BPI BRITISH POWER INTERNATIONAL **Mott MacDonald**

Information and Incentives Project
Audit of Incident Reporting 2003/04
Final Report

September 2004

Information and Incentives Project

Audit of Incident Reporting 2003/04

Final Report

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Glossary

BPI	British Power International
CE	CE (UK) Ltd. Incorporating the NEDL and YEDL licensed areas
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
DNO	Distribution Network Operator
EDF	EDF Energy Group incorporating EPN, LPN and SPN licensed areas
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
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 2003/04 the changes from Version 2 occurred outside of the scope of IIP audit work for 2003/04.
SCADA	Supervisory Control and Data Acquisition
SP	SP Transmission and Distribution incorporating the SPD and SPM licensed areas
SPD	SP Distribution
SPM	SP Manweb
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 2003.

Summary

Overview

British Power International (BPI) and Mott MacDonald (MM) were commissioned in 2001 by the Office of Gas and Electricity Markets (Ofgem) to develop a framework for annual auditing of the incident reporting systems used by the Distribution Network Operators (DNOs) under the Information and Incentives Project (IIP). The initial contract ran for three years during which time a significant amount of development work was undertaken by the DNOs on their systems. Development of the incident reporting process has taken place using 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 initial review and two audits were undertaken with the final one covering the 2002/03 reporting year. The contract to carry out the IIP audits for the reporting years 2003/04 and 2004/05 has been awarded to BPI/MM (The Appointed Auditor).

The purpose of this report is to summarise the work carried out and results obtained for the audit of incident reporting for the period 1 April 2003 to 31 March 2004. The main objective of the audit was to determine the accuracy of each DNO's incident reporting systems. The minimum levels of accuracy that each DNO's incident reporting system is required to meet is set out in Section 5.3 of the Information and Incentives Project, Regulatory Instructions and Guidance, Version 2, dated March 2002 (RIGs). The minimum levels of accuracy are shown in the following table.

	Minimum Level of Reporting Accuracy for LV System Interruptions (%)	Minimum Overall Level of Reporting Accuracy (%)
Customer Interruptions (CI)	90	95
Customer Minutes Lost (CML)	90	95

Audit Process

A three stage audit process was used to determine the Reporting Accuracy. Stage 1 involved confirming any changes in the accuracy of the DNOs' measurement systems during the reporting year. Stage 2 covered the audit of a sample of incidents and the determination of the associated reporting accuracies for CI and CML at both the Overall and LV levels. Stage 3 involved the combination of the accuracies of Stages 1 and 2 to determine the reporting accuracy for each licensed area.

Ofgem circulated the incident audit workbook to DNOs prior to the audit visits. For each licensed area, the workbook was accompanied by the schedule of 140 incidents disaggregated proportionately across the various voltage levels as selected for audit by Ofgem. Several spare incidents were provided and all spare incidents were audited. The purpose of this was to substitute spare incidents where incidents were too complex 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. These outlying results were removed from the assessment of Stage 2 reporting accuracy for each DNO.

The combined accuracy of reporting was then calculated in Stage 3. This was carried out by combining the audited incident reporting accuracy (Stage 2 accuracy) and the accuracy of MPAN measurement (Stage 1 accuracy). Results for LV and Overall categories were produced for both CI and CML. The process for determining the combined accuracy is described in detail in Appendix A.

Audit Results

The planning and logistics of the IIP audit have evolved over the last three 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 the auditors and the DNOs. Company specific reports have been prepared by the visiting auditors for each licensed area and are presented in the Appendix B to Appendix O of this report.

Every DNO was well prepared for the visit 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 errors. With one exception, DNO reporting under the IIP scheme meets the required level of accuracy. Based on the audit results Central Networks East is over reporting on LV CI with an accuracy less than the minimum requirement of 90%.

The audit results with indication of over/under reporting are summarised as follows:

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
Minimum Requirement	95%	95%	90%	90%
CE NEDL	99.73% - Over	99.77% - Over	93.48% - Under	97.61% - Under
CE YEDL	98.39% - Under	98.37% - Under	97.99% - Over	98.18% - Over
CN East	99.39% - Under	97.49% - Under	88.16% - Over	99.37% - Over
CN West	98.55% - Under	98.52% - Under	98.18% - Under	96.81% - Under
EDF – EPN	99.37% - Under	99.18% - Under	98.10% - Under	95.96% - Under
EDF – LPN	99.52% - Over	99.69% - Over	99.89% - Under	99.44% - Under
EDF – SPN	99.90% - Under	99.80% - Over	99.52% - Over	98.03% - Over
SSE – SEPD	99.85% - Under	99.87% - Over	97.63% - Under	99.54% - Under
SSE – SHEPD	99.37% - Under	98.09% - Under	99.61% - Under	99.75% - Under
SPD	99.89% - Over	99.83% - Over	94.61% - Under	99.79% - Under
SPM	99.99% - Under	99.86% - Under	94.09% - Under	92.52% - Under
UU	99.90% - Under	99.22% - Under	94.35% - Under	96.75% - Under
WPD – S Wales	99.73% - Under	99.72% - Under	100.00%	99.98% - Over
WPD – S West	99.92% - Under	99.97% - Under	99.19% - Over	99.05% - Over

The DNOs have continued to improve the accuracy of their measurement systems and there is evidence that they are following the recommendations made during the 2002/03 audit. There are still differences between DNOs with regard to measuring MPAN

accuracy, for example in the frequency of update to MPAN systems and in differing levels of system automation.

There are number of different sources of inaccuracies still remaining in the measurement systems. 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 measurement and reporting processes.

Most DNOs felt that the incident samples were a reasonable representation of the types of incidents they experienced. A minority commented that the size of the LV sample was not large enough to provide robust LV accuracy results.

No changes that materially affected the accuracy of measurement systems were found in any of the DNOs. All calculations presented by the DNOs to support the accuracy of their measurement systems were reviewed and accepted by the auditors. In future it may be possible to conduct this element of the audit prior to the visit itself. This could be achieved through an evaluation of DNO submissions and discussion by teleconference. Only if issues arise should it be necessary to make this element a part of the audit visit itself.

Most DNOs have 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. At the time of the audit visit the DNOs' measurement systems generally use current data and, in the absence of a DNO being able to demonstrate otherwise, this is the figure used as the audited value. These variances 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 to replay 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 the variance was significant. All DNOs used the option within the audit workbook to record their view if they disagreed with the audited figures. On one visit the evidence that was acceptable to verify network changes since the time of the incident was a point of debate. This was resolved, retrospective checks were made and information disseminated to audit teams to ensure future consistency.

During the audit process, it became clear that there were different policies between DNOs with regard to "stopping the clock". The majority of DNOs stopped the clock with the agreement of customers affected if it was not practical to continue work for a period of time. However, some instances were found where the DNO did not restart the clock once work on site was resumed. It is difficult to set definitive rules around "stopping the clock". In general, it would have a small effect upon reported CI and CML and for these reasons consideration should be given to disallowing it or at least only allowing it in exceptional circumstances.

Auditors found that pre-arranged interruptions were difficult to audit. Generally, the evidence to support the reported figures was either not available or it was based on estimates that were difficult to prove or dispute. For next year this will need to be reviewed and a more robust audit trail provided.

The information provided to support the audit of LV incidents was variable where it was derived from non-system sources. Some DNOs need to train their field staff to provide more definitive information on interruption and restoration times. In addition the accurate location of LV faults is needed to support the count of customers interrupted.

Variations in approach were found in incidents where DNOs had to return to a network and re-interrupt supplies to restore normal running conditions and where the fault zone had to be extended to restore supplies safely. Providing the CI and CML had been correctly accounted for visiting auditors accepted the DNO's approach and noted it for subsequent review.

The results of reporting accuracy contained in this report have been reviewed by the relevant DNOs. However, it should not be concluded from this that the DNOs necessarily agree with the audit process or that they will not propose amendments.

General Recommendations

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

- Ofgem should consider providing more clarification on the reporting of supply restoration through backfeeding and on extension of the fault zone;

- The position on "stopping the clock" should be reviewed with the intention of only allowing it in defined exceptional circumstances;

- Ofgem and the DNOs need to discuss the information that it is practical to provide as an audit trail for planned interruptions;

- The Appointed Auditor, in consultation with Ofgem, should confirm the types of evidence required to verify changes in DNO systems since the time of the incident, and a generic list of the types of evidence that visiting auditors would accept should be circulated to DNOs prior to the audit visits; and

- A review should be undertaken of whether changes to the audit process should be made with respect to the accuracy of measurement systems.

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;

- This year a core team of people from Ofgem and the auditors were made available to deal with issues that arose from audits, which 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. These include the overall number of auditors and the match of skills within the visiting audit team;

- The background instruction and training given to visiting auditors must continue to focus on key issues; and

- There needs to be greater liaison between the lead auditor and the DNO prior to the visit. Crucially the lead auditor must discuss the type of evidence likely to be presented by the DNO to support claims of changes in customer numbers.

1   Introduction

Background

1.1   Ofgem's commitment to an ongoing programme of work to strengthen incentives on Distribution Network Operators (DNOs) to deliver an appropriate quality of service to customers 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 including both high and low voltage interruptions.

Audit of DNOs' Measurements Systems and Reporting

1.3   During 2001 the BPI/MM consortium was commissioned by Ofgem to develop a framework for the audit of DNOs' measurement systems, processes and data for the number and duration of interruptions. An interim review was carried out in 2001 and full audits of measurement systems followed in 2002 and 2003. Full details of these audits 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 2003 to 31 March 2004 are to:

- Identify any significant changes in DNOs' measurement systems and their impact (if any) on the accuracy of reported information;

- Identify whether there are any significant weaknesses in the systems that DNOs have in place to report incidents, CIs and CMLs and provide recommendations for improvement(s) in these systems;

- Determine whether the DNOs are complying with the RIGs requirements for reporting;

- Determine whether recommendations from previous audits have been implemented or are in the process of being implemented;

- Identify best practice and where further improvements can be made;

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[1] Information and Incentives Project, Regulatory Instructions and Guidance version 3, Ofgem, November 2003 is the version as at June 2004. 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 3 does not impact on the 2003/04 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.

- Determine the accuracy of the DNOs' measurement systems, their accuracy of reporting and the overall accuracy of reported information; and

- Provide an opinion on the appropriate numerical adjustments to DNOs' reported information so that they are not unfairly rewarded or penalised in the incentive scheme due to measurement issues.

Changes to Audit Approach from the Previous Year

1.5 Following suggestions from Ofgem there have been several changes in approach to the audits and calculation of accuracy from the 2002/03 audit. These include:

- Incident selection has been carried out by Ofgem and provided to the auditors;

- If an incident is found to be too complex to audit it is replaced by a spare audited incident in the assessment of the stage 2 accuracy;

- As defined by Ofgem, Stage 1 accuracy is based on Overall and LV MPAN accuracy and does not take account of connectivity model accuracy;

- In order to determine the audited Stage 1 MPAN accuracy for the overall sample used in the combined accuracy calculation, a weighted average was taken based on the CI and CML contribution of both HV and LV samples (as explained in detail in Appendix A); and

- Combining Stage 1 and Stage 2 accuracies to determine the Stage 3 accuracy was specified by Ofgem and is based on the absolute value of the multiplication of the Stage 1 and Stage 2 accuracies.

Report Structure

1.6 This report sets out the audit findings and accuracy of reporting figures for DNOs for the reporting year 2003/04. The report is structured as follows:

- Section 2 of this report gives a description of the audit process used;

- Section 3 sets out the key results for Stages 1 to 3 of the process together with any differences in interpretation of the RIGs that were found across the DNOs;

- Section 4 gives details of the key lessons learned as a result of this year's audit and identifies areas of best practice;

- Appendix A gives details of the procedure for determining the Stage 3 combined accuracy;

- Individual audit reports for each DNO are set out in Appendices B to O; and

- Appendix P contains the feedback gained from the DNOs and additional points gained from the post-audit workshop held on 16 September 2004.

2 Audit Process

Overview

2.1 The following diagram shows the three stage audit process used for the reporting year 2003/04.

Figure 1 Audit Process Flow Chart
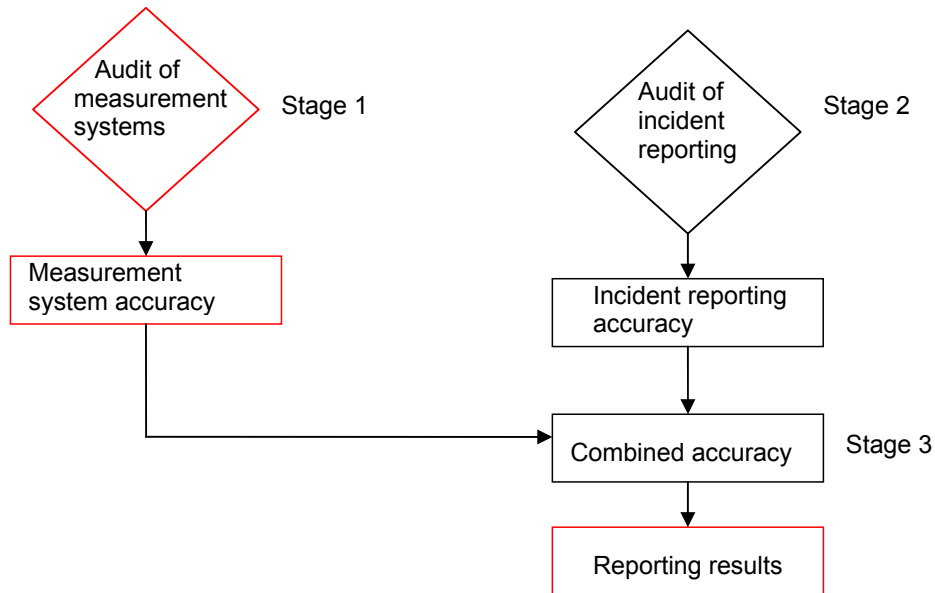
2.2 The approach to Stages 1 and 2 was to circulate an audit questionnaire and incident audit workbook in advance of carrying out an audit visit to each DNO. Updated accuracies of each DNO's measurement systems and the accuracies of each DNO's reporting using these systems were then calculated based 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 and the Overall reporting accuracy for each DNO was calculated in Stage 3. This process builds directly upon the lessons learned from previous audits and is set out in more detail in the following paragraphs.

2.3 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 between the visiting auditors and the DNO audit team to achieve agreement during the visit wherever possible. A core team of key people from BPI/MM and Ofgem were nominated to be available for consultation in support of the visits where necessary.

2.4 Consistency between audit visits was gained by:

- Training;

- Core team consultations;

- The compilation and circulation of updated lists issues with associated resolutions;

- Limiting the number of auditors;

- Previous IIP audit experience; and

- Ofgem's presence.

2.5   The audit visits were 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 provided by Ofgem.

2.6   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 the completed audit questionnaire and issues list;

- An electronic copy of the completed audit questionnaire; and

- An electronic copy of the completed incident audit workbook.

Stage 1 Audit of Measurement Systems

2.7   A questionnaire was circulated to DNOs prior to the audit visits that examined the following:

- the way in which DNOs have counted customers using MPANs;

- the underlying assumptions that the DNOs have used to link customer MPAN information to their network connectivity models;

- whether the DNOs have correctly applied the RIGs definitions; and

- whether Ofgem's reporting template has been populated correctly.

The questionnaire focussed on changes made from 2002/03.

2.8   In their answers to the questionnaire the DNOs were asked to identify updates to relevant measurement systems and to set out their estimates of associated changes to measurement system 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. Changes to measurement system accuracy were only accepted where proven to the satisfaction of the visiting auditors.

2.9   Unlike the 2002/03 audit that used connectivity model accuracy as its Stage 1 accuracy, this year the basis was the MPAN accuracy. This was measured as the percentage of MPANs in MPRS assigned to true feeders (as opposed to dummy feeders or other temporary holding arrangements in the connectivity model) that were capable of attracting interruptions reportable to Ofgem. The connectivity model accuracy (i.e. incorporating the accuracy of connection of each MPAN to its correct true feeder) though reported and audited was not used in any calculations related to accuracy.

2.10 The calculation of MPAN accuracy is new for this year's audit and was suggested by Ofgem. The new calculation reflects the number of primary traded MPANs that are active in a DNO's connectivity model relative to 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 recording CI and CML at the relevant voltage expressed as a percentage of MPANs in MPRS. This means that MPANs attached to dummy/imaginary feeders or post codes are not counted towards the accuracy percentage as they cannot be interrupted and attract CI and CML. MPANs assigned generally across real feeders are counted since they can go off supply even if they are attached to the wrong feeder. It also means that MPAN accuracy can be greater than 100% if there is a delay in removing disconnected MPANs in the connectivity model relative to MPRS. MPAN accuracy is therefore defined as the following ratios expressed as percentages:

- HV MPAN Accuracy = (MPANs allocated to true HV feeders in Connectivity Model) / (MPAN count in MPRS)

- LV MPAN Accuracy = (MPANs allocated to true LV feeders in Connectivity Model) / (MPAN count in MPRS)

2.11 In order to determine the finalised Stage 1 MPAN accuracy for the overall sample used in the combined accuracy calculation, a weighted average was taken of the HV MPAN accuracy and LV MPAN accuracy based on the CI and CML contribution to overall annual HV and LV CI and CML respectively. This is explained in detail in Appendix A.

Stage 2 Audit of Incident Reporting Accuracy

2.12 Ofgem circulated the incident audit workbook to DNOs prior to the audit visits. For each licensed area, the workbook was accompanied by the schedule of 140 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 to audit. DNOs were expected to pre-populate relevant parts of the incident audit workbook prior to the commencement of the audit visit. All incidents in the workbook were audited including spares.

2.13 The two visiting auditors first examined several HV and LV incidents together, but in order to make the most efficient and effective use of time the visiting auditors then separated[3] with one auditor working on the HV incident sample and the other on the LV sample. However this parallel tracking of the majority of the HV and LV audits did not prevent discussions between visiting auditors where questions of understanding or interpretation arose. Ofgem representatives observed a number of the audit visits.

2.14 A core audit team consisting of Ofgem representatives and key BPI/MM consultants was available to contact in the event of clarification 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 ensuring consistency across all the audit teams.

2.15 The accuracy of incident reporting was estimated for each licensed area through detailed audit of each incident in the relevant HV and LV samples. The audit of incidents examined the consistency and accuracy of the following processes:

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[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 sample audits.

- Data capture by telephone operators;

- Network control room data capture;

- Field data capture; and

- Data links to the fault reporting system (e.g. PC-NaFIRS).

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

- Time stamping of the start and finish of the incident;

- Identification of restoration stages within the incident;

- Location of the incident; and

- Identification of the number of customers affected by each stage of 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.

2.16 Audited values for CI and CML were established for each incident and entered into the incident audit workbook. In the event of particular incidents being too complex 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 comments columns were also included in the workbook to capture further information on numbers of customers interrupted and restoration stage duration where appropriate.

2.17 Most DNOs took the opportunity to record their views in the DNO figure columns and the comments columns of the audit 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 and were resolved 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 audit core team and Ofgem in the event of material impact on the final DNO reporting accuracy and the need for dispute resolution.

Post Audit Analysis and Stage 3 Combined Accuracy of Reporting

2.18 Stage 2 accuracy of incident reporting together with the Stage 3 combined accuracy of reporting were calculated for each licensed area in the post audit analysis of the completed audit workbooks. The calculation procedure with relevant detail for each licensed area is described in Appendix A. The following paragraphs summarise the process.

Stage 2 accuracy

2.19 Incidents in the HV and LV workbook pages that were too complex to audit were substituted with audited spare incidents and any remaining unneeded spare incidents were then removed. All the remaining HV incidents and those LV incidents identified by Ofgem as being included in the Overall sample were then

combined to form the Overall data set. The LV data set comprises all the LV incidents in the sample, including those also present in the Overall data set.

2.20 Outlying results were then identified and eliminated from both the Overall and the LV data sets. This was performed by identifying and eliminating restoration stages where the difference between the reported and audited CI and CML was outside the mean plus or minus four standard deviations for CI or CML.

2.21 Having eliminated outlying results, the Stage 2 Overall and LV audit accuracies were then calculated using the following formulae:

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

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

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

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

Calculation of Stage 3 combined accuracy of reporting

2.22 The Stage 3 combined accuracy of reporting was then calculated by combining the Stage 1 MPAN accuracy with the Stage 2 accuracy. For the Overall reporting accuracies for CI and CML this is the product of the finalised Overall MPAN accuracy and the Overall accuracy of reporting of CI and CML. For the LV reporting categories for CI and CML this is the product of the audited LV MPAN accuracy and the LV accuracy of reporting for CI and CML. In this procedure the over counting of MPANs will be offset by an under reporting of incident CI and CML and vice versa.

2.23 The formulae used for producing the Stage 3 combined accuracy of reporting are as follows:

- Combined Overall CI accuracy = 1 – the absolute value of (1- (2003/04 Overall MPAN measurement accuracy) * (Overall CI reporting accuracy))

- Combined Overall CML accuracy = 1 – the absolute value of (1- (2003/04 Overall MPAN measurement accuracy) * (Overall CML reporting accuracy))

- Combined LV CI accuracy = 1 – the absolute value of (1- (2003/04 LV MPAN measurement accuracy) * (LV CI reporting accuracy))

- Combined LV CML accuracy = 1 – the absolute value of (1- (2003/04 LV MPAN measurement accuracy) * (LV CML reporting accuracy))

In the results Tables these are expressed as percentages.

