and from the fault reports reviewed field staff tend to only provide the minimal amount of information required for reporting purposes. Although SPM has carried out training in this area, there is still only a minimal amount of information contained in the fault reports.

The use of “Predicted Numbers”, i.e. connectivity model customer number estimates at the time of incidents, in fault reports was limited and in some cases where “Predicted Numbers” had been provided the fault report did not use these. SPM explained due to its

LV system being interconnected its connectivity model used virtual open points when predicting customer numbers and actual open points where these existed. SPM has provide training to its staff in relation to ensuring that customer numbers are accurately recorded at the time of the fault but many of the faults used customer numbers provided by field staff rather than "Predicted Numbers" from the connectivity model. This was the case even where the fault was on a rural network where actual open points exist and "Predicted Numbers" could be relied on. The provision of good auditable evidence has however resulted in a high level of accuracy in recording of LV customer numbers.

There were two LV incidents: INCD-58576-h and INCD-66978-h that the visiting auditors and SPM agreed that there was insufficient evidence to audit the incident. These incidents were replaced by LV spare4 and LV Spare2 respectively.

With regard to incident INCD-149880-m (LV4), the fault report had indicated that a customer had been forced linked from feeder 61 to feeder 63. However during the audit the customer was still shown to be on feeder 61. In addition, in relation to INCD-147054-m (LV44) the fault report was based on a virtual open point. Since the fault occurred, an actual open point has been established. During the audit the customer numbers produced by the connectivity model used the virtual open point. The model had therefore not been updated to include the actual open point.

SPM has undertaken to pursue these issues to their conclusion. The visiting auditors recommend that SPM not only ensures that the connectivity model is accurate but it determines why its updating processes did not operate correctly in this case.

Audit opinion on accuracy of incident reporting

The audit of SPM's incident reporting systems has resulted in the following accuracies being obtained:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	99.08%
	Overall MPAN Measurement	99.08%
	LV MPAN Measurement	99.08%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.89%	Under
	Overall CML	99.54%	Under
	LV CI	100.19%	Over
	LV CML	93.08%	Under
Combined Accuracy	Overall CI	98.97%	Under
	Overall CML	98.63%	Under
	LV CI	99.26%	Under
	LV CML	92.23%	Under

It is the opinion of the visiting auditors that the accuracy of SPM reporting of incidents overall and LV incidents exceeds the thresholds of 95% for overall reporting and 90% for reporting of LV incidents.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to SPM.

Ensure that the available tools are consistently applied to each incident including an improvement in the information contained in the incident log. This information should include a compulsory field containing details of the cause and nature of the fault, its specific location and the repair actions, including any temporary restoration actions. It should also include an explanation of the customer numbers used if the system numbers are not adopted. SP Manweb may wish to consider the development of an incident log template containing mandatory information fields.

- Following the recommendations made in the 'Audit of incident reporting 2003/04' final report, SPM carried out one to one training of all staff involved in the creation and update of LV incidents using TroubleCALL. The training was carried out by SPM staff involved during the audit, and highlighted the importance of recording information in incident report logs relating to partial feeder faults, single-phase faults and abnormal running conditions. Additionally with the implementation of SPM's CR2 business unit, a new fault management process (QUAL-10-202 Issue 2) has been introduced which reinforces the requirements to obtain and record relevant information. CR2 continue to undertake data analysis and monthly audits where LV incidents are scrutinised for errors.
- SPM has suspended technical development of its current Distribution Management Systems (ENMAC products) which are due to be replaced by the Control 2007 project. However, in the interim period SPM will continue to focus on improvements in its incident reporting by improved record keeping and adherence to the fault management process.

Maintain work records for a full audit year particularly for pre-arranged incidents

- All outages planned and unplanned are recorded within SPM's ICOND (HV) or Troublecall (LV) systems. During the autumn of 2004 the pre-arranged outage management process was centralised within SPM's CR2 business unit. Records for all pre-arranged are now retained centrally.

Reduce customer numbers connected to feeder zero as far as practicable in order to minimise the potential for over reporting.

- Since last year's audit, a 25% reduction in the number of customers connected to feeder zero has been made (now less than 3,000). This has been achieved using the 'toolbox' approach. SPM considers that there may be opportunities for further reductions on completion of its Postal Address Format (PAF) initiative as

the prime reason for customers remaining on Feeder Zero is poor address information preventing a match with a specific LV feeder at the relevant substation.

Ensure that full records are kept by the field controller when a part of the HV system is passed to the field control. These must include all interruption and restoration times and stages, which should then be relayed clearly to the central control engineer for the incident report to be completed.

- SPM's operational instruction for the use of Field Control (OPSAF-11-034) requires all operations completed under field control to be recorded. The instruction specifically states that all operations, which involve the interruption and restoration of supplies, must be recorded by the Field Control person and reported to the Central Control Person.

Link HV metered customers into the system in order that they are included automatically in the customer count for an incident affecting them.

- SPM continues to pursue this recommendation. Since last year's audit, SPM have replaced all HV customer symbols in ICOND with symbols capable of holding an associated NPL link. Linking of HV customer records to these symbols is in progress and targeted for completion within this reporting year, prior to migration to a new system.

Include a facility such as phase tick boxes in the fault management system for the dispatchers to record which phases have operated on HV incidents. The two thirds off rule can be accurately applied to three phase HV transformers to count the customer numbers accurately.

- In SPM, Control Engineers are responsible for completing switching logs and associated fault reports for all HV incidents. They have clear guidance on how to record 'one phase out of three' faults, where the two-thirds rule can be consistently applied.

<u>2004/05 Audit</u>

The following recommendations are made by the visiting auditors as a result of the 2005 audit visit to SPM for its consideration.

- Review the management processes for accurate reporting with regard to the loss of HV networks normally supported by LV interconnected systems. SPM should ensure that disciplines are in place to ensure that control room staff clearly recognise those parts of the network that are normally supported by the LV system and also that they are alerted to any partial or complete failure of the LV system. In the event of loss of supplies, an audit trail should be provided of the extent of the failure, as well as all start and restoration times.
- Ensure that the available tools are consistently applied to each incident including an improvement in the information contained in the incident log. This information should include a compulsory field containing details of the cause and nature of the fault, its specific location and the repair actions, including any temporary restoration actions. It should also include an explanation of the customer numbers used if the system numbers are not adopted.

- SPM should pursue to its conclusion its review of INCD-149880-m (LV4) and INCD-147054-m (LV44). This review should examine its systems for updating its connectivity model to enable the DNO to understand why these processes did not update the connectivity model in these cases.
- SPM should ensure that a higher percentage of LV fault reports include "Predicted Numbers". This is particularly relevant for rural system related faults.

Further Comments from SPM

SPM has made the following additional comments:

Following discussions (resulting from guidance given to the auditors) on the rounding of seconds to minutes for start and end times of HV and LV incidents during the audit, SPM seek clarification on how this should be carried out. (i.e. should further guidance be specified in the QoS RIGs?). SPM will continue to consistently round down unless guidance is issued by Ofgem.

SPM is concerned with the apparent volatility in accuracy between the DPCR4 Stage 2 and Stage 3 results, and are concerned that the sample size is responsible for the volatility.

Recommendations for Ofgem

The visiting auditors do not have any recommendations for Ofgem in relation to the 2005 SPM IIP audit.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.79%	99.08%	98.87%	97%	Pass
Overall CML Accuracy	99.04%	99.08%	98.13%	97%	Pass
LV CI Accuracy	81.79%	99.08%	81.04%	92%	Fail
LV CML Accuracy	97.49%	99.08%	96.59%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.89%	99.08%	98.97%	95%	Pass
Overall CML Accuracy	100.21%	99.08%	99.29%	95%	Pass
LV CI Accuracy	100.19%	99.08%	99.26%	90%	Pass
LV CML Accuracy	93.08%	99.08%	92.23%	90%	Pass

Issues Encountered

There were no particular problems encountered in the trialling of the DPCR4 methodology at SPM. It should however be noted that under the DPCR4 methodology the Stage 2 LV CI accuracy at 81.04% is significantly below the threshold of 92%. This is despite the fact that the Stage 3 accuracy at 99.26% is significantly higher than the threshold. The potential volatility within the small sample size used in the approach is considered to be the cause and to have an unpredictable impact on the result.

Additional Exceptional Event Incidents

Five Exceptional Event incidents were audited (two HV and three LV). The level of support documentation provided by SPM during the audit was similar to that of the main audit.

All incidents occurring during the Exceptional Event could be audited and the audited accuracy of these incidents was similar to that of the main audit.

