Network Rail, Office of Rail Regulation

Independent Reporter (Part A)

Q3 Data Assurance Report

FINAL

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Q3 Data Assurance Report

Safety Risk, Network Availability, Infrastructure Condition Report (ICR) and Network Condition Report (NCR)

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Executive Summary

On completion of the 2009/10 Quarter 3 Data Assurance activities, and having examined the data and procedures employed in the production of the Safety Risk and Network Availability KPIs, and in the Infrastructure Condition Report (ICR) and Network Condition Report (NCR), the Independent Reporter's conclusions are that the data integrity of the KPIs examined is generally good, with all but one scoring B or above for reliability, and all rated at 90% or above for accuracy.

Reassuringly, the most safety-critical KPIs, relating to Category A SPADs and infrastructure Wrong Side Failures, score most highly. Most of the measures examined depend to some degree on the use of manual processes for data collection, collation and refreshment, leaving considerable room for future process improvement, and, similarly, there are significant opportunities for the development of enhanced documentation; the implementation of these process and documentation improvements would in turn improve the confidence ratings of the KPIs under consideration.

The one reliability score of C, obtained by Possession Disruption Index - Freight (PDI-F), is due to the absence of clearly-specified procedures for data collection for the measure, and the possibility of misinterpretation of the available possessions data in the context of four-track route sections and junctions, resulting in inaccurate outputs.

The findings for the individual KPIs are summarised in the following paragraphs.

Safety Risk

- Fatalities and Weighted Injuries Rate – Confidence Rating = B2

  Reliability of the process is good, with well-documented procedures. The fact that internal checks are not yet being done has reduced the reliability grade. Accuracy of data is affected by the inevitable under-reporting of minor accidents, and the difficulties in providing a 100% reliable normaliser. It would almost certainly be impossible ever to achieve accuracy levels above 99%.

- Accident Frequency Rate – Confidence Rating = B2

  Similar factors affect this measure and a B2 rating is again considered appropriate.

- Passenger Safety Indicator – Confidence Rating = B3

  This is a complex measure, with a mixture of factors looking to identify and measure risk, as opposed to actual data. The process is well-documented and the data capture and KPI production processes well set out. As for FWIR and AFR, the absence of checks has slightly reduced the reliability grade. With such a measure, any view on accuracy is inevitably more subjective than for most, since it is in part probability-based, but it is captured in a consistent manner.

- Category A SPADs +20 – Confidence Rating = A1

  This is a well-defined process controlled by the Safety Data Processor in the Safety and Compliance team, which is managed very carefully, reflecting the sensitivity of SPADs. The number of SPADs is such that each is given a high degree of individual management, and the reported numbers are therefore very accurate.

- Irregular Working – Confidence Rating = B3

  Of all the specific event categories this is probably the most difficult to capture accurately. The process relies heavily on the skill levels of team members to correctly identify irregular working as defined, and then to follow up appropriately. There is also almost certainly a degree of under-reporting of events. The process is currently under review and requires significant management intervention to produce credible results.

- Infrastructure Wrong Side Failures – Confidence Rating = A1

The processes are well defined within the relevant NR standards, and up-to-date procedures are applied in capturing the relevant data. The dataset of incidents scoring 50 or more is very small, so the accuracy levels are high.

- Level Crossing Misuse – Confidence Rating = A3

  The procedures for what should be included are well defined. It is unlikely that reporting of all near misses will ever attain 100%, although a definition which focuses near miss reporting around involved train drivers is likely to generate more reliable and complete data. It would be unrealistic, therefore, to expect to score 1 for reliability. That said, all serious incidents at level crossings are almost certainly captured.

- Route Crime – Confidence Rating = B3

  Any reporting of route crime relies heavily on awareness of the act and the filing of a report by the appropriate individual. It is highly unlikely that this will ever capture all such acts, even given the use of diverse data sources such as the checking of BTP logs where available.

Network Availability: Possession Disruption Index – Passenger and Possession Disruption Index – Freight (PDI-P and PDI-F)

- Possessions Disruption Index – Passenger (PDI-P) – Confidence Rating = B3

  The Schedule 4 data process is still largely manual and doesn't have a formal set of procedures. This rating also reflects the findings of our computational checks on and documentation review of the Possession Disruption Indices, which found that the complexity and poor documentation of some of the processes used in the PDI calculations were such that we could not be fully confident of their accuracy.

- Possessions Disruption Index – Freight (PDI-F) – Confidence Rating = C3

  This again reflects the absence of clearly-specified procedures for data collection and input, in contrast to PDI-P, and the uncertainties in the processing of key data taken from PPS such as the blockage of four-track sections. Again, the rating reflects the findings of our PDI computation checks and documentation review.

Infrastructure Condition Report (ICR) and Network Condition Report (NCR)

Confidence Rating = B2

A robust system is in place for producing the periodic ICR and NCR, and the procedures used are automated where possible (although a significant amount of data are copied and pasted in the process), and thoroughly documented, with the documentation being updated as necessary to reflect changes that are introduced.

However, the rating reflects the fact that the population and refreshment of the database used to generate the two Reports relies upon a wide range of disparate upstream data sources and processes, some of which (e.g. performance-related data) are highly automated and well-documented and understood, whereas others (e.g. broken rails) are based on comparatively manual and subjective means of recording and interpretation. While we reviewed a sample of the upstream data, we did not on this occasion undertake a comprehensive review of all data sources and processes.

1 Introduction

1.1 Background

Arup was appointed by ORR and Network Rail (NR) as the Independent Reporter (Part A) to provide assurance as to the quality, accuracy and reliability of the NR data that are used to report performance to ORR, the Department for Transport (DfT) and the wider railway industry.

In order to hold NR effectively to account, it is essential for ORR to have confidence in these data, including any related systems, processes, methodologies and procedures. The Reporter is therefore required to undertake analysis of Network Rail's data reliability, quality, consistency, completeness and accuracy.

Whereas the focus of the Reporter's scrutiny in Control Period 3 (CP3) was on the data included in NR's Annual Return, ORR now requires assurance of the data received in support of a range of Key Performance Indicators (KPIs) at a more regular frequency. The Reporter is therefore required to prepare four quarterly data assurance reports per annum, in accordance with an agreed rolling audit programme. Due to an overlap with the outgoing Reporter's final report, there was no Q1 report this year (2009/10) and all of the KPIs are therefore being covered in the reports for Quarters 2, 3 and 4.

1.2 Q3 Report

This report details the Reporter's data assurance activity in Quarter 3 of 2009/10, covers a range of KPIs, and is produced in accordance with Mandate AO/003: Data Assurance for Output Monitoring. The KPIs covered in this quarterly report are as follows:

- 1 Safety Risk;
- 4(a) and (b) Network Availability: Possession Disruption Index – Passenger and Possession Disruption Index – Freight (PDI-P and PDI-F); and
- Infrastructure Condition Report (ICR) and Network Condition Report (NCR)

(Note: the original rolling programme of work also included the coverage in Q3 of KPIs 2(a) and (b): Customer Satisfaction (TOC and FOC); 6(c) Asset Management (Stations Stewardship); and 6(d): Asset Management (Network Capability). However, because the results of the TOC and FOC Customer Satisfaction surveys did not become available until mid-January (i.e. after the end of Q3), and the Asset Management (Network Capability) results are covered in Network Rail's end-of-year Annual Return, it was agreed with Network Rail and ORR that these KPIs should be covered in our Q4 report, instead, although some preliminary work was conducted in the course of Q3. In the case of Asset Management (Stations Stewardship), the planned schedule of site visits was delayed by the poor weather conditions experienced in January.)

Following this introduction, each of the KPIs listed above is covered in turn as follows: the methodology employed, findings obtained, general observations made, and conclusions drawn. The findings are then brought together in a combined presentation of the confidence ratings obtained, and the recommendations made.

A glossary of terms is provided in Appendix A.

2 Handover from the CP3 Reporter

As previously described in our Q2 report, a handover meeting was held on 8th September 2009 between the incoming, newly-appointed Part A Reporter, and the outgoing CP3 Reporter team, to ensure a smooth and seamless handover. In the course of the handover, the outgoing Reporter team provided a number of documents and reports including:

- the Final Report on the audit of the Network Rail 2008/09 Annual Return
- an explanation and discussion of matters outstanding from this audit
- a schedule of recommendations from the audits conducted during CP3, including the status of the recommendations (the schedule has since been updated and consolidated by ORR, in consultation with NR)

Future quarterly reports will include a detailed annual review of progress with respect to the recommendations relating to the KPIs being covered in the corresponding Quarter, and a less detailed, quarterly review of the other recommendations. The recommendations covered will include both those in ORR's updated and consolidated list, and new ones emerging from the ongoing Data Assurance activities.

2.1 Outstanding Recommendations from 2009 Final Report

The list of recommendations included in the outgoing Reporter's Final Report was reviewed and consolidated by ORR in consultation with Network Rail, and the outstanding consolidated recommendations for each KPI under consideration in this report are summarised below.

2.1.1 KPI 1: Safety Risk

2.1.1.1 Safety Recommendation 1 (ORR Ref. Code 37)

Action must be taken to ensure that wrong side failure data collection is not overlooked for failures that are not related to signalling equipment. It must be made clear to staff responsible for reporting and collation of information that this KPI is not solely concerned with signalling equipment. Clear guidelines should be issued and enforced as to what constitutes a wrong side failure for recording purposes.

We understand that this recommendation has now been implemented, as follows:

The Asset Reporting Team (ART) reports all wrong side failures which score a hazard ranking of 50 or greater. This reporting covers the following engineering disciplines: Track, Signalling, Electrification & Plant, Structures, Earthworks and Telecoms.

The 50 plus data is reviewed by the heads of the relevant disciplines and is sent to the engineering reporting team following every period end. It is written up into an agreed reporting format following a review by the Director of Engineering before it is submitted to the Tactical Safety Group.

All of the 50 plus wrong side failure data since April 2006 is now stored in a MS Access database which is held and managed by ART. During the period a weekly update is received from all disciplines informing ART of any failures scoring 20 or greater. This provides the reporting team with greater visibility of potentially reportable incidents during the financial period.

2.1.1.2 Safety Recommendation 2 (ORR Ref. Code 38)

A procedure should be put in place to ensure Ellipse data on the numbers of signals is checked regularly to ensure that current reporting continues to be accurate.

We understand from Network Rail that this recommendation has now been implemented, as of 2009-10 Period 11.

The new Safety Reporting Team in Milton Keynes started in mid-August. They have now been briefed on the requirement to take the normalising data on signal numbers (used for the Cat A SPAD graph) from Ellipse each period, rather than continually using the figures from previous periods. This will be implemented from Period 11. The Safety Reporting Manager and the Safety Reporting Specialists carry out ongoing regular monitoring of data quality. (Note, this will be verified between now and April 2010).

2.1.1.3 Safety Recommendation 3 (ORR Ref. Code 39)

Staff collating and recording data for analysis and reporting should ensure that personal accidents counted towards the workforce safety measure do not include accidents to members of the public and only railway staff. Internal training and audit should seek to identify and mitigate the potential for any such errors.

