



**Document 12**  
**Asset Category – ESQCR**  
**LPN**

Asset Stewardship Report  
2014

Manjula Singh

**Approved by Richard Wakelen / Barry Hatton**

**Approved Date 03/03/2014**

**Document History**

| Version | Date       | Details   | Originator    | Revision Class | Section Update                             |
|---------|------------|---|---------------|----------------|--|
| 1.0     | 24.02.2014 | Original  | NA            | NA             | NA   |
| 1.1     | 24.02.2014 | Initial Draft for Resubmission  | Manjula Singh | Minor          | Removed cable pits from the whole document |
| 1.2     | 18.02.2014 | Volume & Expenditure tables and graphs are updated as per 14 <sup>th</sup> Feb RIGS tables              | Manjula Singh | Minor          | Section 1.4 & 7.4.                         |
| 1.3     | 22.02.2014 | Added Appendix 5, 8 & 10.   | Manjula Singh | Minor          |  |
| 1.4     | 25.02.2014 | Updated as per the Gold checklist   | Manjula Singh | Minor          | Throughout the document                    |
| 1.5     | 26.02.2014 | Table references and chart references Updated   | Chino Atako   | Minor          | Throughout the documents                   |
| 1.6     | 27.02.2014 | Additional explanation provided for difference between the July 2013 submission and the 2014 submission | Chino Atako   | Minor          | Appendix 10                                |
| 1.7     | 28.02.2014 | Text in the executive summary updated   | Chino Atako   | Minor          | Section 1                                  |
| 2.0     | 03.03.2014 | Approved by Barry Hatton  | Manjula Singh |                | None                                       |

## Preface

UK Power Networks uses Asset Stewardship Reports ('ASR') to describe the optimum asset management strategy and proposals for different groups of assets. This optimised asset management strategy and plan details the levels of investment required and the targeted interventions and outputs needed. Separate ASRs define the most efficient maintenance and inspection regimes needed and all documents detail the new forms of innovation, which are required to maximise value, service and safety for all customers and staff throughout the ED1 regulatory period. Outline proposals for the ED2 period are also included.

Each DNO has a suite of approximately 20 ASR's. Although asset policy and strategy is similar for the same assets, in each DNO the detailed plans and investment proposals are different for each DNO. There are also local issues, which must be taken into account. Accordingly, each DNO has its own complete set of ASR documents.

A complete list of titles of the ASR's, a summary of CAPEX and OPEX investment is included in '**Document 20: Asset Stewardship Report: CAPEX/OPEX Overview**'. This document also defines how costs and outputs in the various ASR's build up UK Power Networks 'NAMP' (Network Asset Management Plan) and how the NAMP aligns, with Ofgem's ED1 RIGs tables and row numbers.

Where 'HI' or asset 'Health Index' information is included, please note predicted ED1 profiles are before any benefits from 'Load driven investment.'

This ASR has also been updated to reflect the feedback from Ofgem on our July 2013 ED1 business plan submission. Accordingly, to aid the reader three additional appendices have been added. They are;

1. **Appendix 8 - Output NAMP/ED1 RIGS reconciliation:** This section explains the 'line of sight' between the UKPN Network Asset Management Plan (NAMP) replacement volumes contained in the Ofgem RIGS tables. The NAMP is the UKPN ten year rolling asset management investment plan. It is used as the overarching plan to drive both direct and indirect CAPEX and OPEX interventions volumes and costs. The volume and cost data used in this ASR to explain our investment plan is taken from the UK Power Networks NAMP. Appendix 8 explains how the NAMP outputs are translated into the Ofgem RIGS tables. The translation of costs from the NAMP to the ED1 RIGS tables is more complex and it is not possible to explain this in a simple table. This is because the costs of a project in the 'NAMP' are allocated to a wide variety of tables and rows in the RIGS. For example the costs of a typical switchgear replacement project will be allocated to a range of different Ofgem ED1 RIGs tables and rows such as CV3 (Replacement), CV5 (Refurbishment) CV6 (Civil works) and CV105 (Operational IT Technology and Telecoms). However, guidance notes of the destination RIGs tables for NAMP expenditure are included in the table in the Section 1.1 of the Executive Summary of each ASR.
2. **Appendix 9 – Material changes since the June 2013 ED1 submission:** This section shows the differences between the ASR submitted in July 2013 and the ASR

submitted for the re-submission in March 2014. It aims to inform the reader the changes made to volumes and costs as a result of reviewing the plans submitted in July 2013. Generally, the number of changes made is very small, as we believe the original plan submitted in July 2013 meets the requirements of a well-justified plan. However, there are areas where we have identified further efficiencies and improvements or recent events have driven us to amend our plans to protect customer safety and service.

We have sought to avoid duplication in other ED1 documents, such as 'Scheme Justification Papers', by referring the reader to key issues of asset policy and asset engineering which are included in the appropriate ASR documents.