Appendix M. United Utilities - UU

Summary

Area	Main findings
Interpretation of the RIGs	UU confirms that there have been no changes to the way in which it has interpreted the definitions and guidance contained in Version 2 of the RIGs in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed UU's calculations and internal audit documentation and agree with its estimates of the accuracy of its MPAN counts as 99.95% at the Higher Voltage level and 99.36% at the LV feeder level.
Connectivity model	The visiting auditors have witnessed the various routines by which UU updates its connectivity model. There is a slight fall in the estimated levels of accuracy compared to last year (2003/04 estimates were 100% for HV and 99.4% for LV). The perceived fall in HV accuracy is due to a more realistic assessment of the effect of the average time delay inherent in the monthly MPRS updates to the HV model. The primary cause of the fall in LV accuracy is an increase in the number of duplicated MPANs and the misallocation of some non-primary traded MPANS. These are currently being investigated by UU.
Overall reporting	The accuracy of overall reporting for both CI and CML was similar to the 2003/04 reporting year. Some sources of error have been eliminated since last year's audit, and were only present for incidents that occurred early in the year i.e. before the 2003/04 audit visit. A common reason for customer number variance at HV is that UU are unable to prove changes to customer numbers between the time of the incident and the audit.
LV reporting	The accuracy of LV for both CI and CML was also similar to the 2003/04 reporting year. Although some sources of error have been addressed, there remains a very high proportion of customer number variances caused by the misinterpretation of affected customers from manual reviews of system diagrams. This has led to both under and over reporting of customer numbers, which tends to have a cancelling-out effect at audit. A new source of error, due to computer problems associated with the introduction of an LV fault inferencing system, has caused some variances to incident duration; this is currently being investigated.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.48%	Over	95%	Pass
Overall Sample CML	99.42%	Under	95%	Pass
LV Sample CI	95.08%	Under	90%	Pass
LV Sample CML	95.16%	Under	90%	Pass

It is auditors' opinion that reporting of UU under the IIP scheme meets the required levels of accuracy.

Introduction

The audit of HV incidents was carried out at UU's Distribution System Management Centre in Manchester between 6 and 8 June 2005. The audit of LV incidents was carried out at UU's Network Restoration Centre in Preston on the 8 and 9 June. The visiting auditors were John Rimell (Team Leader) from BPI and Chee Lee from Mott MacDonald. Paul Ward managed the audit on behalf of UU with Rob Snell, Lynne Walker, Denham Croden and Paul Reynolds working with the visiting auditors. James Hope from Ofgem attended on the first 2 days at Manchester.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the UU team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by UU is set out in the 2002/03 audit report [19]. The audit confirmed that a new LV fault inferencing system (LVFI) has been introduced to automate the recognition of HV incidents from customer calls. LVFI was introduced in November 2004 to aid the identification and diagnosis of LV faults only. UU uses a Control Room Management System (CRMS) for HV incident management and this holds the HV connectivity model. The Customer Information and Fault Management System (CIFMS) are used for LV incident management. Automatic call combination was introduced using CRMS in July 2004 (linked to the CIFMS system) to combine calls automatically for HV faults. The LV connectivity model is held in the Fault Information Gathering System (FIGS) and enables staff to count customers affected by LV incidents along individual feeders. Like the majority of DNOs, UU uses the Langhorne Computer software package PC-NaFIRS to record and extract data on incident information.

Changes since last year

Information in the following paragraphs was presented to the visiting auditors by UU.

[19] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix O3.1

Interpretation of RIGS

UU confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGs in regard to the reporting of the number and duration of interruptions.

MPAN count

UU confirms that there have been no fundamental changes to the way in which it identifies customers by MPAN count. UU confirms the methodology remains the same as that contained in UU's letter to Ofgem in June 2001 and as examined during the 2002, 2003 and 2004 audit visits.

Two new sources of MPAN count inaccuracy have been introduced since the last audit. The first of these is due to the misallocation of non primary traded MPANs e.g. metering time switches and un-metered supplies. Previously these were filtered by codes to prevent them from being included in the count. The second source of inaccuracy is some unexplained double-counting of primary traded MPANs. Both sources of inaccuracy are believed to be as a result of the work carried out to introduce a full GIS system, and are currently under investigation. UU is currently cleansing the data held in its GIS system and this is resulting in these inaccuracies. On completing data cleansing UU will be checking its LVFI model accuracy and then submitting it to Ofgem for approval as its system connectivity model. The estimated number of double and wrongly counted MPANs is approximately 2,500 (0.11% of the total) and the result of these errors is that the total MPANs connected at LV are shown as being greater than those counted in the HV model.

The following estimated total number of active primary traded MPANs, and those contained in the HV and LV connectivity models, are derived from monthly MPRS downloads. A summary of the control reports together with a description of the accuracy calculation was provided to the visiting auditors during the 2005 audit visit. (UU Reference MPRS2005FEB07).

Active Primary Traded MPANs (March 15 2005 snapshot): HV=2,302,152; LV=2,293,554.

Primary Traded MPANs (March 15 2005 snapshot): HV=2,303,192; LV=2,308,288.

Connectivity model

There have been no fundamental changes to UU's HV connectivity model since the last audit. The final effort to remove wall board system diagrams has further reduced the risk of newly commissioned substations being missed, since the updating process is now completed at the time of commissioning.

All MPANs are allocated to substations within the CRMS. Any MPAN with a full postcode is attached to the substation nearest to that postcode location whilst those with incomplete postcode details are spread amongst the top 200 feeders expressed in terms of capacity. A monthly re-population process ensures re-allocation of MPANs as relevant postcode details become available. Estimated HV inaccuracy is derived from the period between monthly downloads from the MPRS, during which time it is possible that new MPANs will have been created and/or old MPANs disconnected. This results in an estimated HV model accuracy of 95.95%, based on a mid-point (2 weeks) average net increase/reduction of MPANs.

Since November 2004 HV incident details are directly input to NAFIRS reports, and this has helped to eliminate transcription errors.

UU estimates that LV model accuracy has declined very slightly, from 99.4% to 99.36% during the audit year. The estimated level of accuracy is supported by an assessment of the higher proportion of MPANs now placed within 1 metre of the property in FIGS (98.93%), a reduced number placed within 30m (0.43%) and an increased number unplaced in FIGS at any one time (0.64%).

In July 2004 an automatic call combination system using CRMS was introduced to recognise HV incidents automatically from logged customer calls, as part of a future project to combine HV and LV connectivity models. This introduced a new source of error, particularly during periods of system emergency, when multiple faults are wrongly merged as one incident, leading to misreporting of both CIs and CMLs. The cause of the problem has now been resolved and UU reports that the system now gives satisfactory performance.

Future changes

UU still intends to combine its HV and LV connectivity models by associating MPANs with LV feeder ways and hence also at HV substation level. This will supersede the FIGS system as well as the reliance on a statistical approach for the HV model and will therefore lead to increased accuracy at the micro level for HV incidents. LV accuracy will not be adversely affected by the change and may in fact show improvement since a source of error due to the existing customer counting process will be eliminated.

It is thought that this change may cause audit difficulties during the year of transition and a procedure to overcome these will need to be considered for next year's audit.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that UU has highly accurate procedures for counting primary traded MPANs, has highly accurate connectivity models and employs robust procedures for maintaining the accuracy of both of them. UU's LV Connectivity Model provides a higher level of accuracy of MPAN placement along LV feeders than generally achieved by DNOs and for this reason UU's reported figures can be audited to a greater degree of precision. The visiting auditors support the figures produced by the company.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

A large proportion of audited HV incidents involved variances of customer numbers, incident duration or both. These resulted in both over and under reporting, which largely cancelled out to result in an high overall level of accuracy. Some sources of error that were prevalent at last year's audit have now been eliminated, however since these improvements were introduced as a result of recommendations made at the time of last year's audit, some were still seen on incidents that took place before that audit. A good example of this is the change to rounded SCADA times automatically, which has eliminated variances caused by incorrect manual rounding since its introduction in June 2004.

The most common cause of HV audit customer number variation was the unproven change in customer numbers between incident and audit. As explained above, UU has taken the decision to not alter its procedures and systems to provide an audit trail, pending the introduction of a proposed, combined HV and LV model.

The quality of information in HV logs was generally high. Three incidents were considered to be not auditable and were replaced by spares. Two of these were because field control documents were unavailable and one because the number of customers affected by a pre-arranged shutdown could not be determined.

Some transcription errors were found. Most involved recognition of final restoration time from the HV log whilst others included misunderstanding of the incident start time, due to incorrect use of the first reported customer call or POD operation.

The audit of LV incidents also revealed a high proportion with customer number variances but, once again, these largely cancelled out to result in an overall high level of accuracy. The most common sources of inaccuracy were unproven customer number changes (see above), rounding errors for single and two-phase faults and misinterpretation of the affected customers. The latter source of inaccuracy is a feature of UU's current LV model, which is able to provide a more accurate view of customer to network allocation than most DNOs' systems but which, conversely, can reveal inaccuracies of manual interpretation at audit.

There were far fewer variances of LV incident duration, and this largely reflects the system improvements that have been made to flag the first customer call time automatically as the incident start time. Restoration times reported from site appear far more realistic than at previous audits i.e. they are not predominantly "on the hour". This appears to be as a result of effective staff briefings and management, and gives increased confidence to reported incident durations.

Five LV incidents could not be audited. Two of these were pre-arranged outages, and there was insufficient evidence of both the numbers of affected customers and of the start/restoration times. Two others were LV faults with insufficient evidence of the extent of the affected networks and one could not be audited, as it had been incorrectly merged with another incident by the fault inferencing system, and could not be unpicked.