Again, we understand from Network Rail that this recommendation has now been implemented:

The new Safety Reporting Team in Milton Keynes started in mid-August, many of which were new to both Network Rail and the rail industry. They underwent an intensive training programme for the first two months, including training provided by RSSB on how to correctly allocate passenger, public or workforce accidents, before taking over the input into SMIS from the route teams. The Safety Reporting Manager and the Safety Reporting Specialists carry out ongoing regular monitoring of data quality, which includes monitoring 100% of staff RIDDORs as per NR/L3/INV/0101. There is also a locally managed instruction to the team that they should state whether the injury is passenger, public or staff in the short description which makes it easier for both the Milton Keynes safety team and the HQ safety team to spot any errors. The Specialists run reports for period end reporting, one is workforce injuries (based on the field having been selected as workforce) and another is injuries to non-workforce (which pulls out accidents to passengers and public). There is therefore less room for error as specific reports are used for specific KPIs (whereas the old organisation tended to just search by person-personal accident component which pulled out all accidents) but at the same time having the necessary information available to do a cross check of the data on both reports by scanning the short description for any anomalies.

RSSB ran a data quality report which they sent to Network Rail on 3rd Dec comparing the new safety team to the old. The number of injury person type discrepancies has decreased from 2.21% to 0.25%, which is excellent progress.

2.1.1.4 Safety Recommendation 6 (ORR Ref. Code 42)

The reporting of near misses, especially at level crossings, as reported in control logs is left to the driver's discretion. This may to lead to arbitrary and therefore inaccurate reporting. Criteria should be agreed with train operators and briefed to all relevant staff as to what constitutes a near miss.

Following discussions between ORR, NR and the reporter team, it was provisionally agreed that this recommendation should be recorded as being ‘closed out’. However, we understand that there are now ongoing discussions between ORR and NR about the need to improve the definition of a near miss.

2.1.2 KPIs 4(a) and (b): Network Availability - Possession Disruption Index – Passenger and Possession Disruption Index – Freight (PDI-P and PDI-F)

These are new KPIs, and there are thus no outstanding recommendations for them.

2.1.3 Infrastructure Condition Report (ICR) and Network Condition Report (NCR)

There are no outstanding recommendations for the ICR or NCR.

3 KPI 1: Safety Risk

3.1 KPI Definitions and Descriptions

The safety targets defined by the CP4 determination are for a 3% reduction in the risk of death or injury from accidents on the railway for passengers or rail workers. Since these are industry targets they do not form a regulated output in themselves, and are therefore not a definitive KPI against which NR is measured.

Following discussions between NR and ORR, ongoing monitoring is focused on key indicators reported within the periodic Safety and Environment Assurance Report (SEAR). Accordingly, this report reviews the following KPIs:

Workforce Safety

- Fatality and Weighted Injuries Rate (FWIR)
- Accident Frequency Rate (AFR)

Passenger Safety

- Passenger Safety Indicator (PSI)

Plus the following additional Measures

- Cat A SPADs Ranked 20+
- Irregular Working
- Infrastructure Wrong Side Failures
- Route Crime
- Level Crossing Misuse

The definitions of most of these indicators are set out in a document produced by NR's Director of Safety and Compliance, called *Network Rail: Safety Key Performance Indicators - Instructions for Compilation*. The document is reviewed annually and is re-issued every year to commence in April. The current version is for 2009/2010. The definitions of the reviewed KPIs are set out below.

3.1.1 Workforce Safety

Fatality and Weighted Injuries Rate (FWIR)

The weighted number of personal injuries to members of the workforce reported in SMIS [Safety Management Information System]. Comprising of those defined as reportable under RIDDOR 95 as well as those which are not reportable, normalised per 1,000,000 hours worked.

Accident Frequency Rate (AFR)

The number of personal accidents to members of the workforce and contractors reported in SMIS. Comprising of those defined as reportable under RIDDOR 95, normalised per 100,000 hours worked.

Both of these KPIs use the same basic data, as described below. It is understood that FWIR is a newer measure, used across the industry and employing weightings by severity of accident, with Fatalities counting as 1, RIDDOR Major 1/10, RIDDOR Minor 1/200 and non-RIDDOR minors at 1/1000. AFR measures all reportable accidents without any weighting, reporting only absolute numbers.

The definition specifies who is covered by the KPI and sets out the targets for 2009/10. Included within the compilation instructions is a clear definition of how hours are calculated for the normaliser. These have been subject to some change in the past, but NR has now

agreed a clear set of definitions, which cover both staff and contractors working in NR infrastructure.

3.1.2 Passenger Safety

Passenger Safety Indicator (PSI)

PSI is defined as:-

Train accident risk (measured via PIM) added to the Fatality and Weighted Injuries figure for all accidents to passengers at Station Level Crossings and NR Managed Stations normalised by 1,000,000 passenger kilometres.

The measure is basically an amalgam of two separate data sources, the Precursor Indicator Model (PIM) and weighted fatality and injury data from Station Level Crossings and NR Managed Stations. PIM is produced by RSSB every Quarter, and provides an indication on the trend in accident risk by looking at the key precursor events e.g. broken rails. The PIM is derived directly from the industry Safety Risk Model (SRM). The SRM has been used to calculate the average outcome of each precursor event in terms of Fatalities and Weighted Injuries. A subset of the PIM is calculated, identifying passenger risks only, and it is that number that is used in calculating the PSI. The PIM is recalculated every three periods and is adjusted on the periodic figures accordingly. The main reason the PIM is used for assessing train accident risk is to avoid the effect of low frequency, high consequence events distorting the KPIs (any actual accidents are highlighted elsewhere in the SEAR). The remaining element of PSI is calculated in an identical fashion to the FWIR for workforce accidents, with fatalities and injuries weighted by severity of outcome. These cover events at Station Level Crossings and NR Managed Stations only.

3.1.3 Additional Measures

3.1.3.1 Irregular Working

This KPI is the number of potentially severe and potentially significant incidents of irregular working.

Ranking is carried out in accordance with the Irregular Working Risk Ranking Methodology, as set out in the applicable NR Standard: NR/L3/INV/0110: *Irregular Working - Reporting and Risk Ranking*. The Standard requires that all incidents are ranked by the worst foreseeable outcome with only those scoring 20+ (potentially severe) and 16-19 (potentially significant) being captured in the KPI.

3.1.3.2 Infrastructure Wrong Side Failures (WSF)

The KPI captures all infrastructure failures which have a hazard index of 50 or above. The definition of this KPI is not included in the *Safety Key Performance Indicators - Instructions for Compilation* document. The process for collation is instead covered by a document produced by the Asset Reporting Team, called “Infrastructure WSFs with Hazard Index >=50 by Period”, which was last issued on the 31st December 2009, and is clearly referenced in the instructions.

A series of standards by engineering discipline define the ranking process for infrastructure failures. Failures ranked 20-49 are reviewed by each discipline but all those ranked at 50 or above are reported to the NR board and captured by this KPI.

3.1.3.3 Level Crossing Misuse

The KPI is defined as:

Any incident where a motorised vehicle is struck by, or strikes a train, any incident where a non-motorised vehicle or pedestrian is struck, any near misses with motorised vehicles, any near misses with non-motorised vehicle or pedestrians.

A recent change in the SEAR report format highlights any resulting child fatalities, but the definition does not yet include this factor. Near misses are only counted if reported by a train driver, a decision endorsed by RSSB and ORR.

3.1.3.4 Category 'A' SPADs +20

The KPI is defined as:

Any Category A SPAD, on or affecting Network Rail's Managed Infrastructure, which has been ranked at 20 or higher.

The instructions for compilation state that this is normalised by 1,000 signals, but the SEAR report records only absolute numbers of high risk SPADs. This is only a minor discrepancy, but needs to be addressed.

3.1.3.5 Route Crime

A more complete definition is contained in the SEAR report itself:

Number of malicious acts (acts of vandalism) on or directly affecting NR infrastructure "likely to cause a significant risk to the railway" normalised per one hundred route miles.

The compilation instructions provide fuller guidance, stating that malicious acts "are those acts that are deliberately undertaken with intent to endanger train operations, passenger or workforce safety or damage or deface property or stations" - the KPI does not include assaults or acts of trespass which do not involve vandalism e.g. shortcuts.

3.2 Audit Methodology

Two initial meetings were held with the NR Data Champion, Rod Reid, on 23rd November and 10th December 2009, to discuss and agree the audit process.

At the second meeting, the key data processors were identified, and a series of review interviews were organised as follows:

Date	Meeting
06 Jan 2010	Safety Reporting Manager, Operations & Customer Services, Milton Keynes
07 Jan 2010	Safety Information Manager, Safety & Compliance, King's Place, London
07 Jan 2010	Principal Assurance Specialist, Investment Projects, Mailbox, Birmingham
07 Jan 2010	Senior Safety Risk Adviser, King's Place, London
08 Jan 2010	Asset Reporting Specialist, Melton Street, London

At these meetings the Reporter team

- Identified the procedures in place to produce the relevant KPIs;
- Identified the data sources used, the systems providing the data, and how the data are used to produce the reported KPIs;
- Established the mechanisms and processes in place for checking the veracity of data, and checking the accuracy of input to recording and reporting systems, and
- Where appropriate, collected data to carry out checks that they were being accurately reported in the SEAR.

Additionally, the Reporter team received guidance from ATOC on the provision of passenger kilometre data used to normalise PSI.

All interviews were carried out by Phil Dargue and Keith Winder.

The Reporter team has sampled data to confirm that the KPIs reported in the SEAR are an accurate reflection of the data being recorded in the main systems. However, the review has not undertaken spot checks to verify that every incident was tracked through to the SEAR. This would involve a very detailed trawl through a sizeable sample of control logs to check that every incident was being recorded. It is suggested this more detailed base data check be carried out as part of a future review of Safety KPIs.

The main data source for the safety KPIs is the Safety Management Information System (SMIS). The next section sets out the main findings of the Reporter team. Since the data collation processes for all those KPIs sourced from SMIS are very similar, these KPIs are treated together in the report. As WSFs and SPAD data are sourced separately, these are described separately, to aid understanding.

3.3 Audit Findings

3.3.1 SMIS Management

3.3.1.1 New Arrangements

The base data source for most of the safety KPIs is SMIS. This provides the data for:

- FWIR
- AFR
- PSI
- Irregular Working
- Route Crime
- Level Crossing Misuse

SMIS as a system dates back to the mid 1990s and is owned by RSSB. Until recently, NR input to the system was done largely within the Route Safety teams. However, NR has recently centralised the management of SMIS to a single office based at Milton Keynes under the Safety Reporting Manager. This is part of the Operations and Customer Service Team.

The new team at Milton Keynes has been split into three units, each linked to a nominated geographical part of the country (London North West/Scotland, London North East/Midland & Continental/Western, and Wessex/Sussex/Kent/Anglia), and each led by a specialist. The Safety Reporting Manager put a transition plan into place to manage the transfer from Routes to the national team, most of whom were new to the role. A training programme was put in place, requiring the team to visit key locations in the context of a learning agenda, to increase their knowledge base as quickly as possible.

A period of parallel running was undertaken by each of the three new teams, with responsibility gradually transferred over a four-week period. The transfer was staggered over the three teams, to manage the risks involved. The transfer of work was completed on the 12th October 2009.

The new team consists of 25 people in total, in comparison to 45 across the Routes previously. It now means that one office is responsible for all data input to SMIS within NR. The staffing levels were arrived at by a review of the input requirements over recent years.