## Contents

|     |  |    |
|-----|--|----|
| 1.0 | Executive Summary - LPN ESQCR Compliance .....                     | 7  |
| 1.2 | Investment Strategy .....  | 7  |
| 1.3 | ED1 Proposals .....  | 7  |
| 1.4 | Innovation .....   | 8  |
| 1.5 | Risks and Opportunities .....                                      | 8  |
| 2.0 | Description of LPN ESQCR Compliance focus areas .....              | 8  |
| 3.0 | Investment Drivers .....   | 9  |
| 3.1 | ESQC Regulations .....   | 9  |
| 3.2 | Identifying Interventions required .....                           | 9  |
| 3.3 | Intervention thresholds .....                                      | 10 |
| 3.4 | Examples of non-compliance .....                                   | 10 |
| 3.5 | Incidents and events .....   | 11 |
| 3.6 | Signage .....  | 11 |
| 4.0 | Asset Assessment .....   | 14 |
| 4.1 | Asset Health .....   | 14 |
| 4.2 | Asset Criticality .....  | 14 |
| 4.3 | Network Risk .....   | 15 |
| 4.4 | Data Validation .....  | 15 |
| 4.5 | Data Verification .....  | 15 |
| 4.6 | Data Completeness .....  | 15 |
| 5.0 | Intervention policies .....  | 16 |
| 5.3 | Interventions: Description of intervention options evaluated ..... | 16 |
| 5.4 | Policies: selecting preferred interventions .....                  | 16 |
| 6.0 | Innovation .....   | 16 |
| 7.0 | ED1 Expenditure requirements for ESQCR Compliance .....            | 20 |
| 7.1 | Method .....   | 20 |
| 7.2 | Additional Considerations .....                                    | 20 |
| 7.3 | Asset volumes & expenditure .....                                  | 21 |
| 7.4 | Commentary .....   | 22 |
|     | Appendices .....   | 23 |
|     | Appendix 1 – Age Profiles .....                                    | 23 |
|     | Appendix 2 – HI Profiles .....                                     | 23 |
|     | Appendix 3 – Fault Data .....                                      | 23 |

All of the cost numbers displayed in this document are before the application of on-going efficiencies and real price effects

|   |    |
|---|----|
| Appendix 4 – WLC Case Studies: risk, cost, performance, condition profiles for various options..... | 23 |
| Appendix 5 – NLRE Expenditure Plan .....  | 25 |
| Appendix 6 – Sensitivity Analysis .....   | 26 |
| Appendix 7 – Named Scheme .....   | 26 |
| Appendix 8 – Output NAMP / ED1 Business Plan Data Table Reconciliation .....                        | 27 |
| Appendix 9 – Efficiency benchmarking with other DNO's.....  | 28 |
| Appendix 10: Material changes since the July 2013 ED1 submission .....                              | 29 |

## 1.0 Executive Summary - LPN ESQCR Compliance

### 1.2 Investment Strategy

In LPN, any safety or ESQCR compliance issues are identified through a defined periodic inspection of its assets. These compliance issues are prioritised through a risk-based prioritisation model and are resolved appropriately within the agreed timelines based on the severity of these issues.

UK Power Networks' investment strategy for ED1 has been set to comply with ESQCR in order to minimise the risk to members of the public and employees.

### 1.3 ED1 Proposals

This document summarises the expenditure on ESQCR compliance issues related to signage. The ED1 investment proposal for signage replacements is £0.2m in legal & Safety table. This is a fifty per cent increase on the average annual expenditure in DPCR5. The increased expenditure is to address the increasing cases of substation trespassing and thefts which we have observed in LPN. Table 1 shows a summary of the DPCR5 and ED1 expenditure.

| Expenditure Category | ED1 Total expenditure | DPCR5 Total expenditure | ED1 Annual average expenditure | DPCR5 Annual average expenditure |
|----------------------|-----------------------|-------------------------|--------------------------------|----------------------------------|
| Signs                | £215,483              | £53,856                 | £26,935                        | £10,771                          |
| Grand Total          | £215,483              | £53,856                 | £26,935                        | £10,771                          |

*Table 1: LPN ESQCR expenditure summary for ED1*

*(Source: 21<sup>st</sup> February 2014 Business Plan data table CV8)*

## 1.4 Innovation

UKPN has introduced a risk-based approach to compliance management, which we believe is an industry leading initiative in the way risk is minimised and compliance issues are identified, prioritised and resolved efficiently. The risk-based framework is implemented using a centrally managed, risk-based prioritisation model to identify the priority of an issue on a scale of P1 to P5, with P5 issues being the most urgent. This has been introduced for all asset types and was developed in collaboration with Network Operations and external parties by developing asset management strategies.

## 1.5 Risks and Opportunities

|                      | Description of similarly likely opportunities or risks arising in ED1 period | Level of (uncertainties)/ cost growth (£m) |
|----------------------|--|--|
| Risk/<br>opportunity | Deviation from average asset life for signs                                  | +/-5%                                      |

*Table 2: Risks and opportunities*

## 2.0 Description of LPN ESQCR Compliance focus areas

ESQC regulations have implications throughout UKPN operations. The work required for ESQCR compliance is covered in asset specific documents (e.g. substation trespass is covered under the Civil justification document, increased safety patrols on high risk sites are covered under the Inspections and Maintenance document). This section details our proposed asset policy, practice and funding strategy in the ED1 period on ensuring ESQCR compliance on signage.