There were no incidents where clock-stopping had been used, either for LV or HV incidents.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	99.95%
	Overall MPAN Measurement	99.85%
	LV MPAN Measurement	99.36%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	100.67%	Over
	Overall CML	99.58%	Under
	LV CI	95.69%	Under
	LV CML	95.77%	Under
Combined Accuracy	Overall CI	99.48%	Over
	Overall CML	99.42%	Under
	LV CI	95.08%	Under
	LV CML	95.16%	Under

It is auditors' opinion that reporting of UU under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

UU reports that five of the six DNO-specific recommendations made at last year's audit have been, or are in the process of being, implemented. UU have not implemented the recommendation that a better audit trail of customer changes should be introduced by better liaison with New Connection teams, since this would require a significant change to business procedures and systems. They have taken the view that audit variances caused by unproven customer number changes do not have a material effect and that, furthermore, the proposed combined HV/LV model will eventually provide an adequate audit trail.

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to UU.

Ensure that the IIP template is populated with 100% of all reportable figures.

- Checks are now made before template is run to make sure that the NGC figure is set at 100%. UU run the template twice on different days to confirm the result before submission to Ofgem.

Continue to communicate to staff the importance of the accuracy of incident times reported for field operations, particularly on manual disconnection at LV and restoration by alternative sources.

- Ongoing – LV fault dispatchers ring staff to get updated information for customers and also get restoration times as the fault progresses.

Ensure that telecontrol times are automatically rounded to the nearest minute (rounded down when below 3 minutes)

- A modification was introduced in August 2004 to automatically round times up at 30 seconds and down from 29.59 seconds. The facility to see times to the millisecond has been retained and this can be toggled on/off by a button on the historic alarm list. This defaults to rounded values to the nearest minute.

Introduce better liaison with New Connection teams, to provide a better audit trail of customer growth.

- UU have difficulty ensuring that new connections are shown on the GIS system with connection dates for each MPAN. UU would be unable to provide a robust audit trail for this customer growth without significantly changing its procedures/systems. The customer growth shows only a minor effect on the audit results. The revised HV/LV model will allow UU to save a monthly system 'snapshot' which we would be able to use to provide a more accurate customer number count for next year's audit.

Ensure that non-interruption customer calls logged in CIFMS can be easily recognised and not used as incident start times.

- Calls are now logged either as INFO (information) or D/CA (damaged cable) and are merged into the no-supply calls after the incident has been completed.

Indicate LV operational times more clearly on CIFMS.

- LV fault dispatchers and site staff are briefed on the requirement to get individual phase restoration times and restoration times of each stage as the fault progresses.

<u>2004/05 Audit</u>

- Provide a better audit trail for pre-arranged outages. Field staff should systematically report the actual start and end times of each outage, and these should be recorded in the same manner as for LV faults. Better details of the extent of the affected network should be recorded to at least the same requirement as for LV faults.
- Provide a better audit trail for field-controlled operations. Field-controlled operational details that affect the extent and duration of customer interruptions should be as accurately reported, and available for audit, as is the case for centrally-controlled operations.
- Investigate and correct the incident "merging" errors that have been introduced by the LV fault inferencing system.
- Investigate and correct the cause of double and incorrect Primary Traded MPAN counting.

Recommendations for Ofgem

- Agreement is needed on the rules that should apply when the time changes due to the start and end of British Summer time to suggest how DNOs' systems best should ensure that the time change is correctly recognised and that accurate times are reported.

Items suggested for future consideration by Ofgem

- If an incident cannot be audited, and neither can its nominated spare(s), agreement is needed over what should be done to ensure that the required number of incidents is included in the audit.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.99%	99.85%	99.84%	97%	Pass
Overall CML Accuracy	98.93%	99.85%	98.78%	97%	Pass
LV CI Accuracy	94.50%	99.36%	93.89%	92%	Pass
LV CML Accuracy	94.01%	99.36%	93.41%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.28%	99.85%	99.87%	95%	Pass
Overall CML Accuracy	99.57%	99.85%	99.42%	95%	Pass
LV CI Accuracy	95.69%	99.36%	95.08%	90%	Pass
LV CML Accuracy	95.77%	99.36%	95.16%	90%	Pass

Issues Encountered

There were no particular issues encountered in the trialling of the DPCR4 methodology at UU once the visiting auditors became familiar with the operation of the various sections of the incident auditing workbook.

Additional Exceptional Events Incidents

Five Exceptional Event incidents were audited (one HV and four LV). UU had no prior knowledge of these and they were not shown to UU until the time of the audit. UU had no problem with assisting with the audit of these events, and documentation relating to all of the incidents was readily presented.

However it was not possible to audit one of the LV events due to lack of sufficient information to establish the extent of the network outage. This in turn was due to poor event logging during an emergency situation.

The remaining incidents were found to have been reported with a high level of accuracy, with only minor variances.

Appendix N. Western Power Distribution (WPD) – South Wales

Summary

Area	Main findings
Interpretation of the RIGs	WPD confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGs in regard to the reporting on the number and duration of interruptions.
MPAN Count	The visiting auditors have viewed WPD's calculations and internal audit documentation and agree with its estimates of the accuracy of its MPAN counts for its South Wales licensed area as 100.00 % at the Higher Voltage level and 99.91% at the LV feeder level.
Connectivity model	The visiting auditors have witnessed the various routines by which WPD updates its connectivity model and confirm that the DNO has not reduced its focus on continually improving the accuracy of its connectivity model.
Overall reporting	The accuracy of overall reporting for both CI and CML is less than that for the 2003/04 reporting year. This is due to a number of reporting errors found in the higher voltage sample.
LV reporting	The accuracy of LV reporting was very high with only one transcription error. In all cases WPD was able to explain with good auditable evidence any variations in customer numbers since the time of the incident.

The calculated combined accuracy results for the two audit samples are set out in the following table.

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	98.02%	Under	95%	Pass
Overall Sample CML	96.11%	Under	95%	Pass
LV Sample CI	99.91%	Under	90%	Pass
LV Sample CML	99.75%	Under	90%	Pass

It is auditors' opinion that reporting of WPD South Wales under the IIP scheme meets the required levels of accuracy.

Introduction

The audit was carried out at the WPD Church Village Control Centre on 9 and 10 May 2005. The visiting auditors were Geoff Stott (Team Leader) from BPI and Bill Howieson from Mott MacDonald. Alison Sleightholm managed the audit on behalf of the DNO with Carolyn Griffiths, Phil Perkins and Mark Taylor working with the visiting auditors. James Hope and Chris Watts from Ofgem attended both days.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the WPD team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by WPD in its South Wales licensed area is set out in the 2002/03 audit report[20]. The audit confirmed that there have been no new systems introduced since the reporting year 2003/04. The GE Harris ENMAC system is used for recording trouble calls, pre-arranged interruptions (planned shutdowns), incident management and network operations and holds the connectivity model for all voltages. Like the majority of DNOs, WPD uses the Langhorne Computer software package, PC-NaFIRS, to record and extract data on incident information.

Changes since last year

The information in the following paragraphs was presented to the visiting auditors by WPD:

Interpretation of the rigs

WPD confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the rigs in regard to the reporting on the number and duration of interruptions.

MPAN count

WPD confirms that there have been no changes to the way in which it identifies customers by MPAN count. WPD confirms the methodology remains the same as that contained in WPD's letter to Ofgem dated 12 June 2001 and as examined during the 2002, 2003 and 2004 audit visits.

WPD introduced a weekly control report following the 2001 interim review visit. WPD uses this report to monitor the accuracy of the transfer of customers from MPRS and their allocation to its connectivity model.

The following estimates are based on the results of automatic weekly control reports that compare the number of primary traded MPANs with the number in ENMAC on each Monday night of the year. A summary of these control reports together with a description of the accuracy calculation was provided to the visiting auditors during the 2005 audit visit (WPD Reference GA 443).

Active Primary Traded MPANs (annual average) from ENMAC: 1,083,323.

Primary Traded MPANs (annual average) from MPRS: 1,083,315.

[20] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix P3.1

Connectivity model

There has been no change in the structure and operation of WPD's connectivity model since the audit for reporting year 2001/02. Where it is not possible to reference a primary traded MPAN within the connectivity model due to insufficient information, WPD confirms that it still references the MPAN to an invalid feeder and/or substation. WPD uses the term "invalid" to describe feeders or substations that are not associated on its live ENMAC system (so therefore could not be counted as off supply in the event of an interruption) WPD reports that typically these invalid MPANs relate to customers awaiting referencing corrections which have been assigned to dummy feeders or substations.

The visiting auditors were provided with examples of updates to the allocation of MPANs within WPD's connectivity model during the 2005 audit visit. During the audit of incidents, the visiting auditors verified WPD's connectivity model updating routines as follows:

- New MPANs being assigned to true LV feeders within the model;
- New MPANs being added to the connectivity model as a result of pre-arranged incidents (shutdowns) at the HV level;
- Re-referencing MPANs as a result of information gained during both pre-arranged and un-planned incidents; and
- A search within the connectivity model to determine MPANs that had been referenced to the model between the date of the incident and the date of the audit into that incident (at both LV and HV).