3   Audit Results

Overview

3.1   The IIP audit visits to DNOs for reporting year 2003/04 took place during 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 the following table.

Table 1   Audit visit Programme

Licensed Area	Date	Location
CE – NEDL	5 – 7 July	Penshaw
CE – YEDL	19 – 21 July	Leeds
CN East	5 – 7 July	Castle Donnington
CN West	21 – 23 June	Tipton
EDF – EPN	19 – 23 July	Ipswich
EDF – LPN	19 – 23 July	Ipswich
EDF – SPN	12 – 15 July	East Grinstead
SPD	12 – 14 July	Hamilton
SPM	27 – 29 July	Prenton
SSE – SEPD	21 – 25 June	Portsmouth
SSE – SHEPD	21 – 25 June	Portsmouth
UU	21 – 24 June	Manchester (HV) and Preston (LV)
WPD – S Wales	9 – 11 June	Cardiff
WPD – S West	7 – 9 June	Exeter

3.2   Two visiting auditors from the BPI/MM consortium 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 in all cases. The visiting auditors generally separated to work in parallel on auditing HV and LV samples. It was the lead auditor's responsibility to retain the master consolidated audit workbook at the end of each day's work.

3.3   In case of issues of interpretation arising during audits, a conference call facility was available to visiting auditors from the core team. By this means, issues were resolved with consistent interpretation on the same day as they arose, and any new findings were communicated promptly across all audit teams. Lists of issues arising together with agreed solutions were compiled on each audit visit and signed off during the audit review session at the end of each visit.

Stage 1: Accuracy of Measurement Systems

Summary of Findings

3.4 The following table summarises the findings on the accuracy of measurement systems across the licensed areas.

Table 2 Accuracies of Measurement Systems

Licensed Area	HV MPAN Accuracy	LV MPAN Accuracy	HV Connectivity Model Accuracy	LV Connectivity Model Accuracy
CE NEDL	100.27%	100.27%	97.00%	93.50%
CE YEDL	98.40%	98.40%	97.00%	97.00%
CN East	100.00%	99.60%	99.79%	99.40%
CN West	98.56%	98.57%	98.56%	98.57%
EDF – EPN	100.00%	95.64%	99.27%	95.60%
EDF – LPN	100.00%	99.93%	99.27%	95.60%
EDF – SPN	100.00%	100.00%	98.50%	94.10%
SSE – SEPD	100.00%	100.00%	98.50%	99.90%
SSE – SHEPD	100.00%	100.00%	99.90%	99.90%
SPD	100.08%	100.08%	99.50%	98.50%
SPM	99.92%	99.92%	99.50%	98.50%
UU	100.00%	100.00%	100.00%	99.40%
WPD – S Wales	100.00%	100.00%	99.92%	99.94%
WPD – S West	100.05%	100.05%	99.94%	99.66%

3.5   The following table summarises the calculation used to determine the Overall MPAN accuracy from the Stage 1 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 are provided in Appendix A.

Table 3 HV, LV and Overall MPAN Accuracies

Licensed Area	HV MPAN Accuracy	LV MPAN Accuracy	HV % in overall sample	LV % in overall sample	Overall MPAN Accuracy
CE NEDL	100.27%	100.27%	79.80%	20.20%	100.27%
CE YEDL	98.40%	98.40%	73.60%	26.40%	98.40%
CN East	100.00%	99.60%	85.26%	14.74%	99.94%
CN West	98.56%	98.57%	82.51%	17.49%	98.56%
EDF – EPN	100.00%	95.64%	84.19%	15.81%	99.31%
EDF – LPN	100.00%	99.93%	51.56%	48.44%	99.97%
EDF – SPN	100.00%	100.00%	85.95%	14.05%	100.00%
SSE – SEPD	100.00%	100.00%	76.70%	23.30%	100.00%
SSE – SHEPD	100.00%	100.00%	87.42%	12.58%	100.00%
SPD	100.08%	100.08%	85.31%	14.69%	100.08%
SPM	99.92%	99.92%	84.73%	15.27%	99.92%
UU	100.00%	100.00%	71.88%	28.12%	100.00%
WPD – S Wales	100.00%	100.00%	85.95%	14.05%	100.00%
WPD – S West	100.05%	100.05%	74.32%	25.68%	100.05%

DNO Changes Since Reporting Year 2002/03

3.6   The key points from Stage 1 of the audit process are set out in the following paragraphs. Full details for each licensed area are set out in Appendix B to Appendix O of this report.

Interpretation of RIGs

3.7   DNOs have not made changes to the way in which they interpret relevant sections of the RIGs since the audit of reporting year 2002/03. A number of issues of differing interpretations were found across DNOs during the audit visits but these were the same as last year or were close variations of issues already discovered. These areas are outlined in the following paragraphs and also discussed further in Section 4 - Key Lessons Learnt.

Reinterruptions

3.8   The "18-hour" rule (RIGs 2.24 to 2.26), applies to customers reinterrupted following restoration via a temporary supply arrangement (RIGs 2.36 and 2.37) defined as a non-permanent change to network feeding arrangements (made without using normal switching devices) or the use of mobile generation. Reinterruptions of this nature can occur when the network feeding arrangements are returned to normal. Inconsistencies over the interpretation of this rule were found between DNOs in previous audits and were found in the present audit relative to reinterruptions following supply restoration through backfeeding arrangements.

"Stopping the Clock"

3.9   Whilst this is not explicitly referred to in the RIGs some DNOs allow "stopping the clock" where a customer requests deferment of supply restoration. Other DNOs take a strict reading of the RIGs and record the full interruption duration even where requested to defer restoration work. Auditors have found a wide diversity of reasons given by DNOs for "stopping the clock". The number of incidents is small but these can take a disproportionate time to audit and it is difficult to achieve consistency of interpretation across DNOs. Examples were also found where DNOs had omitted to restart the clock upon resumption of supply restoration work.

Overrun of pre-arranged interruptions

3.10 Pre-arranged network shutdowns for maintenance sometimes overrun and may occasionally give rise to additional incidents being recorded. Auditors found evidence of differing approaches with some DNOs raising new unplanned interruption incidents, some adding additional stages to the original pre-arranged interruption and some examples of complete omission of the additional faults.

Fault zone extensions

3.11 Occasionally it is necessary to interrupt supply to customers not originally affected by a fault, e.g. for safety reasons during the repair of an LV feeder where only a single phase has faulted leaving customers on the other phases unaffected. Most DNOs include the extra customers as a restoration stage in the original incident but some raise a new incident to cover the extension.

MPAN accuracy

3.12 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 are now reaching the stage at which the accuracy of MPAN count is approaching 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 year to maintain the high standards of accuracy achieved.

Connectivity model

3.13 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.

3.14 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.

3.15 The approach adopted this year was to audit the DNO's claimed accuracy change calculations and add the audited accuracy change to last year's audited accuracy figure. Where no accuracy improvement was claimed DNOs were asked to demonstrate that accuracy had been maintained. Accuracy calculations have been based on unallocated MPANs where DNOs have insufficient information to permit accurate placement. In line with previous audits any MPAN allocation inaccuracies within DNOs' connectivity models resulting from their original data loading have not been considered in the connectivity model accuracy calculation. There is a greater variation between DNOs in connectivity model accuracy than in MPAN accuracy.

IIP Template

3.16 DNOs have not generally changed the way in which they populate Ofgem's IIP template. One DNO identified an error in the routines to populate the "Other DNO/ Connected Systems" and "Embedded Generators" areas within PC-NaFIRS.

3.17 This year DNOs were asked to rerun their population routine to check for differences in the consolidated results since the data was provided to Ofgem in April. One DNO had erroneously set a 10% factor on the CI and CML resulting from grid in-feed faults whereas this should have been reported to Ofgem at 100%. However, this had minimal impact on the DNO's final reported figures. Visiting auditors found no significant variations in the information previously provided by DNOs to Ofgem compared with that generated at the time of the audit. The minor discrepancies related to figures from a small number of field reports received after the deadline for data submission to Ofgem.

Potential sources of error remaining in measurement systems

3.18 Most DNOs 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 the trade-off balance between accuracy and cost in measurement systems has now been reached.

Future changes

3.19 Most DNOs do not anticipate significant future changes to their measurement systems. DNOs with more than one licensed area are looking to share best practice between areas and standardise on systems wherever practical. One DNO is anticipating introducing new measurement systems next year and a second is considering changes subject to a general strategic review that is expected to conclude within the 2004/05 reporting year.

Stage 2: Accuracy of Incident Reporting

Summary of Findings

3.20 The following table summarises the findings across the licensed areas on the accuracy of incident reporting.

Table 4 Accuracies of Incident Reporting

Licensed Area	Overall Reporting Sample - CI	Overall Reporting Sample - CML	LV Reporting Sample - CI	LV Reporting Sample - CML
CE NEDL	100.00%	99.96%	93.23%	97.34%
CE YEDL	99.99%	99.97%	103.67%	103.48%
CN East	99.44%	97.55%	112.29%	101.03%
CN West	99.99%	99.95%	99.61%	98.21%
EDF – EPN	100.06%	99.87%	102.57%	100.34%
EDF – LPN	100.52%	100.34%	99.96%	99.51%
EDF – SPN	99.90%	100.20%	100.48%	101.97%
SSE – SEPD	99.85%	100.13%	97.63%	99.54%
SSE – SHEPD	99.37%	98.09%	99.61%	99.75%
SPD	100.02%	100.08%	94.53%	99.71%
SPM	100.07%	99.94%	94.16%	92.60%
UU	99.90%	99.22%	94.35%	96.75%
WPD – S Wales	99.73%	99.72%	100.00%	100.02%
WPD – S West	99.87%	99.92%	100.76%	100.90%

3.21 For audit consistency across licensed areas the audit guidelines required the visiting auditors to enter the current system CI as the audit CI 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.

3.22 Authorised and time stamped 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

3.23 Details of the Stage 2 audit 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.

3.24 In general, DNOs that had fewer stages requiring manual intervention to transfer information to fault reporting systems experienced fewer transcription errors. Visiting auditors noted that DNOs had reduced this type of error by putting concerted 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

3.25 Network reconfiguration can introduce variances when comparing reported numbers of customers interrupted with current system values. These are normally due to new 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.

Customer number changes since the incident

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

- Network reconfiguration;

- MPAN commissioning/decommissioning; and

- Data cleansing.

3.27 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.

Quality of fault reports

3.28 The frequency of transcription errors during the transfer of source data into fault reports is an area of weakness for some DNOs. Retaining 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.

Stage 3: Combined Stage 1 and Stage 2 Reporting Accuracy

Summary of Findings

3.29 The following table summarises the findings across the licensed areas on Overall and LV reporting accuracies.

Table 5 Overall Reporting Percentage Accuracies

Licensed Area	Overall CI	Overall CML	LV CI	LV CML
Minimum Requirement	95%	95%	90%	90%
CE NEDL	99.73% - Over	99.77% - Over	93.48% - Under	97.61% - Under
CE YEDL	98.39% - Under	98.37% - Under	97.99% - Over	98.18% - Over
CN East	99.39% - Under	97.49% - Under	88.16% - Over	99.37% - Over
CN West	98.55% - Under	98.52% - Under	98.18% - Under	96.81% - Under
EDF – EPN	99.37% - Under	99.18% - Under	98.10% - Under	95.96% - Under
EDF – LPN	99.52% - Over	99.69% - Over	99.89% - Under	99.44% - Under
EDF – SPN	99.90% - Under	99.80% - Over	99.52% - Over	98.03% - Over
SSE – SEPD	99.85% - Under	99.87% - Over	97.63% - Under	99.54% - Under
SSE – SHEPD	99.37% - Under	98.09% - Under	99.61% - Under	99.75% - Under
SPD	99.89% - Over	99.83% - Over	94.61% - Under	99.79% - Under
SPM	99.99% - Under	99.86% - Under	94.09% - Under	92.52% - Under
UU	99.90% - Under	99.22% - Under	94.35% - Under	96.75% - Under
WPD – S Wales	99.73% - Under	99.72% - Under	100.00%	99.98% - Over
WPD – S West	99.92% - Under	99.97% - Under	99.19% - Over	99.05% - Over

3.30 It is auditors' opinion that with the exception of CN East, all reporting under the IIP scheme meets the required level of accuracy. In the case of CN East it is the auditors' opinion that CN East over reports LV CI by 11.84%. CN East's reporting of LV CI is therefore 1.84% below the minimum level of accuracy of 90%.

4   Key Lessons Learnt

Areas of DNO Best Practice

Pre-visit preparation

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

4.2   Retaining the order in which the incidents have been selected and Ofgem's incident reference numbers is helpful to the audit visit and in post visit processing of the completed workbooks. It is also helpful for the DNO to pre-examine incidents for audit where possible to make sure that adequate audit trails are available with supporting documentation from local office files and field logs. A suggestion was discussed at the Post Audit DNO Workshop to audit a small sample of incidents not notified in advance of the visit. Key points from the workshop are set out in Appendix P.

Visit logistics

4.3   During the audit visits the presence of too many people can hinder the re-creation of incidents and hence can be counter-productive. Audits progressed more smoothly for 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.

DNO team

4.4   One DNO rotated the staff involved in this year's audit visit as part of the process of raising the profile of IIP within the organisation and increasing control engineers' understanding of what is required in their day-to-day job for audit trail purposes. It may be useful to promote this approach across all DNOs for future audits.

Audit Trail

4.5   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 found to include:

- Electronic records of those customers affected at the time of the incident as compared with current system values; and

- 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.

4.6   It is essential that audit trail information is date stamped 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.

4.7   Whatever technique is adopted it is 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 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.

4.8   In the case of network abnormalities, it is very helpful to the audit teams if control logs or recording systems are annotated to the effect that the system was abnormal at the time of the incident. 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.

4.9   The audit trail for pre-arranged incidents was found to be a weak point with few DNOs having robust auditable information available. Generally visiting auditors found that times presented were those provided on the carded information to customers and not the actual times. If the shutdown work had to be varied due to problems arising on the day there were differing approaches between DNOs on how to record the work carried out.

4.10   The audit trail presented by some DNOs for LV incidents was found to be weak. Where information cannot be provided from telecontrol visiting auditors looked for clear reports of interruption and restoration times from field staff. These were not always available. Estimates or call times were used in some incidents audited. For sub-feeder faults on LV networks it was not always possible to confirm the estimate of customers affected because the location of the fault had not been recorded.

4.11   Some DNOs 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 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. Relevant notes and colour highlighting were added to the audit workbooks to enable the identification and study of particular issues after completion of the visits.

Visit timetable and organisation

Pre-visit preparation

4.13   Last year, the deadline for DNOs to return their IIP templates to Ofgem was extended to provide for the return of information relating to dissaggregation. This year, the absence of this delay, coupled with Ofgem's pre-arranged programme of visits well in advance saved time and enabled the visits to be conducted on average a month earlier than last year. This avoided visits taking place in the summer holiday period. However, there was considerable pressure on results processing and report writing during August. Next year, it would be advantageous

to bring forward the visits to the latter part of May and throughout June which would enable the major part of the visit follow-up work to be completed in draft form before the holiday period.

4.14   It was helpful to forward the audit workbook and sample of incidents for audit at least two weeks 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 this year could be reviewed as examples at the training day next year. It is important that visiting auditors agree 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 visit to a DNO was successful as a pilot in picking up issues potentially affecting a number of DNOs as sufficient time was available to alert visiting auditors and DNOs involved in subsequent visits. For next year, it is suggested that the early pilot visit could precede the team training day so that information on current issues can be presented and discussed.

4.17   Audit team leaders must contact the DNO prior to the audit visit to provide guidance as to the evidence that will be acceptable in support of any variances between reported and system figures. This year there was the need for consultation during some visits on what was acceptable and what was not. Besides defining this more clearly for next year, 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 core team for advice at an early stage.

4.18   In order to streamline the visit process further it is suggested that work on the Measurement System Accuracy should be completed outside the audit visit. The pre-filled questionnaire could be analysed prior to the visit with discussions via a telephone conference if necessary. Only where there are significant changes to the DNO measurement systems or if particular systems issues arise should this form part of the visit.

Visit logistics

4.19   Pairs of visiting auditors this year were taken from either BPI or MM with only one DNO visit being jointly undertaken. Visiting audit teams made logistical arrangements on a self-managed basis. This generally worked well and enabled the core 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. Next year it is considered advisable to reduce the overall number of visiting auditors further, whilst providing for as much continuity as possible.

4.20   DNOs should avoid making annotations and colouring additions to the audit workbook during the pre-population process as these will need to be cleared by visiting auditors at the start of the visit. In addition DNOs should not remove Ofgem's unique incident reference numbers and should not pre-populate any of the fields to be filled in by the visiting auditors. To ensure transparency, the DNO and the visiting auditors should each retain an electronic copy of the saved workbook at the end of a working day. The re-opening of the time-stamped electronic workbook

should be jointly witnessed at the start of the next working day to ensure it is the correct version.

4.21 Visiting auditors should annotate, initial, and date the audited copy of the incident reports so as to provide an audit trail of the work. The audit sign-off page should be completed after ensuring that the wording of the attachments has been jointly agreed between the DNO and the visiting auditors. The DNO should retain both hard and electronic copies of the audit documentation, and each page of the hard copy should be jointly initialled to enable post-audit verification of authenticity.

4.22 Clearer guidelines are required to assist auditors in deciding whether an incident is too complex to audit. In future it is recommended that all incidents be attempted and reasons given why incidents have had to be abandoned. Lack of a suitable audit trail or expiry of a predetermined time span might constitute valid reasons. In each case, the relevant incident should be highlighted in the audit workbook with full explanations given of the reasons for abandoning it. Some visiting auditors found it useful to "park" any complex incidents for examination after the audit of the remainder of the sample had been completed. In the case of doubt, incidents should be put 'on hold' pending consideration by both visiting auditors together or by the core team in a telephone conference.

Points for audit consistency

Prearranged Interruptions to Supply

4.23 This is generally a weak aspect of DNO reporting. To provide a robust audit trail, the following information needs to be available;

- Evidence that the prearranged incident happened;

- The areas affected,

- The customers affected; and

- Accurate and auditable evidence of start and completion of each stage of the incident.

Deferment of supply restoration – "stopping the clock"

4.24 If the DNO stops the clock, it should be restarted at the time requested by the customer or at the time the restoration work is restarted whichever is the earliest.

4.25 It was noted that there were variations of policy on clock stopping between DNOs and in certain cases within the same DNO. Broadly the variations fell into three categories:

- No clock stopping;

- Clock stopping and restarting. In this case the clock is restarted once work is recommenced; and

- Clock stopping and no restarting. The clock is stopped at the time the customer agrees to work ceasing and no further time is added to the incident report.

4.26 For this year's audit it was agreed that stopping the clock should be accepted only where there is a specific note made at the time in the DNO field log and/or call

centre log to the effect that the customer has requested a deferment of supply restoration. Signed documentation from the customer was not required.

4.27 In order to improve consistency on this matter it would be preferable not to allow clock stopping other than in very exceptional circumstances. The number of customers involved is usually small, there will be a minimal affect on reported CI and CML and the resources needed to operate a clock stopping procedure with a robust audit trail are unlikely to be cost-effective.

Variations to planned supply interruptions

4.28 If a planned shut down is abandoned any additional work outside the scope of the original plans should be captured on a new incident report. However, if the additional incident does not form part of the audit sample it should not be audited.

Voltage mis-classifications

4.29 An incident report containing a mis-classified voltage level will not affect reporting accuracy at the Overall level but may affect accuracy at the LV level. Visiting auditors did not penalise DNOs for mis-classified voltages this year.

4.30 We propose for future audits that incidents incorrectly reported at the HV level are transferred to the LV audit sample, marked with report CI/CML as zero and system/audit CI/CML as found during the audit visit. Incidents incorrectly reported at the LV level should be audited as LV incidents with the report CI/CML as originally reported and the system/audit CI/CML as zero. Spare HV and LV incidents should be substituted respectively for misclassified HV and LV incidents in the Overall sample.

LV back feeds

4.31 This year DNOs were not penalised where they differed on the classification of LV back feeds as temporary or permanent supply restorations. This was found to lead to differing applications by DNOs of the 18 hour rule for reinterruptions in these cases. The issue was discussed in the post audit DNO workshop, the notes of which are set out in Appendix P.

Duration of an interruption

4.32 Clarification is sought from Ofgem on the issue of rounding incident start and finish times. The auditors' 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. This issue was raised in the post audit DNO workshop, the notes of which are set out in Appendix P.

Points of interpretation of the RIGs.

Reinterruptions

4.33 Differences of interpretation still exist between DNOs over the "18 hour rule" for reinterruptions following a temporary restoration of supply. These centred round differing opinions on the classification of supply restoration through backfeeding arrangements. Clarification on these issues is set out in the latest draft version 5 of the RIGs.

Planned interruptions to supply

4.34 Paragraph 2.15 of the RIGs states "A pre-arranged incident which requires a number of switching operations involving an interruption to supply to customers should be treated as a single incident provided that the outage times are within the period stated on the notification provided to the customer(s)." Therefore, if a pre-arranged incident overruns a new unplanned incident should be raised to capture the additional CI and CML involved and the audit values for the pre-arranged incident should reflect its planned end time. For this year visiting auditors accepted an overrun of a pre-arranged incident as part of the original incident and did not penalise the DNO provided the CI and CML were recorded correctly. Further comment on this issue is included in Appendix P.