LPN has a network of 17,563 substations, monitored as part of ESQCR compliance. See Table 3.



| Asset Class | Asset Category            | Total  |
|-------------|---------------------------|--------|
| Site        | Grid Substation Site      | 60     |
|             | Primary Substation Site   | 147    |
|             | Secondary Substation Site | 17,356 |
| Grand Total |                           | 17,563 |

Table 3 – Substations and overhead line assets

(Source: UKPN 2012/2013 RIGS V1 table)

## 3.0 Investment Drivers

### 3.1 ESQC Regulations

The primary investment driver for compliance management is to minimise risk to the public and staff at the lowest cost to customers. Additionally, there is the obligation to ensure compliance with the safety aspects of the ESQC Regulations 2002.

Incidents of substation trespassing and thefts are increasing, subsequently highlighting the risks of potential injury to members of public in substations. These will have to be mitigated by appropriate signage on all substations to notify the public about the risks of potential electrical contact.

The ESQCR Compliance aspects covered in this document are related to regulatory signage warning the public of the electrical hazards on site (substation signs).

LPN inspectors are trained to identify and record ESQCR non-compliance issues as part of the inspection routine, which will then be recorded into the Asset Register application.

Any non-compliance identified through inspections will require resolution. Please refer to Section 5 for specific details on different interventions carried by out UKPN to ensure ESQCR compliance.

### 3.2 Identifying Interventions required

ESQCR compliance issues are identified during routine inspection of our assets. Inspection frequencies are outlined in Engineering Maintenance Standard EMS 10-0002.

ESQCR compliance issues identified are recorded as a defect in the asset management register 'Ellipse'. UK Power Networks uses a risk-based model to robustly manage and prioritise the defects. The defect prioritisation model considers the risk to public safety, quality of supply, environmental risk and the ESQCR risk

rating. This prioritisation model and the defect management programme are detailed further in section 6.

Urgent ESQCR compliance issues are also reported to AIRLine. AIRLine is UKPN Accident and Incident Reporting line. Any compliance issues that are considered as an immediate risk to public safety must be reported to AIRLine. Through AIRLine an action is assigned to a member of staff to investigate and risk assess the issue and arrange for resolution within an appropriate risk based time scale.

### **Signage**

The Substation Inspectors' Handbook details the requirements for safety signage ensuring full compliance with ESQCR.

Signage issues are identified, and where possible, rectified as part of the routine inspection of our assets. Signage issues not rectified at the time of inspection are prioritised and managed as part of the defect management programme.

## **3.3 Intervention thresholds**

### **Signage (Substations)**

Signs will require replacement if they are vandalised, or found to be non-compliant with ESQCR and UKPN policy. In addition, depending on the position of the sign, the expected life can be reduced significantly due to ultra violet exposure, where ultimately, the signage is faded by sunlight and will require replacement. Figure 1 in section 3.4 is a typical example of a yellow danger of death sign, which has faded due to prolonged exposure to direct sunlight.

Where possible, UKPN have reviewed the signage design with the supplier, in particular the ownership sign on substations, to use a black pigment instead of colours as the black pigment has a longer expected life span. Figure 4 shows the previous ownership signage, which has faded.

As mentioned previously, signage issues are rectified where possible at the time of inspection to ensure maximum cost efficiency.

## **3.4 Examples of non-compliance**

### **Signage Issues**

The photos below outline a few examples of signage compliance.



Figure 1 - Faded signage due to UV exposure



Figure 2 - Vandalised Sign with graffiti



Figure 3 - Substation signage missing



Figure 4 - Faded ownership details

### 3.5 Incidents and events

AIRLine is the UKPN Accident and Incident Reporting line. Compliance issues that are considered as an immediate risk to public safety must be reported to AIRLine. All staff and contractors as well as members of the public can report incidents to AIRLine through the customer call centre.

This section outlines the trends of incidents reported to AIRLine between 2010 and 2012 on signage.

### 3.6 Signage

Figure 5 shows an increasing trend of signage issues reported to AIRLine. This is predominantly because of increased awareness by all UKPN staff and contractors following an audit on substation signage carried out in SPN in January 2012.