WPD continues to use its automatically generated weekly reports detailing customer MPANs that are referenced to an invalid feeder or an invalid substation as examined by the visiting audits during previous IIP audit visits. A summary of the detailed reports for the year was provided to the visiting auditors during the 2005 audit visit. WPD confirms that, for its South Wales licensed area, the summarised average results for the 2004/05 reporting year are as follows:

Customers referenced to an invalid feeder: 413;

Customers referenced to an invalid substation: 567;

Total incorrectly referenced: 980; and

Percentage correctly referenced: 99.91%[21].

WPD views the overall accuracy of its connectivity model as a combination of the extent to which its customer numbers are captured in ENMAC and then the extent to which they are referenced to a valid feeder and substation within its connectivity model. WPD confirms that, for its South Wales licensed area, the results for the 2004/05 reporting year are as follows:

Customers transferred from MPRS: 100.00%;

Percentage correctly referenced: 99.91%; and

Combined accuracy: 99.91%.

[21] WPD reports that this is a worst-case scenario as a customer with both a feeder referencing error and a substation referencing error would be counted twice as incorrectly referenced.

Future changes

WPD reports that no changes are planned to its measurement systems. WPD intends to continue to replicate the IIP audit process on a monthly basis to ensure that it continues to meet the required levels of accuracy of reporting.

Through this process, WPD confirms that it intends to identify opportunities to "learn and improve" and to implement those opportunities across its business.

WPD believes that this approach will ensure that accuracy of reporting is not only maintained but also improved wherever possible.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that WPD South Wales has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs robust procedures for maintaining the accuracy of both of them. The visiting auditors support the figures produced by the company.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of LV reporting was high with only one transcription error where the end times of two restoration stages had been incorrectly reported. In all cases WPD was able to explain with good audit information any variations in customer numbers since the time of the incident. The quality of information in the logs was generally very high. Only one incident was considered unauditable because of network changes since the time of the incident.

The accuracy of reporting at the higher voltage level was found to be less than in previous audit visits. The audit of the sample incidents for reporting year 2004/05 revealed several reporting errors, including missing restoration stages and transcription errors. Two instances were found where a report had been submitted for an incident on a customer's privately owned higher voltage system when no IIP report was necessary as no WPD customers were affected.

These errors affected the accuracy of reporting both CI and CML at the higher voltage levels and consequently the overall accuracy of reporting of both indicators.

In the majority of cases WPD elected not to verify customer number changes since the time of the incident as it considers that its connectivity model is highly accurate. In two cases WPD provided good auditable evidence to verify an increase in customer numbers where new customers had been connected to the network since the time of the incident.

The incidents were recreated on WPD's ENMAC system using the connectivity model as it was on 31 March 2005. Four instances were found where network changes between the time of the incident and 31 March 2005 made it impossible to recreate the incidents until the ENMAC back-up tape of 10 August 2004 was loaded into the system being used for the audit.

WPD confirms that, each month, it continues to internally audit 600 LV incidents across both its licensed areas along the lines of the IIP process and publishes the results across both licensed areas. The visiting auditors believe that this significantly helps in the drive to improve the quality of the data collected and the overall accuracy of WPD's reporting.

For HV incidents the HV Control Managers review in a similar manner the incidents containing the top 50% by CI/CML contribution. However, in the case of its South Wales licensed area, the long-term absence of a key member of its team has resulted in the slippage in the accuracy of reporting of higher voltage incidents found during the audit visit. The visiting auditors were pleased to note that WPD is already working to rectify this fall in its standards.

The visiting auditors consider that WPD is continuing to improve its accuracy of reporting by the quality of information it is receiving from its field teams. Examples of this are the inclusion in its measurement systems of reports from site on the number of customers affected by a sub-feeder fault at the LV level and by actual interruption and restoration times for pre-arranged interruptions at all voltage levels.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	100.00%
	Overall MPAN Measurement	99.99%
	LV MPAN Measurement	99.91%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	98.03%	Under
	Overall CML	96.11%	Under
	LV CI	100.00%	Over
	LV CML	99.84%	Under
Combined Accuracy	Overall CI	98.02%	Under
	Overall CML	96.11%	Under
	LV CI	99.91%	Under
	LV CML	99.75%	Under

As part of the 2003/04 IIP audit, where a restoration stage variance was greater than the sample mean +-4 standard deviations, this was identified as being an outlying restoration stage. This stage was then removed from the sample before the sample accuracy was calculated. Based on comments received from some network operators this approach to removing outlying restoration stages has been modified for the 2004/05 IIP audit. For the 2004/05 audit when an outlying restoration stage has been identified, the whole incident is now removed from the sample and not just the outlying restoration stage. This process is carried out for the accuracy calculation for CI and CML separately.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to WPD.

Continue the drive to minimise transcription errors and improve the quality of information in the logs. The visiting auditors consider that WPD has made good progress in this area over the last audit year. However, more remains to be done and one area to look at in some offices is better estimates of customers off supply for LV sub feeder incidents

- WPD confirms that this recommendation has been implemented in full.

Adopt a consistent approach to reporting the following types of incidents after understanding and agreeing relevant Ofgem requirements:

Extension of a fault zone to include customers who were not interrupted by the initial incident but need to be interrupted in the course of restoring supplies to the original customers affected and/or returning the network to its normal operating configuration;

Reinterruption of supplies to remove a temporary supply arrangement after the 18 hour limit (specified in RIGs Version 2 paragraph 2.24) has been exceeded;

For overrun of pre-arranged incidents the incident completion time needs to be agreed as the planned time or the actual time. If planned time is adopted then a separate incident or restoration stage will have to be raised to cover the additional CML; and

LV backfeeds should be treated as temporary restorations.

- WPD confirms that these issues have been clarified with the publication of version 5 of the IIP rigs, which WPD has implemented in full.

2004/05 Audit

- Complete the programme of training in the reporting of incidents at the higher voltage levels so as to correct the reduction in reporting accuracy noted this year. The impending combination of WPD's two control rooms could provide an ideal opportunity to re-emphasise the importance of the accuracy of reporting of incidents and to identify 'best practise' during team building exercises.
- Continue to improve reporting accuracy by capturing information reported from site in WPD's measurement systems. Examples of improved performance of this nature noted this year include: the number of properties affected by a sub-feeder fault and the actual start and end times for operations that are non-SCADA controlled, such as the connection / disconnection of mobile generation and the start and end times of pre-arranged interruptions.

During the audit there were a small number of incidents relating to LV sub-feeder faults. With regard to these incidents WPD produced little network information in support of field estimates of customer numbers affected. The visiting auditors were of the view that this made verifying customer numbers difficult as field estimates could not be confirmed in

this small number of cases. The visiting auditors are of the view that the audit trail would be improved if WPD provided more network information in support of customer numbers for incidents related to LV sub-feeder faults. WPD is of the view that LV sub-feeder faults are at a level of detail that the connectivity model does not and is not required to support.

There is therefore no way of calculating accuracy at sub feeder level and the availability of information (or otherwise in many cases) means that a site estimate is an acceptable approach.

Recommendations for Ofgem

- WPD repeated the concern expressed in previous years that it appears unreasonable for the visiting auditors not to accept minor variations in customer numbers on the audit of HV incidents even though the LV connectivity model accuracy has been accepted. The process needs to be confirmed for auditing HV incidents where it would be disproportionately time consuming to provide detailed evidence to support minor variances.

Items suggested for future consideration by Ofgem

The time taken to load the ENMAC back-up tape and reconfigure the terminal being used for the audit was approximately five hours. However, its use resulted in each higher voltage incident being auditable. The time taken to make this version of the connectivity model available was reduced by approximately twenty-four hours because WPD had already recovered the back-up tape from its safe storage facility in anticipation that it could be required for the audit visit. The visiting auditors have previously commented that they have not advocated the production and storage of such back-up tapes but its availability in this instance meant that the accuracy of reporting all incidents in the sample could be examined.

Whilst, due to the availability of ‘spare incidents’ within the sample, the audit for reporting year 2004/05 was not affected by the inability to examine these higher voltage incidents without recourse to loading the back-up tape, further consideration could be given to the complexity of so-called ‘unauditable’ incidents and the consequential potential for decreased accuracy of reporting.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	100.03%	99.99%	99.98%	97%	Pass
Overall CML Accuracy	100.22%	99.99%	99.79%	97%	Pass
LV CI Accuracy	100.00%	99.91%	99.91%	92%	Pass
LV CML Accuracy	100.00%	99.91%	99.91%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	98.05%	99.99%	98.05%	95%	Pass
Overall CML Accuracy	96.22%	99.99%	96.22%	95%	Pass
LV CI Accuracy	100.00%	99.91%	99.91%	90%	Pass
LV CML Accuracy	99.84%	99.91%	99.75%	90%	Pass

Issues Encountered

There were no particular problems encountered in the trialling of the DPCR4 methodology at WPD South Wales once the visiting auditors became familiar with the operation of the various sections of the incident auditing workbook. The reduction in the audited reporting accuracy between Stage 2 (the reduced sample) and Stage 3 (the total sample) in all but LV CI Accuracy could be cause for further consideration and analysis.

Additional Exceptional Events Incidents

There were no exceptional event claims in the WPD South Wales area for the 2004/05 reporting year.