A key focus of the Safety Reporting Manager now is to improve the consistency of input to SMIS and to drive up the overall quality of reporting and recording.

3.3.1.2 Procedures

Reporting is undertaken against Railway Group Standard GE/RT8047: *Reporting of Safety Related Information*. The RGS mandates the use of SMIS and the incidents/accidents that must be recorded.

Further requirements are set out in the Network Rail Level 3 Standard NR/L3/INV/0101: *General Requirements for Reporting of Accidents, Incidents and Occupational Ill Health* (last issue 5 September 2009). This sets out key timescales for inputting to SMIS, and mandates the verification procedures that must be undertaken.

The other key procedure is the SMIS Event Matrix. This is actually provided within the SMIS 'on line' help facility. The current version is dated 3rd November 2007.

NR/L3/INV/0101 states that the Events Matrix is an RSSB document, but the interview with the Safety Reporting Manager did cast some doubt on this. The current version (dated November 2007) was produced by one of the NR Route Safety Managers, and responsibility for updating it rests with the Safety Reporting Manager. This is a key document, since it sets out how SMIS should be used to comply with the Group Standard, yet it only provides 'guidance', and has no formalised status or authority within NR. Any uncertainty as to the ownership and the process for updating it should be resolved.

Various levels of data verification of SMIS inputs exist within the current procedures. NR/L3/INV/0101 specifies the required levels of verification required. For example, it requires that most of the high risk events, such as Cat A SPADs, potentially high-risk train accidents and workforce accidents are fully checked. Each check requires the input quality to be scored against a preset scoring matrix, to give a quantified/numerate outcome.

However, since the move to Milton Keynes, these formal checks have not yet started. During the transition period, which officially finished on 12th December 2009, the Safety Reporting Manager and the three team leaders have undertaken regular reviews of a high proportion of events, as part of the drive for consistency, and to assist with the learning processes of new team members. However, no formal evidence of these checks has been seen by the Reporter team. The Safety Reporting Manager is now about to start routine monitoring, in accordance with the line standard. The outcomes of these activities will be fed back formally to the data input staff at regular review meetings. The Reporter team supports this proposal, which will formalise the checks and ensure compliance with the standards.

Independent checks have also been carried out by RSSB and evidence of the checks was seen by the Reporter team. It is understood that these are termed as data quality checks, and not as audits, with any outcome being advisory only. These checks have examined various parameters, to assist the Safety Reporting Manager and provide a good independent overview of data quality. These have been particularly useful during the transition period and do provide evidence of checks taking place in the absence of the formal checks mentioned in the previous paragraph. The Reporter team has not undertaken a detailed check on the work undertaken by RSSB. It may be useful to carry out a more detailed review in the future of the work undertaken by RSSB in checking NR's management of SMIS.

3.3.2 SMIS-Based KPI Compilation Process

For the KPIs using SMIS data, the compilation processes are very similar, and are contained within the *Instructions for Compilation*, issued by NR's Director of Safety and Compliance, and already referred to above. A separate worksheet entitled *Generation of the Safety and Environment Report* sets out the detailed steps required to actually create the SEAR.

The process currently requires the population of an Access database, named the *Safety Information Database* (SID). Data is input manually by the team at Milton Keynes from the

information and reports produced from SMIS. There is no direct link between the two systems. The process of transferring data is used as a back check by the team leaders to verify that SMIS records are complete and, as far as possible, that information is entered correctly. Any anomalies are checked, and changes are made to the SMIS data as required.

The SID data is used by the Safety Information Manager to create the SEAR report.

Normalisations are applied to the FWIR, AFR and PSI. In the case of FWIR and AFR, this is by hours worked, FWIR by 1,000,000 hours worked and AFR by 100,000 hours worked. To calculate the normaliser, a table is provided in the *Instructions for Compilation*, setting out by department how this should be done. In the case of NR staff, this is a simple multiplication of relevant headcount (taken from the Human Resource Management System (HRMS)) against a set number of hours per function (e.g. 40 for Operations and Customer Services and 48 for Maintenance), which is an average for staff within each function. The Reporter team have not audited HRMS to check the accuracy of the measure.

The more complex issue is the collation of contractor hours. The main provider of this data is the Central Assurance Team within Investment Projects, based in Birmingham. The collation of contractor hours on the various projects requires a very manual and labour-intensive process, involving the collection of data from a large number of contractors. Because most contractors are not paid based on hours worked, the team relies on the reporting processes within the projects being recorded, and the numbers being challenged by the programme managers if they stray from the norm. It is clear that this process requires a great deal of effort to provide credible numbers, and will never give 100% accuracy; however, by means of consistent management, it should produce a sensible basis for use in a normaliser. The important issue with normalisers is that they are consistent to avoid swings in the reported rates which do not reflect real changes in accident/incident levels and the revised process does appear to achieve this more consistently.

PSI is normalised by million passenger kilometres. This data are provided to the Safety and Compliance team every period by the Head of Business Analysis at ATOC. The data are obtained from a system called LENNON, which is a ticketing database. The database contains the data for all rail journeys in the UK and is based on actual tickets sold. The data are used in revenue allocations between TOCs, and so are subject to close scrutiny, and are managed by Rail Settlement Plan (RSP) within ATOC. The Reporter team has not undertaken any examination of this process as part of this review.

The risk to the safety KPIs is most likely to arise if a change is made to the rules on which LENNON calculates mileage; for example, a re-adjustment in the number of assumed journeys for season tickets although such major changes are unlikely. It is important that the Safety and Compliance team are aware of any actual or planned changes so they can assess if there is a need to recalculate the PSI and amend targets. The Safety and Compliance team do check for any significant variations in the reported passenger kilometres but may not become formally engaged prior to changes being made in the data recording and reporting process.

The additional measures audited, i.e. Irregular Working, Level Crossing Misuse and Route Crime, are all taken directly from SMIS data and transposed to SID for the production of the SEAR.

Irregular Working requires quite a complex process to correctly identify incidents and ensure that a risk ranking is applied. One particular area of difficulty is the following up of incidents occurring in possessions, where responsibility is often disputed. A very manual check is currently undertaken by the Safety Data Processor in the Director of Safety and Compliance team, to ensure the rankings are undertaken correctly. The Safety Reporting Manager has recognised the difficulties involved in this area, and is currently putting a great deal of effort into improving the level and accuracy of recording. This work is supported by the Reporter

team, as this is an important precursor event and understanding and correcting irregular working practices is an important process in the management of safety.

Level crossing misuse data is fairly straightforward and in terms of the more serious incidents, such as collisions with vehicles and pedestrians, will always be captured fully given the level of investigation inherent in the process. It is, however, unlikely that all near miss incidents will be captured. To aid consistency, a near miss is now defined as the driver seeing the vehicle or pedestrian concerned and reporting it. Even so, it is probable that not all such incidents are reported. The recent change in the SEAR format to include a separate category for child fatalities is not yet covered in the procedures. This minor anomaly should be corrected.

Route crime data is like all other SMIS data dependent on it being reported and picked up from control logs. There is scope for under reporting given the nature of the measure and control offices being unaware of malicious acts that have gone unreported. To help improve the situation the Safety Reporting Manager is seeking greater cooperation with the British Transport Police (BTP) to be able to view their incident reports to identify acts which NR were unaware of or to get greater detail on those already reported. The Reporter team supports this initiative and the Safety Reporting Manager received the first BTP division office agreement on the day of the review meeting.

3.3.3 Category A SPADs +20

The SPAD data reported within the SEAR is sourced from SPADSYS although they are also recorded in SMIS and contained within the SID data. The reason for this is that SPADSYS is managed within the Safety and Compliance team, who keep a very strong control of all Category A SPAD data and manage the master dataset. Any changes to the status of SPADs (either changes in category or to the risk ranking scores) are recorded within SPADSYS. There are occasions when SMIS and SPADSYS may differ during the time the file is 'live' but the latter is always regarded as the primary data set.

The process for the creation of the SPAD data in the SEAR is set out in a procedure maintained by the Safety and Compliance team. Given the relatively low number of Category A SPADs, a considerable amount of management effort is invested in ensuring that they are managed and reported accurately. This includes challenge from RSSB on the categorisation and appropriateness of the rankings. These numbers can, therefore, be regarded as highly reliable.

3.3.4 Wrong Side Failures

Wrong Side Failures data are provided in their entirety by the Asset Reporting Team within the team of the Director, Engineering. The report within SEAR is only for those incidents ranked at 50 or above. The risk ranking processes are contained in a series of NR Level 2 standards, covering each of the key engineering disciplines. These standards set out clearly how each failure must be investigated and ranked. Each also contains advice on the ranking of typical incidents, to ensure consistency in the application of the ranking. It is also a requirement of the standards that the person performing the ranking must be competent. For all disciplines, if the ranking is 50 or greater, it must be reported to NR board level, but each standard sets lower levels of review within the corresponding discipline, and these vary.

Within the reporting process AR-W1-31 (last issued on 31st December 2009), the data providers, by discipline, are clearly set out, as are the lower-level providers. Reports are required by Wednesday of Week 1 for the previous period and a "positive" nil return is required (i.e. a positive statement is required to the effect that there is nothing to report, and the absence of a statement is not taken to imply that this is the case).

The reports are checked by the Asset Reporting Specialist who will collate the reports and pass them to the nominated asset reviewers to check their accuracy, and that of the

associated dialogue. The whole report is checked by the Director, Engineering before being passed to the Safety and Compliance team for publication.

The Asset Reporting Specialist maintains a check of failures during the period, and is passed information on failures which potentially may breach the risk rank threshold of 50 or above, and become reportable in the SEAR. This acts as a useful back check to challenge any under-reporting. He also keeps a very detailed log of incidents, particularly any which change ranking, to ensure the maintenance of a full picture of events, and clear records of any changes. A check is also maintained on the adherence to timescales by the reporting manager, when reporting and ranking infrastructure failures. The Reporter team did not carry out any detailed checks of the rankings given, in particular whether any between 20 and 49 should in fact be ranked higher. It is not clear whether any independent formal audit of the rankings awarded by a competent assessor takes place.

3.4 General Observations

3.4.1 SMIS Management

The majority of key data are sourced from SMIS. The centralisation of the team in Milton Keynes appears to the Reporter team to have been well managed, given the potential pitfalls. The evidence for this is that report levels have not fluctuated significantly, the independent RSSB checks have not highlighted major shortcomings and the Safety and Compliance team are already reporting an improvement in the consistency of reports. In the future the new arrangements should ensure a significant step change in the quality of data production, as the team beds in. A more detailed review of data inputs by techniques such as sampling would be appropriate as part of the 2010/11 review.

3.4.2 Increased Automation

Changes to SMIS are planned in the next six months, to automate more of the report production process. SMIS Vision is expected to obviate the need for SID, which, as an Access database, will be phased out anyway. Whilst any reductions in manual intervention and in ‘re-keying’ are beneficial, a degree of caution is advised. Each stage of the current process of data transfer encourages checking of records for completeness, and challenge to the categorisation of incidents or accidents. In terms of KPI production, this is very important since moving an injury from minor to major would have a significant impact on the weighting for that event. Inevitably, many of the accidents will be borderline, and any aspect of the current process which encourages or prompts robust challenge, whether within the SMIS team, from Safety and Compliance, or from RSSB should be seen as positive. Any changes to the systems and the means by which data are collated should ensure that this is taken into account, and that checks are built into whatever re-design of the process is necessary.