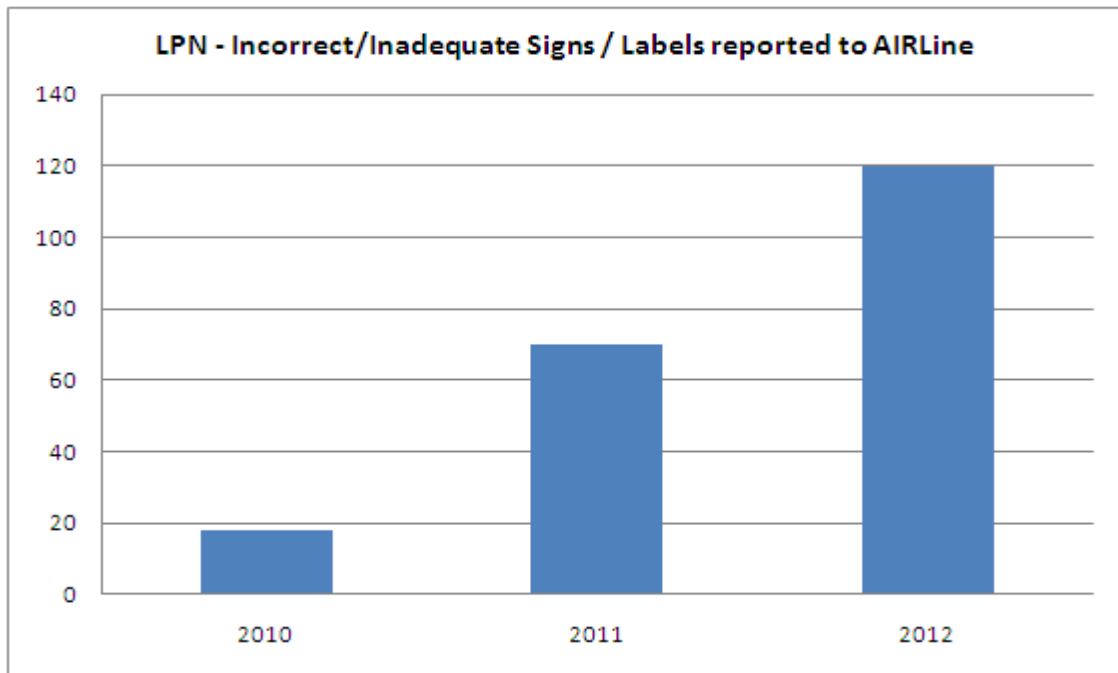


Figure 5 - *Incorrect signage incidents reported to AIRLine*

The audit focussed on the ESQCR requirement to display sufficient safety signs as well as identification of ownership and location details. Compliance issues identified included faded, vandalised and missing signage, as illustrated in Figures 1 - 4 of section 3.4.

Signs have been redesigned to avoid the use of colours, where possible, so as to reduce fading. Internal signage audits continue to be carried out and dedicated briefing sessions have been held with inspectors across all of UKPN. ESQCR signage requirements are also included in team briefing sessions for all staff to ensure a wide audience can identify and report ESQCR signage compliance issues. The simple message conveyed to staff is to ask yourself - if you were the emergency services and arrived on site, could you contact the owner of the site and readily provide location or an identification number for the site. This is critical information required by the emergency services if an incident were to occur on the site. Figure 6 displays the team brief communication.

# SUBSTATION SIGNAGE

## Compliance

Random inspections by the Health & Safety Executive at 6 Grid and Primary substation sites raised a concern as signs were either missing, inadequate, defaced or faded. This is not compliant with statutory regulations and UKPN EI 09-0019.



Graffiti should be removed.



UKPN ownership label faded.



Danger of Death should be bright yellow.

Look out for incorrect signage and report to AIRline. Ask yourself, if you were the emergency services and arrived on site, could you contact the owner of the site (UKPN) and readily provide the location or an identification number for the site? This is critical information required by the emergency services if an incident were to occur on the site.



Every main gate (the first one that the emergency services arrive at) has this sign fitted.



'Danger of Death' sign should be clean and bright yellow.



Every secondary gate accessible by vehicles has signage in this format fitted.



UKPN ownership & site location labels should be clear & clean.

Figure 6 - Team Brief communication following audit

## 4.0 Asset Assessment

### 4.1 Asset Health

UKPN has an established defect rectification programme with the aim of reducing the outstanding defect count to normal operating level by 2015.

### 4.2 Asset Criticality

UKPN has developed a comprehensive defect prioritisation model to prioritise the defects identified on the network and ensure they are dealt with the appropriate level of urgency.

Each of the defect categories were reviewed and assigned a risk score based on:

- Regulatory Risk
- Safety Risk
- Environmental Risk
- Quality of Supply Risk
- Financial Risk

Regulatory, safety and environmental risk are assigned a higher weighting to ensure that they are resolved as a priority.

The priority on a defect is not decided by the inspector but will be applied centrally through the defect prioritisation model thereby ensuring strict control and governance on the process. The model will rely on additional factors such as location risk, equipment risk of the asset (safety, environmental, QoS and financial risk already assigned on the defect category) to arrive at the overall priority. Once the priority is assigned, it will not be subject to change and will have to be resolved as per the agreed resolution time standard.