Appendix O. Western Power Distribution (WPD) – South West

Summary

Area	Main findings
Interpretation of the RIGs	WPD confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.
MPAN count	The visiting auditors have viewed WPD's calculations and internal audit documentation and agree with its estimates of the accuracy of its MPAN counts for its South West licensed area as 99.99 % at the Higher Voltage level and 99.84% at the LV feeder level.
Connectivity model	The visiting auditors have witnessed the various routines by which WPD updates its connectivity model and confirm that the DNO has not reduced its focus on continually improving the accuracy of its connectivity model.
Overall reporting	The accuracy of overall reporting was very high with few transcription errors. The reporting of pre-arranged interruptions has markedly improved since the 2004 audit.
LV reporting	The accuracy of LV reporting was very high with only one input error. In all but one case WPD was able to explain with good auditable evidence any variations in customer numbers since the time of the incident.

The calculated combined accuracy results for the two audit samples are set out in the following Table:

Sample	Accuracy	Over/Under Reporting	Threshold	Pass/Fail
Overall Sample CI	99.84%	Under	95%	Pass
Overall Sample CML	99.81%	Under	95%	Pass
LV Sample CI	99.74%	Under	90%	Pass
LV Sample CML	99.85%	Under	90%	Pass

It is auditors' opinion that reporting of WPD South West under the IIP scheme meets the required levels of accuracy.

Introduction

The audit of LV incidents was carried out at the WPD Church Village Control Centre on the 10 May 2005 and the audit of HV incidents and a sample of incidents associated with exceptional event claims was conducted at the WPD Exeter Control Centre on 11 and 12 May 2005. The audit visit was concluded with a wrap-up session on 13 May 2005. The visiting auditors were Geoff Stott (Team Leader) from BPI and Bill Howieson from Mott MacDonald. Alison Sleightholm managed the audit on behalf of the DNO with Dave Crocker, Carolyn Griffiths and Neil Griffiths working with the visiting auditors.

The visit arrangements were similar to those for the previous year with the exception of a shortened introductory session on the first morning. The visiting auditors would like to thank the WPD team members for their participation in the audit and in particular for the pre-visit preparation which again contributed significantly to the smooth running of the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of the measurement systems used by WPD in its South West licensed area is set out in the audit report for reporting year 2002/03[22]. The audit confirmed that there have been no new systems introduced since the reporting year 2003/04. The GE Harris ENMAC system is used for recording trouble calls, pre-arranged interruptions (planned shutdowns), incident management and network operations and holds the connectivity model for all voltages. Like the majority of DNOs, WPD uses the Langhorne Computer software package, PC-NaFIRS, to record and extract data on incident information.

Changes since last year

The information in the following paragraphs was presented to the visiting auditors by WPD.

Interpretation of the RIGS

WPD confirms that there have been no changes in the way in which it has interpreted the definition and guidance contained in Version 2 of the RIGS in regard to the reporting on the number and duration of interruptions.

MPAN count

WPD confirms that there have been no changes to the way in which it identifies customers by MPAN count. WPD confirms the methodology remains the same as that contained in WPD's letter to Ofgem dated 12 June 2001 and as examined during the 2002, 2003 and 2004 audit visits.

WPD introduced a weekly control report following the 2001 interim review visit. WPD uses this report to monitor the accuracy of the transfer of customers from MPRS and their allocation to its connectivity model.

The following estimates are based on the results of automatic weekly control reports that compare the number of primary traded MPANs with the number in ENMAC on each Monday night of the year. A summary of these control reports together with a description of the accuracy calculation was provided to the visiting auditors during the 2005 audit visit (WPD Reference GA 443).

- Active Primary Traded MPANs (annual average) from ENMAC: 1,485,192.
- Primary Traded MPANs (annual average) from MPRS: 1,485,300.

[22] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix Q3.1

Connectivity model

There has been no change in the structure and operation of WPD's connectivity model since the audit for reporting year 2001/02. Where it is not possible to reference a primary traded MPAN within the connectivity model due to insufficient information, WPD confirms that it still references the MPAN to an invalid feeder and/or substation. WPD uses the term "invalid" to describe feeders or substations that are not associated on its live ENMAC system (so therefore could not be counted as off supply in the event of an interruption) WPD reports that typically these invalid MPANs relate to customers awaiting referencing corrections which have been assigned to dummy feeders or substations.

The visiting auditors were provided with examples of updates to the allocation of MPANs within WPD's connectivity model during the 2005 audit visit. During the audit of incidents, the visiting auditors verified WPD's connectivity model updating routines as follows:

- New MPANs being assigned to true LV feeders within the model;
- New MPANs being added to the connectivity model as a result of pre-arranged incidents (shutdowns) at the HV level;
- Re-referencing MPANs as a result of information gained during both pre-arranged and un-planned incidents; and
- A search within the connectivity model to determine MPANs that had been referenced to the model between the date of the incident and the date of the audit into that incident (at both LV and HV).

WPD continues to use its automatically generated weekly reports detailing customer MPANs that are referenced to an invalid feeder or an invalid substation as examined by the visiting audits during previous IIP audit visits. A summary of the detailed reports for the year was provided to the visiting auditors during the 2005 audit visit. WPD confirms that, for its South West licensed area, the summarised average results for the 2004/05 reporting year are as follows:

- Customers referenced to an invalid feeder: 1,952;
- Customers referenced to an invalid substation: 485;
- Total incorrectly referenced: 2,410; and
- Percentage correctly referenced: 99.84%.

WPD reports that this is a worst-case scenario as a customer with both a feeder referencing error and a substation referencing error would be counted twice as incorrectly referenced.

WPD views the overall accuracy of its connectivity model as a combination of the extent to which its customer numbers are captured in ENMAC and then the extent to which they are referenced to a valid feeder and substation within its connectivity model. WPD confirms that, for its South West licensed area, the results for the 2004/05 reporting year are as follows:

- Customers transferred from MPRS: 99.99%;
- Percentage correctly referenced: 99.84%; and
- Combined accuracy: 99.83%.

Future changes

WPD reports that no changes are planned to its measurement systems. WPD intends to continue to replicate the IIP audit process on a monthly basis to ensure that it continues to meet the required levels of accuracy of reporting.

Through this process, WPD confirms that it intends to identify opportunities to "learn and improve" and to implement those opportunities across its business.

WPD believes that this approach will ensure that accuracy of reporting is not only maintained but also improved wherever possible.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that WPD South West has highly accurate procedures for counting primary traded MPANs, has a highly accurate connectivity model and employs robust procedures for maintaining the accuracy of both of them. The visiting auditors support the figures produced by WPD.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of reporting at the higher voltage level was high with only one input error where it was agreed that the start time of a restoration stage had been wrongly reported.

In the majority of cases WPD elected not to verify customer number changes since the time of the incident as it considers that its connectivity model is highly accurate. In four cases WPD provided good auditable evidence to verify an increase in customer numbers where new customers had been connected to the network since the time of the incident.

The incidents were recreated on WPD's ENMAC system using the connectivity model as it was on 31 March 2005. No instances were found where network changes between the time of the incident and 31 March 2005 made it impossible to audit the incident.

The accuracy of LV reporting was also high with only one incident where a transcription error in the end time of one restoration stage had resulted in an inaccurate report. In all cases WPD was able to explain with good audit information any variations in customer numbers since the time of the incident. The quality of information in the logs was generally very high. None of the incidents were considered unauditable because of network changes since the time of the incident.

WPD confirms that, each month, it continues to internally audit 600 LV incidents across both its licensed areas along the lines of the IIP process and publishes the results across both licensed areas. For HV incidents the HV Control Managers review in a similar manner the incidents containing the top 50% by CI/CML contribution. The visiting auditors believe that this significantly helps in the drive to improve the quality of the data collected and the overall accuracy of WPD's reporting.

The visiting auditors consider that WPD is continuing to improve its accuracy of reporting by the quality of information it is receiving from its field teams. Examples of this are the inclusion in its measurement systems of reports from site on the number of customers affected by a sub-feeder fault at the LV level and by actual interruption and restoration times for pre-arranged interruptions at all voltage levels.

Audit opinion on accuracy of incident reporting

The accuracies from Stages 1 and 2 are summarised as follows:

Stage 1	Audit Area	Accuracy
MPAN Count	HV MPAN Measurement	99.99%
	Overall MPAN Measurement	99.97%
	LV MPAN Measurement	99.84%

The results from the results of the combined accuracy calculations are shown below:

Stage 2		Accuracy	Over/Under Reporting
Reporting	Overall CI	99.87%	Under
	Overall CML	99.84%	Under
	LV CI	99.90%	Under
	LV CML	100.01%	Over
Combined Accuracy	Overall CI	99.84%	Under
	Overall CML	99.81%	Under
	LV CI	99.74%	Under
	LV CML	99.85%	Under

It is auditors' opinion that reporting of WPD South West under the IIP scheme meets the required levels of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of the 2004 audit visit to WPD.

Continue the drive to minimise transcription errors and improve the quality of information in the logs. The visiting auditors consider that WPD has made good progress in this area over the last audit year. However, more remains to be done and one area to look at in some offices is better estimates of customers off supply for LV sub feeder incidents.

- WPD confirms that this recommendation has been implemented in full.