Extension of the fault zone

4.35 By strict interpretation of the RIGs customers not originally interrupted by an incident should be recorded on a separate incident report. An example of this is where a section of a network has to be made dead in order for repair work to proceed safely. For this year's audit the restoration stages involving these additional interruptions were included in the original incident report if they were necessary to repair the initial fault. Further comment on this issue is included in Appendix P.

Points for Ofgem

Pre-arranged Interruptions

4.36 The information provided to support pre-arranged incident reports is variable and makes auditing difficult. Clearer guidance from Ofgem is necessary on what information DNOs should present for audit for these incidents.

Accuracy of measurement systems

4.37 The introduction this year by Ofgem of the standardised MPAN accuracy calculation reduces the difficulty in comparing accuracy of different connectivity models.

Stopping the clock

4.38 "Stopping the clock" affects relatively few incidents, mostly involving small numbers of customers at LV, and introduces extra data capture and audit processes that take a disproportionate time to check and add little value. The auditors recommend that Ofgem amends the RIGs to the effect that clock stopping is not permitted in future.

Sampling regime

4.39 Pre-agreement of the sampling regime between Ofgem and the DNOs, introduced by Ofgem before the visiting auditors were appointed, 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 2003/04 reporting year. Some DNOs felt that the LV sample was too small. Further comment on this issue is included in Appendix P.

<u>Ofgem incident reference number</u>

4.40 The provision of an Ofgem reference number helped significantly in identifying incidents when analysing the workbooks this year. However this was undermined by the fact that the Ofgem reference number was not unique to a single incident. It is therefore suggested that the Ofgem reference number should be unique to a single incident in future year's samples.

Appendix A.   Accuracy Calculation Details

Stage 1 – Calculation of Overall MPAN Accuracy and LV MPAN Accuracy

The LV MPAN accuracy used is the audited Stage 1 LV MPAN accuracy. The Overall MPAN accuracy is calculated by giving a weighting to each reporting category in the 2003/04 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	0.0%	10.0%
Other DNO/connected systems	HV	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 MPAN accuracy * Proportion of HV CI/CML contribution to annual totals) + (LV MPAN Accuracy * Proportion of LV CI/CML contribution to annual totals).

The resultant Overall and LV MPAN Accuracy for each DNO are shown in the following Table.

	HV MPAN Measurement	LV MPAN Measurement	% HV Contribution	% LV Contribution	Overall MPAN Accuracy
CE NEDL	100.27%	100.27%	79.80%	20.20%	100.27%
CE YEDL	98.40%	98.40%	73.60%	26.40%	98.40%
CN East	100.00%	99.60%	85.26%	14.74%	99.94%
CN West	98.56%	98.57%	82.51%	17.49%	98.56%
EDF - EPN	100.00%	95.64%	84.19%	15.81%	99.31%
EDF - LPN	100.00%	99.93%	51.56%	48.44%	99.97%
EDF - SPN	100.00%	100.00%	85.95%	14.05%	100.00%
SSE - SEPD	100.00%	100.00%	76.70%	23.30%	100.00%
SSE - SHEPD	100.00%	100.00%	87.42%	12.58%	100.00%
SPD	100.08%	100.08%	85.31%	14.69%	100.08%
SPM	99.92%	99.92%	84.73%	15.27%	99.92%
UU	100.00%	100.00%	71.88%	28.12%	100.00%
WPD - S Wales	100.00%	100.00%	85.95%	14.05%	100.00%
WPD - S West	100.05%	100.05%	74.32%	25.68%	100.05%

Stage 2 – the accuracy of incident reporting

The following steps were taken to calculate Stage 2 accuracy results from the audit workbooks completed during the audit visits:

Workbook cleansing

The workbooks were first cleansed by the replacement of HV incidents that were too difficult to audit by relevant spare incidents and by the removal of unneeded spare incidents as follows:

- HV incidents that were too difficult to audit were identified;

- Corresponding spare incidents for the HV incidents that were too difficult to audit 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 too difficult to audit were removed; and

- The spare incidents not used were removed.

The Table below shows the details of the HV incidents that were too difficult to audit and the spares that were used for each licensed area.

Licensed Area	Too difficult Incident	Spares Used
CE NEDL	None	Not needed
CE YEDL	81694	This incident is a spare
CN East	HV/2003/14/000837	HV/2003/23/000421
	HV/2003/44/000031	HV/2003/14/000658
	HV/2003/44/000263	HV/2003/42/000200
	PA/2003/42/000221	PA/2003/14/000066
	PA/2003/14/000123	No spare available
	PA/2003/42/000140	PA/2003/23/000362
CN West	None	Not needed
EDF - EPN	1033497	This incident is a spare
	1035308	1034827
EDF - LPN	2003826	2004002
	2004051	2004351
EDF - SPN	47106	50245
	51418	53260
SSE - SEPD	550166	450046
SSE - SHEPD	25965	This incident is a spare
	26633	No spare available
SPD	None	Not needed
SPM	None	Not needed
UU	HV/2003/63/000385	HV/2003/21/000098
	PA/2003/45/000461	This incident is a spare
WPD - S Wales	None	Not needed
WPD - S West	None	Not needed

The workbooks were then cleansed by the replacement of LV incidents that were too difficult to audit by relevant spare incidents and by the removal of unneeded spare incidents as follows:

- LV incidents that were too difficult to audit were identified;

- Corresponding spare incidents for the LV incidents that were too difficult to audit 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 too difficult to audit were removed; and

- The spare incidents not used were removed.

The following Table shows the details of the LV incidents that were too difficult to audit and the spares that were used for each licensed area.

Licensed Area	Too difficult Incident	Spares Used
CE NEDL	None	Not needed
CE YEDL	89712	82660
	76382	74778
CN East	LV/2003/14/000218	LV/2003/52/001431
	LV/2003/42/000443	LV/2003/42/000008
	PA/2003/44/000632	This incident is a spare
	PA/2003/42/000196	No spare available
	PA/2003/44/000160	No spare available
	PA/2003/14/000167	This incident is a spare
CN West	None	Not needed
EDF - EPN	None	Not needed
EDF - LPN	None	Not needed
EDF - SPN	59948	62206
SSE - SEPD	None	Not needed
SSE - SHEPD	None	Not needed
SPD	None	Not needed
SPM	None	Not needed
UU	61 2515	45 1750
WPD - S Wales	22204-T	17971-T
WPD - S West	103588-a	104630-a

The following LV incidents were also replaced in addition to those shown above:

- For WPD South West, incident 97527-a was removed from the LV data set because this incident was an HV incident that had been reported as an LV incident. It was replaced with spare incident 27113-c

- For SSE – SEPD, incident 340055 was identified as being a short interruption and was therefore removed from the data set. This was replaced with spare incident 340129.

Creation of the Overall and LV data sets

Following the workbook cleansing described above all the remaining HV incidents, together with the LV incidents specified by Ofgem, were included in the Overall data set from which Overall CI and CML reporting accuracy would be calculated.

All the LV incidents, including those in the Overall data set, were included in the LV data set from which LV CI and CML reporting accuracy was calculated.

Identification of restoration stages with outlying results

Having produced the Overall and LV data sets, the next step in calculating Stage 2 reporting accuracy was to remove the restoration stages that were considered to contain outlying results. 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 for CI and CML variances in both the Overall and the LV data sets.

Removal of restorations stages with outlying results

Having identified the outlying results for CI and CML in both the Overall and the LV data sets, they were then removed from the data sets prior to calculation of Stage 2 audited accuracy of reporting. Using the process for identifying outlying results described above, the following restoration stages were removed from the Overall data sets.

Licensed Area	CI		CML	
	Incident	Restoration Stage	Incident	Restoration Stage
CE NEDL	3140	3	2925	11
	3140	6	3140	3
	-	-	3140	6
	-	-	3142	1
CE YEDL	73045	3	75481	1
	-	-	75481	2
	-	-	86429	2
	-	-	86071	2
	-	-	2279	1
CN East	HV/2003/14/000447	1	HV/2003/14/000447	1
	HV/2003/44/000470	1	HV/2003/42/000279	5
	HV/2003/52/000154	2	HV/2003/52/000154	2
	HV/2003/52/000582	2	HV/2003/52/000515	5
CN West	EHV/2003/08/000969	3	EHV/2003/08/000969	3
	-	-	HV/2003/07/000336	2
EDF - EPN	1031731	1	1031731	1
	1034655	2	1031748	6
	1034701	2	1034701	3
	1034701	3	1035333	1
EDF - LPN	2004141	1	2003878	3
	2004170	1	2004062	3
	-	-	2004170	1
	-	-	2004173	3
EDF - SPN	50193	11	50193	11
	52599	11	52599	16
	52599	13	58326	1219530
	52599	16	58684	1
	52761	1	-	-
	55946	1	-	-
	67671	1351587	-	-

Outlying results removed from the Overall data sets – continued:

Licensed Area	CI	CML	Licensed Area	CI
SSE - SEPD	450068	1	490026	8
	450068	3	490026	9
	490026	8	490026	10
	490026	9	-	-
	490026	10	-	-
	510039	8	-	-
SSE - SHEPD	57H000572	1	50H000144	9
	57H000572	2	50H000144	11
	57H000572	5	-	-
	57H000572	6	-	-
SPD	F-59560-I	1	F-53422-I	1
	INCD-340951-U	1	-	-
	INCD-340951-U	3	-	-
	INCD-323081-U	1	-	-
SPM	F-2741-d	1	MW\2003\025450	1
	F-6443-a	1	F-6443-a	1
	F-6443-a	2	-	-
UU	HV/2003/61/000026	1	HV/2003/16/000064	1
	HV/2003/16/000064	1	HV/2003/16/000064	2
	HV/2003/16/000064	2	HV/2003/63/000289	3
	HV/2003/63/000289	3	HV/2003/63/000195	1
WPD - S Wales	F-11380-O	2	F-11380-O	2
	F-11160-O	1	F-11160-O	1
	F-11160-O	4	F-11160-O	4
	21674-T	1	F-12179-O	1
	21674-T	2	-	-
WPD - S West	100664-a	2	102559-a	5
	94729-a	3	94729-a	3
	94729-a	6	81717-a	1
	90804-a/90816-a	3	-	
	81717-a	1	-	-

The restoration stages with outlying results removed from the LV data sets are shown in the following Table.

Licensed Area	CI		CML	
	Incident	Restoration Stage	Incident	Restoration Stage
CE NEDL	None	None	3694	1
CE YEDL	77628	2	85731	1
	-	-	77628	2
CN East	None	None	LV/2003/52/001436	1
CN West	LV/2003/07/001354	3	LV/2003/08/000439	1
EDF - EPN	1105568	1	1105568	1
	-	-	1107454	1
EDF - LPN	2048061	3	2047841	4
	2049669	2	2047841	5
EDF - SPN	65899	1	57065	1
	65899	2	66939	1
	59639	2	-	-
SSE - SEPD	530593	1	530593	1
SSE - SHEPD	240001030	1	240000391	3
	-	-	240001030	1
SPD	INCD-323081-U	1	INCD-348317-U	2
SPM	INCD-111053-m	1	INCD-102854-m	1
UU	41 0434	2	33 0614	1
WPD - S Wales	12340-T	1	12340-T	1
WPD - S West	81717-a	1	81717-a	1

Calculation of Stage 2 audit accuracy

Once the outlying results had been removed, the Overall and LV Stage 2 accuracies of incident reporting were then 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)

Stage 3 – Combined Accuracy of Reporting

Having determined the Stage 2 audited accuracy of incident reporting at the Overall and the LV levels for both CI and CML, the Stage 3 combined accuracy of reporting was then calculated. This was carried out by combining the audited accuracy of incident reporting (Stage 2 accuracy) with the MPAN accuracy (Stage 1 measurement system accuracy).

Overall MPAN accuracy was arrived at by weighting the HV and LV MPAN results from Stage 1 by the respective contribution to average IIP CI and CML in 2003/04 of HV and above incidents and LV incidents. This was then multiplied with the stage 2 overall accuracy results for CI and CML. For the LV data set, the calculation is the product of the audited LV MPAN accuracy for 2003/04 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 Stage 3 combined accuracies of reporting are as follows:

- Combined Overall CI accuracy = 1 – the absolute value of (1- (2003/04 Overall MPAN accuracy) * (Overall CI audited accuracy))

- Combined Overall CML accuracy = 1 – the absolute value of (1- (2003/04 Overall MPAN accuracy) * (Overall CML audited accuracy))

- Combined LV CI accuracy = 1 – the absolute value of (1- (2003/04 LV MPAN accuracy) * (LV CI audited accuracy))

- Combined LV CML accuracy = 1 – the absolute value of (1- (2003/04 LV MPAN accuracy) * (LV CML audited accuracy))

In the results Tables these are expressed as percentages.

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

Summary

Area	Main findings
Interpretation of the RIGs	CN West has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support CN West's estimate of MPAN accuracy of 98.56% at HV and of 98.57% at LV.
Connectivity model	The visiting auditors support CN West's estimate of connectivity model accuracy of 98.56% at HV and of 98.57% at LV.
IIP template	CN West has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program. CN West has identified an error in the extraction routines used to populate the IIP Template and the results of this can be observed when comparing the corrected version of the Template as at 31 April 2004 with the re-run version. The error did not affect the accuracy of reporting and was manually amended by CN West before submission to Ofgem.
Overall reporting	The accuracy of Overall reporting was found to be very high with few transcription errors. Where significant variations between reported numbers and current system numbers for HV incidents were found they were explained with good audit evidence.
LV reporting	The accuracy of LV reporting was very high with few transcription errors. CN West 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
Overall Sample CI	98.55%	Under Reported
Overall Sample CML	98.52%	Under Reported
LV Sample CI	98.18%	Under Reported
LV Sample CML	96.81%	Under Reported

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

Introduction

The audit was carried out at the CN West Offices at Tipton from the 21st to 23rd June 2004. The visiting auditors were Geoff Stott (Team Leader) and Brian Wales, both from BPI.

The visit arrangements were similar to those for the previous year. The visiting auditors would like to thank the team members at CN West for their participation in the audit and in particular for the pre-visit preparation 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 is set out in last years audit report[4]. CN West's Control & Incident Room Automation System (CIRAS) is used for recording trouble calls, planned shutdowns, incident management and network operations and holds the connectivity model for all voltages. Like the majority of DNOs CN West uses PC-NaFIRS to record and extract data on incident information. Since the audit for reporting year 2002/03 CN West has introduced an automatic interface between its CIRAS system and its PC-NaFIRS system. This interface removes the previous manual system by automatically populating PC-NaFIRS with all HV and LV incidents.

Changes since last year

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

Interpretation of RIGs

There have been no changes in the way which CN West interprets the definitions and guidance contained in the RIGS.

MPAN count

There had been no changes to the way in which CN West 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 2002/03 audit. 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 2002/03 IIP audit visit in July 2003 there were 22,539 customers (MPANs) that were in the Connectivity Model but were not connected to a defined cable due to the quality of address data. There were also a further 14,869 customers in the

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[4] Information and Incentives Audit of Incident Reporting 2002/2003 (Ofgem 2004) Appendix E

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.

By June 2004 only 1,060 addresses remain in CN West's NRS whose address are insufficiently structured to pass to the Connectivity Model and there were 31,017 customers in the Model that were not connected to a defined cable or metering point. CN West has attached a total of 30,097 MPANs to its Connectivity Model in the past 12 months.

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 agree that this demonstrates that CN West is actively measuring and managing this aspect of its IIP processes.

IIP Template

There have been no changes to the mechanism that CN West uses to populate the IIP template for reporting to Ofgem.

The visiting auditors witnessed a rerun of the program. CN West identified an error in the extraction routines used to populate the IIP Template and the results of this can be observed when comparing the corrected version of the Template as at 31 April 2004 with the re-run version in the audit workbook. Whilst the overall CI and CML figures are the same, there is a transposition of the entries in the rows entitled 'Other DNO Connected Systems' and 'Embedded Generators'. This has been formally raised as an issue in this year's IIP audit. Ofgem were given the correct figures in the relevant categories.

Potential sources of error remaining in measurement systems

Despite the introduction of the interface to transfer data automatically from CIRAS to PC-NaFIRS CN West still requires some manual intervention to interpret LV incidents that contain multiple restoration stages. Central Network West estimates that the effect on the accuracy of reporting CI and CML is minimal.

It is possible for mistakes to occur during the recording of real time incident information due to the nature of fault restoration. All incident reports automatically entered into CN West's PC-NaFIRS system undergo a further manual check before submission; thus helping to ensure that any information mis-recorded in CN West's CIRAS is not included in the final incident report.

CN West uses a manual process to transfer EHV and pre-arranged incident from its CIRAS system to its PC-NaFIRS system. Due to the complexity of the small numbers of incidents at EHV, CN West intends to retain this manual procedure at this voltage level.

All inaccuracies that CN West has found during internal audits have been identified as manual errors, such as transcription errors or incorrect interpretation of the RIGs in complex incident situations.

Future changes

CN West intends to continue to pursue the connection of customers to its Connectivity Model and to correct connection errors discovered during day to day operations. CN West employs ISO 9002 documented procedures for updating network records when

alterations are made to the electrical network and these operate in tandem with its connectivity model updating procedures.

In addition, CN West intends to continue its work to reduce any isolated problems it has with the information held for connected customers, such as LV customers connected to the wrong side of a network open point and delays in the submission to the records update centre of connectivity changes following LV switching operations in the field.

In April 2004 CN West extended its automatic interface between CIRAS and PC-NaFIRS to include pre-arranged outages. The Visiting Auditors agree that this should improve the accuracy of pre-arranged reporting at both HV and LV, as manual transcription errors will be greatly reduced. CN West's internal audit programme will continue to be concentrated on complex incidents or incidents with high CI/CML to provide the basis for ongoing training and improvement.

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.

For the reporting year 2003/04, Central Network West's estimate of MPAN accuracy is 98.56% at HV and 98.57% at LV. The accuracy of its connectivity model is as follows:

CN West	2003/04	2002/03
HV	98.56%	99.10%
LV	98.57%	99.10%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of LV reporting was found to be high with only occasional transcription errors of little significance. In three out of seven cases CN West was able to explain with good auditable information the variations in customer numbers since the time of the incident. The quality of information in the logs was generally very high. No LV incidents were considered to be unauditable.

The accuracy of HV reporting was also high with only one transcription error of little significance. The majority of variations between the reported customer numbers and current system numbers were explained with good auditable evidence.

The functionality within Central Network West's CIRAS system has the capability to store switching schedule information, outage history and restoration stage details of all HV incidents. Thus the customers affected within each restoration stage of an incident are automatically identified from the network connectivity model by recording the details of each transformer and associated customers at the time of the incident. This detail allows changes to customer numbers to be identified by comparing those at the time of the incident with the current numbers. Where differences exist, further information from network amendment records shows details and dates of new connections and therefore allows the specific customers to be identified.

CIRAS also has the ability to simulate and replay an incident by displaying diagrammatically the parts of the network affected by each restoration stage. This in combination with restoration stage information can be used to identify where there were abnormal running conditions at the time of an incident.

Interrogation of this robust database enabled CN West to prove, where relevant, that network running conditions had changed between the time of the incident and the time of the audit visit. This interrogation also provided the key to the associated number of customer interruptions and allowed CN West to identify those customers that had been connected in the period between the incident and the audit visit. Through use of this facility all HV incidents were audited despite severe network abnormalities at the time of several incidents.

No additional issues arose during the audit visit requiring resolution by the core team. The only issue to arise was the error identified by CN West in the populating of the IIP Template. This error did not affect the reporting accuracy of CN West and will be followed up independently of the IIP audit.

CN West continues to conduct detailed internal audits of its reported incidents. During the 2003/04 reporting year CN West has placed specific emphasis upon high CI / CML incidents as well as the more complex incidents and any learning points have been circulated. CN West intends to continue this internal audit activity and to include a focus upon the more complex LV incidents in addition to ensuring that a consistent approach is adopted in its reporting recording of abnormal network running arrangements.

The visiting auditors believe that this significantly helps CN West in its drive to improve the quality of the data collected and the overall accuracy of Central Network West's reporting.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	98.56%
Stage 1	LV MPAN Measurement	98.57%
Stage 1	HV Connectivity Model	98.56%
Stage 1	LV Connectivity Model	98.57%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	98.56%
	LV MPAN Accuracy	98.57%
Stage 2	Overall CI	99.99%
	Overall CML	99.95%
	LV CI	99.61%
	LV CML	98.21%

Combined Accuracy	Overall CI	98.55%
	Overall CML	98.52%
	LV CI	98.18%
	LV CML	96.81%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Develop a more formal approach to the self audit process.

- Central Network West continues to focus its internal auditing on complex incidents and those with a high CI/CML. The internal audit process is used to identify areas for improvement.

More emphasis needs to be placed on accuracy of reporting incidents at EHV.

- CN West has reinforced its structured process for the reporting of incidents at the EHV level. The network running arrangement at the time of the incident is recorded. CN West intends to increase the number of EHV incidents that are the subject of internal audit.

2003/04 Audit

The following recommendations were made by the visiting auditors as a result of this year's audit visit to CN West.

- Continue the drive to minimise manual input and transcription errors.

- Continue the emphasis on the structured internal audit regime.