Based on risk scores, each defect category is assigned a priority from P5 to P1, which has a designated resolution time schedule as shown in the table 4.

| Defect Criticality | Definition | Resolution Time Schedule            |
|--------------------|------------|-------------------------------------|
| P5                 | Critical   | < 3 months                          |
| P4                 | Urgent     | 3 – 12 months                       |
| P3                 | Required   | 12 – 24 months                      |
| P2                 | Medium     | 24 – 48 months                      |
| P1                 | Low        | During next maintenance, next visit |
| P0                 | -          | For information only                |

Table 4: Defect Criticality Definition and Resolution Time Schedule

### 4.3 Network Risk

The risk of an asset failing is a combination of the probability of failure (such as age and duty) and the consequence of failure (such as network performance). Asset criticality provides a measure of the consequence of failure and is evaluated in terms of the following four primary criticality categories:

- Network Performance (PD monitoring, function, spares/obsolescence, licence area and customer number)
- Safety (internal arc rated, arc extinction and ESQC risk level)
- Financial; opex (licence area, spares/obsolescence) and capex (voltage and licence area)
- Environmental (site sensitivity, arc extinction, gas capacity and volume of oil)

In order to compare and combine category consequences, each consequence value is equated to a monetary assessment. Once the average consequence of failure for a group has been valued, it is necessary to define the criticality of an individual asset (for each consequence category). The score for each consequence category is then added together and converted to an Ofgem criticality index (C1-4) A detailed methodology for calculating the criticality index can be found in 'Commentary Document 15: Model Overview'.

### 4.4 Data Validation

Not Relevant: Intentionally Left Blank

### 4.5 Data Verification

Not Relevant: Intentionally Left Blank

### 4.6 Data Completeness

Not Relevant: Intentionally Left Blank

## 5.0 Intervention policies

### 5.3 Interventions: Description of intervention options evaluated

Table 5 outlines the issues and the remediation adopted for resolution of non-compliant signs.

| ESQCR compliance issue | Compliance description  | Description of intervention options   |
|------------------------|---|---|
| Signs:                 | Provision of warning signs for overhead line structures and substations | <ul style="list-style-type: none"> <li>• Replacement of defective and non-compliant signs</li> <li>• Cleaning of signs with graffiti / dirt where possible</li> </ul> |

Table 5: LPN – Interventions on signage

### 5.4 Policies: selecting preferred interventions

Each site will be risk assessed and the most cost effective intervention, if required, will be applied. Intervention for specific compliance issues depend on a variety of factors, such as, location and type of asset.

## 6.0 Innovation

### Defect Management Program

UKPN launched the Defect Management Programme in September 2011 to review, prioritise and resolve the defects identified during inspections.

A risk-based defect prioritisation model has been implemented to prioritise and ensure that the most critical issues are addressed as appropriate.

The programme has established defect task forces in each region, led by the Heads of Network Operations, who are supported by Asset management and Health and Safety teams that review the defects and responses identified on a monthly basis. The inclusion of Asset Management teams in the programme also ensures that uniform defect resolution approach is adopted across the regions.



### Task force structure

| Roles                       | Participants   |
|-----------------------------|--|
| Chairman                    | Head of Operations   |
| Steering Committee          | Head of Asset Strategy, Head of Health and Safety, Head of Asset Information |
| Co-ordination, Data reports | Asset Management Team  |
| Team                        | Tree Managers<br>Civil Managers<br>I&M Managers<br>Capital Delivery Managers |
| Meeting Frequency           | Monthly meetings   |

Table 6: Task force structure

Through a focussed approach to network defects, the programme has successfully reduced the outstanding volume of defects by 33% by the end of December 2012. The current defects in the asset register are being regularly analysed to see redundancies and duplicates while also resolving any incorrectly categorised defects that need attention.

### UKPN – Outstanding defects

#### Sep 2011 baseline

| Category           | P5 - VERY HIGH | P4 - HIGH      | P3 - MEDIUM    | P2 - LOW      | P1 - VERY LOW | Grand Total    |
|--------------------|----------------|----------------|----------------|---------------|---------------|----------------|
| OHL                | 36,688         | 30,538         | 240,522        | 30,315        | 6,460         | <b>344,523</b> |
| Pole Condition     | 98             | 15,621         | 2,482          | 0             | 0             | <b>18,201</b>  |
| Towers             | 21             | 1,260          | 15,338         | 5,574         | 0             | <b>22,193</b>  |
| Trees              | 8,378          | 160,475        | 24,269         | 0             | 0             | <b>193,122</b> |
| Civil              | 1,043          | 12,850         | 23,743         | 15,403        | 15,647        | <b>68,686</b>  |
| Link box           | 8,718          | 4,597          | 1,863          | 1,422         | 15,946        | <b>32,546</b>  |
| Plant              | 1,820          | 80             | 206            | 31,759        | 4,565         | <b>38,430</b>  |
| <b>Grand Total</b> | <b>56,766</b>  | <b>225,421</b> | <b>308,423</b> | <b>84,473</b> | <b>42,618</b> | <b>717,701</b> |

The outstanding defect count has reduced by 239,867 (~33.42%)

#### Dec 2012 End status update

| Category           | P5 - VERY HIGH | P4 - HIGH      | P3 - MEDIUM    | P2 - LOW      | P1 - VERY LOW | Grand Total    |
|--------------------|----------------|----------------|----------------|---------------|---------------|----------------|
| OHL                | 25,659         | 33,070         | 127,304        | 25,199        | 101           | <b>211,333</b> |
| Pole Condition     | 15             | 17,841         | 2,665          | 0             | 0             | <b>20,521</b>  |
| Towers             | 28             | 1,165          | 12,561         | 5,404         | 0             | <b>19,158</b>  |
| Trees              | 1,742          | 76,598         | 43,607         | 302           | 0             | <b>122,249</b> |
| Civil              | 731            | 11,308         | 18,784         | 8,408         | 9,037         | <b>48,268</b>  |
| Link box           | 0              | 8,747          | 0              | 0             | 4,279         | <b>13,026</b>  |
| Plant              | 1,240          | 957            | 409            | 34,905        | 5,768         | <b>43,279</b>  |
| <b>Grand Total</b> | <b>29,415</b>  | <b>149,686</b> | <b>205,330</b> | <b>74,218</b> | <b>19,185</b> | <b>477,834</b> |

P5 defects have reduced by 48.18%

Table 7: Defect Management – UKPN Performance Dec 2012

**December 2013 End Status**

update

| Asset Category | P5            | P4             | P3             | P2            | Total          |
|----------------|---------------|----------------|----------------|---------------|----------------|
| Civil          | 341           | 8,106          | 7,058          | 9,563         | <b>25,068</b>  |
| Link box       |               | 6,858          |                |               | <b>6,858</b>   |
| OHL            | 7,986         | 27,175         | 96,027         | 24,780        | <b>155,968</b> |
| Plant          | 1,119         | 320            | 457            | 19,655        | <b>21,551</b>  |
| Pole Condition | 13            | 15,098         | 2,364          |               | <b>17,475</b>  |
| Towers         | 39            | 1,312          | 12,181         | 2,252         | <b>15,784</b>  |
| Trees          | 1,276         | 45,084         | 13,322         |               | <b>59,682</b>  |
| <b>Total</b>   | <b>10,774</b> | <b>103,953</b> | <b>131,409</b> | <b>56,250</b> | <b>302,386</b> |

Table 8 – UK Power Networks defect management update 2013

LPN has contributed significantly to the overall progress. This has resulted in 47% reduction in outstanding defects for LPN.

**LPN Performance**

Sep 2011 baseline

| Category           | P5 - VERY HIGH | P4 - HIGH    | P3 - MEDIUM  | P2 - LOW      | P1 - VERY LOW | Grand Total   |
|--------------------|----------------|--------------|--------------|---------------|---------------|---------------|
| Towers             | 0              | 6            | 18           | 28            | 0             | <b>52</b>     |
| Trees              | 0              | 3            | 17           | 0             | 0             | <b>20</b>     |
| Civil              | 315            | 3,972        | 7,486        | 8,527         | 3,883         | <b>24,183</b> |
| Link box           | 6,518          | 2,559        | 1,083        | 1,058         | 8,410         | <b>19,628</b> |
| Plant              | 263            | 27           | 35           | 11,508        | 589           | <b>12,422</b> |
| <b>Grand Total</b> | <b>7,096</b>   | <b>6,567</b> | <b>8,639</b> | <b>21,121</b> | <b>12,882</b> | <b>56,305</b> |

The outstanding defect count has reduced by 26,459 (~46.99%)

P5 defects have reduced by 95.07 %

December 2012 End status

| Category           | P5 - VERY HIGH | P4 - HIGH    | P3 - MEDIUM  | P2 - LOW      | P1 - VERY LOW | Grand Total   |
|--------------------|----------------|--------------|--------------|---------------|---------------|---------------|
| Towers             | 0              | 7            | 15           | 12            | 0             | <b>34</b>     |
| Trees              | 0              | 3            | 16           | 0             | 0             | <b>19</b>     |
| Civil              | 234            | 3,052        | 3,795        | 3,984         | 882           | <b>11,947</b> |
| Link box           | 0              | 4,522        | 0            | 0             | 1,837         | <b>6,359</b>  |
| Plant              | 116            | 41           | 25           | 10,620        | 685           | <b>11,487</b> |
| <b>Grand Total</b> | <b>350</b>     | <b>7,625</b> | <b>3,851</b> | <b>14,616</b> | <b>3,404</b>  | <b>29,846</b> |

Table 9: Defect Management – LPN Performance

**December 2013 End**

Status

| Asset Category | P5  | P4    | P3    | P2    | Total |
|----------------|-----|-------|-------|-------|-------|
| Civil          | 110 | 4,790 | 2,224 | 1,874 | 8,998 |
| Link box       |     | 3,099 |       |       | 3,099 |
| Plant          | 104 | 60    | 26    | 3,609 | 3,799 |

|        |     |       |       |       |        |
|--------|-----|-------|-------|-------|--------|
| Towers |     | 7     | 19    | 8     | 34     |
| Trees  | 0   | 5     |       |       | 5      |
| Total  | 214 | 7,961 | 2,270 | 5,491 | 15,936 |

*Table 10 – LPN Performance t 2013*

Table 10 shows the progress made in reducing the number of defects as of December 2013 in LPN. LPN successfully reduced the outstanding defect count by 71% by the end of 2013 from the September 2011 Baseline. The strategy is to address all outstanding issues raised by the end of DPCR5 and Business as usual.

### **Defect reporting tool**

An online defect reporting tool has been developed to improve visibility of the defects and aid planning for resolution of defects. The reporting tool is accessible by both UKPN staff and its contractors. The report enables effective access and viewing of the defects as well as development of progress graphs for efficient monitoring and tracking of key performance indicators.