Adopt a consistent approach to reporting the following types of incidents after understanding and agreeing relevant Ofgem requirements:

Extension of a fault zone to include customers who were not interrupted by the initial incident but need to be interrupted in the course of restoring supplies to the original customers affected and/or returning the network to its normal operating configuration;

Reinterruption of supplies to remove a temporary supply arrangement after the 18 hour limit (specified in RIGS Version 2 paragraph 2.24) has been exceeded;

For overrun of pre-arranged incidents the incident completion time needs to be agreed as the planned time or the actual time. If planned time is adopted then a separate incident or restoration stage will have to be raised to cover the additional CML; and

LV backfeeds should be treated as temporary restorations.

- WPD confirms that these issues have been clarified with the publication of version 5 of the IIP RIGS, which WPD has implemented in full from April 1 2005.

2004/05 Audit

- The impending combination of WPD's two control rooms could provide an ideal opportunity to re-emphasise the importance of the accuracy of reporting of incidents and to identify 'best practise' during team building exercises.
- Continue to improve reporting accuracy by capturing information reported from site in WPD's measurement systems. Examples of improved performance noted this year include: the number of properties affected by a sub-feeder fault and the actual start and end times for operations that are non-SCADA controlled, such as the connection / disconnection of mobile generation and the start and end times of pre-arranged interruptions.

During the audit there were a small number of incidents relating to LV sub-feeder faults. With regard to these incidents WPD produced little network information in support of field estimates of customer numbers affected. The visiting auditors were of the view that this made verifying customer numbers difficult as field estimates could not be confirmed in this small number of cases. The visiting auditors are of the view that the audit trail would be improved if WPD provided more network information in support of customer numbers for incidents related to LV sub-feeder faults. WPD is of the view that LV sub-feeder faults are at a level of detail that the connectivity model does not and is not required to support.

There is therefore no way of calculating accuracy at sub feeder level and the availability of information (or otherwise in many cases) means that a site estimate is an acceptable approach.

Recommendations for Ofgem

- WPD repeated the concern expressed in previous years that it appears unreasonable for the visiting auditors not to accept minor variations in customer numbers on the audit of HV incidents even though the LV connectivity model accuracy has been accepted. The process needs to be confirmed for auditing HV incidents where it would be disproportionately time consuming to provide incidents and the consequential potential for decreased accuracy of reporting.

Trial of DPCR4 Audit Process

Results

DPCR4 trial Stage 2 results refer to the accuracies obtained from the audit of the reduced sample of incidents against the higher level of required accuracy.

Stage 2	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.96%	99.97%	99.93%	97%	Pass
Overall CML Accuracy	99.95%	99.97%	99.92%	97%	Pass
LV CI Accuracy	99.82%	99.84%	99.66%	92%	Pass
LV CML Accuracy	99.44%	99.84%	99.27%	92%	Pass

DPCR4 trial Stage 3 results refer to the accuracies obtained from the audit of the total sample of HV+ and LV incidents in the relevant auditing workbook sheets.

Stage 3	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy	99.92%	99.97%	99.89%	95%	Pass
Overall CML Accuracy	99.76%	99.97%	99.73%	95%	Pass
LV CI Accuracy	99.90%	99.84%	99.74%	90%	Pass
LV CML Accuracy	100.01%	99.84%	99.85%	90%	Pass

Issues Encountered

There were no particular problems encountered in the trialling of the DPCR4 methodology at WPD South West once the visiting auditors became familiar with the operation of the various sections of the incident auditing workbook.

Additional Exceptional Events Incidents

Ten exceptional event incidents were audited in total. Seven were LV and there were no issues found with these. Some errors were found in the higher voltage incidents including two missing restoration stages.

Appendix P. Key Issues Raised at the Post-Audit DNO Workshop

The post-audit workshop held on Wednesday 27 July 2005 at SSE's Reading office was chaired by Ofgem and attended by representatives from all DNOs and from the central BPI/MM audit team.

The workshop was shorter in duration in comparison with previous years reflecting that the audit process is now much more mature and understood than in previous years. The majority of the time was spent on reviewing key points from this year's audit and considering issues for next year's audit. The next audit will be the first under DPCR4 and a number of changes to the audit process will be introduced.

Issues with RIGs

The visiting auditors found no issues with interpretation of the RIGs in contrast to previous years. The current audit was conducted in accordance with RIGs version 2 and it was clear that the DNOs were altering their processes in preparation for RIGs version 5 and DPCR4. Version 5 has addressed points where different interpretations were placed on the treatment of certain incidents by individual DNOs. During the current audit some DNOs raised concerns that in certain circumstances they were expected to raise new incidents when reinterrupting customers to return a network to normal running conditions following final repair work after an incident. These requirements have been clarified in version 5 but still exist. Ofgem made it clear that in future years it would expect auditors to work closely to the guidance given in the RIGs on all matters including this issue and the DNOs needed to modify their processes where necessary.

Incident Samples

The DNOs expressed little concern with the make up of their incident samples.

It was agreed that it would be best to avoid samples where a small number of incidents represented the majority of CI & CML.

The auditors suggested that incidents with more than ten stages should be avoided because of the time to audit them and the greater possibility of these incidents being excluded as outliers (see next sub section). The DNOs agreed that there should be a limit but were not sure whether ten was the correct one.

Most DNOs were asked to provide audit information on five incidents in the reporting year that were part of an exceptional event that they experienced. These incidents were not part of the core incidents used in the various calculations and were on a separate worksheet of the audit workbook. The standard of reporting on these incidents was found in general to be on a par with the incidents in the main sample. Some of the DNOs had no prior warning of the individual incidents that had been selected but appeared to have no issues in providing sufficient data during the audit visit. The suggestion by the visiting auditors that a small number of incidents that the DNOs have had no prior knowledge should form part of next year's audit received no adverse comments.

Outliers & Accuracy Calculations

Discussions took place on the best approach to remove incidents or incident stages from the sample which may disproportionately affect the accuracy calculations. In the audit for 2004/2005 reporting year the total audited CI and or CML for the incident was excluded if the reported CI and or CML of any one stage varied by more than 4 standard deviations

from the mean value. The concern was expressed that the chances of excluding an incident rises in proportion to the number of stages and incidents may be discarded which ultimately should be included. A view was supported that if it was feasible to discard the audited incident CI and or CML only if the total reported incident CI and or CML exceeded the 4 standard deviations from the mean value test then this may be a better approach. It was agreed that the impact of this approach should be tested on this year's audit workbooks so a conclusion could be reached well in advance of the next audit.

The visiting auditors pointed out that although all DNOs passed the minimum requirements of each DPCR3 accuracy calculation, there were wide variations in the percentages of errors in fault reports between individual DNOs. Accuracy calculations involve summing all the positive and negative variances of the samples and DNOs can return good results with relatively high numbers of errors providing they tend to cancel out. It was agreed that the basis of the accuracy calculations should not be changed in this respect for the formal results. However it was further agreed that it would be useful if the workbooks provided additional results based on treating all variances as positive values. This would give more of an indication of the absolute accuracy of reporting on an individual incident basis. This will be investigated using this year's audit workbooks.

Logistics and content of audit

The DNOs were generally happy with this year's compressed timetable. There is no doubt that a considerable amount of effort is involved in the preparation of audit material by the DNOs and the view was that there would be little further opportunities to bring forward the audit start date and reduce the overall duration. DNOs also wanted it understood that if they experienced a system exceptional event in the period of preparing for an audit then dealing with the emergency must be their priority.

Ofgem raised a point concerning the consideration that it was giving to taking a more active part in the audit visits which may lead to them providing one of the two visiting auditors. The DNOs raised no issues with this and could see benefits. However they were keen to ensure that where possible one of the auditors visiting them had experience of their systems and processes.

It was agreed that providing interim accuracy results whilst on site by using the new incident workbook was of considerable benefit and should continued in future years.

A visiting auditor's suggestion that an interim DNO report should be produced at the conclusion of the visit was thought to be worthy of consideration. This report is currently produced by the visiting auditors after they leave site and a period of two weeks can elapse before it is agreed. The style of the existing report would need to change to make it easier for auditors to produce on site and it is suggested that this report forms the basis of discussions at a formal review meeting at the end of the audit visit. The involvement of Ofgem in the review meeting would be beneficial and add greater formality to it. Appendix R provides a suggested DNO report template for consideration for next year's audit.

DPCR4 Trial

The visiting auditors presented a breakdown of the results and some initial analysis on the results. Only one DNO failed to meet the complete DPCR4 Stage 2 (restricted

incident set) minimum accuracy values. All the DNOs met the complete DPCR4 Stage 3 (full incident set) minimum accuracy values. Appendix Q of this report presents the results in detail.

The figures showed that there was volatility in the results particularly between the LV samples.

There was general consensus amongst the DNOs that it would make sense to prepare audit information for all the LV incidents even if they were confident that they would pass the more onerous target on the reduced incident data set. In the initial audits under DPCR4 it is likely that most DNOs would also prepare audit information for all the higher voltage incidents as well. Therefore the amount of pre-visit preparation work required by DNOs for the proposed DPCR4 audit process is likely to be the same initially as that required under the DPCR3 audit process.

There will be the need to have the visiting audit team available to extend the visit in the event of the DPCR4 audit process requiring the full sample audit.