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

Recommendations for Ofgem

- Investigate the error identified by CN West in the nationally written extraction routine that is used to populate the "Other DNO/connected systems" and the "Embedded generators" rows of the IIP Template.

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

Summary

Area	Main findings
Interpretation of the RIGs	There have been no changes in the way CN East has interpreted the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	CN East has made no changes to its methods of creation and counting of MPANs since the 2002/03 audit. The visiting auditors estimated CN East's MPAN accuracy to be 100% at HV and 99.6% at LV. CN East agreed with these estimates
Connectivity model	CN East's connectivity model accuracy has improved during the audit year as a result of continued data cleansing work. The visiting auditors support CN East's estimate of connectivity model accuracy at HV/LV substation level of 99.79% and LV Feeder level of 99.40%.
IIP template	CN East has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program. One EHV (33kV) incident had been added to NaFIRS since the reporting date but no customers were involved hence it had no impact on CI or CML.
Overall reporting	CN East's HV incident reporting was found to have a significant number of data entry errors but these did not have a significant effect on Overall accuracy. In addition, some HV pre-arranged incidents could not be audited because of the lack of an audit trail.
LV reporting	The visiting auditors found some data entry errors in the reporting of LV incidents. Lack of an audit trail prevented the audit of all four LV pre-arranged incidents in the audit sample.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.39%	Under Reported
Overall Sample CML	97.49%	Under Reported
LV Sample CI	88.16%	Over Reported
LV Sample CML	99.37%	Over Reported

It is auditors' opinion that reporting of CN East under the IIP scheme does not meet the required level of accuracy.   It is the auditors' opinion that CN East over reports LV CI by 11.84%. CN East's reporting of LV CI is therefore 1.84% in excess of the minimum level of accuracy of 10%.

Introduction

Central Networks East (CN East) was previously known as East Midland Electricity (EME). The audit was carried out at the CN East's Castle Donnington headquarters from 5 to 7 July 2004. The visiting auditors were Alan Taylor (Team Leader) and Chee Lee from Mott MacDonald.

The auditors would like to thank the CN East team for their comprehensive assistance in carrying out the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

An overall summary of CN East's measurement systems is given in last year's audit report[5]. Since the 2002/03 reporting year CN East has upgraded its incident reporting systems. 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. This process thus required two manual data transcriptions.

From 1 April 2003 CLASS and CORGOS have been replaced by the GE Harris Energy Network Management and Control System (ENMAC) and the LeT Systems eRespond Outage Management System (OMS). OMS has the advantage that it will transfer data to PC-NaFIRS automatically, thus removing one manual data transcription stage with corresponding improvement in data accuracy.

Changes since last year

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

Interpretation of RIGs

There have been no changes to the way in which CN East interprets the definitions and guidance contained in RIGS Version 2 since the 2002/03 audit.

MPAN count

CN East has made no changes to its methods of creation and counting of MPANs since the 2002/03 audit.

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

Connectivity model

CN East has made no systems changes to its HV and LV connectivity model since the 2002/03 audit and report that connectivity model accuracy has improved during the audit year as a result of continued data cleansing work.

IIP Template

CN East has not changed the way it populates the IIP template. The only changes CN East has made to the automatic NaFIRS interface are those required by Ofgem to the format of the IIP template. The template is populated automatically from PC-NaFIRS as in previous years.

Potential sources of error remaining in measurement systems

CN East believes there will inevitably be sources of error in its measurement systems due to day to day customer connections and disconnections and the time taken for this to be reflected in the connectivity model. However, measurement systems accuracy should continue to improve in future as a result of CN East's ongoing data cleansing activities.

Future changes

CN East does not anticipate further significant changes to its systems. However, further data cleansing and corrections to MPAN attachments at substation and feeder level will be carried out as new information becomes available from sectors of the network affected by incidents.

Audit opinion on measurement systems

The visiting auditors were provided with details of an MPAN count and estimate of numbers in the connectivity model taken from a reconciliation exercise carried out in September 2003. These were compared with results from a similar exercise carried out in September 2002 to verify the location and magnitude of improvements achieved. The auditors estimated CN East's MPAN accuracy to be 100% at HV and 99.6% at LV% and the figures were agreed by CN East. The visiting auditors also support CN East's estimates of connectivity model accuracy shown in the Table below.

CN East	2003/04	2002/03
HV	99.79%	99.40%
LV	99.40%	98.46%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Three 11kV incidents in the HV sample were unauditable. One complex incident forms part of the exceptional event HV/2003/14/000837 and was considered too lengthy to audit within the half hour guideline time limit. The second was a cross boundary incident which took four months to resolve and for which relevant records had been archived. The other one incorporated a redesigned LV network such that customer numbers could not be verified.

CN East indicated that significant changes were likely in system CI for 33kV incidents between the time of the incidents and the audit. Network open points were rearranged in

CN East's ABSD (Air Break Switch Disconnector) recovery programme as a result of the "Suspension of Operating Practice 294", which changed customer numbers on 33kV feeders and substations. Three of the 11kV pre-arranged supply interruptions could not be audited due to lack of an audit trail. For example it was not possible to verify customer numbers independently where details of affected LV circuits and backfeed arrangements were not available. Two of the five re-interruptions audited were not identified at the reporting stage by control room staff and 25 transcription/misreporting errors were noted to have occurred during the manual transfer of data from switching schedules into OMS.

Two LV fault incidents were unauditable because an audit trail was not available to recreate the incident. None of the pre-arranged supply interruptions were auditable for the same reason. There were seven transcription/misreporting errors associated with the audited LV incident reports.

In general, CN East believes that the CI and CML reported at the time of the incident are correct and that the numbers derived from the connectivity model at the time of the audit differ slightly due to normal day to day customer connections and disconnections. For most incidents the visiting auditors found that CN East had no way to confirm customer number changes between incident and audit dates although the number of customers affected at the time of the incident is automatically archived within the OMS system. CN East believes it is not practical to provide an audit trail that gives details of every connectivity transaction. Consequently the system CI at the time of audit was taken as the audit value but CN East's number reported at the time of incident was recorded for reference in the "DNO Customers" column of the audit workbook.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	99.60%
Stage 1	HV Connectivity Model	99.79%
Stage 1	LV Connectivity Model	99.40%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	99.94%
	LV MPAN Accuracy	99.60%
Stage 2	Overall CI	99.44%
	Overall CML	97.55%
	LV CI	112.29%
	LV CML	101.03%
Combined Accuracy	Overall CI	99.39%

	Overall CML	97.49%
	LV CI	88.16%
	LV CML	99.37%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Over Reported
	LV CML	Over Reported

It is auditors' opinion that reporting of CN East under the IIP scheme does not meet the required level of accuracy.   It is the auditors' opinion that CN East over reports LV CI by 11.84%. CN East's reporting of LV CI is therefore 1.84% in excess of the minimum level of accuracy of 10%.

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2002/03 Audit</u>

Further staff training should be provided associated with pre-arranged incidents so that start and end times are reported properly.

- The procedure for reporting interruption times for prearranged supply interruptions has been improved so that staff can leave messages by text, automatic logger or answer-phone. This will assist in overcoming the original problem of staff leaving site once the work is finished and not reporting times properly because administrators' phones are busy.

A consistent approach is adopted in determining customer numbers for LV incidents.

- A new LV module has been incorporated into the Loss of Supply (LoS) system, which together with a consistent process based on GIS data, will improve consistency as more technical support staff are trained. Also, new staff and selected existing staff have been trained or have received refresher courses.

<u>2003/04 Audit</u>

- Improve the accuracy of the manual input of data into OMS. Staff need to be more careful when copying data, deriving customer numbers and entering times e.g. entering completion times rather than instruction times. Also, when data in NaFIRS is audited care should be taken to ensure that correct reports are not altered.

- Retain field information for HV and LV pre-arranged incidents so that that the audit trail can be adequately reconstructed.

- Adopt a consistent approach for LV incidents involving deliberate supply interruptions e.g. additional outages required for repairs arising from other incidents. A consistent approach is required so that site staff report the actual start and completion times, and actual locations of fault repair so that NMC staff can estimate the customer numbers from GIS. NMC staff should include as much information as possible in the incident notes.

Recommendations for Ofgem

- None.

Appendix D. EDF Energy Networks – EPN

Summary

Area	Main findings
Interpretation of the RIGs	EPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	EPN has made no changes to its MPAN counting systems since the 2002/03 audit. The visiting auditors support EPN's estimates of MPAN Accuracy at 100% for HV and 95.6% at LV level.
Connectivity model	Continued data cleansing has lead to improved accuracy of EPN's connectivity model. The visiting auditors support EPN's estimates of connectivity model accuracy at HV/LV substation level of 96.6% and 93.5% at LV feeder level
IIP template	EPN has not changed its method for population of the IIP template since the 2002/03 audit. The process still requires a manual transfer of data into the template. Only marginal differences were noted by the visiting auditors when the template population procedure was repeated.
Overall reporting	The visiting auditors considered the reporting of incidents at HV level was good with high levels of accuracy largely because of reduced manual intervention. Some incidents at EHV level were difficult to audit due to a poor audit trail.
LV reporting	The visiting auditors noted a significant improvement in the presentation and recording of information since last year and conclude that EPN's accuracy of incident reporting at LV level is high. However some errors were found including missed restoration stages, missed calculation of customer numbers from numbers of phases affected, and transcription errors. In addition the recording of information for planned interruptions could be improved.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.37%	Under Reported

Overall Sample CML	99.18%	Under Reported
LV Sample CI	98.10%	Under Reported
LV Sample CML	95.96%	Under Reported

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

Introduction

The audit was carried out at the EPN offices in Fore Hamlet, Ipswich, from 21 July to 23 July 2004. Ofgem's visiting auditors were Alan Taylor (Team Leader) and David Holding both from Mott MacDonald.

The auditors would like to thank the EPN team for their participation in the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of EPN's measurement systems is set out in last year's audit report[6]. EPN uses "TroubleCall" as its Fault Management System, with faults being created manually using the Fault Reporting System (FRS). There is a manual process of transferring information from the FRS into the IIP template, with details being generated from a range of standard reports. Customer numbers are automatically populated into HV fault reports from the connectivity model at the time of raising the relevant report.

Over the course of the 2003/2004 year SCADA was integrated with the Network Management System (ENMAC) and this ensures automatic date and time stamping for SCADA operated switching.

Changes since last year

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

Interpretation of RIGs

EPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

EPN has made no changes to its MPAN counting systems since the 2002/03 audit.

Connectivity model

EPN has made no changes to its connectivity model at LV or HV level since the 2002/03 audit.

IIP Template

EPN has not changed its method for population of the IIP template since the 2002/03 audit. When asked to rerun the template the results were found to be only marginally

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

different from those originally reported to Ofgem. The differences appeared consistent with minor updating and small numbers of reports entered after the completion of the original figures. The process involves running a suite of queries and then a manual process of transferring the results of the query into the template. The visiting auditors do not believe the manual transfer of data to be a cause for concern providing sufficient checks are in place before submission of the information.

<u>Potential sources of error remaining in measurement systems</u>

There remains the potential for error due to a combination of inaccurate supplier information, unrecorded disconnected MPANs, and address errors.

<u>Future changes</u>

EPN is not planning any significant changes to its measurement systems for future years.

Audit opinion on measurement systems

The visiting auditors support EPN's estimate of MPAN accuracy of 100% at the HV level and 95.6% at the LV level.

During the audit of LV incidents it was possible to identify some errors in the connectivity model. When looking at individual faults on a small number of occasions it was evident that customers were attached to incorrect feeders. The numbers involved appeared very small and no similar problems were encountered at HV level.

EPN includes all MPANs in the connectivity model and argues that although some customers are included on dummy feeders at LV, control engineers will identify and reassign them in the process of creating fault reports. It was not possible for the visiting auditors to verify this claim during the audit.

The visiting auditors support EPN's estimates of connectivity model accuracy set out in the following Table.

EPN	2003/04	2002/03
HV	96.6%	96.09%
LV	93.5%	93.0%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The audit trail was comprehensive and it was clear that EPN had taken a lot of time in preparing the information for audit. For complex incidents EPN had gone a step further and had produced detailed notes for the audit which proved of great benefit.

Due to the nature of the telemetry systems operating at the HV level there is a low level of manual intervention when reporting HV faults. Apart from differences in customer numbers as a result of apparent customer growth there were few reporting errors noted by the visiting auditors. Of the errors found most were apparent transcription errors or misreading of the available information. The reporting of times was also considered very accurate, although some errors were discovered where the confirmed time had been used in the fault report rather than the actual event time. Only two HV incidents were

considered too complex to audit, one because of the abnormal running arrangements at the time of the incident and the other because it would have required significantly longer than 30 minutes to audit.

At LV there were two errors in relation to classifying reinterruptions, two errors in relation to missed restoration stages, and two errors in relation to miscalculation of customer numbers due to taking an incorrect number of phases. Some other small errors were either unexplained or the result of apparent misinterpretation of notes. For pre-arranged Interruptions the number of customers carded was reported on two occasions rather than the actual number of customers interrupted, and the reported customer numbers were often significantly different to those found on the system. In a number of incidents the system CI was different to the reported CI apparently due to normal day to day customer connections and disconnections between incident and audit and it was not possible to reconcile these variances. There were a small number of errors in recording customer interruption times. These included taking the time of the second call rather than the first and using the logged time rather than the event time. All the LV incidents and spares were audited.

The information on the switching control reports has improved in clarity since last year and this in turn resulted in clearer information being recorded in fault reports. There were few instances of significant errors at LV level and the visiting auditors conclude that EPN's accuracy of incident reporting at LV level is high. However, the recording of information for pre-arranged interruptions could be improved.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	95.64%
Stage 1	HV Connectivity Model	99.27%
Stage 1	LV Connectivity Model	95.60%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	99.31%
	LV MPAN Accuracy	95.64%
Stage 2	Overall CI	100.06%
	Overall CML	99.87%
	LV CI	102.57%
	LV CML	100.34%
Combined Accuracy	Overall CI	99.37%
	Overall CML	99.18%

	LV CI	98.10%
	LV CML	95.96%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Reduced reliance on manual recording and transcription.

- EPN still relies on manual creation of fault reports at the HV and LV levels although raising the profile of IIP and training appears to have had a significant impact on reporting accuracy by considerably reducing transcription errors.

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

- EPN reports that a process with associated training is in place to ensure this is done. During the course of the audit the visiting auditors noted far fewer obvious errors when viewing the connectivity model, which substantiates the continuous process of reassigning customers to the correct feeders during fault report creation.

Create a more robust audit trail.

- Overall the consistency and clarity witnessed including switching logs and fault reports appeared greatly improved.

Keep a record of network changes.

- It is possible to work out through the system how the network was running at a given point in time although this can be a time consuming process. HV fault reports are populated with customer numbers automatically, but at LV it is still not possible to recreate customer numbers at a given point in time.

2003/04 Audit

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

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

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

Recommendations for Ofgem

- Some concerns were raised by EPN in relation to the selection of the incident samples for audit. Clarification from Ofgem may help on the policy for inclusion of major incidents such as the London outage and on the rationale for determination of numbers of incidents and associated restoration stages.

- EPN raised concerns about the definition of connectivity accuracy and whether this was consistently calculated across licensed areas. For example EPN's LV connectivity accuracy represents the probability of a single MPAN being correctly assigned to the correct LV feeder. This point is to be addressed as part of the Appointed Auditor's work for Ofgem.

Appendix E. EDF Energy Networks (LPN)

Summary

Area	Main findings
Interpretation of the RIGs	LPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	LPN has not made any changes from last year to the way in which it counts MPANs. The visiting auditors support LPN's MPAN accuracy estimates of 99.93% at LV and 100% at the HV transformer level.
Connectivity model	The accuracy of LPN's connectivity model has improved as a result of ongoing data cleansing. The visiting auditors support LPN's estimate of accuracy of its connectivity model of 99.3% at HV/LV substation level and 95.7% at the LV feeder level
IIP template	LPN has not changed the way it populates the IIP template. The process still requires the manual transfer of data into the template. Only marginal differences were noted by the visiting auditors when the template population procedure was repeated.
Overall reporting	There were a small number of transcription errors at the HV level although the visiting auditors do not consider the impact to have been material. Overall the visiting auditors noted a high level of accuracy of reporting in part due to the automatic nature of the process at the HV level.
LV reporting	The visiting auditors noted a significant improvement in the presentation and recording of information since last year. However, there were some errors in reporting including missed restoration stages, miscalculation of customer numbers from the number of phases affected, and transcription errors.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.52%	Over Reported
Overall Sample CML	99.69%	Over Reported
LV Sample CI	99.89%	Under Reported
LV Sample CML	99.44%	Under Reported

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

Introduction

The audit was carried out at the LPN offices in Fore Hamlet, Ipswich, from 19 to 21 July 2004. Ofgem's auditors were Alan Taylor from Mott MacDonald (Team Leader) and David Holding from Mott MacDonald.

The auditors would like to thank the LPN team for their participation in the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of LPN's measurement systems is set out in last year's audit report[7]. LPN uses "TroubleCall" as its Fault Management System, with incidents being created manually using the Fault Reporting System (FRS). There is a manual process of transferring information from the FRS into the IIP template with IIP details being generated from a range of standard reports. Customer numbers are transferred manually to fault reports from the connectivity model at the time of raising the reports.

Changes since last year

The visiting auditors found a number of minor differences from last year in the systems and processes in place at LPN. The LV Control Switching Log has been significantly revised and turned into a standard pro forma for incident reporting. This appears to have greatly increased the consistency and quantity of information captured which improved the accuracy of the fault reports.

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

Interpretation of RIGs

LPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

LPN has made no changes to its MPAN counting systems since the 2002/03 audit.

Connectivity model

LPN has made no changes to its Connectivity Model at either the LV or the HV level since the 2002/03 audit.

IIP Template

LPN's process for populating the IIP template is unchanged from previous years. The process involves running a suite of queries and then transferring the results manually into the template. The visiting auditors do not believe the manual transfer of data is a cause for concern providing sufficient checks are in place before submission of the finalised information. When asked to rerun the template the results were found to be

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

only marginally different from those originally reported to Ofgem. The differences appeared consistent with minor updating and small numbers of reports entered after the completion of the original figures.

Potential sources of error remaining in measurement systems

There is continued potential for error in measurement systems due to a combination of inaccurate supplier information, unrecorded disconnected MPANs, and address errors.

Future changes

LPN does not propose any measurement system changes for the audit year 2004/05.

Audit opinion on measurement systems

All MPANs are included in the connectivity model and LPN argues that although some customers are included on dummy feeders at LV, the control engineer will identify and reassign them at the time of fault report creation. It was not possible to verify this claim during the audit. LPN reported its MPAN accuracy to be 100% at HV and 99.93% at the LV level and the visiting auditors support these figures.

During the audit of incidents it was possible to identify some errors in the LV connectivity model. When looking at individual faults on a small number of occasions it was evident that customers were attached to incorrect feeders. However, the numbers involved appeared very small and there were no equivalent problems noted at HV level. The marginal improvements on last year's connectivity model accuracy figures were achieved through LPN's ongoing data cleansing process. The visiting auditors support LPN's estimates of connectivity model accuracy set out in the Table below.

LPN	2003/04	2002/03
HV	99.3%	99.27%
LV	95.7%	95.6%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Due to the nature of the telemetry systems operating at HV there is a low level of manual intervention when reporting HV faults. Apart from differences in customer numbers as a result of apparent customer growth there were few reporting errors found by the visiting auditors. Some issues were noted such as a small number of transcriptions errors where customer numbers were found to have been swapped between restoration stages.

Only two HV incidents could not be audited. One was backfed at LV and no customers were interrupted although it was not possible to confirm the LV backfeed arrangements at the time of the incident. The other incident was associated with an LV network that had changed since the time of the incident and no data was available relating to the changes.

LPN presented a comprehensive LV audit trail including hard copies of the incident log, control log data, LV diagram and LV voltage fault report, and there were few incidences of significant error. The information on control reports has improved in clarity since last year and greatly helped in the identification of pieces of network affected by individual

restoration stages. It was clear that LPN had taken a lot of time in preparing the information for the audit and the full sample of LV incidents was audited.

During the course of the audit of LV incidents the visiting auditors found a number of errors. There were five errors related to reinterruptions and three errors in relation to restoration stage identification. Three occasions were found where errors in calculation of customer numbers were made, apparently due to taking the incorrect number of phases. Unauditable differences in customer numbers were found in a number of incidents apparently due to customer connections and disconnections between the times of the incident and the audit. There were also a number of errors in recording customer interruption duration. These included taking 'expected' times from the control log rather than the actual loss of supply time or restoration time, and taking the time of the first call on occasions when there was not an immediate loss of supply, one example being in the case of a fire.

For pre-arranged interruptions the number of customers carded was often erroneously reported as the CI. In these cases the visiting auditors frequently found that the customer numbers were significantly different in the measurement system. Recording of start and completion times on the planned interruption reports was also of poor quality.

LPN rotated the staff involved in the audit visit as part of the process of raising the profile of IIP within the organisation. LPN felt this was a very useful exercise in increasing control engineers' understanding of what is required in their day-to-day job for audit trail purposes. This may be a useful idea to promote across other licensed areas for future audits.