The audit in 2010/11 should review what changes have been made, and how this issue has been addressed.

3.4.3 Procedures

Generally, the processes are well documented, with high-level standards (what must be done) supported by detailed procedures (how it should be done).

The one area of uncertainty appears to be the SMIS Event Matrix, where the status of the Guidance document and its ownership are currently unclear. Given the importance of this document, NR should resolve this issue with RSSB and ensure that a robust process is put in place to keep it up-to-date.

3.5 Conclusions Drawn

Overall, this is a well-managed set of KPIs, with well-documented processes in place, and a wide range of inbuilt checks on reported information and recorded data. The recent

changes to SMIS management have been well-controlled, but clearly need time to bed in. The specific conclusions drawn by the Reporters are as follows:

- Clear definitions for each KPI have been documented and agreed by all relevant industry parties.
- Documented processes for collecting, checking and verifying information and data are comprehensive and generally well-articulated. The SMIS Event Matrix is the only document which requires clarification of its status and ownership, between NR and RSSB
- There is extensive checking and verification of events classified as 'major' or 'high potential' (Cat A SPADs, level crossing incidents, WSF 50+, etc.)
- The processes appear to give a good level of checking and verification of all data and indicators included in the SEAR. Many of these checks are performed at the various points in the process at which data are transferred. Much of this data transfer currently has a significant degree of manual input, with the involvement of competent staff, and any intended future automation of these processes (such as SMIS Vision) must seek to protect the current levels of checking and verification.
- Certain normalising data are collected from sources external to NR, and their control and management are outside NR's control.
- Links and relationships between management reporting teams appear to be generally very good, even where organisations and personnel are relatively new – e.g. the SMIS team in Milton Keynes, and the Central Assurance team in Birmingham.
- Superimposed SMIS input checks, carried out by the Safety Reporting Manager and her Specialists, have not yet formally commenced following the centralisation of the team in Milton Keynes. However, the independent verification checks undertaken by RSSB have been helpful to the Safety Reporting team, both in establishing priorities and in addressing shortfalls in the current arrangements.
- Future review work by the Part A Reporter should include
    - Sampling of event reports, through SMIS input, to the SEAR
    - Review of the arrangements to protect external sources of data, their consistency and veracity.
    - Review of any data transfer automation implemented in 2010/11, to ensure no loss of verification or check of data, and to assess how these issues have been managed
    - Review of the independent data integrity and verification work undertaken by RSSB, which provides a check on SMIS management by NR.

3.6 Assessment of Confidence Ratings

The ratings determined for the Safety Risk KPIs are set out below. They are explained and additionally summarised in section 6, together with the ratings for the other KPIs covered in this report.

3.6.1 Fatalities and Weighted Injuries Rate

Reliability of the process is good, with well-documented procedures. The fact that internal checks are not yet being done has reduced the reliability grade. Accuracy of data is affected by the inevitable under-reporting of minor accidents, and the difficulties in providing a 100% reliable normaliser. It would almost certainly be impossible ever to achieve accuracy levels above 99%. A score of B2 has therefore been applied.

3.6.2 Accident Frequency Rate

Similar factors affect this measure, and B2 is therefore again considered to be appropriate.

3.6.3 Passenger Safety Indicator

This is a complex measure, with a mixture of factors seeking to identify and measure risk, as opposed to actual data. The process is well-documented and the data capture and KPI production processes are clearly set out. As for FWIR and AFR, the absence of checks has slightly reduced the reliability grade. With such a measure, any view on accuracy is inevitably more subjective than for most, since in part it is a probability-based measure, but it is captured in a consistent manner. A score of B3 is therefore considered to be appropriate.

3.6.4 Irregular Working

Of all the specific event categories, this is probably the most difficult. The process relies heavily on the skill levels of team members to correctly identify irregular working as defined, and to follow incidents up appropriately. There is also almost certainly a degree of under-reporting of events. The process is currently under review, and requires significant management intervention to produce credible results. The KPI is therefore rated at B3.

3.6.5 Infrastructure Wrong Side Failures

The processes are well-defined within the relevant NR standards and up-to-date procedures are applied to the capture of the relevant data. The dataset of incidents scoring 50 or more is very small, so the accuracy levels are high. The KPI is rated at A1.

3.6.6 Level Crossing Misuse

The procedures for what should be included are well-defined. It is unlikely that reporting of all near misses will ever attain 100% coverage, although a definition which focuses near miss reporting around involved train drivers is likely to generate more reliable and complete data. It would be unrealistic, therefore to expect to score 1 for reliability. That said, all serious incidents at level crossings are almost certainly captured. The KPI is therefore assessed as having a rating of A3.

3.6.7 Category A SPADs +20

This is a well-defined process, controlled by the Safety Data Processor in the Safety and Compliance team, which is managed very carefully, due to the sensitivity of SPADs. The number of SPADs is such that each is given a high degree of individual management, and the reported numbers are therefore very accurate. The KPI rating is assessed as A1.

3.6.8 Route Crime

Any reporting of route crime relies heavily on both an awareness of the act and a report being filed by the appropriate individual. It is highly unlikely that all such acts will ever be captured, even given the use of diverse data sources such as the checking of BTP logs where available. The KPI rating is therefore assessed as B3.

3.7 Recommendations

Table 3.1 contains a set of draft recommendations. The recommendations are numbered 2010.1.1, 2010.4.2, etc. to reflect the (end of the) current year and the Safety Risk KPI number. The recommendations for these KPIs are combined, in Section 7, with those for the other KPIs under consideration in this report, in order to provide an overview of the recommendations made in the current Quarter.

We would emphasise that the quality of the data and processes used to generate the Safety Risk KPIs is high, that the recommendations listed are of relatively minor importance, and that their number does not reflect negatively upon the KPI data quality.

Table 3.1: Recommendations

No.	Recommendation to NR	Location in Text	NR Data Champions	Due Date
2010.1.1	NR should ensure that planned future automation of currently manual management and transfer of data from SMIS to the SEAR does not degrade or abolish the existing level or standards of check/verification.	Section 3.4.2	Rod Reid	July 2010
2010.1.2	NR and RSSB should clarify the status and ownership of the SMIS Event Matrix to ensure there is no dubiety over responsibility for maintaining and updating this important document.	Section 3.3.1.2	Rod Reid	May 2010
2010.1.3	NR should confirm that the current arrangements for protecting the integrity, consistency and veracity of externally sourced data such as passenger km and contractor hours are adequate and that no additional safeguards are necessary.	Section 3.3.2	Rod Reid	May 2010
2010.1.4	NR should correct the normalising anomaly in the instructions for compilation of the Cat A SPAD 20+ KPI and ensure the level crossing misuse instructions reflect the separate capture of child fatalities.	Sections 3.1.3.4, 3.1.3.3	Rod Reid	March 2010
2010.1.5	NR should implement the formal checks of SMIS data in accordance with the line standard.	Section 3.3.1.2	Charlotte Kingdon	February 2010

4 KPIs 4(a) and (b): Network Availability - Possession Disruption Index – Passenger (PDI-P), Possession Disruption Index – Freight (PDI-F)

4.1 Previous Reports

The data and computational processes used to generate all the Network Availability KPIs were reviewed and reported upon by the Independent Reporter (Part A) under a separate mandate, and the findings published on the ORR website (see http://www.rail-reg.gov.uk/upload/pdf/reporters-audit-ove-arup.pdf and http://www.rail-reg.gov.uk/upload/pdf/reporters-checks-ove-arup.pdf). The KPI definitions for PDI-P and PDI-F, and the review methodology and findings are summarised in this section of the Quarter 3 Report as part of the regular Data Assurance process. Further details of the review methodology and findings on the supporting KPIs for Network Availability can be found in the reports published on the ORR website.

4.2 Background

While it is essential that the maintenance, renewal and enhancement of the railway network is conducted efficiently and safely, trends in recent years towards longer engineering possessions and route blockades have led to increasing levels of disruption to passenger and freight rail services, and it has been agreed within the industry that these levels of disruption are no longer acceptable.

In order to improve network availability and move towards a 'seven-day railway', and as part of ORR's 2008 Periodic Review of Network Rail's outputs and funding for Control Period 4 (2009-2014), Network Rail is required to produce Possession Disruption Indices (PDIs), to ensure these are reduced from 2009/10 for passenger traffic, to ensure no increase for freight traffic, and to specify in its Delivery Plan how these targets will be achieved. A draft Network Availability Delivery Plan has been published by Network Rail, and the company produces Possession Indicator Reports, covering the recorded and target PDI values and the values of the associated KPIs, and also providing a commentary on the results and details of the planned Programme of Improvements.

The Possession Disruption Indices for Passenger and Freight services (PDI-P and PDI-F, respectively) are calculated using the Network Availability model developed by Steer Davies Gleave (SDG) for ORR, and subsequently adapted by both ORR and Network Rail for their respective purposes and use. In addition to the spreadsheet forming the forecast Network Availability model, several additional databases and spreadsheets are used to calculate historic PDI-P and PDI-F values, based on actual historic data, rather than the predicted levels of possession activity that provide much of the input to the forecast model.

NR has also developed a series of supporting KPIs which are reported periodically. These are intended to give a view of the underpinning factors which support the achievement of the regulatory targets, but are not subject to review in the course of the regular Data Assurance process, of which this report is part.

4.3 KPI Definitions and Descriptions

4.3.1 PDI-P

As noted in ORR's *Network Availability Model User Guide*, PDI-P

> *measures the impact of engineering possessions in terms of the economic value of the excess journey time passengers' experience, normalised by total train-km.*

The formal definition of the measure is included in section 4 of SDG's *Final Summary Report*, which defines it as EPJwVT, or

Excess Passenger Journey Time and Weighted Cancellation Minutes (EPJ), weighted by Busyness, Passenger Journeys and User Value of Time (wVT).

The measurement unit is £/train-km, which represents "the value of the excess journey time per train-km per period." The report also explains that the metric

measures the value of the impact of possessions on the excess journey time as experienced by the passenger, normalised to total train-km [and that] it takes account of the effect of cancellations and reflects the economic value of the additional journey time incurred.

As noted in ORR's *User Guide*, PDI-P was indexed to 1, based on the average of the historic metric for 2007-08, so that 1.16 in the historic passenger index became PDI-P = 1.

4.3.2 PDI-F

As described in ORR's *Network Availability Model User Guide*, PDI-F

measures the 'unavailability' of track for freight use, weighted by the level of freight traffic operated over each section of track.

The use of 'track unavailability' is a change from SDG's originally-proposed freight measure, whose formal definition in section 4 of SDG's *Final Summary Report* is

Track km Availability Weighted by Freight Traffic Level (TwF).

The measurement unit is (or was) the weighted percentage of track km available per period. SDG's report explains that this metric

measures the availability of track-km weighted by the level of freight traffic operated over each ELR [Engineers' Line Reference]. The measure takes the level of non-availability by ELR and applies a weighting to reflect the intensity of freight traffic scheduled over that section on the relevant day of the week. It is calculated daily taking account of the proportion of freight traffic operating by day of the week and aggregated to give a measure per period.

As noted above, and described in ORR's *User Guide* (paragraphs 1.6, 1.12-1.13), the PDI-F measure was modified by ORR in 2008 so as to represent 'track unavailability', instead of track availability. The User Guide describes the amended measure as being the reciprocal of the original measure, but we understand that it is in fact the original measure subtracted from 1 (i.e. 1 – TwF), since the use of the reciprocal (i.e. 1/ TwF) would produce a network unavailability value greater than or equal to 100%, implying zero availability.

As noted in ORR's *User Guide*, PDI-F was also indexed to 1, based on the average of the historic metric for 2007-08.

4.4 Audit Methodology

The review focused on the collation of data used by the National 7-Day Railway Programme Team based currently in Melton Street. The review covered the data used in the creation of all the indicators reported in the Possession Indicator Report used to measure progress in delivering the regulatory targets, although, as noted above, only the elements relevant to PDI-P and PDI-F are included in this report.

The KPIs covered by this report are thus:

- Possession Disruption Index - Passenger (PDI-P)
- Possession Disruption Index - Freight (PDI-F)

These KPIs are used to measure the formal regulatory targets set by ORR for CP4, namely a 37% reduction in PDI-P and that PDI-F is no worse than at the start of CP4.

This part of the review has concentrated on the process by which data is collected and not how that data is processed by the 7-Day Railway Programme Team. A series of meetings were undertaken to support the review as data is provided by various parts of the NR team, as set out in Table 4.1.

Table 4.1: Network Availability Meetings Programme

Date	Meeting
14th October	Tony Roberts/Temidayo Amusu, 7-Day Railway Programme Team
3rd November	Business Manager (Compensation), Network Delivery Service (NDS)
3rd November	Business Manager, National Plan Integration
5th November	Business Improvement Specialist, NDS
6th November	Head of Network Access Unit (NAU)
6th November	Possession Systems Support Specialist, NAU
7th November	Operational Planning Support Unit (OPSU)
10th November	Project Manager, National TSR Avoidance, Maintenance Improvement Team
11th November	National Performance Team
12th November	Tony Roberts/Temidayo Amusu

The initial meeting with the 7-Day Programme Team was used to understand the reporting pack and identify the suppliers of data used to produce the reporting pack. The final meeting was to review draft findings and explore arising issues.

Each of the subsequent meetings consisted of an interview to explore how data was collected, processed and supplied to the national team (the last two were phone conferences). Where appropriate, samples of data were requested. Within each of the KPIs the assessors sought to understand how well defined and documented the data requirements were and the actual method of data collection, whether from a defined system or from any manual sources and the actual data that was submitted to the 7 Day Railway Programme Team.

All interviews were carried out by Phil Dargue and Keith Winder.

Due to the timescales for this audit it was not possible to complete detailed checks on base data. For example, there has been no reconciliation between actual possessions taken against those reported through PPS. It is recommended that this review is completed as part of next year's audit when more time will be available.

4.5 Audit Findings – PDI-P and PDI-F

4.5.1 Possession Disruption Index – Passenger (PDI-P)

This is a new measure implemented at the start of CP4 to measure the impact of engineering work on passengers. A separate report by the Part A Reporter Team has reviewed the calculation used in the model by the 7-Day Railway Programme Team.

In contrast this report focussed on examining the data supplied for input into the model.

The main data source is taken from S4CS, the national Schedule 4 management system, and supplied by the Business Manager (Compensation) and her team, currently transferring to Milton Keynes. Train km data are provided by the National Performance Team.

The KPI is summarised as:-

PDI-P – Excess passenger journey time and weighted cancellation minutes (EPJ) weighted by busyness, passenger journeys and user value of time (wVT) normalised by the MAA for 2007/08.

The S4CS data is supplied on a periodic basis to the 7-Day Railway Programme team on a spreadsheet known as the Part 3 report.

The creation of the data is a fairly manual process which is primarily undertaken to calculate the payment levels for TOCs. S4CS will undertake a daily comparison between actual train mileages and extended journey times against plan.

This is actually done twice. The system compares the perfect timetable for any given day to the "first working timetable". This will pick up where planned engineering periods have led to WTT amendments that affect the passenger service. The Schedule 4 team must agree the 'perfect' timetable with each TOC at every timetable change. For most TOCs this usually consists of selecting an unaffected day set from previous years. However in some cases, for instance Arriva CrossCountry this may mean constructing the timetable for Sundays.

The second comparison is between the first working timetable and the service that operates on the day. S4CS uses Trainplan data to undertake this check. The accuracy of this process has not been checked. The Schedule 4 team, which is split by TOCs, will then investigate all differences. To do this they will look at possession data from PPS. All disruptive possessions are placed in a holding area within S4CS to aid this process. This relies on the NAU marking the possession as disruptive.

The team will also check TRUST to eliminate any differences caused by incidents which will be subject to Schedule 8 payments. If necessary the team will also check other possession data directly within PPS to identify any that are not marked as disruptive but that have caused delays for mileage differences.

The S4CS system is maintained by Atos who currently make any changes to the tables used for calculation purposes. These are normally carried out at timetable change under instruction from the Business Manager (Compensation).

Little of the process described is currently written down, and the team undertaking this work is currently being assembled. In the meantime some of the work is still being undertaken by outbased staff due either to move to Milton Keynes, take up new posts, or leave the business. This would appear to be a well-managed transition, but many of the new team are inexperienced and the Business Manager (Compensation) is looking to train and improve the skill set of the new team members.

The move to implement a process manual is supported and should be put in place as quickly as possible alongside the training.

There is little done currently in terms of internal verification of the data. Most errors that deny payments to TOCs are likely to be picked up by the affected TOC. Currently this is a rare occurrence, although no data was made available on the actual levels. The process requires all possessions which do not get the maximum discount factor to be fully investigated. However, there is no sampling of possessions receiving full discounts. The process review should consider what internal checks can sensibly be implemented to verify the regime.

Train km data are derived from PALADIN, part of the current national performance suite of systems. This takes the base data from TRUST which records the actual operation of services. An Access database is used to process the PALADIN data by simply totalling the mileage by TOC. The process is entirely automatic apart from an adjustment to Eurostar data to ensure that only the four trains a day that traverse the NR conventional network at

Ashford are counted (the system records all Eurostar data currently right through to Paris and Brussels). In processing the data NR apply the same rules as for delay data. This for example excludes the following:

- ECS moves
- Light locomotives
- Non-revenue services

This data is used widely across NR reports, and recent checks carried out by NR have shown it to be accurate. No changes are felt necessary at present to the collection process.

4.5.2 Possession Disruption Index – Freight (PDI-F)

Like the PDI-P section, this review has concentrated on the data supply, not the calculations within the model.

The data is supplied by the NAU in Leeds.

The KPI is summarised as:-

Track-km availability weighted by freight traffic level (TWF), normalised by the MAA for 2007/08.

A file of data is extracted from PPS which proves the following data:-

- Location of possession – from and to
- Lines affected
- Duration of possession
- Whether or not it is disruptive

A second file is supplied which provides data on each possession by work type, i.e. whether it is for maintenance, enhancements or renewals.

The data is taken straight from PPS and does not involve any processing by the NAU team. Because the file is taken from PPS this does not include any very late possessions, since these are not contained in PPS, which means PDI-F is inconsistent with PDI-P, which does include them.

At the review in the NAU, some concerns were expressed about how the data supplied is interpreted. Two specifics raised were how possessions on four track sections were interpreted and how the model dealt with location data within the ELR model. Either of these factors could overstate or understate the impact of engineering work. In the first instance a route will be available if only two lines are blocked and the model needs to interpret this correctly. In the second case location data at junctions does not precisely describe which routes are affected and others that are available. This could lead to the model showing unaffected routes as not available. When the model is revised or updated, it would be useful for ORR and NR to conduct a joint review, exploring these issues in detail, to confirm the basic robustness or otherwise of the PDI-F model.

No formal procedures/processes setting out the data collection arrangements are currently in place and these should be provided.

The NAU team will shortly move to Milton Keynes and it is not clear currently which staff will transfer. This issue must be recognised and the production of procedures will help mitigate any risk of personnel changes.

4.6 General Observations

The reporting pack is still relatively new and is not yet supported by formal procedures setting out how data is to be captured.

The fact that data are provided from such disparate sources reinforces the need for more formality.

There are several areas where definitions are unclear and lead to potential differences in the collection of data. These sometimes actually lie within the process which provides the data, a good example being different definitions of a disruptive possession.

Many of the teams providing this data are currently in transition. This adds risk to the creation of the underpinning data. Whilst each team is seeking to manage its own risks, it is important the 7-Day Railway Team ensure that its processes will not be interrupted during these changes.

Some of the procedures used rely on a great deal of manual intervention, and any opportunity for further automation should be explored.

There are few verification checks currently built into the collation process. A review of how this could be undertaken to offer better assurance should be carried out. In some cases, such as S4CS data, the responsible manager is sorting out the data.

Many people in the business are still struggling with PDI-P and PDI-F as measures, particularly in terms of understanding how this affects their planning role. It will be a major challenge to ensure that those involved in longer term engineering planning can plan effectively against the constraints imposed by the new measures. However, the teams involved in the planning of possessions are very aware of the requirement to reduce disruption to the network, and are actively seeking to do so.

4.7 Conclusions Drawn

The collation of data currently lacks any homogenised set of procedures to ensure consistent collection.

Variation of interpretation is possible and means any data collected is unlikely to reach 100% reliability, particularly given the manual nature of much of the process.

The data collected does not necessarily reflect the intent of the KPI. A review of each KPI data source, as well as the definitions and criteria to be used, should be undertaken to ensure its appropriateness now that the KPIs have been in use for some time.

4.8 Assessment of Confidence Ratings

The confidence ratings for PDI-P and PDI-F are summarised below, and are combined in Section 6 of this report with those for the other KPIs, where an explanation of the ratings system is also provided. The accuracy scores reflect the view of the assessors of the potential levels of error based on the data seen, rather than statistical sampling:

- Possessions Disruption Index – Passenger (PDI-P) – the audited data have a rating of B3. This reflects the fact that the Schedule 4 data process is still largely manual and doesn't have a formal set of procedures. This rating also reflects the findings of our earlier, companion report on the Computational Checks and Documentation Review conducted on the Possession Disruption Indices, which found that the complexity and poor documentation of some of the processes used in the PDI calculations are such that we cannot be fully confident of their accuracy without additional, detailed checks.
- Possessions Disruption Index – Freight (PDI-F) – the audited data have a rating of C3. This again reflects the lack of processes given to those collecting the data to feed in, and the uncertainties in the processing of key data taken from PPS such as the blockage of four-track sections. Again, the rating reflects the findings of our earlier, companion report on the PDI computation checks and documentation review.

While PDI-F is the worst-performing of the KPIs reviewed in this report, and the only one to score a reliability rating of C, our wider review of the PDI KPIs and their eight supporting

measures, conducted under a separate mandate (see Section 4.1, above) indicated that three of the supporting measures also scored C for reliability (two of which received accuracy rating below 90%), while three scored B, and two A.

4.9 Recommendations

Table 4.2 contains a set of recommendations already agreed with NR and ORR. The recommendations are numbered 2010.4.1, 2010.4.2, etc. to reflect the (end of the) current year and the Network Availability KPI number.

Like the Confidence Ratings in the preceding sub-section, the recommendations for these KPIs are combined, in Section 7, with those for the other KPIs under consideration in this report, in order to provide an overview of the recommendations made in the current Quarter.

Table 4.2: Recommendations

No.	Recommendation to NR	Location in Text	NR Data Champions	Due Date
2010.4.1	Put in place a procedure for each KPI detailing what data is to be collected and where it should be sourced from. At a minimum each should contain: • Definitions • Data source • Verification and check arrangements	Sections 4.5, 4.6	Tony Roberts	March 2010
2010.4.3	Review transitional risks posed to the KPI production process and develop mitigation plans: • Managing staffing changes both in teams supplying data and in the 7 Day Railway Programme team • Addressing system changes, such as to ITPS from Trainplan. A new data source for measuring WTT Weekend Compliance based on ITPS data will need to be implemented	Sections 4.5, 4.6	Neil Henry	January 2010
2010.4.5	Put in place a plan to automate the collection of S4CS and other manually-collected and –collated data. This should identify opportunities and set out a path to achievement.	Section 4.5.1	Neil Henry	March 2010

(Note: the non-consecutive numbering of the recommendations is due to the fact that recommendations made in our earlier report on Network Availability with respect to the supporting KPIs have been excluded from this report.)

We understand that Recommendation 2010.4.3 has now been implemented, by means of a series of meetings to review risks and develop transitional plans. According to Network Rail,

[they] have reviewed the organisational changes that could impact on the production of the Network Availability KPI's and confirmed that appropriate mitigation arrangements are in place. These include identifying key personal and putting plans in place to ensure that there is continuity of sufficient staff with the right knowledge.

The organisation for 7 day railway team is not affected by the current reorganisation within Operations Planning and Performance.

[Their] systems team have been engaged to establish how to extract the data needed to produce the WTT Compliance measure and have established a method to extract the required data fields from TPS. [They] have agreed where the responsibility within the

new organisation for extracting this data will be and are arranging for the systems team to go through the required process with those that will be responsible.

The switch over to ITPS takes place from the introduction of the May timetable so [they] are on target to ensure there is no loss of WTT data when this takes place.

5 Infrastructure Condition Report and Network Condition Report

5.1 Definition and Description

The Infrastructure Condition Report (ICR) and Network Condition Report (NCR) are issued for each operating Period by Network Rail's Asset Reporting Team (ART), using inputs from a wide range of infrastructure-related data sources, and providing periodic 'snapshots' of the state of NR's infrastructure.

The ICR is the larger of the two reports, is produced in spreadsheet and hard copy format, and is primarily for Network Rail's internal use, although it is also made available to ORR at their request. The NCR is a subset of the ICR, produced in spreadsheet format for ORR, and presents the periodic status of a subset of Regulatory Measures; it also presents the Network Asset Stewardship Incentive Index (ASII) and Route Asset Stewardship Indices (ASIs), both of which are CP3 Regulatory Measures.

The ICR comprises four main sections: Foreword, Executive Summary, Performance, and Asset Condition/Faults, whose contents are summarised below:

- Foreword
- Executive Summary
    - Asset Management Summary (Summary of Progress against Targets/Trends)
    - ORR Summary (Summary of ORR Asset Measures and Capabilities, i.e. M1-M29, C1-C4)
    - Year-end Targets for the current year
    - Asset Stewardship Indicator, i.e. a composite measure of agreed indicators to reflect overall asset stewardship (this is a CP4 internal measure)
- Performance
    - Asset-Related Train Delays, i.e. delay incidents and minutes arising from infrastructure failures
- Asset Condition/Faults
    - Track
    - Civils
    - Signalling
    - Electrification and Plant
    - Telecoms

The NCR includes the following data:

- Track Geometry (Regulatory Measure M3), including 'Super Reds' and L2 Exceedences by Route and Country (Regulatory Measure M5)
- Isolated and Continuous Defective Rails (Regulatory Measure M2)
- Broken Rails by Route and Network (Regulatory Measure M1)
- Numbers of Derailments caused wholly or partly by Track Faults, split by Route and Line category
- Signal Failures causing Delays, and Signal Failures causing Delays greater than 10 minutes (Regulatory Measure M9), both split by Route

- Higher Risk Signalling Failures (i.e. those with Hazard Rating 20+), split by Obscured Signals, Leaf Fall, and Other causes
- Traction Power Supply Failures causing Delays in excess of 500 minutes (Regulatory Measures M11 and M12), split by AC and DC power
- Cumulative numbers of infrastructure-related incidents causing delays, and year-to-date delay per incident, both split by a range of infrastructure failure categories
- Network Asset Stewardship Incentive Index (ASII) and Route Asset Stewardship Indices (ASIs) (both are CP3 Regulatory Measures, as noted above)

(Note: the spreadsheets also contain some hidden worksheets, containing data used to generate some of the outputs listed above.)

The data used to produce the ICR and NCR are imported from various sources into a single Access database ('ICRetcDATASTORE.mdb'), which is then used to filter and aggregate the data to produce the contents of the ICR and NCR.

5.2 Audit Methodology

5.2.1 General

When the review methodology was originally developed, it was agreed with ORR that the Reporter would check the accuracy of NCR data inputs, using another, equivalent dataset as a benchmark, and also check the internal spreadsheet formulae and calculations for accuracy and consistency. The remit was subsequently expanded to cover the ICR, in addition.

An initial meeting was held with Network Rail's ICR/NCR Data Champion, at 40 Melton Street, on 5th November, 2009. Subsequent meetings were held with the NERT team leader on 10th November and 5th January, during which the ICR and NCR preparation methodologies were described, the constituent database and spreadsheets were demonstrated, and internal Network Rail specifications and work instructions were provided, together with copies of the database and spreadsheets used to prepare the ICR and NCR for 2009-10 Period 7.

It was agreed that the data held in the central 'ICRetcDATASTORE' database would be checked against the contents of the ICR and NCR (for both computational accuracy and consistency with the specifications and working instructions), and that the database would also be checked against a sample of the various external data sources (the variety and extent of the source data precluded an exhaustive check within the time and resources available, but such a check should be considered in the course of CP4).

5.2.2 Import of Source Data

As noted above, a sample of source data was compared with the database contents to verify that the data were being imported consistently and correctly. The sample included PSS-derived data for overall Delay Minutes and numbers of Incidents, and Signalling and Telecommunications failures, and other data for Earthworks Failures, Broken Rails and Track Geometry.

5.2.3 Database

In order to verify the flow of data through the database, and thus the process for transferring data from the database to the ICR, a series of parallel, spreadsheet-based tests were conducted to ensure that the data held in the ICR correctly reflected the contents of the database, and the specified intermediate calculation and aggregation processes.

5.2.4 ICR

The ICR comprises two separate spreadsheets, each of which uses data contained in a single worksheet named 'CALC', and obtained from the database referred to above, to

produce the tables and charts presented in the ICR. A series of lookups and other formulae is used to extract the data required for the various measures.

For each table in the two ICR worksheets, a sample of data was checked to ensure that the correct value had been obtained from the 'CALC' worksheet, and thus from the database. Further checks were then conducted, in formula auditing mode, to ensure that formulae and cell references were employed correctly and continuously within the worksheets.

5.2.5 NCR

Similarly to the ICR, the NCR includes a worksheet named 'Data', containing the data used to generate the requisite tables and charts (these data are a subset of the data held in the equivalent ICR worksheets).

As in the case of the ICR, for each worksheet in the NCR, a sample of data was checked to ensure that the correct value had been obtained from the 'CALC' worksheet, and formula auditing mode was again used to ensure that formulae and cell references were employed correctly and continuously within the worksheets.

5.3 Audit Findings

5.3.1 Import of Source Data

The sample of source data provided by NR was checked against the contents of the central database. The data sources and spreadsheet names are listed in Appendix B, together with individual worksheet names and descriptions, details of the checks conducted and the results obtained.

No errors were found in the sample of data checked. Future Reporter work should include additional 'upstream' data checks, in order to provide a comprehensive check of the input data over the course of the current Control Period, to verify that the observed high standards of consistency are maintained across the full range of data inputs.

5.3.2 Database

The results of the tests undertaken verified that the inputs to the ICR and NCR are being generated correctly by the database, and in accordance with the specification and working instructions.

5.3.3 ICR

As in the case of the source data, the tests conducted and results obtained are set out in detail in Appendix B. The ICR was largely found to be error-free, with only a few minor observations:

- In the 'Track 10' worksheet of the Part 1 ICR spreadsheet, 'Traffic Light' conditional formatting is missing from the table 'ALL Lines';
- In the same worksheet, a Y/N toggle is used to control the captioning of the 'National Status' indicators for some charts; this is not documented or highlighted, and, while not particularly serious, could easily be overlooked. A similar issue affects many of the worksheets of the Part 2 ICR spreadsheet, while, in some worksheets, the National Status indicators appear to be updated without using a toggle (see Appendix B for details of the worksheets affected); and
- More generally, the reliance on copying and pasting data from the database into the ICR (and NCR) spreadsheets introduces a possibility of inadvertent user error, although no examples of this were found.

5.3.4 NCR

Again, the tests conducted on the NCR are set out in detail in Appendix B, together with the results obtained. No errors were found, and it was verified that the data used to generate the NCR are a subset of the data generating the ICR.

5.4 General Observations

Although the processes employed to produce the ICR and NCR are described in considerable detail by NR's internal documentation, 'official' specifications of the Reports, and descriptions of their nature, purpose, and their intended audiences, do not appear to be available.

Some of the upstream data sources, such as PSS, are highly automated and specified, and not dependent on individual expertise; others, however, are less well-documented and less widely understood, and their accuracy and consistency are much more dependent upon the specialist knowledge of various members of NR staff, and thus present a degree of risk to business continuity.

5.5 Conclusions Drawn

The production of the ICR and NCR from the central ICR database is highly automated and well documented, and is robust and accurate. Some of the 'upstream' data sources and collection and refreshment processes are comparatively manual in nature, however, and are less well documented and widely understood.

It would be useful to have a single, controlled specification document available within NR and ORR, setting out the purposes, requirements and methods of preparation of the ICR and NCR.

5.6 Assessment of Confidence Ratings

The rating determined for the ICR and NCR is set out below. It is also summarised in section 6, together with the ratings for the KPIs covered in this report.

A robust system is in place for producing the periodic ICR and NCR, and the procedures used are automated where possible (although a significant amount of data are copied and pasted in the process), and thoroughly documented, with the documentation being updated as necessary to reflect changes that are introduced.

However, the population and refreshment of the database used to generate the two Reports relies upon a wide range of disparate upstream data sources and processes, some of which (e.g. performance-related data) are highly automated and well-documented and understood, whereas others (e.g. broken rails) are based on comparatively manual and subjective means of recording and interpretation. Based on the data received and reviewed by the Reporter, the audited Reports therefore have a confidence rating of B2.

(Note: the use of a single rating for the two Reports reflects the fact that the NCR is a subset of the ICR, and also that the upstream data sources and refreshment processes were not individually reviewed. It would be worthwhile examining these in more detail in future years – a detailed review of PSS data has already been proposed in the Quarter 2 Report – and this could result in the generation of a disaggregate set of confidence ratings for the various data sources, similar to the approach taken to Safety Risk data in this report.)

5.7 Recommendations

Table 5.1 contains a set of draft recommendations. The recommendations are numbered 2010.NCR.1, 2010.NCR.2, etc. to reflect the current year and the Regulatory data to which they apply. These recommendations are combined, in Section 7, with those for the other KPIs under consideration in this report, in order to provide an overview of the recommendations made in the current Quarter.

Table 5.1: Recommendations

No.	Recommendation to NR	Location in Text	NR Data Champions	Due Date
2010.NCR.1	ORR and NR to discuss ORR's requirements for asset reporting.	Section 5.4	Mary Jordan	March 2010
2010.NCR.2	Correct minor documentation/highlighting and formatting issues in ICR spreadsheets	Section 5.3.3	Mary Jordan	March 2010

Recommendation 2010.NCR.2 has now been partially implemented, with some issues still outstanding.

6 Assessment of Confidence Ratings

6.1 Confidence Grading System

The confidence grading system used in this report is based on the approach taken by previous Reporter in their reports, whereby a two-character alphanumeric rating (e.g. 'A2') is used to provide a combined assessment of reliability and accuracy, with the letter used as a reliability rating, and the number as a confidence rating. The rating system used is summarised in Table 6.1 which again is adopted from the previous Reporter's final report. As noted in Section 3.6.1 above, for example, a rating of A1 is not realistically achievable for all KPIs; maximum realistically attainable ratings for each KPI will be assessed and reported upon in future quarterly reports.

In response to some misgivings about the current system, particularly in respect of the difficulty of applying a single system to a wide range of quite different measures, the need for development of an alternative, improved system has been identified. Based on proposals developed by the Reporter team, it has been agreed that a revised approach will be adopted from 2010/11 on, using a grading system tailored to the individual KPIs and reflecting their individual and specific indicators of reliability and accuracy.

Table 6.1: Confidence Grading System

Reliability Band	Description	
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment.	
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, some use of extrapolation.	
C	Extrapolation from limited sample for which Grade A or B data is available.	
D	Unconfirmed verbal reports, cursory inspections or analysis.	
Accuracy Band	**Accuracy to or within +/-**	**But outside +/-**
1	1%	-
2	5%	1%
3	10%	5%
4	25%	10%
5	50%	25%
6	100%	50%
X	accuracy outside +/- 100 %, small numbers or otherwise incompatible (see Table 9.2)	

Again, as in the previous Reporter's reports, some reliability/accuracy combinations are considered to be incompatible, as shown as 'N/A' in Table 6.2.

Table 6.2: Confidence Grading Compatibilities

Compatible Confidence Grades				
Accuracy Band	**Reliability Band**			
	A	B	C	D
1	A1	**N/A**	**N/A**	**N/A**
2	A2	B2	C2	**N/A**
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5	**N/A**	**N/A**	C5	D5
6	**N/A**	**N/A**	**N/A**	D6
X	AX	BX	CX	DX

This grading system is subject to review, and our graphical interpretation of the gradings we have awarded is included in the following section.

6.2 Confidence Ratings Achieved

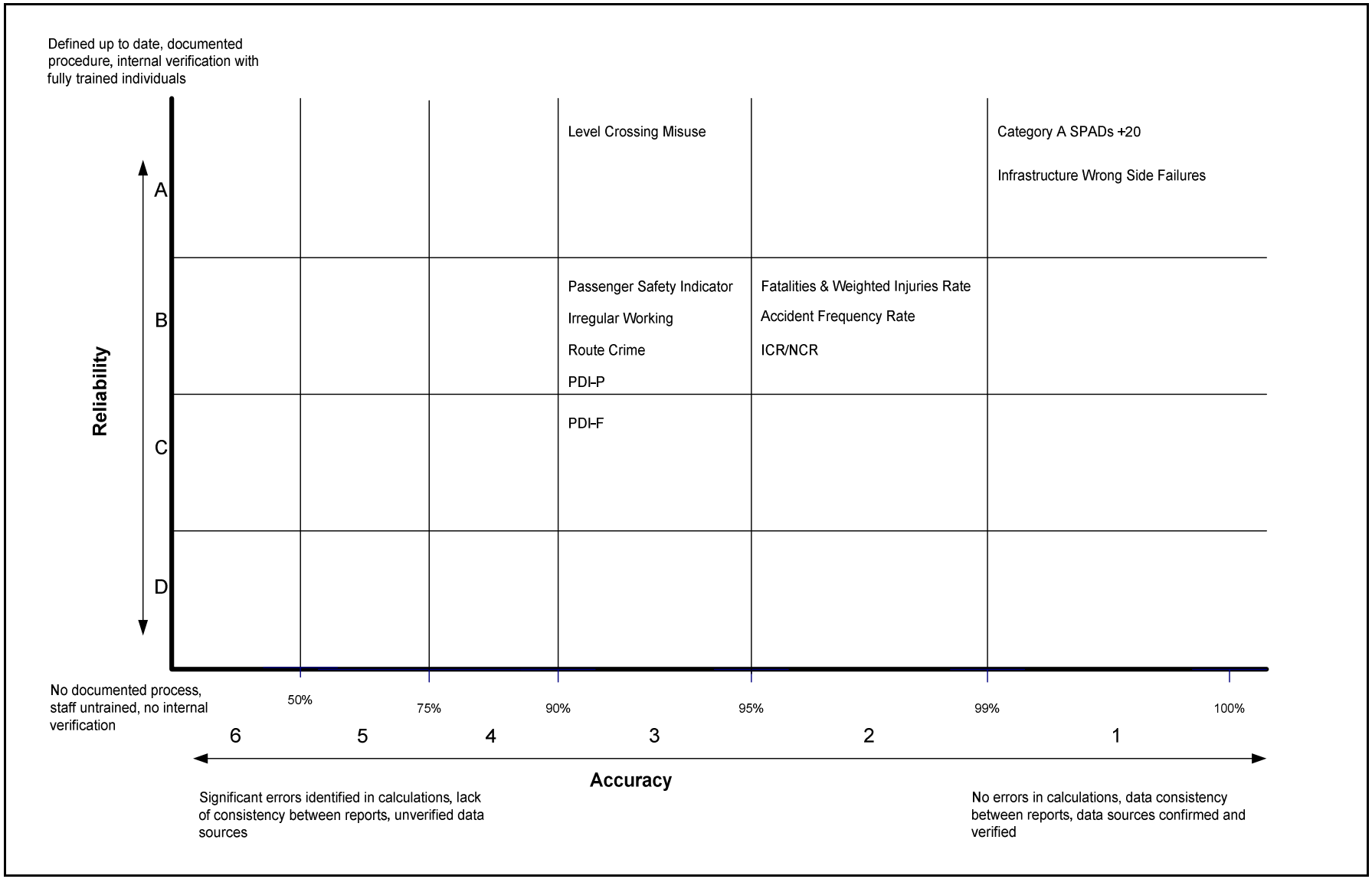
Our confidence ratings for the Quarter 3 KPIs are summarised below, and their values are represented graphically in Figure 6.1:

- Safety Risk: Fatalities and Weighted Injuries Rate – the audited data has a rating of B2. Reliability of the process is good, with well-documented procedures. Accuracy of data is affected by the inevitable under-reporting of minor accidents, and the difficulties in providing a 100% reliable normaliser. It would almost certainly be impossible ever to achieve accuracy levels above 99%.
- Safety Risk: Accident Frequency Rate – the audited data has a rating of B2. Again, process reliability is good, and the process is well-documented, but data accuracy is inevitably affected by under-reporting of minor accidents, and the difficulties in providing a completely reliable normaliser. Again, it is highly unlikely to be possible to achieve accuracy levels in excess of 99%.
- Safety Risk: Passenger Safety Indicator – the audited data has a rating of B3. This is a complex measure, with a mixture of factors seeking to identify and measure risk, as opposed to actual data. The process is well-documented and the data capture and KPI production processes are clearly set out. With such a measure, any view on accuracy is inevitably more subjective than for most, since in part it is a probability-based measure, but it is captured in a consistent manner.
- Safety Risk: Irregular Working – the audited data has a rating of B3. Of all the specific event categories, this is probably the most difficult. The process relies heavily on the skill levels of team members to correctly identify irregular working as defined, and to follow incidents up appropriately. There is also almost certainly a degree of under-reporting of events. The process is currently under review, and requires significant management intervention to produce credible results.
- Safety Risk: Infrastructure Wrong Side Failures – the audited data has a rating of A1. The processes are well-defined within the relevant NR standards and up-to-date procedures are applied to the capture of the relevant data. The dataset of incidents scoring 50 or more is very small, so the accuracy levels are high.
- Safety Risk: Level Crossing Misuse – the audited data has a rating of A3. The procedures for what should be included are well-defined. It is unlikely that reporting of all near misses will ever attain 100% coverage, although a definition which focuses near

miss reporting around involved train drivers is likely to generate more reliable and complete data. It would be unrealistic, therefore to expect to score 1 for reliability. That said, all serious incidents at level crossings are almost certainly captured.

- Safety Risk: Category A SPADs +20 – the audited data has a rating of A1. This is a well-defined process, controlled by the Safety Data Processor in the Safety and Compliance team, which is managed very carefully, due to the sensitivity of SPADs. The number of SPADs is such that each is given a high degree of individual management, and the reported numbers are therefore very accurate.
- Safety Risk: Route Crime – the audited data has a rating of B3. Any reporting of route crime relies heavily on both an awareness of the act and a report being filed by the appropriate individual. It is highly unlikely that all such acts will ever be captured, even given the use of diverse data sources such as the checking of BTP logs where available.
- Network Availability: Possessions Disruption Index – Passenger (PDI-P) – the audited data have a rating of B3. This reflects the fact that the Schedule 4 data process is still largely manual and doesn't have a formal set of procedures. This rating also reflects the findings of the Computational Checks and Documentation Review conducted on the Possession Disruption Indices in the course of our previous reporting on the Network Availability KPIs, which found that the complexity and poor documentation of some of the processes used in the PDI calculations are such that we cannot be fully confident of their accuracy without additional, detailed checks.
- Network Availability: Possessions Disruption Index – Freight (PDI-F) – the audited data have a rating of C3. This again reflects the absence of specific processes for those collecting the data for input, and the uncertainties in the processing of key data taken from PPS, such as the blockage of four-track sections. Again, the rating reflects the findings of the computation checks and documentation review conducted in the course of our previous work in this area.
- Infrastructure Condition Report (ICR) and Network Condition Report (NCR) – the audited data have a rating of B2. A robust system is in place for producing the periodic ICR and NCR, and the procedures used are automated where possible and thoroughly documented. However, the rating reflects the fact that the population and refreshment of the database used to generate the two Reports relies upon a wide range of disparate upstream data sources and processes, and, while some of which are highly automated and well-documented and understood, others are based on manual means of recording and interpretation, and are somewhat subjective in nature.

Figure 6.1: Confidence Ratings Matrix



7 Recommendations

The table below contains a combined set of draft recommendations for ORR, to be discussed with the responsible Data Champions prior to the issue of our final Q3 report, and provides the basis for a work plan and schedule to be agreed with NR. The recommendations are numbered 2010.1.1, 4.1, etc. to reflect the current year and the relevant KPI numbers.

Table 7.1: Combined Recommendations

No.	Recommendation to NR	Location in Text	NR Data Champions	Due Date
2010.1.1	NR should ensure that planned future automation of currently manual management and transfer of data from SMIS to the SEAR does not degrade or abolish the existing level or standards of check/verification.	Section 3.4.2	Rod Reid	July 2010
2010.1.2	NR and RSSB should clarify the status and ownership of the SMIS Event Matrix to ensure there is no dubiety over responsibility for maintaining and updating this important document.	Section 3.3.1.2	Rod Reid	May 2010
2010.1.3	NR should confirm that the current arrangements for protecting the integrity, consistency and veracity of externally sourced data such as passenger km and contractor hours are adequate and that no additional safeguards are necessary.	Section 3.3.2	Rod Reid	May 2010
2010.1.4	NR should correct the normalising anomaly in the instructions for compilation of the Cat A SPAD 20+ KPI and ensure the level crossing misuse instructions reflect the separate capture of child fatalities.	Sections 3.1.3.4, 3.1.3.3	Rod Reid	March 2010
2010.1.5	NR should implement the formal checks of SMIS data in accordance with the line standard.	Section 3.3.1.2	Charlotte Kingdon	February 2010
2010.4.1	Put in place a procedure for each KPI detailing what data is to be collected and where it should be sourced from. At a minimum each should contain: • Definitions • Data source • Verification and check arrangements	Sections 4.5, 4.6	Tony Roberts	March 2010
2010.4.3	Review transitional risks posed to the KPI production process and develop mitigation plans: • Managing staffing changes both in teams supplying data and in the 7 Day Railway Programme team • Addressing system changes, such as to ITPS from Trainplan. A new data source for measuring WTT Weekend Compliance based on ITPS data will need to be implemented	Sections 4.5, 4.6	Neil Henry	January 2010
2010.4.5	Put in place a plan to automate the collection of S4CS and other manually-collected and –collated data. This should identify opportunities and set out a path to achievement.	Section 4.5.1	Neil Henry	March 2010
2010.NCR.1	ORR and NR to discuss ORR's requirements for asset reporting.	Section 5.4	Mary Jordan	March 2010
2010.NCR.2	Correct minor documentation/highlighting and formatting issues in ICR spreadsheets	Section 5.3.3	Mary Jordan	March 2010

Appendix A

Glossary of Terms

A1 Glossary of Terms

AFR	-	**Accident Frequency Rate**
ATOC	-	**Association of Train Operating Companies**
BTP	-	**British Transport Police**
FWIR	-	**Fatalities and Weighted Injuries Rate**
HRMS	-	**Human Resource Management System**
ICR	-	**Infrastructure Condition Report**
LENNON	-	**Latest Earnings Networked Nationally Over Night**
NCR	-	**Network Condition Report**
NERT	-	**National Engineering Reporting Team**
PIM	-	**Precursor Indicator Model**
PSI	-	**Passenger Safety Indicator**
RGS	-	**Railway Group Standard**
SEAR	-	**Safety and Environment Assurance Report**
SID	-	**Safety Information Database**
SMIS	-	**Safety Management Information System**
SPAD	-	**Signal Passed at Danger**
SRM	-	**Safety Risk Model**

Appendix B

Details of ICR/NCR Checks

B1 Import of Source Data

Data Source	Workbook	Worksheet Name	Description	Checks Conducted	Findings
1.	Broken Rail Information.xls	Broken Rail Summary	Contains recorded broken rail data	None - raw data	
		ICR	Summation of the data from the Broken Rail summary sheet.	i. A pivot table was used to check the array formulae used for the summation. ii. A comparison of the spreadsheet output was conducted against the data in the ICR database.	No Errors
2.	Earthworks Failures P09 Revised.xls	DataSheet	Contains recorded data	None - raw data	
		prenonSetan	Contains recorded data	None - raw data	
		ICR stats	The output used for the ICR Database. Values here sum data from the above two sheets	Checks were carried out using filters on the 'Datasheet' worksheet and compared against values calculated on the 'ICR stats'.	No Errors
3.	PSS Pd07Oct20ICRetc Report.xls (Train Performance data)	incidents	Train incidents	Compared with data from ICR Database, using the Train Incident Nos (760) button.	No Errors
		delays	Delay minutes for the incidents above	Compared with data from ICR Database, using the Train Delay Minutes (760) button)	No Errors
		sigfail	Signalling incidents	Compared with data from ICR Database, using the Signalling Incidents (40) button	No Errors
		Sigfail10	Signalling incidents with more than 10 mins of delay	Compared with data from ICR Database, using the 10+ Signalling Incidents (40) button	No Errors
		tel10	Tele incidents	Compared with data from ICR Database, using the 10+ Tele Incidents (40) button.	No Errors

Data Source	Workbook	Worksheet Name	Description	Checks Conducted	Findings
4.	TGbyICM07y16.xls	ICR	Track Geometry by route classification. This is a summary sheet with calculated values ready for the ICR Database	Compared with data from ICR Database, using the Track Geom Class (117) button	No Errors
	TGR07y16.xls	ICR	Track Geometry output. This is a summary sheet with calculated values ready for the ICR Database	Compared with data from ICR Database, using the Track Geom ASIR (25) button and Track Geom IMDM (527)	No Errors

B2 Outputs to ICR

ICR	Workbook	Worksheet Name	Description	Checks Conducted	Findings
1.	Part1ICR Pd07_2009_10.xls	Delay Incidents	Number of train delaying infrastructure incidents	i. Samples of metric were manually looked up, using crtl+Find, from 'CALC' sheet to check for correct cell referencing and metric names. ii. Checked for continuity of cell references across the columns iii. Chart values were observed and compared against tables.	No Errors
		Delay Minutes	Infrastructure train delays	Same as above	No Errors
		01P Track	Primary Track Indicator	Same as above	No Errors
		02S Track	Secondary Track Indicator	Same as above	No Errors
		03R Track	Rural Track Indicator	Same as above	No Errors
		Track 1an	Poor Track Geometry	Same as above	No Errors
		Track 1bn	Poor Track Geometry - S&C	Same as above	No Errors
		Track 1cn	Good Track Geometry	Same as above	No Errors
		Track 2an	Track Geometry Faults	Same as above	No Errors
		Track 2bn	Track Geometry Faults for line speeds over 40mph	Same as above	No Errors
		Track 4n	Percentage of track exceeding the Maximum standard deviation values	Same as above	No Errors
		Track 8	Broken Rails	Same as above	No Errors
		Track 9a	Isolated Rail Defects	Same as above	No Errors
		Track 9b	Continuous Rail Defects	Same as above	No Errors
		Track 10	Track Related Derailments	Same as above	i. Conditional formatting missing for the table 'ALL Lines' ii. The Y/N input for the National Status indicators is not documented. This is a minor issue, but affects

ICR	Workbook	Worksheet Name	Description	Checks Conducted	Findings
					chart captions,
		Track 11	Track Buckles	Same as above	No Errors
		Track 13	Points Failures	Same as above	No Errors
		CALC	Stores data imported form the Database	Compared with Output from ICRetcDATASTORE	No Errors
		Civils 2c	Structures subject to additional inspections	i. Samples of metric were manually looked up, using crtl+Find, from 'CALC' sheet to check for correct cell referencing and metric names. ii. Checked for continuity of cells reference across the columns iii. Chart values were observed and compared against tables.	No Errors
2.	Part2ICR Pd07_2009_10.xls	Civils 4	Number of Earthworks Failures	Same as above	No Errors
		Civils 5a	Structures Related Temporary Speed Restrictions	Same as above	The Y/N input for the National Status indicators is not documented.
		Civils 5b	Earthworks Related Temporary Speed Restrictions	Same as above	The Y/N input for the National Status indicators is not documented.
		Civils 5c	Number (accumulating) of sites with imposed TSR/ESR for a duration of 4 weeks or more	Same as above	No Errors
		Civils 5d	Year-to-date Number (accumulating) of sites with a TSR/ESR imposed.	Same as above	No Errors
		Signal 2a	Signalling Failures causing train delay	Same as above	The Y/N input for the National Status indicators is not documented.
		Signal 2b	Number of TRUST incidents for 18 specific delay codes	Same as above	The Y/N input for the National Status indicators is not documented.

ICR	Workbook	Worksheet Name	Description	Checks Conducted	Findings
		Signal 3	Number of Track Circuit Faults	Same as above	The Y/N input for the National Status indicators is not documented.
		Signal 4	Number of Cat B SPADs	Same as above	The Y/N input for the National Status indicators is not documented.
		Signal 5a	Cumulative number of signalling failures with a hazard rating of 20 and above	Same as above	The Y/N input for the National Status indicators is not documented.
		Signal 5b	Number of signalling failures with a hazard rating of 20 and above	Same as above	The Y/N input for the National Status indicators is not documented.
		Signal 5c	Number of signalling failures with a hazard rating of 50 and above	Same as above	The Y/N input for the National Status indicators is not documented.
		E&P6	Traction Power Supply Incidents causing substantial Train Delay	Same as above	No Errors
		E&P4	Number of ORR Reportable Incidents accruing greater than 500 minutes delay.	Same as above	No Errors
		E&P5	Number of Incidents accruing greater than 500 minutes delay.	Same as above	The Y/N input for the National Status indicators is not documented.
		Telecom 4	Number of telecoms failures with a hazard rating of 20 and above	Same as above	The Y/N input for the National Status indicators is not documented.
		Telecom 6	Number of TRUST incidents for specific delay codes	Same as above	The Y/N input for the National Status indicators is not documented.

B3 Outputs to NCR

NCR	Workbook	Worksheet Name	Description	Checks Conducted	Findings
1.	Network Condition Report - 2009-10 Period 07.xls	Country Track Geometry	Rail top and track alignment profiles (Regulatory Measure M3)	i. Samples of metric are manually looked up, using crtl+Find, from 'data' sheet to check for correct cell referencing and metric names. ii. Check for continuity of cells reference across the columns compared against tables.	No Errors
		Route Super Reds	Percentage of eighths miles containing Super Red track geometry	Same as above	No Errors
		Country Super Reds	Chart	Same as above	No Errors
		Route L2s	Number of L2 exceedences (Top, Line, 3 metre Twist and Gauge) per track mile (Regulatory Measure M5)	Same as above	No Errors
		Country L2s	Chart - Number of L2 Exceedences per Track Mile	Same as above	No Errors
		Defective Rails - Isolated	Number of isolated rail defects discovered in Network Rail's running lines	Same as above	No Errors
		Defective Rails - Continuous	Length of Continuous rail defects discovered in Network Rail's running lines	Same as above	No Errors
		Route Broken Rails	Number of Broken Rails	Same as above	No Errors
		Network Broken Rails	Chart	Same as above	No Errors
		Derailments	Number of Derailments	Same as above	No Errors
		All Signal Failures	Signalling Failures Causing Train Delays	Same as above	No Errors
		All Signal Failures >10mins	Signalling Failures Causing Train Delays over 10 mins	Same as above	No Errors

		Higher Risk Signalling Failures	Failures with a hazard rating of 20 or more	Same as above	No Errors
		Traction Failures > 500 mins	Incidents causing delays in excess of 500 minutes	Same as above	No Errors
		Infrastructure Incidents	Cumulative incidents causing delays	Same as above	No Errors
		Asset Stewardship Indices	CP3 Network Asset Stewardship Incentive Index	Same as above	No Errors
		data	Data imported from the ICRetcDATASTORE	Compared with data exported from the 'NCR routes (366)' Query.	No Errors