Appendix Q. Trial of the DPCR4 Audit Process

Audit Trial Proposal and Method

During the 2004 post audit workshop Ofgem suggested that, under DPCR4, the audit of incident reporting could be streamlined by the adoption of a two stage approach under which a reduced sample of incidents would first be audited against a higher accuracy requirement. 97% was suggested for the higher voltage level and 92% for the lower voltage level. Only if the accuracy of reporting at the initial stage falls short of the required restricted sample accuracy would the whole sample then be audited against the original RIGs target accuracy requirements of 95% at the overall level and 90% at the low voltage. A comparison of the minimum accuracies required under the DPCR3 Audit Process and the proposed DPRC4 audit process are set out in the following Table:

	Overall Accuracy – Full Audit Sample (DPCR3 Process)	**Overall Accuracy – Pilot Trial Subset of Full Audit Sample (Proposed DPCR4 Process)**	**LV Accuracy– Full Audit Sample (DPCR3 Process)**	**LV Accuracy– Pilot Trial Subset of Audit Sample (Proposed DPCR4 Process)**
Customer Interruptions (CI)	95%	97%	90%	92%
Customer Minutes Lost (CML)	95%	97%	90%	92%

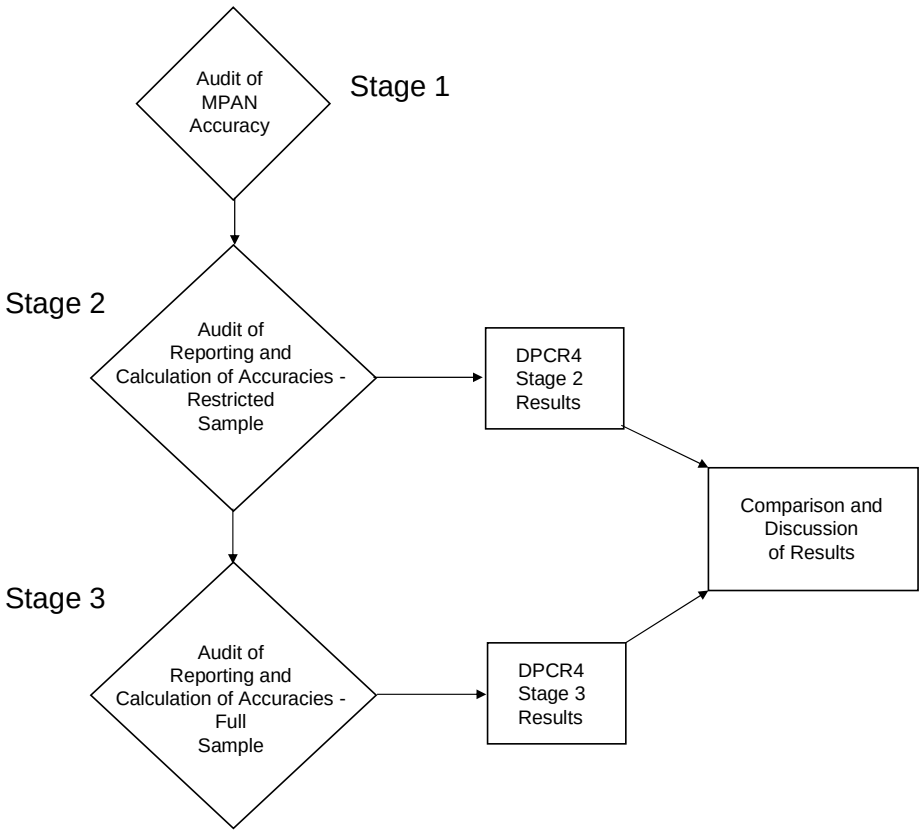
DNOs thought this idea had the potential to save on preparation time provided that they were able to self-assess the accuracy of the reduced sample at an early stage. However, some DNOs expressed concern that any changes to the audit for the 2004/05 reporting year may impact on information that they had already started to collect. It was suggested that the results of the proposed streamlined DPCR4 approach could be pilot tested and compared with the present DPCR3 approach during the audit of reporting year 2004/05.

For reporting year 2004/05 the calculation of accuracy based on a pre-determined subset of audited incidents (part of the DPCR4 process) was therefore performed in parallel with the calculation of final reporting accuracies based on the audit of the full sample of incidents provided by Ofgem. All calculations were achieved automatically in the incident auditing workbook provided by Ofgem and did not require visiting auditors to carry out additional audit work.

For the audited performance for reporting year 2004/05 the Consortium carried out the assessment of reporting accuracy under DPCR3 based upon the full sample selection. A restricted sample of these incidents was automatically extracted by the logic embedded within the incident auditing workbook to provide a trial accuracy result for the reduced sample size under DPCR4. In addition, Ofgem developed the incident auditing workbook to combine the MPAN and incident reporting accuracies automatically during the audit visit, thus providing a result for the overall accuracy of reporting.

For the trial of the DPCR4 audit process 'Stage 1' of the audit refers to the calculation of MPAN accuracy, and is the same as Stage 1 of the DPCR3 audit process. 'Stage 2' of the DPCR4 audit process trial refers to the audit of incident reporting based on the restricted incident sample and the combination of MPAN and incident reporting accuracies to give the corresponding Overall and LV final accuracies. 'Stage 3' of the DPCR4 audit process trial refers to the calculation of Overall and LV accuracies on the basis of the full audit sample as proposed under DPCR4. The results of Stages 2 and 3 of the trial are then compared. This process is illustrated in the following diagram.

Audit Process Flow Chart for DPCR4 Trial



Note: The DPCR4 Stage 3 full sample accuracy calculation for the Overall voltage category differs from the DPCR3 calculation. In the DPCR4 Overall accuracy calculation the full sample of LV incidents is included but in the DPCR 3 calculation only a subset of the LV incidents is included. The DPCR4 and DPCR3 full sample accuracy calculations for the LV voltage category are identical.

Audit Trial Results

The following Tables summarise the results of Stages 2 and 3 of the trial of Ofgem's proposed DPCR4 audit process.

Restricted sample results:

DPCR4 Stage 2 Overall Percentage Accuracies

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
CE NEDL	99.85% U	99.82% U	98.13% O	98.19% O
CE YEDL	98.56% U	98.62% U	99.72% O	94.95% U

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
CN East	99.70% U	99.33% U	97.85% U	94.07% U
CN West	98.84% U	98.97% U	97.13% U	99.31% U
EDF – EPN	99.74% O	98.96% O	96.18% U	97.34% U
EDF – LPN	99.86% O	99.02% U	94.33% O	99.87% O
EDF – SPN	99.97% O	99.48% O	96.74% O	93.86% O
SSE – SEPD	99.15% U	98.44% U	92.12% U	92.81% U
SSE – SHEPD	99.26% U	97.81% U	99.00% U	95.30% U
SPD	99.86% U	99.70% U	99.47% U	99.48% U
SPM	98.87% U	98.13% U	81.04% U	96.59% U
UU	99.84% U	98.78% U	93.89% U	93.41% U
WPD – S Wales	99.98% O	99.79% O	99.91% U	99.91% U
WPD – S West	99.93% U	99.92% U	99.66% U	99.27% U

In the above Table O signifies over reporting and U signifies under reporting.

Full sample results:

DPCR4 Stage 3 Overall Percentage Accuracies

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
CE NEDL	99.51% O	99.83% O	99.72% U	94.00% U
CE YEDL	98.70% U	98.47% U	97.53% O	99.78% O
CN East	99.83% U	99.70% U	97.55% U	97.84% U
CN West	98.83% U	98.86% U	99.74% O	99.42% U
EDF – EPN	99.25% U	99.95% O	96.23% U	96.52% U
EDF – LPN	99.87% O	99.44% U	99.14% O	99.45% O
EDF – SPN	99.94% O	99.73% O	95.81% O	94.53% O
SSE – SEPD	99.00% U	98.61% U	97.88% U	96.37% U
SSE – SHEPD	99.27% U	98.74% U	98.12% O	93.95% O
SPD	99.87% U	99.75% U	99.36% U	99.40% U
SPM	98.97% U	99.29% U	99.26% U	92.23% U
UU	99.87% O	99.42% U	95.08% U	95.16% U
WPD – S Wales	98.05% U	96.22% U	99.91% U	99.75% U
WPD – S West	99.89% U	99.73% U	99.74% U	99.85% U

In the above Table O signifies over reporting and U signifies under reporting.

Discussion of Audit Trial Results

Overview

In general the trial ran very smoothly and visiting auditors did not encounter any significant complications or difficulties with the operation of the automated auditing workbook. The DPCR4 Stage 2 and 3 results were produced automatically by selective calculation from the DPCR3 incident sample and only minimal extra work was required by the DNO and the visiting auditors.

In summary only one company failed based on the DPCR4 reduced sample (Stage 2), but passed when the full audit sample was taken into account (Stage 3). As such the pass/fail conclusions from the proposed DPCR4 audit process are the same as from the DPCR3 process with a saving of auditing time in all but one case. However, the results show some volatility for the LV sample and this is demonstrated and discussed in more detail below.