LPN raised concerns about the definition of connectivity accuracy and whether this was consistently calculated across licensed areas. For example LPN's LV connectivity accuracy represents the probability of a single MPAN being correctly assigned to the correct LV feeder. This issue will be addressed as part of the ongoing development work by BPI/MM in consultation with Ofgem.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	99.93%
Stage 1	HV Connectivity Model	99.27%
Stage 1	LV Connectivity Model	95.60%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	99.97%
	LV MPAN Accuracy	99.93%
Stage 2	Overall CI	100.52%
	Overall CML	100.34%

	LV CI	99.96%
	LV CML	99.51%
Combined Accuracy	Overall CI	99.52%
	Overall CML	99.69%
	LV CI	99.89%
	LV CML	99.44%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Over Reported
	Overall CML	Over Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Reduce reliance on manual recording and transcription.

- There is still a reliance on manual creation of fault reports at the HV and LV level although raising the profile of IIP and staff training appears to have had a significant impact on reducing transcription errors.

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

- LPN stated that a process and associated training are in place to ensure this is done. During the course of the audit the visiting auditors found far fewer obvious errors when viewing the connectivity model. The improved accuracy figures also substantiate the continuous process of reassigning customers to the correct feeders during fault report creation.

Create a more robust audit trail.

- Good progress has been made at LV to improve the quality of the audit trail. Information contained in the fault reports also aided the audit process, although

the audit process would have been assisted if better notes had been made on HV fault reports relating to system conditions at the time of the incident.

Keep a record of network changes.

- Further work is needed on this. It is possible to work out from the system how the network was running at a given point in time although this can be a time consuming process. At LV it is not possible to recreate customer numbers at a given point in time.

<u>2003/04 Audit</u>

- Further improve the quality of audit trail for HV incidents. In particular it would assist the audit process if details of abnormal system operating conditions could be noted on relevant HV fault report sheets, and further work on recording network changes is needed at both HV and LV.

- Improve the process of collecting and recording information for pre-arranged interruptions.

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

Recommendations for Ofgem

- Some concerns were raised by LPN in relation to the selection of the incident samples for audit. Clarification from Ofgem may help on the policy for inclusion of major incidents such as the London outage and on the rationale for determination of numbers of incidents and associated restoration stages.

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 2002/03 audit.
MPAN Accuracy	SPN has not made any changes from last year to the way in which it counts MPANs. The visiting auditors support SPN's estimate of 100% accuracy for MPAN accuracy. SPN demonstrated that all MPANs were attached to 'true' LV feeders in its connectivity model.
Connectivity model	During the course of the audit of LV incidents it was apparent that some customers are assigned to incorrect LV feeders and the visiting auditors did not witness a robust process for reassignment of these customers to the correct feeder. The visiting auditors support SPN's estimate of 98.5% accuracy at the HV level, and 94.1% at the LV level.
IIP template	SPN has not changed the way it populates the IIP template. Some errors were discovered in the manual process of aggregating codes but the impact on accuracy was not material. SPN plans to automate the process for next year.
Overall reporting	The visiting auditors did not find any systematic errors in reporting of HV incidents. Manual transcription errors were the only significant problem identified.
LV reporting	The manual nature of fault reporting at LV level resulted in a higher level of errors than noted at HV. Lack of evidence for start and end times, transcription errors and two missed restoration stages were the main causes of error.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.90%	Under Reported
Overall Sample CML	99.80%	Over Reported
LV Sample CI	99.52%	Over Reported
LV Sample CML	98.03%	Over Reported

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

Introduction

The audit was carried out at the SPN offices in Wealden House, East Grinstead, between 12 July and 16 July 2004. Ofgem's visiting auditors were Alan Taylor (Team Leader) and David Holding both from Mott MacDonald.

The visiting auditors would like to thank the SPN team for their participation in the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of SPN's measurement systems is set out in last year's audit report[8]. MPRS information is interfaced with the Map Management System, which attaches LV distributor and HV Site details to MPANs. This data is then stored in Discovery, the data warehouse.   The Fault Management System (FMS) for LV information is fed by information from customer calls and field staff feedback.   The Network Management System (NMS) for HV outage data collects real-time information from telemetry devices and from real time dressing of the electronic NMS network diagram for non-telemetered operation.

Fault Reporting combines connectivity data with incident data from FMS and NMS, and automatically pre-populates part of the relevant fault report. RIG logic is applied to the data set to generate the IIP and other performance reporting.   There have been no material changes from previous years.

Changes since last year

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

Interpretation of RIGs

SPN has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

SPN has made no changes to its MPAN count systems since the 2002/03 audit. Reports were run to demonstrate that all MPANs were assigned to real feeders and that no MPANs were assigned to dummy feeders.

Connectivity model

SPN has made no changes to its connectivity model at LV or HV level since the 2002/03 audit.

IIP Template

SPN has not changed its method for population of the IIP template since the 2003/03 audit. When asked to rerun the template the results were found to be only marginally

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

different from those originally reported to Ofgem. The differences appeared consistent with minor updating and small numbers of reports entered after the completion of the original figures. However, one exception was noted in the figures for 'Others'. SPN runs a suite of queries from the Discovery data warehouse, and the manual process of transferring the query results involves aggregating a set of codes to arrive at the classifications required for the IIP template. During the process of aggregating it appears that three codes (covering a total of 17 LV single customer incidents) appear to have been omitted from the 'Other' category. The visiting auditors do not believe this to have had a material impact on SPN's reported figures. SPN plans to automate its template population process for next year.

<u>Potential sources of error remaining in measurement systems</u>

There is continued potential for error in measurement systems due to a combination of inaccurate supplier information, unrecorded disconnected MPANs, and address errors. Time lags in receiving information from suppliers can also lead to inaccuracies.

<u>Future changes</u>

SPN is not planning any significant changes to its measurement systems for future years.

Audit opinion on measurement systems

The visiting auditors support SPN's estimate of 100% for MPAN accuracy. SPN demonstrated that all MPANs were attached to 'true' LV feeders in its connectivity model.

During the course of the audit of LV incidents it was apparent that some customers are assigned to incorrect LV feeders. Reports were noted showing customer calls that indicated customers on a range of LV feeders when clearly only a single feeder was affected. The visiting auditors did not witness a robust process for reassignment of these customers to the correct feeder but the level of inaccuracy witnessed was not sufficient to question SPN's estimate of connectivity model accuracy at the LV level. The visiting auditors did not encounter any similar problems at the HV level. The visiting auditors support SPN's estimates of connectivity model accuracy set out in the following Table.

SPN	2003/04	2002/03
HV	98.5%	98.5%
LV	94.1%	94.1%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The most significant improvement noted by the visiting auditors was SPN's process for tracking changes to the system during the course of the year. For simple LV incidents this was quite a straightforward process with the figures reconciling in all cases. For HV incidents involving large numbers of transformers the same process could be undertaken with a high level of accuracy although this became time consuming and was only carried out for a few incidents where variances were significant.

Due to the nature of the telemetry systems operating at the HV level there is a low level of manual intervention when reporting HV faults. Apart from differences in customer

numbers as a result of apparent customer growth there were few reporting errors found by the visiting auditors. In two HV incidents the problems identified last year relating to block instructions were also found this year. In one incident a block instruction was used to isolate supplies with another block instruction being used to effect restoration resulting in an error in reported CML. In the other incident the block switching instruction included the work within the block thus distorting interruption time. One restoration stage was apparently inadvertently deleted by the control engineer.

The LV audit trail was comprehensive and it was clear that SPN had taken a lot of time in preparing the information used in the reports and had reviewed all incidents thoroughly beforehand.

There were errors or omissions in reporting start or end times resulting in variances for approximately 15% of the stages audited. Examples included using the time the fault was raised rather than time of loss of supply, using expected loss of supply time rather than actual, and lack of evidence for start or end times. The reporting of customer numbers was more robust with approximately 10% of stages found to have errors. Examples included using numbers from field notes rather than the connectivity model and apparent manual transcription errors. The visiting auditors believe that the LV reporting errors were largely due to lack of information and inconsistent quality in fault reports although most of the errors had low impact on reported CI and CML.

The visiting auditors noted instances where SPN incorrectly flagged stages as reinterruptions even where there had been an auto-reclose resulting in a restoration in less than three minutes. In addition SPN should have excluded some short interruptions occurring within selected incidents. The visiting auditors also identified a problem with the recording of incident times where SPN had recorded incident times to the nearest second resulting in a variance in CML when rounded to the nearest minute. In a number of LV incidents where the reported numbers of customers was significantly different from the current system numbers SPN was able to demonstrate reasons for the variances using the track change process. No LV incidents were found to be too complex to audit, and all spares were also audited.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	100.00%
Stage 1	HV Connectivity Model	98.50%
Stage 1	LV Connectivity Model	94.10%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.00%
	LV MPAN Accuracy	100.00%
Stage 2	Overall CI	99.90%

	Overall CML	100.20%
	LV CI	100.48%
	LV CML	101.97%
Combined Accuracy	Overall CI	99.90%
	Overall CML	99.80%
	LV CI	99.52%
	LV CML	98.03%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Over Reported
	LV CI	Over Reported
	LV CML	Over Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

LV numbers disagree sometimes between incident reports and the connectivity model due to misreporting. The transcription procedure from field reports to IIP reports could be improved to ensure greater accuracy.

- The visiting auditors noted some tightening up of the process although errors were still found.

For HV incidents it is sometimes necessary to enter the initial 'off' times manually into NMS e.g. where telecommunications has failed. Errors are occurring in this action and a means should be devised to ensure entry of the correct time.

- Manual input is still required where the interrupting device is not tele-controlled.

Review of procedures for Recording of Block Switching Instructions.

- SPN's system was designed to account for Block Instructions and a report was written which found the size of associated errors to be negligible.

Metering Circuit Breakers (MCBs) count as one customer even for multiple MPANs and during a future upgrade of the system this anomaly should be rectified.

- SPN has made no change and does not view it as practical to do so. During the audit one instance was found of over reporting where it was assumed a customer existed because of an MCB connecting to an adjoining network.

Differences in customer numbers associated with system changes count as errors and SPN could reduce these apparent errors by tracking system changes and providing a reconciliation capability at the time of the IIP audit.

- For incidents it is now possible to track numbers of customers on LV feeders to the date of the incident. The process was found to be very accurate although for HV incidents it was partly a manual process and proved time consuming for complex incidents.

2003/04 Audit

- Exclude short interruptions from the data in the audit workbook.

- Where practical, formalise the process for identifying and correcting customers not attached to the correct feeders at the LV level.

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

Recommendations for Ofgem

- Clarify the rules on how incident start and end times should be rounded.

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

Summary

Area	Main findings
Interpretation of the RIGs	NEDL has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	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 100.27%.
Connectivity model	Apart from some data cleansing NEDL's connectivity model is unchanged from last year. The visiting auditors support NEDL's estimate of connectivity model accuracy of 97% at HV and 93.5% at LV.
IIP template	NEDL has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and the results were identical to those provided to Ofgem.
Overall reporting	NEDL generally had a good audit trail for HV incidents with date and time stamped documents available for inspection. However, several data entry errors were noted where data was entered from another person's hand written NaFIRS report proforma.
LV reporting	NEDL's LV reporting was generally good. The most significant source of error was poor quality of the audit trail in a small number of LV incident reports. The quality of information recorded by NEDL has improved since last year but there remains scope for further improvement in the coming year.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.73%	Over Reported
Overall Sample CML	99.77%	Over Reported
LV Sample CI	93.48%	Under Reported
LV Sample CML	97.61%	Under Reported

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

Introduction

The audit was carried out over the three day period from 5 July 2004 to 7 July 2004 at NEDL's Penshaw control and call centre by John Woodhouse and Simon Critten of Mott MacDonald. This is the same location as for previous audits of NEDL and has the advantage that control engineers, call centre dispatchers and new service teams are co-located in the building. The visiting auditors would like to thank the NEDL team for their pre-visit preparation and assistance in the audit.

Please note that the term "HV" in this Appendix relates to the 6.6 kV, 11 kV and 20 kV networks in NEDL's licensed area.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

NEDL's measurement systems have not materially changed since last year's audit. 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 last year's audit report[9].

Changes since last year

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

Interpretation of RIGs

NEDL has not changed the way that it interprets the definitions and guidance contained in version 2 of the RIGs.

MPAN count

NEDL has implemented a number of additional measures to improve MPAN accuracy. An electronic system for notification of new MPANs with validation at the data entry stage has been introduced to replace the previous paper system. A validation process to reduce errors in the allocation of post codes to replace the original plot numbers for new properties has been implemented. Validation processes to avoid MPAN data becoming out of date on change of postcode have also been introduced. Joint work is continuing with electricity suppliers aimed at improving MPAN address details.

NEDL has not changed the way in which it identifies customers by MPAN count, and although continuing incremental improvement is anticipated NEDL believes that any further step increases in accuracy would require disproportionately large amounts of work.

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[9] Information and Incentives Audit of Incident Reporting 2003/04 (Ofgem 2004) Section J3.1

Connectivity model

The connectivity model used by NEDL has not changed since the last audit.

Work has been ongoing to improve the accuracy of the connectivity model at the LV feeder level. This mainly consists of re-allocating wrong LV feeder connections where two LV feeders run down a street and the model has allocated the property to the wrong feeder.

IIP Template

NEDL has populated the IIP template in an identical manner to previous years, except where Ofgem has changed the data requirements.

Potential sources of error remaining in measurement systems

NEDL considers that the potential sources of error that remain in its connectivity model are minor and from known sources. The remaining inaccuracies are being addressed at the LV feeder level in an ongoing data cleansing activity in which NEDL is systematically working to correct errors as they are identified during faults, routine interruptions, construction or maintenance work.

Future changes

NEDL and YEDL are together looking at best practice across both licensed business operations (the licensees are in common ownership). This allows best practice in one business or region to be adopted by other units in the group.

Audit opinion on measurement systems

Based on detailed work done in previous audits and information gathered on this visit, the visiting auditors conclude that NEDL has maintained the accuracy of its MPAN count and connectivity model and employs robust procedures for maintaining accuracy. The new connections process continues to be tightly managed and the visiting auditors support NEDL's overall conclusion that its MPAN accuracy is 100.27%. NEDL estimates connectivity model accuracy to LV feeder to be 93.5% based on an audit of 40,000 premises in 2002, which is unchanged from the last audit. The HV connectivity accuracy remains at 97.0%.

The visiting auditors support NEDL's estimate of accuracy of its connectivity model as summarised in the Table below.

NEDL	2003/04	2002/03
HV	97%	97%
LV	93.5%	93.5%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Overall the HV sample of incidents was straightforward to audit as NEDL generally had a good audit trail with date and time stamped documents available for inspection. However there were several data entry errors and there is potential for a major error where data is entered from another person's hand written NaFIRS report proforma.

All HV and LV incidents were auditable, and only one HV incident was difficult to audit due to changes to the HV network since the incident date. This difficulty only affected the count of present day customers and did not alter the count at the time of the incident, as date and time stamped historic information was available for the visiting auditors.

A small number of LV incidents took longer than average to audit due to a poor audit trail in associated incident reports. This was caused by a lack of adequate information to determine the exact location of the fault and the damaged component. Information such as "a damaged service cable in Newcastle Road" is not precise enough for audit purposes. It was recommended in last year's audit that staff be trained to ensure that sufficient information is entered. The quality of information recorded by NEDL has improved since last year but there remains scope for further improvement in the coming year.

It was found in two LV incidents that reinterruptions of customers who had temporary connections were wrongly classified. This resulted in the over-reporting of CI, as the incidents were wrongly recorded as second stage interruptions where they should have been shown as reinterruptions under the 18 hour rule for the removal of temporary supply arrangements.

Audit numbers were based on available evidence, and current system numbers were used in the absence of auditable evidence.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.27%
Stage 1	LV MPAN Measurement	100.27%
Stage 1	HV Connectivity Model	97.00%
Stage 1	LV Connectivity Model	93.50%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.27%
	LV MPAN Accuracy	100.27%
Stage 2	Overall CI	100.00%
	Overall CML	99.96%
	LV CI	93.23%
	LV CML	97.34%
Combined Accuracy	Overall CI	99.73%
	Overall CML	99.77%
	LV CI	93.48%

	LV CML	97.61%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Over/under reporting
Combined Accuracy	Overall CI	Over Reported
	Overall CML	Over Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

A standard terminology is needed for LV incidents so that field and office staff are clear as to what is being communicated.

- Nothing has been undertaken regarding this recommendation and this is still an area where NEDL needs to improve LV incident reporting. The terminology already exists for the HV and EHV operations and as such is not difficult to develop for the LV.

A "clarity check" is done, in particular for LV incidents involving significant CI and/or CML, whilst the details are still fresh in operatives' minds.

- This has been implemented and has delivered benefits to NEDL's reporting accuracy.

The availability of the connectivity model information to field staff will improve the accuracy of LV reporting and assist restoration decisions.

- The model has not yet been made available to field staff, but it is available to dispatchers who use a new 'LV trace' functionality to identify customers affected by LV incidents.

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.

- 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.

- 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.

Recommendations for Ofgem

- None.

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

Summary

Area	Main findings
Interpretation of the RIGs	YEDL has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support YEDL's MPAN accuracy calculation of 98.4% at both the HV and LV levels.
Connectivity model	The visiting auditors support the calculated accuracy of the YEDL connectivity model of 97.0% at both the HV and LV levels.
IIP template	YEDL has not changed the way it populates the IIP template. The re-run of the IIP template population process for YEDL was carried out during the IIP Audit visit to NEDL during w/c 5th July 2004 and there were no differences between the re-populated results as compared with the figures originally provided by YEDL to Ofgem.
Overall reporting	YEDL's measurement systems at the higher voltage level are a combination of computerised and manual stages. Despite the disadvantages that this brings, the visiting auditors are of the opinion that the DNO has done all it can to provide an acceptable audit trail and the accuracy of reporting was found to be high. The move to a fully integrated measurement system has already begun and the completion of this will further improve YEDL's accuracy of reporting.
LV reporting	The accuracy of reporting of CI in LV incidents was found to be variable with a significant proportion of errors made when using the GIS connectivity model to count MPANs on affected feeders. Some further staff training in the use of the GIS connectivity model may be beneficial in reducing these errors. The consistency and accuracy of incident reports from YEDL's field staff has clearly increased since last year's audit visit but there remains room for further improvement.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	98.39%	Under Reported

Overall Sample CML	98.37%	Under Reported
LV Sample CI	97.99%	Over Reported
LV Sample CML	98.18%	Over Reported

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

Introduction

The audit was carried out at the YEDL offices in Gelderd Road, Leeds, during week commencing 19th July 2004. Ofgem's auditors were Geoff Stott (Team Leader) and Rob Shackleton from British Power International. The YEDL and NEDL licensed areas are under the common ownership of the CE Electric UK Funding Company.

The visiting auditors would like to thank the YEDL team for their excellent preparation work and professional approach to the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of YEDL's measurement systems is set out in last year's audit report[10]. There have been changes to systems during the 2003/04 audit year in accordance with the strategy of sharing best practice between the NEDL and YEDL licensees. The NEDL TMS (Trouble Management System) replaced the YEDL CCH (Customer Call Handling) system from 12th December 2003. TMS was initially introduced with fault handling functionality only with the full functionality version of TMS available for the YEDL licensed area from June 2004.

Changes since last year

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

Interpretation of RIGs

YEDL has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

Whilst the systems used by YEDL have not changed, a number of additional measures have been implemented in order to increase confidence in the MPAN data. These include the replacement of manual procedures with electronic notification systems for new MPANs and the introduction of new staff with responsibility for system analysis reporting.

Connectivity model

There have been no changes made to the YEDL Connectivity Model. However, the number of checks to ensure that data is being captured accurately has been increased through weekly examination of the data captured, monthly reconciliation of MPANs

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

between MPRS and GIS, and a quarterly complete trace of the network from MPAN to feeding substation.

<u>IIP Template</u>

YEDL has not changed the way it populates the IIP template. The re-run of the IIP template population process for YEDL was carried out during the IIP Audit visit to NEDL during w/c 5th July 2004. The visiting auditors for NEDL, John Woodhouse and Simon Critten, witnessed the process for YEDL and there were no differences between the re-populated results as compared with the figures originally provided to Ofgem by YEDL.

<u>Potential sources of error remaining in measurement systems</u>

The remaining sources of error are associated with problems of matching address details in MPRS to the postal address details in GIS. This leads to MPANs either not being loaded into GIS or being loaded as near as possible to the true location. In addition there are a number of MPANs no longer connected in GIS because related properties have been demolished or services removed. Human error continues to be a source of inaccuracy due to the high level of manual intervention (e.g. manual input of data into NaFIRS).

<u>Future changes</u>

There will be changes from next year to the way in which YEDL populates the IIP template as the processes and systems are changed to be identical with those used in NEDL. In addition, the YEDL GIS team is continuing joint work with the NEDL/YEDL MPRS team to increase the accuracy of MPAN placement to address in GIS.

CE Electric is looking at both YEDL and NEDL practices and intends to adopt best practice across the two licensed areas. Planned changes over the coming year mainly focus on the continued integration of NEDL and YEDL measurement systems and ongoing data cleansing work. Further reduction in manual data input following the introduction of TMS and IRIS from NEDL is expected to improve the YEDL accuracy for reporting year 2004 / 2005.

Audit opinion on measurement systems

The visiting auditors are satisfied that YEDL has completed the IIP template accurately.

YEDL explained its measurement system for assessing MPAN accuracy to the visiting auditors and the visiting auditors consider that YEDL has adopted a robust approach to this aspect of its IIP measurement systems. YEDL's calculation of MPAN accuracy was scrutinised by the visiting auditors and was found to be accurate.

For the reporting year 2003 / 2004, the agreed accuracy of customer count by traded MPAN is 98.4% at both the HV and LV levels. The agreed accuracy of the YEDL connectivity model is set out in the following Table:

YEDL	2003/04	2002/03
HV	97.0%	97.2%
LV	97.0%	97.2%

The marginal reduction in connectivity model accuracies from last year were explained by YEDL being within the range of expected monthly variances and the visiting auditors did not find evidence of systematic deterioration in accuracy.

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of HV reporting was high with only three incidents where a transcription error had occurred. One other incident had been misreported due to a transposition in customer numbers between two restoration stages. Five incidents were found where an incorrect start time had been used in the NaFIRS report. None of the audited incidents had missing restoration stages, and re-interruptions were all reported correctly in all relevant audited incidents. All errors could be traced to the elements of manual processing that YEDL uses to interlink its stand-alone computerised processes. YEDL will be adopting the fully automated NEDL measurement systems and this will eliminate these manual processes and the associated transcription inaccuracies.

No incident was found to be too complex or difficult to audit, even where system changes had occurred. With only one exception, all variations between the reported customer numbers and current system numbers were explained with good auditable evidence. The unauditable incident was the spare pre-arranged HV incident where there was a lack of supporting documentation.

YEDL provided an HV audit trail consisting of computer generated printouts taken at the time of the incident showing substations affected and associated customer numbers. YEDL's current measurement systems do not always automatically time stamp these printouts and the date has to be added manually in many cases. By cross-referencing the printouts with the customer numbers reported in the NaFIRS system it was possible to verify the customer numbers in all incidents. The visiting auditors are of the opinion that YEDL has done all it can with its existing systems to provide an understandable and acceptable audit trail.

The accuracy of reporting of CI in LV incidents was found to be variable with a significant proportion of errors made when using the GIS connectivity model to count MPANs on affected feeders. Double counting of MPANs was also noted in several incidents where the fault zone was extended to effect repairs before restoring supply to batches of customers in successive stages. Some further staff training in the use of the GIS connectivity model may be beneficial in reducing MPAN counting errors at LV.

The accuracy of reporting of incident start and finish times was higher. Only two minor start time errors and one incident were found. In the latter incident the recorded times appeared to have been confused with a separate incident outside the audit sample. Two of the four LV prearranged interruptions were unauditable due to the lack of audit trail information, and improvement to the reporting of prearranged incidents would assist future audits. In another incident the reinterruption of a customer following a temporary restoration had been overlooked.

The consistency and accuracy of incident reports from YEDL's field staff has clearly increased since last year's audit visit but there remains room for further improvement.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	98.40%
Stage 1	LV MPAN Measurement	98.40%
Stage 1	HV Connectivity Model	97.00%
Stage 1	LV Connectivity Model	97.00%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	98.40%
	LV MPAN Accuracy	98.40%
Stage 2	Overall CI	99.99%
	Overall CML	99.97%
	LV CI	103.67%
	LV CML	103.48%
Combined Accuracy	Overall CI	98.39%
	Overall CML	98.37%
	LV CI	97.99%
	LV CML	98.18%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Over Reported
	LV CML	Over Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Make sure all field staff are reminded of the 18-hour rule in the RIGs.

- A brief was prepared and circulated to field staff as a reminder of the 18-hour rule in the RIGs. Only one minor misinterpretation was noted this year.

Give further attention to making sure that clearer and more extensive information is recorded on the NaFIRS sheets for LV incidents showing fuller details of what caused the incident, the equipment involved, and where and when repairs were made.

- The quality and scope of information from the field has improved during the audit year but YEDL is still working to make further improvements.

Minimise manual entry and or manipulation of data and ensure that electronic audit trail incorporate time and date stamping.

- Introduction of the NEDL TMS has improved the date and time stamping of incidents. Improved date and time stamping audit trails were evident this year. Further improvements will be introduced when the NEDL systems are fully implemented in YEDL as this will eliminate most of the need for manual intervention through automation of data links between systems.

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 printouts and its completed NaFIRS reports.

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

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

Recommendations for Ofgem

- YEDL provided an HV audit trail consisting of computer generated printouts taken at the time of the incident showing substations affected and associated customer numbers. If the DNO repeats this approach for the 2004 / 2005 reporting year, the visiting auditors recommend that the 2005 IIP audit team should accept audit trail evidence on the same basis. It would be helpful for Ofgem to review and confirm the types of audit trail evidence that will be deemed satisfactory for 2005.

Appendix I. Scottish and Southern Energy – SEPD

Summary

Area	Main findings
Interpretation of the RIGs	SEPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support SEPD's estimate of MPAN accuracy of 100.00%.
Connectivity model	The visiting auditors support SEPD's estimate of connectivity model accuracy of 99.90% at HV and of 98.50% at LV.
IIP template	SEPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and no errors were identified in the extraction routines used to populate the Template
Overall reporting	The accuracy of Overall reporting was found to be high for both customer numbers and duration. The main reasons for variations in customer numbers were missed stages and normal day-to-day changes in customer connections. The errors in incident duration were mainly due to wrongly recorded start or finish times.
LV reporting	The accuracy of LV reporting was found to be very high with only one transcription error. The main reason for variations was normal day-to-day changes in customer connections.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.85%	Under Reported
Overall Sample CML	99.87%	Over Reported
LV Sample CI	97.63%	Under Reported
LV Sample CML	99.54%	Under Reported

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

Introduction

This report covers the IIP audit for the 2003/04 reporting year that was carried out between 21 and 25 June 2004 at SEPD's Network Management Centre (NMC) in Portsmouth. SEPD is one of two distribution licences held by Scottish and Southern Energy (SSE). The DNO operates the two licensed areas as a single managed unit with common systems and mutual support between the North of Scotland and Southern England.

The visiting audit team were Janet Berry and Gordon Roberts from BPI. The visiting auditors would like to thank the SEPD team for the considerable time spent in preparing for the visit and the time given assisting the auditors during their visit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

The company uses common systems in the SHEPD and SEPD licensed areas for its Network Management process, which also form the basis of the measurement systems for IIP reporting. This approach also applies to customer call handling, resource dispatch, high voltage system control 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 last year's audit report[11], and the systems have not changed significantly since then.

A data extraction process using "Business Objects" enquiry software searches the SIMS data-base to extract data in an IIP compliant form to populate the IIP annual return template.

Changes since last year

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

Interpretation of RIGs

SEPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

SEPD has not changed its MPAN measurement system since the 2002/03 audit.

Connectivity model

The connectivity model is unchanged except for updates due to network modifications, and movement of customers from Network Reference Numbers (NRNs) when more accurate information is available, e.g. from better knowledge gained during a fault.

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[11] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix N.

IIP Template

SEPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and no errors were identified in the extraction routines used to populate the Template.

Potential sources of error remaining in measurement systems

The potential sources of error are due to the original allocation of MPANs to the network given the challenge of identifying the correct LV feeder in urban areas and near feeder boundaries. In addition a small number of supplies not connected to an LV network are accounted for inaccurately.

Future changes

SEPD has an on going data cleansing process in place and so no additional changes are anticipated. SEPD intends to continue pursuing the connection of customers to its Connectivity Model and to correct errors discovered during its day-to-day operations.

Audit opinion on measurement systems

Whilst internal audit checks are carried out regularly no formal records are kept. In addition these audit checks do not appear to be included in the company's audit governance process. This is particularly important when there is manual intervention at various stages.

Based on detailed work done during previous audit visits and information gathered on this visit, the visiting auditors conclude that SEPD has highly accurate procedures for counting primary traded MPANs. The visiting auditors support SEPD's estimate of MPAN accuracy of 100.00%.

The connectivity model is highly accurate and employs robust procedures for maintaining accuracy. The visiting auditors support the accuracy figures produced by SEPD as summarised in the Table below:

SEPD	2003/04	2002/03
HV	99.9%	99.9%
LV	98.5%	98.5%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The quality of the HV audit trail was generally good. The live SIMS data base was used for audit validation together with fault log sheets from the NMC control desks and printed extracts from the ENMAC system. SEPD uses operators' switching logs reported to the NMC control desk when field control is in operation, but this affected less than ten incidents in the audit sample in which no reporting errors were found. Two restoration stages in the HV sample could not be audited due to complex network arrangements making them impossible to reconstruct within the allotted timeframe.

There was no disagreement between the visiting auditors and the company on the audit of restoration stages in the HV sample. The main variances found between the audited figures and the company's reported figures were due to missing stages, wrong start or

finish times, missing stages or where reinterruptions had been wrongly recorded. There was also evidence that some individual customers supplied at HV are not shown connected to their own HV supply. The remaining variances were attributable to reasonable model changes, network reconfiguration particularly at the higher voltages and customer growth. However, the company was not able to verify the reasons for these differences so the numbers recorded in the information system at the time of audit were used. There were no issues regarding interpretation of the RIGs.

Few errors were found in the LV incidents audited, and where variances occurred this was mainly due to natural customer changes in the connectivity model. One incident sampled showed a variance which, on investigation, was found to be due to only part of the feeder being affected. This was checked and confirmed on GIS, which was witnessed by the visiting auditors. The quality of information in the LV logs was generally very high and no LV incidents were considered to be unauditable.

Of the thirteen examples of Pre-arranged Supply Interruptions (PSIs) twelve were reported as less than the estimated duration and one more than the estimated duration. This is a difference from last year where the audited sample showed that the report duration of most PSIs was equal to the estimated duration. The duration of these incidents is reported from site and entered directly into SIMS, and there is no additional record kept.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	100.00%
Stage 1	HV Connectivity Model	98.50%
Stage 1	LV Connectivity Model	99.90%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.00%
	LV MPAN Accuracy	100.00%
Stage 2	Overall CI	99.85%
	Overall CML	100.13%
	LV CI	97.63%
	LV CML	99.54%
Combined Accuracy	Overall CI	99.85%
	Overall CML	99.87%
	LV CI	97.63%
	LV CML	99.54%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Over Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2002/03 Audit</u>

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

- SEPD has reconsidered updating the connectivity model following planned supply interruptions, but still believe this is not a practical option.

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.

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.

<u>2003/04 Audit</u>

- Include the internal audit checks in the formal audit governance process.
- Keep appropriate records of the internal audit checks.
- Concentrate on the areas where there is still manual intervention and input to minimise input and transcription errors.

Recommendations for Ofgem

- Clarification of rules on "clock stopping" is required.

Appendix J. Scottish and Southern Energy – SHEPD

Summary

Area	Main findings
Interpretation of the RIGs	SHEPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support SHEPD's estimate of MPAN accuracy of 100.00%.
Connectivity model	The visiting auditors support SHEPD's estimate of connectivity model accuracy of 99.90% at HV and of 99.90% at LV.
IIP template	SHEPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and no errors were identified in the extraction routines used to populate the Template.
Overall reporting	The accuracy of Overall reporting was found to be high for both customer numbers and duration. Variations in customer numbers were caused by normal day-to-day changes in customer connections. Duration errors were mainly caused by wrongly recorded start or finish times.
LV reporting	The accuracy of LV reporting was found to be very high with few errors. Variations in customer numbers were caused by normal day-to-day changes and there was one incident where a stage was missing.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.37%	Under Reported
Overall Sample CML	98.09%	Under Reported
LV Sample CI	99.61%	Under Reported
LV Sample CML	99.75%	Under Reported

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

Introduction

This report covers the IIP audit for the 2003/04 reporting year that was carried out between 21 and 25 June 2004. SHEPD is one of two distribution licences held by

Scottish and Southern Energy (SSE), which operates the two licensed areas as a single managed unit with common systems and mutual support between the North of Scotland and Southern England. The SHEPD audit took place at the SEPD Network Management Centre in Portsmouth.

The visiting audit team were Janet Berry and Gordon Roberts both from BPI. The auditors would like to thank the SSE team for the considerable time spent in preparing for the visit and the time given assisting the auditors during their visit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

The DNO uses common systems for the SHEPD and SEPD licensed areas in its Network Management process, and these also form the basis of the measurement systems for IIP reporting. This approach also applies to customer call handling, resource dispatch, high voltage system control 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 last year's audit report[12], and the systems have not changed significantly since then.

A data extraction process using "Business Objects" enquiry software searches the SIMS data-base to extract data in an IIP compliant form to populate SHEPD's IIP annual return template.

Changes since last year

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

Interpretation of RIGs

SHEPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

SHEDP has not made any changes to MPAN measurement systems since the 2002/03 audit.

Connectivity model

The connectivity model is unchanged except for updates due to network modifications, and movement of customers from Network Reference Numbers (NRNs) when more accurate information is available e.g. from better knowledge gained during a fault.

IIP Template

SHEPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and no errors were identified in the extraction routines used to populate the Template.

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[12] Information and Incentives Audit of Incident Reporting 2002/03 (Ofgem 2004) Appendix M.

<u>Potential sources of error remaining in measurement systems</u>

The potential sources of error are due to the original allocation of MPANs to the network given the challenge of identifying the correct LV feeder in urban areas and near feeder boundaries.

<u>Future changes</u>

SHEPD has an on going data cleansing process in place and so no additional changes are anticipated. SHEPD intends to continue pursuing the connection of customers to its Connectivity Model and to correct errors discovered during day-to-day operations.

Audit opinion on measurement systems

Whilst internal audit checks are carried out regularly no formal records are kept. In addition these audit checks do not appear to be included in SHEPD's formal audit governance process. This is particularly important when there is manual intervention at various stages.

Based on detailed work carried out during previous audit visits and information gathered on this visit, the visiting auditors conclude that SHEPD has highly accurate procedures for counting primary traded MPANs. The visiting auditors support SHEPD's estimate of MPAN accuracy of 100.00%.

The connectivity model is highly accurate and employs robust procedures for maintaining accuracy at both HV and LV levels. The visiting auditors support the accuracy figures produced by SHEPD as summarised in the Table below:

SHEPD	2003/04	2002/03
HV	99.9%	99.9%
LV	99.9%	99.9%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of HV reporting was found to be high with only one transcription error of little significance. The main differences between the audited figures and SHEPD's reported figures were attributable to reasonable model changes, network reconfiguration particularly at the higher voltages and customer growth. The majority of variations between the reported customer numbers and current system numbers were explained with good auditable evidence. There were five instances where wrong start or restoration times had been recorded and one incident where the company had miscalculated the customer numbers following a high voltage fault. There were two planned interruption stages that were not auditable and there was no disagreement between the visiting auditors and SHEPD on the audit of restoration stages in the sample. There were no issues regarding interpretation of the RIGs.

The accuracy of the LV reporting was also found to be high with very few errors. Where variances occurred this was mainly due to normal day to day customer changes in the connectivity model. In one audited incident the customer asked for repairs to be carried out the following day and the clock should have been stopped in line with the policy adopted by SSE. However, on this occasion SHEPD inconsistently recorded the full interruption duration and a third reinterruption stage in this incident was not reported.

Of the eight examples of pre-arranged supply interruptions (PSIs), seven were reported as less than the estimated duration and one overran. This is a difference from last year where the audited sample showed that the report duration of most PSIs was equal to the estimated duration. The duration of these incidents is reported from site and entered directly into SIMS, and there was no additional record kept.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	100.00%
Stage 1	HV Connectivity Model	99.90%
Stage 1	LV Connectivity Model	99.90%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.00%
	LV MPAN Accuracy	100.00%
Stage 2	Overall CI	99.37%
	Overall CML	98.09%
	LV CI	99.61%
	LV CML	99.75%
Combined Accuracy	Overall CI	99.37%
	Overall CML	98.09%
	LV CI	99.61%
	LV CML	99.75%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

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

- SHEPD has reconsidered updating the connectivity model following planned supply interruptions, but still believes this is not a practical option.

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.

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 their restoration to be deferred.

2003/04 Audit

- Include the internal audit checks in SHEPD's audit governance process.

- Keep appropriate records of the internal audit checks.

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

Recommendations for Ofgem

- Clarification of rules on "clock stopping" is required.

Appendix K. Scottish Power Distribution - SPD

Summary

Area	Main findings
Interpretation of the RIGs	SPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support SPD's estimate of MPAN accuracy for SPD of 100.08% for both HV and LV.
Connectivity model	The visiting auditors support SPD's estimate of connectivity model accuracy for SPD HV/LV substation of 99.50% and LV feeder of 98.50%.
IIP template	SPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the process and the results were identical to those provided to Ofgem.
Overall reporting	The accuracy of Overall reporting was high with few transcription errors. All incidents were supported by time stamped evidence of the MPANs allocated to the affected section of network at the time of the incident.
LV reporting	The accuracy of LV reporting was reasonable in the early part of the year, showing improvement during the year as data was cleansed, and the CR2 process developed and implemented. In most cases SPD was able to explain with good auditable evidence the numbers at 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
Overall Sample CI	99.89%	Over Reported
Overall Sample CML	99.83%	Over Reported
LV Sample CI	94.61%	Under Reported
LV Sample CML	99.79%	Under Reported

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

Introduction

The audit of HV and LV incidents was carried out at SPD's Power System Management Centre in Hamilton from 12 to 14 July 2004. The visiting auditors were Bill Slegg (Team

Leader) from BPI and Bill Howieson from Mott MacDonald. John Woodhouse from Mott MacDonald attended the first morning of the audit to view the systems in use in preparation for his audit of SP Manweb. Nicholas Russ and Alex Graves from Ofgem were in attendance on 12 July and part of 13 July. 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 that 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 last years audit report[13]. The 2004 audit visit confirmed that there have been no new systems introduced since the 2002/03 audit year. The GE Harris 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

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

Interpretation of RIGs

SPD has not changed the way it interprets the definitions and guidance contained in the Version 2 of the RIGs since the 2002/03 audit.

MPAN count

SPD has not changed the way in which it identifies customers by MPAN count since the 2002/03 audit. SPD has, however, implemented a number of additional measures to improve the accuracy of MPANs including data cleansing to classify HV MPANs. There is now a shorter time needed to create live MPANs, with a running average of 10 -12 days to establish them on the connectivity model. This reduces the impact of work in progress, although SPD does not believe it has materially affected the previous estimate of accuracy.

Connectivity model

SPD has not changed the structure and operation of its connectivity model since the 2002/03 audit. However, work has been ongoing to improve the accuracy of the connectivity model by re-allocating incorrect LV transformer and feeder connections. SPD has implemented a number of initiatives (so called "toolbox initiatives") based partly on the recommendations from the 2002/03 audit of which the following are examples.

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[13] Information and Incentives Audit of Incident Reporting 2002/2003 (Ofgem 2004) Appendix K3.1

Robust tracking to ensure all MPAN status changes are linked with the connectivity model, and defined business processes ensuring improvement of MPAN connection confidence level.

The Control, Restoration and Repair (CR2) business restructure with more focus on the underlying obligation to report CI and CML accurately, and the improvement of switching log reporting including formal training.

Data cleanse of MPANs by identifying unlinked customer addresses and ensuring conversion to recognised address with connectivity linking.

Three sample tests completed each month to establish accuracy of the connectivity model against external physical data.

<u>IIP Template</u>

SPD has not changed the mechanism that it uses to populate the IIP template since the 2002/03 audit. The visiting auditors witnessed a rerun of the Business Objects enquiry extraction routine and no variation was noted. The CI and CML remained unchanged in all categories as did the total number of incidents.

<u>Potential sources of error remaining in measurement systems</u>

The remaining inaccuracy in the HV/LV estimate results from MPANs in the connectivity model for which the actual HV/LV substation is not known. These MPANS are normally assigned to the correct HV feeder and are identified in faults affecting entire HV feeders, hence having a limited overall impact on HV reporting accuracy. The inaccuracy at LV feeder level represents MPANs that are assigned to the correct HV/LV substation but for which the actual LV feeder is not known. These MPANs are assigned to the LV busbar at the relevant substation and included in the CI count for faults on all feeders from the substation, hence leading to over-reporting. The model is updated when MPANs are confirmed as connected to particular feeders through information from incidents or routine operations.

<u>Future changes</u>

SPD is planning to continue with the application of its toolbox initiative approach to achieve ongoing incremental improvements in accuracy but believes that the scope for continuing improvement is reducing. SPD is investigating new technology enabling field staff to receive and send real time information to and from the Troublecall system, which will remove the requirement for verbal data transfer between field staff and dispatchers. SPD has investigated establishing automatic linkages between fault management systems and PROSPER but has concluded that implementation would require significant system changes and the strategic direction is the subject of current analysis with a decision expected later this year.

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, a connectivity model with improving accuracy, and employs robust procedures for improving and maintaining accuracy. The visiting auditors support SPD's estimate of accuracy of customer count by traded MPAN of 100.08% at both HV

and LV levels. The visiting auditors also support SPD's estimates of connectivity model accuracy shown in the Table below.

SPD	2003/04	2002/03
HV	99.50%	98.00%
LV	98.50%	96.00%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of HV reporting was high with only occasional transcription errors of little significance. Inaccuracies at the HV/LV substation level were noted in the audit of HV incidents but this did not generally have significant impact on HV reporting accuracy as the variations were between substations on the same feeder. All incidents were supported by time stamped evidence of the MPANs allocated to the affected section of network at the time of the incident. Inaccuracies were found to be less frequent for incidents occurring later in the reporting year reflecting the benefit of the initiatives that have been taken by SPD. The reporting of incidents involving planned interruptions and the extension of fault zones for restoration purposes was noted by the visiting auditors to be in accordance with the RIGs.

The accuracy of LV reporting was in general high with only occasional minor transcription errors. Some significant errors were found in LV incident reports in the early part of the reporting year before the full CR2 implementation was completed and the recommendations of the 2002/03 audit had become effective. The quality of information in the logs was generally at an acceptable level resulting in an adequate audit trail being available in most cases. However, more supporting information would assist the audit process relating to LV faults where a partial feeder is involved or an apportionment of customer numbers is reported based on the thirds rules. In general information on abnormal LV running conditions at the time of the incident was not available.

There were no HV or LV incidents that could not be audited due to a lack of information or understanding of the incident sequence.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.08%
Stage 1	LV MPAN Measurement	100.08%
Stage 1	HV Connectivity Model	99.50%
Stage 1	LV Connectivity Model	98.50%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.08%

	LV MPAN Accuracy	100.08%
Stage 2	Overall CI	100.02%
	Overall CML	100.08%
	LV CI	94.53%
	LV CML	99.71%
Combined Accuracy	Overall CI	99.89%
	Overall CML	99.83%
	LV CI	94.61%
	LV CML	99.79%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Over Reported
	Overall CML	Over Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Improve the quality of information in incident reports. SPD has implemented the CR^2 process taking ownership of all incident management and the application of suitable training processes.

- Data cleansing has been implemented through a concerted approach via data cleansing bureaux, which have now completed the bulk of the data cleansing task.

Implement a more objective approach to assessing LV model connectivity accuracy.

- SPD has implemented regular sample tests based on the audit procedure used in the Ofgem 2002/03 audit.

Develop automatic linkages between fault management system and reporting tools.

- Although this is yet to be implemented SPD has undertaken consultation with its IT service providers and has produced a specification for costing. The implementation of this recommendation will have significant cost implications

relating to both hardware and software. A strategic IT review has been undertaken and this requirement has been included in the more global picture.

2003/04 Audit

- Continue the drive to minimise 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 to 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.

- 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.

Recommendations for Ofgem

- Clarity is needed on the evidence that is acceptable to establish the audit CI figure and on the circumstances in which a variation from system CI is acceptable.

- Guidance containing examples of the level of information considered auditable would benefit DNOs and should be developed by the Appointed Auditor in consultation with Ofgem.

Appendix L. Scottish Power Manweb - SPM

Summary

Area	Main findings
Interpretation of the RIGs	SP Manweb has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	SP Manweb has not changed its methods of creating and counting MPANs since last year. The visiting auditors support SP Manweb's estimate of MPAN accuracy of 99.5%.
Connectivity model	SP Manweb has instigated a number of initiatives designed to improve the quality of data. The visiting auditors considered summaries of these initiatives and the results from sample testing. The visiting auditors found no evidence of error in SP Manweb's connectivity model accuracy estimates and support the estimates of 99.5% at HV and 98.5% at LV.
IIP template	SP Manweb has not changed the way it populates the IIP template since the 2002/03 audit. The visiting auditors witnessed a rerun of the program and the results were identical to those provided to Ofgem.
Overall reporting	No systematic HV incident reporting errors were noted, and the overall reporting accuracy was found to be high. Manual transcription of data was found to be a remaining source of inaccuracy in reporting that would merit further attention.
LV reporting	Inconsistent quality of information in incident logs highlights a need for SP Manweb to make further improvements in this area.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.99%	Under Reported
Overall Sample CML	99.86%	Under Reported
LV Sample CI	94.09%	Under Reported
LV Sample CML	92.52%	Under Reported

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

Introduction

The audit was carried out from 27 to 29 July 2004 at SP Manweb's Prenton control centre by John Woodhouse and Simon Critten both from Mott MacDonald. The visiting auditors would like to thank the SP Manweb team for the pre-visit preparation and all their assistance in the audit.

Stage 1: Accuracy of Measurement Systems

Summary of measurement systems

A summary of SP Manweb's measurement systems is set out in last years audit report[14].

Changes since last year

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

Interpretation of RIGs

SP Manweb has not changed the way that it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

SP Manweb has not changed the way in which it identifies customers by MPAN count but has implemented a number of additional measures to improve MPAN accuracy including data cleansing designed to ensure that all MPANs are correctly classified as HV or LV and instigating a reduction in the timescale for MPAN creation to MPAN live status. It is anticipated that incremental improvement in accuracy has occurred.

Connectivity model

SP Manweb has not changed its connectivity model systems since the 2002/03 audit. However, work has been ongoing to improve the accuracy of the connectivity model by re-allocating wrong LV feeder connections which in turn improves the HV accuracy. In addition a number of initiatives (so called "toolbox initiatives") have been implemented of which the following are examples.

- Robust tracking to ensure all MPAN status changes are linked with the connectivity model, and defined business processes ensuring improvement of MPAN connection confidence level.

- The Control, Restoration and Repair (CR^2) business restructuring put more focus on the underlying obligation to report CI and CML accurately, and the improvement of switching log reporting including formal training.

- Data cleanse of MPANs by identifying unlinked customer addresses and ensuring conversion to recognised address with connectivity linking.

- Three sample tests completed each month to establish accuracy of the connectivity model against external physical data.

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[14] Information and Incentives Audit of Incident Reporting 2003/04 (Ofgem 2004) Appendix L3.1

<u>IIP Template</u>

SP Manweb has not changed the way it populates the IIP template since the 2002/03 audit except where Ofgem has introduced new data requirements. The visiting auditors witnessed a rerun of the program and the results were identical to those provided to Ofgem.

<u>Potential sources of error remaining in measurement systems</u>

SP Manweb has implemented a number of initiatives aimed at reducing the potential sources of inaccuracy. The main sources of error that remain can be summarised in three categories: human error, inaccurate GIS or GND records and un-recorded changes in LV Network configuration.

<u>Future changes</u>

SP Manweb is planning to continue with the application of the toolbox initiative approach to improve accuracy, but believes that further measurable increases in connectivity model accuracy will require a significant quantity of work. In addition SP Manweb is carrying out a pilot study of new technology enabling field staff to receive and send real time information to and from the Troublecall system, thus removing the requirement for verbal data transfer between field staff and dispatchers.

SP Manweb has investigated establishing automatic linkages between fault management systems and reporting tools. The review has concluded that implementation would require significant system changes, and the strategic direction is the subject of current analysis with a decision expected later this year.

Audit opinion on measurement systems

The visiting auditors support SP Manweb's estimate of 99.5% for MPAN accuracy on the basis of evidence witnessed during the audit. The visiting auditors also support SP Manweb's estimates of connectivity model accuracy shown in the Table below.

SP Manweb	2003/04	2002/03
HV	99.5%	98%
LV	98.5%	96%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

Reporting errors were observed in EHV and HV incidents where data had been transferred manually and incorrect incident times had been entered. No systematic HV incident reporting errors were noted, and the overall reporting accuracy was found to be high, but manual transcription of data would merit further attention as it has the potential to cause significant inaccuracy. In addition, errors were observed in the counting of customers interrupted from a single HV fuse operation. The lack of information from the field on which phase had operated (e.g. on a main line fuse sectionaliser) made it difficult to assess how single phase spur lines were affected. Some of the records returned following a period of field control had no log of actual restoration times, and the only time available was the time when field control was passed back to the central control engineer.

In one HV incident an HV metered customer showed a "system zero" for customers, even though the switchgear was showing live on the network diagram and was therefore not a de-energised service. SPM explained that this would be entered manually by the control engineer.

During the audit of the LV incidents the visiting auditors found that whilst in many cases sufficient evidence to support the incident numbers could be provided, the quality of the audit logs was often poor. This resulted in considerable efforts being required by the SP Manweb audit team to collate and present the evidence to the visiting auditors. Much of this effort and many of the remaining errors could have been avoided through the compilation of higher quality incident logs.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	99.92%
Stage 1	LV MPAN Measurement	99.92%
Stage 1	HV Connectivity Model	99.50%
Stage 1	LV Connectivity Model	98.50%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	99.92%
	LV MPAN Accuracy	99.92%
Stage 2	Overall CI	100.07%
	Overall CML	99.94%
	LV CI	94.16%
	LV CML	92.60%
Combined Accuracy	Overall CI	99.99%
	Overall CML	99.86%
	LV CI	94.09%
	LV CML	92.52%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Under Reported

	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2002/03 Audit</u>

Improve the quality of information recorded in the incident logs.

- SP Manweb has included communications related to this issue in team briefs. CR^2 has adopted initiatives to ensure that field staff are fully versed in underlying performance indicators and the need for justification. Dispatcher training has occurred to ensure that questions obtaining sufficient information are asked. The audit of incidents highlighted that further work could be carried out in this area and that there is significant room for improvement in the quality of information recorded in the logs.

Develop electronic linkages between systems.

- SP Manweb has undertaken consultation with third party IT service providers and has produced a specification for costing. It is apparent that the implementation of this recommendation will have significant cost implications relating to both hardware and software. A strategic IT review has been undertaken and SP Manweb anticipates that a decision on the future strategic direction of the overall IT systems will be made later this year.

Data cleansing process of approximately 40,000 customers presently located in the capture tool, attaching them to the correct LV feeder.

- SP Manweb has initiated a number of data cleansing measures that have improved the confidence and accuracy of the systems. Currently approximately 4,000 customers remain allocated to 'feeder zero' meaning they are attached to the correct substation but as yet have not been assigned to a particular feeder.

Develop a more objective approach to assessing LV connectivity model accuracy.

- SP Manweb has implemented a monthly random sample test audit of the models to check accuracy of initial data capture, IT interfaces and efficient capture of network changes. This testing also incorporates comparison checks with external physical data.

<u>2003/04 Audit</u>

- 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 requirement fields.

- Maintain works records for a full audit year particularly for pre-arranged incidents.

- Reduce customer numbers attached to feeder zero as far as practical in order to minimise the potential for over-reporting.

- Ensure that full records should be kept by the field controller when a part of the HV system is passed to 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.

- Link HV metered customers into the system in order that they are included automatically in the customer count for an incident affecting them.

- 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 correctly.

Recommendations for Ofgem

- The LV sample selected resulted in a low CI count. This meant that low number variations in the audited CI had a more significant percentage effect on the results. Ofgem should consider ensuring samples for future audits cover a minimum number of CI.

- Guidance on clock-stopping is needed. Clear definition of whether it is permitted under IIP would allow the development of IIP rules that can be applied consistently across DNOs.

- Guidance containing examples of the level of information considered auditable would benefit DNOs and should be developed by the Appointed Auditor in consultation with Ofgem.

Appendix M. United Utilities - UU

Summary

Area	Main findings
Interpretation of the RIGs	UU has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The auditors support UU's estimate of accuracy of 100% for its MPAN accuracy.
Connectivity model	The auditors support the estimated accuracy of the HV connectivity model as 100% overall, over a typical annual cycle of incidents, and the estimated accuracy of the LV model as 99.4%.
IIP template	UU has not changed the way it populates the IIP template. The auditors witnessed a re-run of the process and the results were identical to those provided to Ofgem.
Overall reporting	The visiting auditors found a number of different sources of error leading to both under and over reporting of CI and CML. Amongst these were transcription errors and inconsistent rounding of incident start times. For all but two incidents UU was unable to provide evidence of changes to customer numbers since the incident dates.
LV reporting	Although UU's LV connectivity model provides high levels of accuracy at individual feeder level a number of errors caused by misinterpretation of the network were found. The incorrect recording of customer calls as supply interruptions was a further source of over reporting.

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

Sample	Accuracy	Over/Under reporting
Overall Sample CI	99.90%	Under Reported
Overall Sample CML	99.22%	Under Reported
LV Sample CI	94.35%	Under Reported
LV Sample CML	96.75%	Under Reported

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

Introduction

The audit of HV incidents was carried out at UU's Distribution System Management Centre in Manchester on 22nd and 23rd June 2004. The audit of LV incidents was carried out at UU's Network Restoration Centre in Preston on the 23rd and 24th June. Ofgem's visiting auditors were John Rimell (Team Leader) and Oliver Joseph, both from BPI. The visit arrangements were similar to those for last year. The visiting auditors would like to thank the UU team members for their participation in the audit, and in particular for the excellent pre-visit preparation 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 UU is set out in last year's audit report[15]. Although no new systems have been introduced since the 2002/03 audit, wall boards have been removed and HV control diagrams are now computer-displayed 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) is used for LV incident management. 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. In common with many other DNOs UU uses PC-NaFIRS to record and extract incident data.

Changes since last year

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

Interpretation of RIGs

UU has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.

MPAN count

There have been no changes to the way in which UU identifies customers by MPAN count. Last year's audit confirmed that UU's accuracy was approaching 100% since the initial fixed number of primary MPANs that were indistinguishable from secondary MPANs was diminishing in proportion to the total. The visiting auditors were satisfied that UU has now achieved 100% accuracy.

Connectivity model

Although there have been no fundamental changes to UU's HV connectivity model the removal of wall board system diagrams has 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

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[15] Information and Incentives Audit of Incident Reporting 2002/2003 (Ofgem 2004) Appendix O3.1

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.

Taking into account the findings of previous audits these ongoing improvements have raised estimated levels of accuracy to approximately 100% at the HV level.

IIP Template

UU has continued to improve the accuracy of its LV connectivity model by data-cleansing the placement of MPANs within FIGS and by training of staff using the system. UU estimates that this has improved accuracy from 98.45% to 99.4% during the audit year. This estimated improvement is supported by an assessment of the higher proportion of MPANs placed within 1 metre of the property in FIGS (95%), those placed within 30m (4.89%) and those which are unplaced in FIGS at any one time (0.11%). 90% of MPANs within 30m are now correctly counted as a result of continuing improvements in the ability of staff to recognise and locate them.

Potential sources of error remaining in measurement systems

Sources of measurement system error remaining in the LV connectivity model are due to those MPANs that are not placed with sufficient accuracy within FIGS, as described above.

Future changes

UU 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

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. In a similar way, UU's representation of telecontrol operational times to milliseconds introduces rounding errors into the audit. Nevertheless the visiting auditors support UU's estimates of accuracy improvements since last year.

For the reporting year 2003/04, the agreed estimate of accuracy of customer count by primary traded MPAN is 100% (previous year 100%) and for connectivity model is as shown in the following Table.

UU	2003/04	2002/03
HV	100%	99.5%
LV	99.4%	98.45%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The audit of LV and HV incidents revealed a number of different sources of error that led to some over and under reporting of CI and CML, but individual incident variances tend to cancel out when considering all of the audited incidents together. Audits of three incidents had to be abandoned, two because of missing information and one because of extensive reconfiguration of the network. In general, however, the quality of available information was good.

The placement of MPANs along feeders in UU's LV connectivity model led to a number of audited variances caused by operator misinterpretation of the extent of affected network and hence the number of customers interrupted. Another major source of error at LV was the misreporting of some customer calls as interruptions e.g. when a customer had reported a loose service bracket. Transcription errors at LV were relatively few, since PC-NaFIRS input data is automated, but there were still a number of field-reported times that appeared inaccurately rounded to whole hours. However these were slightly less frequent than in previous years and did not result in significant variances.

Transcription errors were more common at HV, since the transfer of data between operational logs and PC-NaFIRS input forms is manual. Misinterpretation of stage restorations and area of network affected were other causes of error noted at HV.

There were a number of HV incidents with errors of reported duration, for example the incorrect and inconsistent rounding of telecontrol times. UU's system presents these to milliseconds of accuracy and the manual rounding of these sometimes leads to a reporting error. UU is planning to implement a system change to provide automatic rounding of incident times.

The practice of UU's HV reporting team is to "stop the clock" when customers request or agree to a delay in supply restoration and in one HV incident it was found that the clock was not restarted when restoration work resumed. UU's LV reporting team also "stop the clock" and where this was found in the incidents audited the timing was restarted correctly. It is recommended that Ofgem issue written clarification on the rules governing these situations.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.00%
Stage 1	LV MPAN Measurement	100.00%
Stage 1	HV Connectivity Model	100.00%
Stage 1	LV Connectivity Model	99.40%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.00%

	LV MPAN Accuracy	100.00%
Stage 2	Overall CI	99.90%
	Overall CML	99.22%
	LV CI	94.35%
	LV CML	96.75%
Combined Accuracy	Overall CI	99.90%
	Overall CML	99.22%
	LV CI	94.35%
	LV CML	96.75%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Under Reported
	LV CML	Under Reported

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

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Ofgem should clarify the rules regarding the practice of "clock stopping".

- This issue still requires clarification by Ofgem.

Ofgem should clarify the rules concerning how telecontrol event times should be rounded.

- UU altered its system to provide times automatically rounded to the nearest minute.

Investigate the procedure for measuring LV Short Interruptions, with the objective of establishing more accurate recording and reporting processes.

- This year's audit excluded Short Interruptions

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.

- Continuous communication and supervision has resulted in evident improvement in time accuracy since last year, although more needs to be done as many times are still recorded inaccurately.

Continue to monitor and improve the performance of FIGS operators, particularly with respect to establishing accurately the extent of networks affected by incidents (it is suggested that known addresses are routinely used to check affected circuits).

- UU have introduced processes to monitor and improve performance, although errors are still evident. The intended transfer to new LV systems should reduce this source of error.

Ensure that non-reportable incidents are correctly coded, and thereby excluded.

- This source of error appears to have increased in frequency for LV incidents.

Due to the nature of the HV connectivity model, UU should provide a better audit trail for planned HV incidents i.e. enable the audit to verify planned numbers from the LV connectivity model.

- UU intend to combine LV and HV centres within 12 months which will address this recommendation.

2003/04 Audit

- Ensure that the IIP template is populated with 100% of all reportable figures.

- 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.

- Ensure that telecontrol times are automatically rounded to the nearest minute (rounded down when below 3 minutes).

- Introduce better liaison with New Connection teams, to provide a better audit trail of customer growth.

- Ensure that non-interruption customer calls logged in CIFMS can be easily recognised and not used as incident start times.

- Indicate LV operational times more clearly on CIFMS.

Recommendations for Ofgem

- Clarify the rules on "clock stopping" and restarting.

- Clarify the requirement for auditing MPAN accuracy and the way in which HV and LV estimates will be combined for Stage 3 accuracy assessments.

Appendix N. Western Power Distribution (WPD) – South Wales

Summary

Area	Main findings
Interpretation of the RIGs	WPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support WPD's estimate of MPAN accuracy for WPD South Wales of 100.00%.
Connectivity model	The visiting auditors support WPD's estimate of connectivity model accuracy for WPD South Wales HV/LV substation of 99.92% and LV Feeder of 99.94%.
IIP template	WPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the program and the results were identical to those provided to Ofgem.
Overall reporting	The accuracy of Overall reporting was very high with few transcription errors. Where significant variations were found between reported numbers and current system numbers for HV incidents they were explained with good auditable evidence. The reporting of some incidents involving planned shutdowns and the extension of fault zones for restoration purposes was found to be inconsistent and/or not strictly in accordance with the RIGs. However, in overall terms these were minor points.
LV reporting	The accuracy of LV reporting was very high with few transcription errors. In virtually 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
Overall Sample CI	99.73%	Under Reported
Overall Sample CML	99.72%	Under Reported
LV Sample CI	100.00%	100% Accuracy
LV Sample CML	99.98%	Over Reported

It is auditors' opinion that reporting of WPD South Wales under the IIP scheme meets the required level of accuracy.

Introduction

The audit was carried out at the WPD Church Village Control Centre from the 7th to 9th June 2004. The visiting auditors were Geoff Stott (Team Leader) and Oliver Joseph both from BPI. Alison Sleightholm managed the audit on behalf of the DNO with Carolyn Griffiths and Phil Perkins working with the visiting auditors. James Hope from Ofgem attended for the first two days.

The visit arrangements were similar to those for the previous year. 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 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 last years audit report[16]. The audit confirmed that there have been no new systems introduced since the 2002/03 audit year. The GE Harris ENMAC system is used for recording trouble calls, 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. Since last year's audit WPD has moved its Call Centre provision in-house and ceased using an external provider. The basic process remains the same.

Changes since last year

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

Interpretation of RIGs

There have been no changes to the way in which WPD interprets the definitions and guidance contained in RIGS Version 2 since the 2003/04 audit.

MPAN count

There had been no changes to the way in which WPD identifies customers by MPAN count. WPD bases its MPAN accuracy estimates on the results of automatically generated weekly control reports that compare the number of primary traded MPANs with those in the ENMAC system on each Monday night of the year. Figures of above 100% are occasionally produced because of the time delay in MPANs disconnected in MPRS being removed from the ENMAC system.

Connectivity model

There has been no change in the structure and operation of WPD's connectivity model since the 2001/02 audit. Similar to the procedure for MPAN reconciliation, an automatic weekly control report identifies the number of customers allocated to invalid HV/LV substations and invalid LV feeders. The annual averages of these weekly numbers are

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[16] Information and Incentives Audit of Incident Reporting 2002/2003 (Ofgem 2004) Appendix P3.1

used to estimate the connectivity model accuracy results, stated as the percentage of customers that are assigned to the correct HV/LV substation and the percentage of customers that are assigned to the correct LV feeder.

At the time of the 2002/03 IIP audit visit, 98.5% of customers were allocated to LV feeders (combined total of both licensed areas). Work has subsequently been carried out by WPD's teams to allocate the 1.5% of unallocated customers (approximately 37500 MPANs) to LV feeders. This is now largely complete, resulting in the improvement in LV feeder accuracy shown this year.

<u>IIP Template</u>

There have been no changes to the mechanism that WPD uses to populate the IIP template for reporting to Ofgem. The visiting auditors witnessed a rerun of the extraction for WPD S Wales and confirm that the figures were exactly the same as those provided to Ofgem.

<u>Potential sources of error remaining in measurement systems</u>

The remaining inaccuracy in the HV/LV estimate represents the number of customers in the connectivity model whose actual HV/LV substation is not known. These customers are assigned to the correct HV feeder and are identified in faults affecting entire HV feeders, but are assigned to dummy HV/LV substations. Similarly, the inaccuracy at LV feeder level represents customers who are assigned to the correct HV/LV substation but whose actual LV feeder is not known. These customers are assigned to a dummy LV feeder identified as feeder 0000 or feeder 9999.

In addition to the unknown substations and feeders discussed above, there are a small number of customers assigned to incorrect LV feeders within WPD's connectivity model. However, it is only possible to identify and re-reference these customers when they contact WPD following a supply interruption on a different feeder. The impact on the accuracy of WPD's measurement systems due to these incorrectly referenced customers is considered low as they are only a potential source of inaccuracy on incidents affecting individual LV feeders. WPD re-references these customers when they are identified as a means of continually improving the accuracy of its connectivity model.

<u>Future changes</u>

WPD has no system or process changes planned that will affect the accuracy of reporting at LV or higher voltages and will continue to replicate the IIP audit on a monthly basis. For the next reporting year WPD will be able to show disconnections from its ENMAC model more easily which will help the audit process.

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.

For the reporting year 2003/04, WPD's estimate of MPAN accuracy is 100% (previous year 100.02%) and that the accuracy of its connectivity model is shown in the following Table.

WPD South Wales	2003/04	2002/03
HV	99.92%	99.60%
LV	99.94%	99.55%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of LV reporting was high with only occasional transcription errors of little significance. In virtually 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 the inability to establish a robust start time.

The accuracy of HV reporting was also high with only occasional transcription errors of little significance. Any significant variations between the reported customer numbers and current system numbers were explained with good auditable evidence in all cases.

Three issues arose which were resolved after discussions involving Ofgem. These were:

Where customers not initially involved in an incident are interrupted in the process of restoring the permanent supply to those customers directly interrupted by the incident (extending the fault zone), the strict interpretation of RIG 2.11 is that customers not affected by the initial incident should be covered in a separate incident. WPD includes these customers in restoration stages within the initial incident report. It was decided to audit these incidents and allow these stages within the main incident for this year's audit.

If a temporary supply arrangement is removed after 18 hours then under guidance given in RIG 2.26, a new incident should be raised to capture the CI and CML involved. WPD's normal practice in most cases is to include this in the main incident. It was decided to allow restoration stages of this nature to be included in the main incident for this year's audit.

When a pre-arranged incident overruns WPD records the completion time as the actual time and not the planned time. The initial view was that the audit time should be the planned time thus penalising the DNO for the overrun. However it was decided for this year's audit that the audit value used would be the actual completion time.

Each month WPD audits 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.

Audit opinion on accuracy of incident reporting

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

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

| Stage 1 | HV Connectivity Model | 99.92% |
| Stage 1 | LV Connectivity Model | 99.94% |

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.00%
	LV MPAN Accuracy	100.00%
Stage 2	Overall CI	99.73%
	Overall CML	99.72%
	LV CI	100.00%
	LV CML	100.02%
Combined Accuracy	Overall CI	99.73%
	Overall CML	99.72%
	LV CI	100.00%
	LV CML	99.98%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	100% Accuracy
	LV CML	Over Reported

It is auditors' opinion that reporting of WPD South Wales under the IIP scheme meets the required level of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

2002/03 Audit

Certain regional offices provided higher quality of information than others. This was not noted at WPD this year.

- The drive to improve quality by using self audit methods and circulating the information appears to be working.

Determination of customer numbers on part feeder incidents at LV level. WPD's connectivity model is not developed to store information automatically on exactly where customers are connected down an LV feeder.

- It was noted in the call logs that the onsite personnel in many cases put effort into making accurate estimates for customers affected by incidents. This could be made more universal across all operational units.

Inclusion of all restoration stages on LV incidents.

- No problems noted on this year's WPD audit. Training appears to have resolved this.

Use of restoration time rather than incident completion time in LV incidents.

- Training appears to have resolved this.

Manual transcription errors in both LV and higher voltage incidents.

- The occasional error was found at WPD but in the opinion of the Audit Team Leader the numbers were lower than in previous years and overall the situation is good.

<u>2003/04 Audit</u>

The following recommendations were made by the visiting auditors as a result of this year's audit visit to WPD. Other issues arose in the audit of WPD South West which would have been treated in a similar manner by WPD South Wales so the section below covers both licensed areas.

- 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.

- 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. WPD would not currently raise a separate incident to cover customers not involved in the initial interruption.

- 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. Currently in the majority of cases WPD would cover this on an additional stage of the original incident.

- 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. Currently WPD record the completion time the actual completion time and allocate the CML to the planned shutdown.

- LV backfeeds should be treated as temporary restorations. There appears to be confusion here.

Recommendations for Ofgem

- Although Ofgem has made decisions on the four points in the previous section for the 2003/04 audit there is a need to agree and confirm the approach for future audits.

- WPD repeated the concern expressed last year 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.

Appendix O. Western Power Distribution (WPD) – South West

Summary

Area	Main findings
Interpretation of the RIGs	WPD has not changed the way it interprets the definitions and guidance contained in Version 2 of the RIGs since the 2002/03 audit.
MPAN Accuracy	The visiting auditors support WPD's estimate of MPAN accuracy for WPD South West of 100.05%.
Connectivity model	The visiting auditors support WPD's estimate of connectivity model accuracy for WPD South West HV/LV substation of 99.94% and LV Feeder of 99.66%.
IIP template	WPD has not changed the way it populates the IIP template. The visiting auditors witnessed a rerun of the process and the results were identical to those provided to Ofgem.
Overall reporting	The accuracy of Overall reporting was very high with few transcription errors. Where significant variations were found between reported numbers and current system numbers for HV incidents they were explained with good auditable evidence. The reporting of some incidents involving planned shutdowns and the extension of fault zones for restoration purposes was found to be inconsistent and/or not strictly in accordance with the RIGs. However, in overall terms these were minor points.
LV reporting	The accuracy of LV reporting was very high with few transcription errors. In virtually 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
Overall Sample CI	99.92%	Under Reported
Overall Sample CML	99.97%	Under Reported
LV Sample CI	99.19%	Over Reported
LV Sample CML	99.05%	Over Reported

It is auditors' opinion that reporting of WPD South West under the IIP scheme meets the required level of accuracy.

Introduction

The audit of LV incidents was carried out at the WPD Church Village Control Centre on the 9th June 2004 and the audit of HV incidents was conducted at the WPD Exeter Control Centre. The visiting auditors were Geoff Stott (Team Leader) and Oliver Joseph both from BPI. Alison Sleightholm managed the audit on behalf of the DNO with Carolyn Griffiths, Dave Crocker and Neil Griffiths working with the visiting auditors. The visit arrangements were similar to those for last year. 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 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 last years audit report[17]. The audit confirmed that there have been no new systems introduced since the 2002/03 audit year. The GE Harris ENMAC system is used for recording trouble calls, 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. Since last year's audit WPD has moved its Call Centre provision in-house and ceased using an external provider. The basic process remains the same.

Changes since last year

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

<u>Interpretation of RIGs</u>

There have been no changes in the way which WPD interprets the definitions and guidance contained in the RIGS.

<u>MPAN count</u>

There had been no changes to the way in which WPD identifies customers by MPAN count. WPD bases its MPAN accuracy estimates on the results of automatically generated weekly control reports that compare the number of primary traded MPANs with those in the ENMAC system on each Monday night of the year. Figures of above 100% are occasionally produced because of the time delay in MPANs disconnected in MPRS being removed from the ENMAC system.

<u>Connectivity model</u>

There has been no change in the structure and operation of WPD's connectivity model since the 2001/02 audit. Similar to the procedure for MPAN reconciliation, an automatic weekly control report identifies the number of customers allocated to invalid HV/LV

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[17] Information and Incentives Audit of Incident Reporting 2002/2003 (Ofgem 2004) Appendix Q3.1

substations and invalid LV feeders. The annual averages of these weekly numbers are used to estimate the connectivity model accuracy results, stated as the percentage of customers that are assigned to the correct HV/LV substation and the percentage of customers that are assigned to the correct LV feeder.

At the time of the 2002/03 IIP audit visit, 98.5% of customers were allocated to LV feeders (combined total of both licensed areas). Work has subsequently been carried out by WPD's teams to allocate the 1.5% of unallocated customers (approximately 37500 MPANs) to LV feeders. This is now largely complete, resulting in the improvement in LV feeder accuracy shown this year.

IIP Template

There have been no changes to the mechanism that WPD uses to populate the IIP template for reporting to Ofgem. The visiting auditors witnessed a rerun of the extraction and a minor variation was noted. Subsequent to the production of the figures for Ofgem, three incidents had been moved from the HV to the EHV category. There were no customers involved so the CI & CML remained unchanged in all categories as did the total number of incidents. The DNO had opened the 2003/04 database to put this minor misclassification correct as part of its ongoing internal auditing procedures.

Potential sources of error remaining in measurement systems

The remaining inaccuracy in the HV/LV estimate represents the number of customers in the connectivity model whose actual HV/LV substation is not known. These customers are assigned to the correct HV feeder and are identified in faults affecting entire HV feeders, but are assigned to dummy HV/LV substations. Similarly, the inaccuracy at LV feeder level represents customers who are assigned to the correct HV/LV substation but whose actual LV feeder is not known. These customers are assigned to a dummy LV feeder identified as feeder 0000 or feeder 9999.

In addition to the unknown substations and feeders discussed above, there are a small number of customers assigned to incorrect LV feeders within WPD's connectivity model. However, it is only possible to identify and re-reference these customers when they contact WPD following a supply interruption on a different feeder. The impact on the accuracy of WPD's measurement systems due to these incorrectly referenced customers is considered low as they are only a potential source of inaccuracy on incidents affecting individual LV feeders. WPD re-references these customers when they are identified as a means of continually improving the accuracy of its connectivity model.

Future changes

WPD has no system or process changes planned that will affect the accuracy of reporting at LV or higher voltages and will continue to replicate the IIP audit on a monthly basis. For the next reporting year WPD will be able to show disconnections from its ENMAC model more easily which will help the audit process.

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 accuracy. The visiting auditors support the statements in the above paragraphs and the accuracy figures shown in the Tables below.

For the reporting year 2003/04 WPD's estimate of MPAN accuracy is 100.05% (previous year 100.12%) and that the accuracy of its connectivity model is shown in the following Table.

WPD South West	2003/04	2002/03
HV	99.94%	99.92%
LV	99.66%	99.14%

Stage 2: Accuracy of Incident Reporting

Audit of incidents

The accuracy of LV reporting was in general high with only occasional minor transcription errors. Significant error was found in only one LV incident audited where the reported CI was too high. In virtually 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 and only one incident was considered unauditable because of the inability to establish a robust start time. An incident was found that was reported as LV but in fact was HV but it was decided to audit this incident as if it was in the correct category at the time of the audit. One incident was found with a missing restoration stage and this was added to the workbook.

The accuracy of HV reporting was also high with only occasional transcription errors of little significance. Variations were explained with good auditable evidence in all cases but one, where there were significant differences between the reported customer numbers and current system numbers. One incident was found where a restoration stage should have been split into two and the workbook was modified accordingly.

The following issues were resolved after discussions involving Ofgem:

Where customers not initially involved in an incident are interrupted in the process of restoring the permanent supply to those customers directly interrupted by the incident (extending the fault zone), the strict interpretation of RIG 2.11 is that customers not affected by the initial incident should be covered in a separate incident. WPD includes these customers in restoration stages within the initial incident report. It was decided to audit these incidents and allow these stages within the main incident for this year's audit.

If a temporary supply arrangement is removed after 18 hours then under guidance given in RIG 2.26, a new incident should be raised to capture the CI and CML involved. WPD's normal practice in most cases is to include this in the main incident. It was decided to allow restoration stages of this nature to be included in the main incident for this year's audit.

WPD does not generally recognise LV backfeeds as temporary restorations. For this year's audit it will be accepted if LV backfeeds are categorised as permanent restorations.

Each month WPD audits 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.

Audit opinion on accuracy of incident reporting

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

Stage	Audit Area	Accuracy
Stage 1	HV MPAN Measurement	100.05%
Stage 1	LV MPAN Measurement	100.05%
Stage 1	HV Connectivity Model	99.94%
Stage 1	LV Connectivity Model	99.66%

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

		Accuracy
Stage 1	Overall MPAN Accuracy	100.05%
	LV MPAN Accuracy	100.05%
Stage 2	Overall CI	99.87%
	Overall CML	99.92%
	LV CI	100.76%
	LV CML	100.90%
Combined Accuracy	Overall CI	99.92%
	Overall CML	99.97%
	LV CI	99.19%
	LV CML	99.05%

The following Table indicates whether the combined accuracy relates to over or under reporting.

		Under/Over Reported
Combined Accuracy	Overall CI	Under Reported
	Overall CML	Under Reported
	LV CI	Over Reported
	LV CML	Over Reported

It is auditors' opinion that reporting of WPD South West under the IIP scheme meets the required level of accuracy.

Recommendations for Reporting Improvements

Recommendations for the DNO

<u>2002/03 Audit</u>

Certain regional offices provided higher quality of information than others.

- This was not noted at WPD this year. The drive to improve quality by using self audit methods and circulating the information appears to be working.

Determination of customer numbers on part feeder incidents at LV level.

- WPD's connectivity model is not developed to store information automatically on exactly where customers are connected down an LV feeder. It was noted in the call logs that the onsite personnel in many cases put effort into making accurate estimates for customers affected by incidents. This could be made more universal across all operational units.

Inclusion of all restoration stages on LV incidents.

- Only one incident where a restoration stage was missing was noted on this year's WPD audit. Training appears to have resolved this.

Use of restoration time rather than incident completion time in LV incidents.

- Training appears to have resolved this.

Manual transcription errors in both LV and higher voltage incidents.

- The occasional error was found at WPD but in the opinion of the Audit Team Leader the numbers were lower than in previous years and overall the situation is good.

<u>2003/04 Audit</u>

The following recommendations were made by the visiting auditors as a result of this year's audit visit to WPD. Other issues arose in the audit of WPD South Wales which would have been treated in a similar manner by WPD South West so the section below covers both licensed areas.

- 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.

- 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. Currently WPD would not raise a separate incident to cover customers not involved in the initial interruption.

- 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. Currently in the majority of cases WPD would cover this on an additional stage of the original incident.

- 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. Currently WPD record the completion time as the actual completion time and allocate the CML to the planned shutdown.

- LV backfeeds should be treated as temporary restorations. There appears to be confusion here.

Recommendations for Ofgem

- Although Ofgem has made decisions on the four points in the previous section for the 2003/04 audit there is a need to agree and confirm the approach for future audits.

- For the current audit year the approach has been agreed on how to process incidents where DNO's misclassify the voltage category of an incident. The audit process for this type of error if it arises in the 2004/05 audit needs to be confirmed.

- WPD repeated the concern expressed last year 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.

Appendix P.   Key Issues Raised at the Post-Audit DNO Workshop

The post-audit workshop held on Thursday 16 September 2004 at Ofgem's offices at Millbank, London, was hosted by Ofgem and attended by representatives from all DNOs and from the core BPI/MM audit team.

MPAN accuracy

All DNOs indicated that they were satisfied both with the revised method of calculating MPAN accuracy and with the decision not to use connectivity model accuracy in the final accuracy calculations.   DNOs felt they had been assessed consistently for MPAN accuracy by the audit teams. The possibility of investigating the accuracy of connectivity models in more detail was discussed and DNOs were not in favour.   Some DNOs suggested that it was not necessary to include measurement systems accuracy in future audits as all DNOs are now approaching 100% MPAN accuracy. However it was felt on balance that the continued inclusion of MPAN and connectivity model accuracy assessment in future audits would be good to help track improvements and check that measurement accuracy is being maintained.

Selection of incidents for audit

Following discussion DNOs agreed that the number of LV incidents selected for audit seemed reasonable. Ofgem undertook to incorporate an additional check in its sampling procedure to ensure that the incidents chosen generated a representative level of CI/CML.

IIP template

In view of the minor nature of the variances evident in the re-running of the IIP template it was decided that this part of the audit might be discontinued.   However, Ofgem emphasised the need for DNOs to ensure that 100% of CI and CML in all categories were reported by DNOs in the template.

Streamlined audit process

Ofgem suggested streamlining the Stage 2 audit of incident reporting in future 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 as an example). Only if this initial stage fell short of the required accuracy would the whole sample then be audited against the RIGs target accuracy requirement. 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 2004/05 may impact on information that they have already started to collect.   It was suggested that the results of the proposed streamlined approach could be tested and compared with the present approach during the 2004/05 audit.

Ofgem undertook to set out the proposal in more detail in the September 2004 update paper.

Inclusion of incidents without prior notification

In order to reduce the possible customer perception of lack of rigour of the audit, in particular under the reduced first stage sample size of the proposed two stage process, it

was suggested that visiting auditors might ask DNOs at the start of the audit visit to provide details of a small sample of incidents not notified in advance. DNOs were not confident that this could be done satisfactorily in parallel with the main audit due to extra staff requirements. They also felt it would add little extra benefit whilst increasing audit costs and time.

Variances in customer numbers

DNOs generally considered that it was not worth spending extra time and money filing time-stamped audit evidence to support small changes in customer numbers between the time of the incident and the time of the audit. One DNO expressed concern that visiting auditors would not accept figures that had been automatically produced by the system at the time of the incident, and another indicated that the routine refusal to accept unsupported number changes was having a negative effect on efforts to improve quality of reporting by control engineers. However, another DNO indicated that increased confidence in the audit process generally and the procedure for removing outlying results had reduced concerns about minor variances. It was agreed that the Appointed Auditor would circulate a generic schedule of acceptable audit evidence in advance of the 2004/05 audits.

Pre-arranged interruptions

DNOs commented that information from the field cannot be cross checked for pre-arranged interruptions and so has to be trusted. Ofgem indicated that a lack of information had become apparent due to more pre-arranged interruptions being included in the sample for this year. DNOs undertook to increase the extent and precision of information recorded in pre-arranged interruption reports. With regard to the reporting of over-runs of pre-arranged incidents Ofgem confirmed that DNOs will not be penalised in the 2004/05 audit for differing reporting interpretations provided the correct CI and CML are captured.

Accuracy calculation

DNOs expressed concern that the final accuracy calculation method was not available to them and so they could not determine whether they had passed the audit at the conclusion of the visit. One DNO suggested that visiting auditors should agree the result with the DNO at the conclusion of the visit. Ofgem expressed concerns about consistency of treatment and the need to release finalised results for all DNOs simultaneously without the need for recalculation. However it was acknowledged that details of the calculation method should be circulated to DNOs to enable them to complete an estimate of accuracy at the conclusion of the audit visit. Ofgem undertook to circulate the calculation process details in advance of the 2004/05 audit.

Ofgem will introduce additional formulae into the audit workbooks to enable DNOs and auditors to estimate the first stage accuracy results under the proposed new audit process. These results would be used to determine whether it was necessary to proceed to the second stage. Where results are borderline or disputed then all incidents should be audited.

Where appropriate, the formulae would also be used to calculate indicative second stage audit results. These would be subject to quality assurance by the core team before publication but would provide an indication as to whether the DNO had met the accuracy levels set out in the RIGs.

Audit visit programme

One DNO expressed the need for greater notice of incident schedules for audit. Ofgem indicated agreement with DNOs requiring more notice to be audited later in the visit programme. It was also considered beneficial for the "pilot" audit to be carried out before the auditors' team training day and for the pilot DNO to be varied from year to year.

The length of the introductory session to the audit visits was discussed. One DNO expressed the view that this was particularly necessary when they had new staff involved in the IIP audit. The possibility of sending pre-audit presentations to auditors before the visit was discussed. Ofgem stated that it would be prepared to visit DNOs to assist in explaining the process to new DNO staff.

It was agreed that the pilot for next year could be conducted in mid May 2005 to bring forward the visit programme. SSE offered to host the 2004/05 pilot audit visit.

Points on the RIGs and audit consistency

Backfeed – the DNOs suggested that it is not a temporary restoration of supply where in-situ network switching devices are used.

Extension of the fault zone - this was generally not thought to be a problem at LV, but at HV it can be more difficult to classify in particular where operational restrictions are in place. However Ofgem expressed the view that as long as the CI and CML are recorded correctly DNOs would not be penalised in the 2004/05 audit for differing interpretations of the number of incidents and stages raised.

Rounding of incident start and finish times - Ofgem felt that this probably did not have a material impact on results but undertook to consider whether to include clarification on this point in the RIGs. DNOs pointed out that if specific requirements are made either to round up or down, this may result in the requirement for material changes to measuring systems.

Ofgem is currently considering the DNOs' comments on the latest draft version 5 of the RIGs.