### **Defect inspectors handbook**

A handbook on defects for inspectors is being developed to improve clarity on what constitutes a defect. This will cover all defect categories, not just the categories detailed throughout this document. The handbook will aid improved reporting and understanding of each defect and is planned for completion by the end of 2013.

It is widely acknowledged that the presence of gas can exacerbate the effects of a disruptive failure. Within the literature it can be observed that the most common strategy of mitigating the effects of these disruptive faults is to form an assumptive stance; whereby a disruptive fault is assumed to be inevitable. Consequently, relatively cheap mitigating safety devices, such as tethered covers etc, can be deployed in order to mediate and mitigate the effects of a fault and not to stop the fault occurring.

## 7.0 ED1 Expenditure requirements for ESQCR Compliance

### 7.1 Method

The investment strategy for ED1 has been set to achieve ESQCR compliance and minimise the risk to members of the public and employees. Any defects identified will also be resolved during the ED1 period. The current defect management programme will address the outstanding defects by the end of DPCR5. A targeted approach to resolving ESQCR compliance issues will continue throughout ED1. The investment plan for ESQCR safety compliance addressed in this document is primarily for signage. Other areas of expenditure for ESQCR compliance are covered in asset stewardship reports for other asset groups.

The ESQCR forecasts are based on historical trends and apply data quality correction to ensure forecast volumes that are more realistic.

Wherever there is a skewed annual volume, which may be due to a system upgrade or migration issues, the volumes are discounted in the forecasting, to not skew the volume due to very high or very low volumes in any given year.

As described in earlier sections, the Defect Management programme, currently being executed by UKPN is expected to bring down the volume of outstanding defects to a manageable level by 2015.

#### Methodology for volume forecasting:

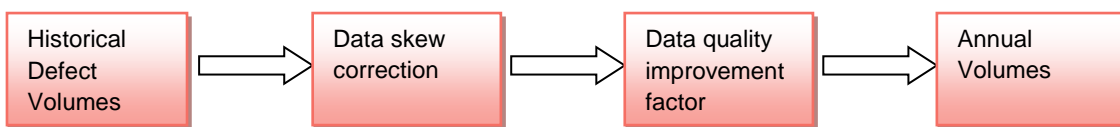


Figure 7 - ED1 forecasting process

### 7.2 Additional Considerations

None.

### 7.3 Asset volumes & expenditure

Table 11 summarises the ESQCR Safety related expenditure for the ED1 period.

| Assets             | NAMP    | Description                     | ED1 Total Expenditure | ED1 Total Volume | ED1 Yearly Expenditure | ED1 Yearly Volume |
|--------------------|---------|---------------------------------|-----------------------|------------------|------------------------|-------------------|
| Signs              | 1.13.05 | ESQC Provision of warning signs | £215,483              | 19,200           | £26,935                | 2,400             |
| <b>Grand Total</b> |         |                                 | £215,483              | 19,200           | £26,935                | 2,400             |

Table 11: LPN ESQCR Expenditure (source: Costs - 19<sup>th</sup> February 2014 NAMP, Table J Less Indirects, Volumes - 19<sup>th</sup> February 2014 NAMP, Table O)

#### Signage

As previously mentioned in section 3.4, warning signs require replacement if they are vandalised, faded, or found non-compliant with ESQCR and UKPN Policy. An average annual volume of 2,400 sign replacements is forecast in ED1. This is out of a total population of 19,200 signs. Since 2010, LPN has procured an average annual volume of 1,382 signs.

| NAMP    | Description                     | ED1 Total Expenditure | ED1 Total Volume | ED1 Yearly Expenditure | ED1 Yearly Volume |
|---------|---------------------------------|-----------------------|------------------|------------------------|-------------------|
| 1.13.05 | ESQC Provision of warning signs | £215,483              | 19,200           | £26,935                | 2,400             |

Table 12: LPN – ED1 expenditure on signage (source: Costs - 19<sup>th</sup> February 2014 NAMP, Table J Less Indirects, Volumes - 19<sup>th</sup> February 2014 NAMP, Table O)



Table 13: LPN expenditure trend on signs

There is a lack of information contained within the asset register for spend on signage in the early years of DPCR5. The volumes of signs are known and the cost of these has been calculated for ED1 forecasting.

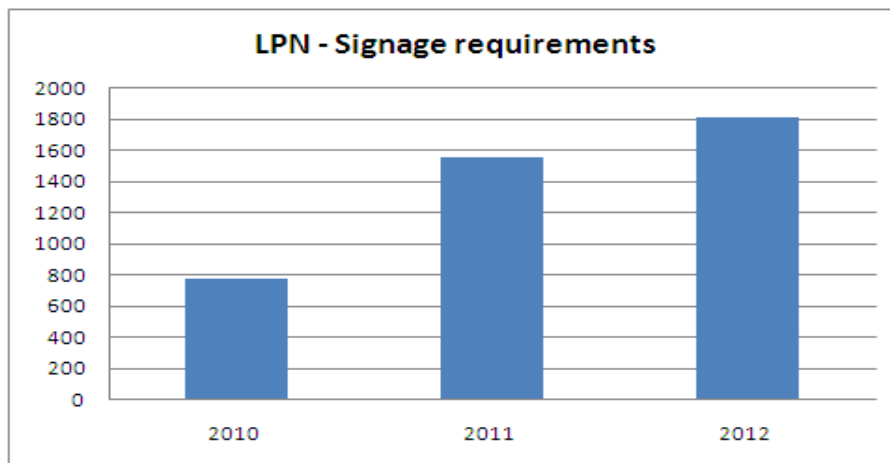


Figure 8 - LPN usage trend on signs

## 7.4 Commentary

The proposed investment level for signs, in ED1, is **£0.21m**. The proposal has been determined from a review of historical achievements and a risk-based management policy. The proposals will enable compliance with ESQCR and minimise risks to the public, UKPN staff and its contractors.

## Appendices

### Appendix 1 – Age Profiles

Not Relevant: Intentionally Left Blank

### Appendix 2 – HI Profiles

Not Relevant: Intentionally Left Blank

### Appendix 3 – Fault Data

Not Relevant: Intentionally Left Blank

### Appendix 4 – WLC Case Studies: risk, cost, performance, condition profiles for various options

Not Relevant: Intentionally Left Blank





## Appendix 5 – NLRE Expenditure Plan

| Asset Type                       |           | RIG Table |         | Cost in (£m) |             |             |             |             |             |             |             |             |
|----------------------------------|-----------|-----------|---------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Investment description           | NAMP Line | RIG Table | RIG Row | 2015/6       | 2016/7      | 2017/8      | 2018/9      | 2019/20     | 2020/21     | 2021/22     | 2022/23     | Total       |
| ESQC Provision for Warning Signs | 1.13.05   | CV8       | 14      | 0.08         | 0.08        | 0.08        | 0.08        | 0.08        | 0.08        | 0.08        | 0.07        | <b>0.64</b> |
| Total                            |           |           |         | <b>0.08</b>  | <b>0.08</b> | <b>0.08</b> | <b>0.08</b> | <b>0.08</b> | <b>0.08</b> | <b>0.08</b> | <b>0.07</b> | <b>0.64</b> |

Table 14 NLRE Expenditure (Source: 19<sup>th</sup> February 2014 NAMP J Less Indirects)

\* The costs in Table CV8 Row 14 include provision for additional warning signs for a separate work programme “Substation Earthing Reinstatement Following Theft”.

## **Appendix 6 – Sensitivity Analysis**

Not Relevant: Intentionally Left Blank

## **Appendix 7 – Named Scheme**

Not Relevant: Intentionally Left Blank

## Appendix 8 – Output NAMP / ED1 Business Plan Data Table Reconciliation

| Asset Types                      | Asset Stewardship reports |        |        |        |        |         |         |         |         |        | RIG Table |         |        |        |        |        |         |         |         |         |        |
|----------------------------------|---------------------------|--------|--------|--------|--------|---------|---------|---------|---------|--------|-----------|---------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
| Investment Description           | NAMP Line                 | 2015/6 | 2016/7 | 2017/8 | 2018/9 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | Total  | RIG Table | RIG Row | 2015/6 | 2016/7 | 2017/8 | 2018/9 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | Total  |
| ESQC Provision for Warning Signs | 1.13.05                   | 2,400  | 2,400  | 2,400  | 2,400  | 2,400   | 2,400   | 2,400   | 2,400   | 19,200 | CV8       | 14      | 2,400  | 2,400  | 2,400  | 2,400  | 2,400   | 2,400   | 2,400   | 2,400   | 19,200 |
| Total                            |                           | 2,400  | 2,400  | 2,400  | 2,400  | 2,400   | 2,400   | 2,400   | 2,400   | 19,200 |           |         | 2,400  | 2,400  | 2,400  | 2,400  | 2,400   | 2,400   | 2,400   | 2,400   | 19,200 |

**Table 15 - NAMP to ED1 Business Plan Data Table Reconciliation** (Source: 19th February 2014 NAMP Table O /21st February ED1 Business Plan Data Tables)

## **Appendix 9 – Efficiency benchmarking with other DNO's**

Not Relevant: Intentionally Left Blank

## Appendix 10: Material changes since the July 2013 ED1 submission

| DNO | Action  | Change type     | 2013  | 2014  | Difference (Reduction) | Comment |
|-----|---------|-----------------|-------|-------|------------------------|---------|
| EPN | Replace | Volume          | 2,400 | 2,400 | 0                      | -       |
|     |         | Investment (£m) | 0.64  | 0.64  | 0                      |         |
|     |         | UCI (£k)        | 0.26  | 0.26  | 0                      | -       |

Table 16 – Material Changes to July 2013 ED1 Submission for LPN

(Source: Business Plan Data Tables following the OFGEM question and answer processes / 21<sup>st</sup> February 2014 Business Plan Data Tables)

In the July 2013 submission, ESQCR warning signs are incorrectly labelled as “Tunnel Radio” in the RIGS table CV8 (Row 14). This is corrected in the 2014 resubmission tables. However, there are no material changes since the July 2013 submission.