Stage 1 and Stage 3 audit pass/fail conclusions

The following Table shows a comparison of the pass/fail results from Stages 2 and 3 of the trial of the proposed DPCR4 audit process:

DPCR4 Stages 2 and 3 Audit Pass/Fail Summary

Licensed Area	Overall CI		Overall CML		LV CI		LV CML	
Stage	2	3	2	3	2	3	2	3
Minimum Requirement	97%	95%	92%	95%	97%	90%	92%	90%
CE NEDL	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
CE YEDL	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
CN East	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
CN West	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
EDF – EPN	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
EDF – LPN	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
EDF – SPN	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SSE – SEPD	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SSE – SHEPD	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SPD	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
SPM	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass
UU	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
WPD – S Wales	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
WPD – S West	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

With only one exception all DNOs exceeded the target accuracy in both the audit of the restricted (Stage 2) and full (Stage 3) samples of incidents in all CI and CML categories. The one exception was SPM where there was a failure to meet the LV CI target accuracy

in the Stage 2 audit but the target accuracy in this category for the Stage 3 audit was exceeded.

The trial of the proposed DPCR4 audit process was successful in that for all but one case (SPM LV CI) the DNO passed both the Stage 2 and Stage 3 audits and so the Stage 3 audit could have been omitted without leading to an erroneous conclusion on reporting accuracy. In the case of SPM LV CI the Stage 3 audit would have been carried out and would have led to the conclusion that the target reporting accuracy had been exceeded. Carrying out the audit according to the proposed DPCR4 audit process would therefore have reached the same pass/fail conclusions as the DPCR3 process with reduced incident auditing time.

Differences between Stage 2 and Stage 3 audit results

Some significant differences were noted between the Stage 3 and Stage 2 audit results in particular for the LV CI and CML categories. The following Table shows the differences between the Stage 3 and Stage 2 DPCR4 pilot trial results in each audit category for each licensed area:

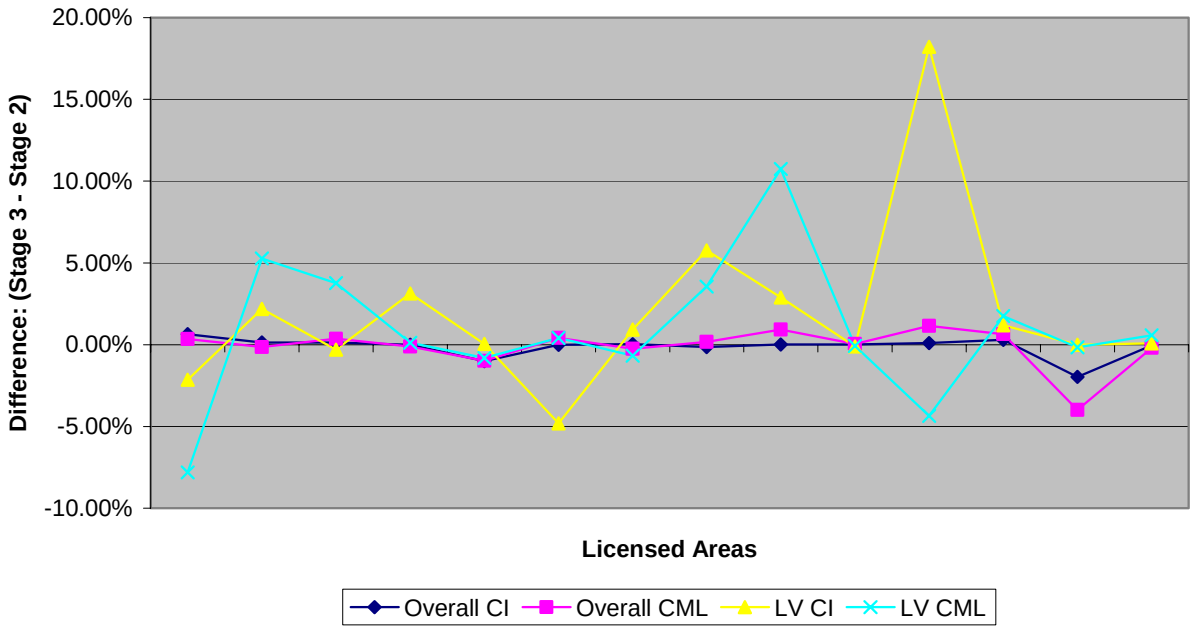
DPCR4 Difference (Stage 3 accuracy – Stage 2 accuracy) Results

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
CE NEDL	0.64%	0.35%	-2.15%	-7.81%
CE YEDL	0.14%	-0.15%	2.19%	5.27%
CN East	0.13%	0.37%	-0.30%	3.77%
CN West	-0.01%	-0.11%	3.13%	0.11%
EDF – EPN	-1.01%	-0.99%	0.05%	-0.82%
EDF – LPN	-0.01%	0.42%	-4.81%	0.42%
EDF – SPN	0.03%	-0.25%	0.93%	-0.67%
SSE – SEPD	-0.15%	0.17%	5.76%	3.56%
SSE – SHEPD	0.01%	0.93%	2.88%	10.75%
SPD	0.01%	0.05%	-0.11%	-0.08%
SPM	0.10%	1.16%	18.22%	-4.36%
UU	0.29%	0.64%	1.19%	1.75%
WPD – S Wales	-1.97%	-3.99%	0.00%	-0.16%
WPD – S West	-0.04%	-0.19%	0.08%	0.58%
Average	-0.13%	-0.11%	1.93%	0.88%
Standard Deviation	0.63%	1.24%	5.31%	4.33%

The differences in the above Table are calculated from results in which values over 100% indicate over reporting.

The difference results in the above table are shown visually in the following graphical presentation, which more clearly shows the spread of results:

Graph of (Stage 3 – Stage 2) Difference Results



The differences in the above graph are calculated from results in which values over 100% indicate over reporting.

The volatility of the difference results is particularly evident in the LV sample results where the standard deviation of the difference is around 5%. This arises because the total CI and CML in the Stage 2 LV audit samples are much lower (about 350CI and 70,000CML) than in the Stage 2 Overall sample (25,000CI and 1,500,000CML) and so the LV results are more greatly affected by variances in individual incidents.

This is illustrated in the case of the SPM LV Stage 2 sample result the low accuracy value was caused by the inclusion of two incidents with positive variances of 27CI. An incident with a variance of -50 was excluded due being outside the 4SD band of 43. In the Stage 3 calculation the 4SD band had increased to 54 and hence the -50CI incident was not excluded. In the Stage 3 calculation the positive variances were offset and this gave rise to the higher final accuracy level.

The wide variation in Stage 2 and Stage 3 LV results across companies appears to be due to the random effects of the inclusion or elimination of individual incidents with large variances. Companies with a greater frequency of variances may in some cases do better because the 4SD exclusion limit is wider and positive and negative variances tend to cancel out more readily.

Although it did not happened this year the view of the Consortium is that there is the distinct possibility for the LV audit that a DNO could pass on the audit of the restricted sample but fail on the full sample audit. This possibility appears much less for the overall sample audit but could occur if for example a large EHV or 132kV incidents variance were to affect the result significantly.

Points for the DNOs

Due to the potential for volatility in the results from the Stage 2 audit it is likely that DNOs will need to prepare audit evidence in advance for the full sample of incidents just in case the audit needs to proceed to Stage 3. The pre-visit preparation work needed by DNOs will most likely not be reduced relative to that required under the DPCR3 process.

Points for Ofgem

Review number of spares in each voltage category as it is a particularly important factor for the proposed reduced sample sizes.

Appendix R. Suggested Report Template for DPCR4

Introduction	
Dates of audit visit:	
Location of audit visit:	
Visiting Auditors:	
DNO Auditing Team:	

Audit Preparation

Tick Boxes	Excellent	Good	Fair	Poor
Response to Questionnaire				
Preparation of supporting information for incidents				
Response to requests for additional information				
Facilities for conducting the audit visit				

Audit of Measurement Systems

Measurement Area	Significant changes
Interpretation of RIGs	
Emergency data capture	
MPAN systems	
Connectivity model	
Future changes planned	

Audit of Incident Reporting

Reporting Area	Audit point	Main Findings
HV incidents	Number of unauditable incidents and spares used	
	Main sources of reporting error	
	Issues identified	
LV incidents	Number of unauditable incidents and spares used	
	Main sources of reporting error	
	Issues identified	
EE Incidents	Number of unauditable incidents	
	Main sources of reporting error	
	Issues identified	

Audit Results

These results have been copy/pasted from the agreed final version of the IIP auditing workbook and are subject to final confirmation after QA checking by the Consortium. In the tables u signifies under reporting and o signifies over reporting.

Restricted incident sample	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy					
Overall CML Accuracy					
LV CI Accuracy					
LV CML Accuracy					

The full incident sample is needed only in the event of failure in the restricted sample.

Full incident sample	Audit	MPAN accuracy	Combined accuracy	Threshold	Pass/fail
Overall CI Accuracy					
Overall CML Accuracy					
LV CI Accuracy					
LV CML Accuracy					

Recommendations for Reporting Improvements

Recommendations for the DNO from last year's audit	DNO response

To:	Recommendation from this year's audit
DNO	
Ofgem	

Sign-Off

This headline report is agreed as a true and accurate record of the annual IIP audit for the reporting year [---] in the [---] licensed area.

Visiting audit team leader:

DNO audit team leader:

Date: